The Annual Report of International Seabuckthorn Development for the Year of 2024

国际沙棘发展报告（2024 年度）

International Seabuckthorn Association (ISA)
Management Center for Seabuckthorn Development
Ministry of Water Resources, CHINA

In December of 2025

国际沙棘协会
水利部沙棘开发管理中心

2025 年 12 月

The Editing Committee

Published by: The Secretariat of International Seabuckthorn Association

Address: Jia 1, Fuxinglu, Haidian District, Beijing 100038, the People's Republic China

Telephone: 86–10–63204364

Website: www.isahome.net

Email: isahome@126.com

编辑委员会

编　　印：国际沙棘协会秘书处

地　　址：北京市海淀区复兴路甲一号院

邮　　编：100038

官　　网：http://www.isahome.net

联系电话：86–10–63204364

电子信箱：isahome@126.com

Notes to the publication The *Annual Report of International Seabuckthorn Development* (the 2025 Edition)

This report is published by ISA on behalf of the Editing Committee for ***The Annual Report of International Seabuckthorn Development.*** The list of ISA Board/SCISA members and partners can be found on the following website: *www.isahome.net.*

By using the content of this publication, the users accept to be bound by the terms of use of ***The Annual Report of International Seabuckthorn Development.*** For the use of any material not clearly identified as belonging to ISA, prior permission shall be requested from the copyright owner.

The designations employed and the presentation of material throughout this publication do not imply the expression of any opinion whatsoever on the part of ISA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Similarly, boundaries and names shown and the designation used on the maps do not imply official endorsement or acceptance by the ISA. The ideas and opinions expressed in this publication are those of the authors; they are not necessarily those of ISA and do not commit the Association. The contents were contributed by ISA Board /SCISA Members and Partners, and others on the title pages of the chapters therein. ISA and the Editing Committees are not responsible for errors in the content provided or for discrepancies in data and content between contributed chapters. The Editing Committee provided the opportunity for individuals to be listed as authors and contributors or to be acknowledged in this publication. The Editing Committee is not responsible for any omissions in this regard.

目录 Contents

Preface

Seabuckthorn is a multi-purposes plant known as *Hippophae* in Latin name, Seabuckthorn in English, Shaji in Chinese, Облепиха in Russian, Sanddorn in German, Argousier in French, Espina de Mar in Spanish, Rokitnik zwyczajny in Polish, Tyrni in Finnish, Havtorn in Swedish and Tsestallu/Charma/Bardiphal in India respectively.

International Seabuckthorn Association (ISA) with the Headquarter in Beijing, China, is an academic and industry-based international non-governmental and non-profit organization that is voluntarily formed by enterprises, institutions, individuals and other organizations which are active in the research and development of seabuckthorn around the world. The purpose of the ISA is to give full play to the role of seabuckthorn in facilitating environmental protection, economic development and human health, promote exchanges and global cooperation in seabuckthorn cultivation, scientific research, production, economy and trade, personnel, information, etc., and provide international communication service of seabuckthorn to ISA members and all sectors of the society.

ISA has the following scope of activities:

1. Give play to the self-discipline role of the seabuckthorn industry, formulate industry regulations, standardize industry behaviors, and promote the development of the industry;
2. Investigate and research the developmental dynamics and trends of seabuckthorn at home and abroad, and provide consulting services for the construction and development of seabuckthorn;
3. Undertake international exchange and cooperation projects entrusted or funded by government agencies and other organizations;
4. Build international seabuckthorn information network and database, and promote international exchanges and cooperation of seabuckthorn;
5. In accordance with relevant provisions, edit and publish professional publications, and expand the popularity and publicity of seabuckthorn knowledge;
6. Organize and host exchange activities such as seabuckthorn

academic seminars at home and abroad;
7. Carry out personnel training and exchange visits in the field of seabuckthorn.

For the purpose of information exchange, data sharing among member countries and to improve attraction globally, it is the responsibility and work plan of ISA Secretariat to publish ***The Annual Report of International Seabuckthorn Development.*** We fully understand that Country Report of Seabuckthorn Development in the Year of 2024 is the important basic materials. The members of Board/Scientific Committee of ISA are requested to provide with national-wide statistical information in 7 aspects listed in Appendix as in detail as possible. And then kindly submit the document in English and/or in Chinese to Mr. Zhang Bin, Deputy Secretary General of ISA, by email of isahome@126.com.

By October of 2025, we have received the Country Report of China, Finland, India, Mongolia and Poland respectively. All these reports have been translated into Chinese or English for further bilingual printing with assistance from the Board and Scientific Committee of ISA.

According to the uncompleted statistics, by the end of 2024, seabuckthorn was found in 55 countries of Europe, Asia, South Afica, North America and South America. The global seabuckthorn resource was around 2,638,600 ha (with yearly increase of 78,600 ha in 2024), including 2,325,300 ha in China.

This Report was financially supported by Ministry of Water Resources, the People's Republic of China with joint technical supports from Gansu Agricultural University, Dalian Minzu University and Shanxi Academy of Forestry and Grassland Sciences .

We are looking forward to the better ISA operation and global seabuckthorn development.

The Editing Committee

序 言

沙棘是一种广泛分布在欧亚大陆温带地区的多功能植物资源，在中国西北、华北地区又名：醋柳、酸刺、黑刺、酸溜溜、圪针。其拉丁文：*Hippophae*，英语：Seabuckthorn，俄语：Облепиха，德语：Sanddorn，法语 :Argousier，波兰语 Rokitnik zwyczajny，西班牙语 : Espina de Mar，芬兰语 :Tyrni，瑞典语：Havtorn。在印度不同地区分别称为 : Tsestallu, Chharma, Bardiphal。

国际沙棘协会于 1999 年由中国水利部沙棘开发管理中心联合世界各国沙棘专家共同发起，在 2001 年印度会议上同意成立。2011 年 9 月，经国务院批准、民政部注册登记，成为第 27 家总部设在中国的国际组织，其业务主管单位为中华人民共和国水利部。协会由会员代表大会、理事会、专业委员会、秘书处四级组织管理机构组成，秘书处挂靠在沙棘中心。协会理事会成员由全球主要沙棘国家的代表组成，技术委员会成员由世界各国的知名沙棘专家组成。

协会的目标和宗旨是全面发挥沙棘在促进环境保护、经济发展及人类健康等方面的作用，推进中国与世界各国在沙棘种植、科研、生产、经贸以及人员和信息等方面的交流与合作，为会员和社会各界提供沙棘领域的国际交流服务。

协会主要职能是：

一、发挥沙棘行业自律作用，制定行业规章，规范行业行为，推动行业发展；

二、调查研究国内外沙棘发展动态和趋势，提供沙棘建设与开发咨询服务，组织举办全国性、国际性学术会议；

三、承办政府机构等组织委托或资助的国际交流与合作项目，组织举办沙棘专业技术培训和专题考察；

四、建设国际沙棘信息网络和资料库，促进国际沙棘交流与合作；

五、编辑出版专业刊物，加大沙棘知识的普及和宣传力度。

为加强国际沙棘协会各成员之间的信息交流，分享世界各国沙棘发展成功经验，国际沙棘协会秘书处成立了《国际沙棘发展报告》专门工作组，组织邀请了国际知名沙棘专家撰写其所在国家的2024年度沙棘发展报告。截止2025年10月，我们收到来自中国、芬兰、印度、蒙古和波兰等国家的报告，并组织翻译成中文（或英文）。现将上述5个国家的报告汇编成《国际沙棘发展报告》，用中英文双语出版。

据不完全统计，截止 2024 年底，沙棘植物分布在全球 55 个国家，总面积约 2,638,600 公顷（约合 3958 万亩），比上一年增加约 78,600 公顷（约合 118 万亩）。其中，中国约 2,325,300 公顷（约合 3488 万亩），其他国家约 313,300 公顷（约合 470 万亩）。

本报告得到水利部有关司局的大力支持，得到甘肃农业大学、大连民族大学、山西省林业和草原科学研究院等单位的技术帮助。

祝愿国际沙棘协会及全球沙棘事业更好更快发展！

《国际沙棘发展报告》编委会

2025 年 12 月

Appendix:

The Recommended Format/Framework for ISA Member Country Report of Seabuckthorn Development in the Year of 2024

1. The national-wide seabuckthorn resources of plantations and berry yield.

1.1. The total area of seabuckthorn resources up to the year of 2024 including the natural stands and the artificial plantations, and the increased areas in the year of 2024.

1.2. The harvested and the estimated amounts of total production of seabuckthorn berries in your country in the year of 2024.

1.3. A brief introduction of main seabuckthorn plantations in your country.

2. The genetic resources of seabuckthorn in your country

2.1 Introduction of natural seabuckthorn species and subspecies of *Hippophae*.

2.2. Names of newly bred seabuckthorn varieties and introduced cultivars from other countries and their performance including morphological/biochemical features.

3. Enterprises and processing

3.1. In the year of 2024, the number of seabuckthorn enterprises, the gross output and the total value of seabuckthorn products in your country.

3.2. A brief introduction of main enterprises and their main products of seabuckthorn.

4. Scientific research

4.1 The status of seabuckthorn scientific institution in your country in terms of the number of institutes and their scientists, and their research field.

4.2. A brief introduction of main research institutes/universities and enterprises, the main research programs and updated achievements on seabuckthorn.

5. Human resources

5.1. The total personnel involved in seabuckthorn research, manufacturing, marketing planting, public management, etc. in your country.

5.2. The members of National Seabuckthorn Association if provided, including institutional and individual members.

5.3. A brief introduction of successful institutional members of seabuckthorn Association if provided.

6. Introduction of important activities, key events, successful stories and advanced persons in your country in the year of 2024.

7. The policies, documents related with seabuckthorn and research papers in the year of 2024 in your country.

附 录

2024 年度国家沙棘发展报告编写框架

1. 全国沙棘资源总面积（含天然林和人工种植、工业原料种植园）、当年果实总产量及采收量。主要种植区（种植工程、种植园）简要介绍。

2. 全国沙棘加工企业总数、总产量、总产值。主要生产企业及产品简要介绍。

3. 全国沙棘科学研究情况（研究人员、研究领域、主要成果），重点研究单位（大学、研究所、企业）简要介绍。

4. 全国沙棘从业人员情况，协会会员总数（集体会员、个人会员）。先进人物简要介绍。

5. 当年全国有关沙棘的重要活动、事项简要介绍。

6. 当年本国有关沙棘的主要政策文件、发表的研究论文等。

1. Country report of China

中国沙棘发展报告

Drafted by:

(Henry) LU Shunguang, Deputy Director General, Management Center for Seabuckthorn
Development, Ministry of Water Resource, CHINA
Secretary General, International Seabuckthorn Association (ISA)
GAO Yan, Division Chief, Mamagement Center for Seabuckyhorn Development, Ministry of Water Resources, PR China
XIA Jingfang, Deputy Secretary General, International Seabuckthorn Association
LIANG Yue, Deputy Division Chief, Mamagement Center for Seabuckyhorn Development, Ministry of Water Resources, PR China
LU Jian, Chairman of Chinese Enterprise Committee, International Seabuckthorn Association
ZHANG Bin, Deputy Secretary General, International Seabuckthorn Association
MA Yuan, Engineer, Mamagement Center for Seabuckyhorn Development, Ministry of Water Resources, PR China
ZHANG Changwang, Deputy Secretary General, Chinese Enterprise Committee of International Seabuckthorn Association
YANG Liu, Deputy Secretary General, Chinese Enterprise Committee of International Seabuckthorn Association

撰稿人：

撰　稿：国际沙棘协会秘书处
卢顺光 （国际沙棘协会理事兼秘书长）
高　岩 （水利部沙棘开发管理中心处长）
夏静芳 （国际沙棘协会理事兼副秘书长）
梁　月 （水利部沙棘开发管理中心副处长）
卢　健 （国际沙棘协会（中国）企业委员会会长）
张　滨 （国际沙棘协会副秘书长）
马　原 （水利部沙棘开发管理中心工程师）
张长旺　国际沙棘协会（中国）企业委员会副秘书长
杨　柳　国际沙棘协会（中国）企业委员会副秘书长

Seabuckthorn Development of China in 2024

2024 年中国沙棘发展报告

Management Center for Seabuckthorn Development, Ministry of Water Resource
Secretariat of International Seabuckthorn Association (ISA)
水利部沙棘开发管理中心
国际沙棘协会秘书处

1. Seabuckthorn Resource Situation in China

1.1 Resource Area and Distribution

China has the richest and largest area seabuckthron natural stands and plantations. By the end of 2024, there were a total of 2,325,333 ha (34,880,000 mu) of seabuckthron resources nationwide, accounting for 90% of the global resources (2,638,000 ha).

In 2024, the increased area of artificial seabuckthron plantations in China was about 70,667 ha (1,060,000 mu), including 21,000 ha (315,000 mu) for ecological purposes and 50,333 ha ((755,000 mu) for economic purposes. The provinces with the largest number of new artificial forests were the Inner Mongolia Autonomous Region and the Xinjiang Uygur Autonomous Region. Nationally, there were 720,000 ha (10,800,000 mu) of natural seabuckthron forests, basically the same as in 2023. The increased area of seabuckthron forests in 2024 was about 17,333 ha (260,000 mu) more than that in 2023.

In China, seabuckthron is naturally distributed and artificially cultivated in 17 provinces (or autonomous regions or municipalities), such as Beijing, Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Shangdong, Henan, Sichuan, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. (As shown in Table 1)

一、全国沙棘资源情况

（一）资源面积与分布

中国是世界上天然沙棘林和人工种植沙棘林面积最大的国家。截止 2024 年 12 月，全国沙棘资源总面积约 3488 万亩，占世界沙棘资源总面积 3958 万亩（263.8 公顷）的 90%。

2024 年全国新增 106 万亩人工沙棘林，其中人工生态林 31.5 万亩，经济林 75.5 万亩，新增人工林最多的省份为内蒙古自治区和新疆维吾尔自治区。全国天然沙棘林 1080 万亩，与 2023 年基本持平。2024 年沙棘林增长面积较 2023 年增加约 26 万亩。

目前全国 17 个省、自治区、直辖市（北京市、河北省、山西省、内蒙古自治区、辽宁省、吉林省、黑龙江省、山东省河南省、四川省、云南省、西藏自治区、陕西省、甘肃省、青海省、宁夏回族自治州区、新疆维吾尔自治区）有沙棘天然林分布或人工种植沙棘。（见表 1）

Table 1. Existing seabuckthron resource area in major provinces of China in 2024 (unit: 10,000 mu)
表 1. 2024 年中国主要省现有沙棘资源面积 (单位：万亩)

产区 Province	截至 2024 年底 Up to end of 2024	2024 年新增沙棘生态林 New SBT for ecological purpose in 2024	2024 年新增沙棘经济林 New SBT for economic purpose in 2024
河北省 Hebei	146	2	8
山西省 Shanxi	611	3	7
内蒙古自治区 Inner Mongolia	680	10	15
辽宁省 Liaoning	105	2	3
吉林省 Jilin	37	1	6
黑龙江省 Heilongjiang	73	1	5
四川省 Sichuan	67	0	1
云南省 Yunnan	11	0.5	0.5
西藏 Xizang	151	3	3
陕西省 Shanxi	388	2	6
甘肃省 Gansu	501	3	1
青海省 Qinghai	472	1	4
宁夏回族自治区 Ningxia	100	1	2
新疆维吾尔自治区 Xinjiang	138	2	14
其他地区 Other provinces	8	0	0
合计 in total	3488	31.5	75.5

1.2 Fruit Yield of Seabuckthorn

Natural Forests: In 2024, the harvest results of wild seabuckthron ((*Hippophae rhamnoides ssp.* Sinensis, *Hippophae rhamnoides ssp.* Mongolica, etc.) in China were basically the same as those in 2023. Due to the destructive harvesting in recent years, the yield of wild seabuckthron in Shanxi Province, Hebei Province, Inner Mongolia Autonomous Region, Shaanxi Province and other places has significantly decreased, especially in Shanxi Province.

Overall, among seabuckthron resources, the area of ecological forests is significantly larger than that of economic forests. Most wild seabuckthron resources lack centralized management, and the harvesting methods are rather crude. The competitive harvesting of unripe fruits has resulted in a gradual annual decrease in the yield of wild seabuckthron fruits. Without government intervention, wild seabuckthron will fall in an awkward situation where there are no fruits to harvest, which will pose a severe challenge to enterprises that primarily process wild seabuckthron fruits.

Plantations: Based on the 2024 national harvest data for seabuckthron plantations, due to the increase in the planting area and the acreage reaching the peak fruiting age, as well as the advantages of artificial management and protection, the fruit yield of plantations increased by approximately 15% compared to 2023. Among them, large - fruited seabuckthron is the main variety, with only a small number of economic forests growing *Hippophae rhamnoides* subsp. sinensis (also known as small - fruited seabuckthron). However, since 2023, the planting area of seabuckthron economic plantations in China has been increasing, mainly due to the high - yield seabuckthron varieties selected through improvement or hybridization by the International Sea - buckthorn Association and related nursery bases. Among them, the "Yulu" variety developed by Chengde Yuhangren in Hebei and the "Changbaishan" variety in Jiaohe, Jilin are the most

（二）沙棘果实产量

天然林： 2024 年全国野生沙棘（中国沙棘亚种、蒙古沙棘亚种等）结果情况与 2023 年基本持平，受最近几年破坏性采收的影响，山西省、河北省、内蒙古自治区、陕西省等地大量野生沙棘大量减产，山西减产尤为严重。

沙棘资源从总体来看是生态林多，经济林少，野生资源大多没有形成集中管理，采收也比较粗放，竞争性采收未成熟果品，已经形成了野生沙棘果逐年减产的态势，如果没有政府干预，野生沙棘果就会陷入无果可采的尴尬境地，到时对于以野生沙棘果加工为主的企业将是一个严峻的考验。

人工林： 从 2024 年全国人工沙棘林结果情况看，受种植面积和达盛果期面积增加，以及人工管护的优势发挥，人工林产果量较 2023 年增加 15% 左右。其中以大果沙棘为主，仅有少量的中国沙棘（小果沙棘）经济林。 但是从 2023 年开始，中国沙棘经济林种植面积开始增加，主要得益于国际沙棘协会及相关育苗基地培育出丰产的优良选育或杂交沙棘品种，其中以河北承德宇航人“宇璐”品种、吉林蛟河“长白山”等品种最为丰产，已经开始向主要沙棘种植区普及，预计小果经济林种植面积会以每

productive and have begun to be popularized in major sea - buckthorn planting areas.

It is expected that the planting area of small - fruit economic plantations will increase at a rate of 20% - 50% per year. In 2024, newly added seabuckthron economic and ecological plantations were mainly small - fruit seabuckthron, accounting for over 80% of the increase.In 2024, it is estimated that the total yield of fresh seabuckthron fruit in China was 600,000 - 700,000 tons. The harvestable amount was approximately 300,000 - 350,000 tons. The actual amount harvested, processed, and utilized was about 200,000 - 250,000 tons, and the actual harvest rate was 25% - 30%. Among them, the fruit storage capacity of *Hippophae rhamnoides* subsp. sinensis (small - fruited seabuckthron) was between 300,000 and 500,000 tons, and about 150,000 - 200,000 tons could be harvested. The actual amount harvested and processed for utilization was about 80,000 tons. The harvestable amount of large - fruited seabuckthron fresh fruits was 180,000 to 200,000 tons, and the actual harvested amount was 100,000 - 150,000 tons.

1.3 Seabuckthorn germplasm resources

Seabuckthorn is found in 55 countries around the world. China boasts the most abundant natural seabuckthron germplasm resources globally. According to the classification by Professor LIAN Yongshan, a Chinese taxonomic scientist, there are 6 species and 12 subspecies of seabuckthron worldwide. Among them, 6 species and 8 subspecies are distributed in China, namely:
Hippophae rhamnoides
Hippophae rhamnoides ssp. sinensis
Hippophae rhamnoides ssp. yunnanensis
Hippophae rhamnoides ssp. turkestanica
Hippophae rhamnoides ssp. mongonica
Hippophae salicifolia
Hippophae tibetana
Hippophae gyantsensis
Hippophae neurocarpa
Hippophae neurocarpa ssp. stellatopilosa

年 20% – 50% 的速度增加。2024 年新增沙棘经济林、生态林主要以小果沙棘为主，占到了增量的 80% 以上。

据估算，2024 年全国沙棘鲜果总产 60 万 – 70 万吨，可采收约 30 万 – 35 万吨之间，实际采收加工利用约 20 万 – 25 万吨，实际采收率为 25% – 30%。其中中国沙棘亚种（小果沙棘）果实储存量在 30 万 –50 万吨之间，可采收约 15 万 – 20 万吨，实际采收加工利用约 8 万吨左右。大果沙棘的鲜果可采收量 18 万 –20 万吨，实际采收 10– 15 万吨。

（三）沙棘种质资源情况

全球约有 55 个国家有沙棘分布。中国是世界上天然沙棘种质资源最丰富的国家。按照我国沙棘植物学家廉永善的分类方法，沙棘属植物分为 6 个种 12 个亚种，其中在中国分布有 6 个种 8 个亚种，分别是鼠李沙棘（种），柳叶沙棘（种），西藏沙棘（种），江孜沙棘（种），肋果沙棘（种），棱果沙棘（种），中国沙棘（亚种），云南沙棘（亚种），蒙古沙棘（亚种），中亚沙棘（亚种），肋果沙棘（亚种），理塘沙棘（亚种），棱果沙棘（亚种）。

Hippophae neurocarpa ssp. neurocarpa
Hippophae goniocarpa
Hippophae goniocarpa ssp. litangensis
*Hippophae goniocarpa ssp.*goniocarpa

Currently, China has introduced excellent seabuckthron varieties from countries such as Mongolia, Russia, Germany, and Finland. These varieties are characterized by large fruits, high oil content in seeds, and having no or few thorns on the branches, which facilitates harvesting and processing.

In Dengkou County of Inner Mongolia, China, a national-level seabuckthron genetic resource bank covering 1,000 mu (approximately 66.7 hectares) has been established. It is recognized as the country's largest seabuckthron germplasm repository. This core breeding experimental site holds the "three top-tier" distinctions: the most extensive variety collection, the highest quality standards, and the most comprehensive preservation of seabuckthron cultivars. The repository currently preserves 779 germplasm resources, including 511 seed samples and 268 ex situ preserved germplasm resources from seabuckthron, poplar, and desert-adapted plants.

2. National Processing Status of Seabuckthorn Products

2.1 Number and Distribution of Enterprises

The Chinese seabuckthron industry started in the 1980s and has been in rapid development since the early 21st century. In recent years, high-tech seabuckthron products have continued to emerge. This marks that the development of China's seabuckthron industrialization has entered a new historical stage. It also indicates that China has reached an internationally leading level in the field of seabuckthron research, development, and utilization. China currently leads the world in the development and application of seabuckthron products. Its offerings cover eight major categories and over 200 varieties across food, pharmaceuticals, health supplements, and cosmetics.The primary seabuckthron extracts

目前，我国先后从蒙古、俄罗斯、德国、芬兰等国引进了优良沙棘品种，其特点是果实大，种子含油量高、枝条无刺或者少刺，方便采摘和加工。

在我国内蒙古磴口县，设立了一个面积达 1000 亩的，全国最大的沙棘国家级林木种质资源库，它也是全国沙棘良种品种最多、质量最好、保存最全的“三最”沙棘核心育种实验点。沙棘国家林木种质资源库共收集保存种质资源 779 份，其中种子资源 511 份，异地保存沙棘、杨树及沙旱生植物种质资源 268 份。

二、全国沙棘产品加工情况

（一）企业数量与分布

我国的沙棘产业起步于 20 世纪 80 年代中后期，在 21 世纪初开始快速发展。近年来沙棘高科技产品不断出现，标志着我国沙棘产业化的发展进入了新的历史阶段，同时说明我国在沙棘研究和开发利用领域已处于国际领先水平。

我国是目前开发应用沙棘产品最多的国家，其产品涵盖了食品、药品、保健品、化妆品等 8 大类 200 多个品种。国内外市场上的沙棘提取物主要为沙棘籽油、沙棘果油、沙棘果粉、原花青素、沙棘黄酮、沙棘膳食纤维等。沙棘籽

available in domestic and international markets include seed oil, fruit oil, fruit powder, proanthocyanidins, flavonoids, and dietary fiber. As key intermediates and raw materials for pharmaceuticals, cosmetics, and functional foods, seabuckthron seed oil and fruit oil have extensive applications and immense market potential.The demand for various natural extracts and juices, such as concentrated seabuckthron juice, fruit powder, seabuckthron oil, and flavonoids, has surged exponentially. Leading global brands such as Nestlé, Procter & Gamble, Yangshengtang, and Tianjin Tianshi have all launched or developed multiple seabuckthron - based products.

油和果油作为药品、化妆品、功能食品的中间体和原辅料，应用领域广阔、市场潜力巨大。对各种天然沙棘提取物和果汁，如沙棘汁浓缩汁、沙棘果粉、沙棘油、沙棘黄酮等的需求成倍增长，一些国内外知名企业如美国雀巢公司、宝洁公司、养生堂、天津天狮等都已推出或开发了多个沙棘相关产品。

After nearly 40 years of development, there are more than 7,000 seabuckthron processing enterprises in China, representing an increase of about 10% compared with 2023. The industry's annual output value reached approximately 30 billion yuan in 2024. This growth reflects the sector's transition from extensive expansion to high - quality development, driven by policy incentives, consumption upgrades, and technological breakthroughs. Future competition will focus on branding, standardization, and internationalization. To thrive, companies must address challenges through innovation and collaboration while seizing opportunities in the "Big Health" era.

经过近四十年的发展，截止到 2024 年底全国现有各类直接沙棘加工企业 7000 余家，较 2023 年增加 10% 左右。2024 年沙棘相关企业年产值达 300 亿元左右。2024 年沙棘企业数量的增长反映行业从粗放扩张向高质量发展转型，政策红利、消费升级与技术突破是核心驱动力，而未来竞争将围绕品牌化、标准化与国际化展开。企业需通过创新与协作应对挑战，把握“大健康”时代机遇。

2.2 Main products and types of seabuckthorn

（二）沙棘主要产品、产品类型

In food processing, seabuckthron serves as a versatile raw material for producing beverages and alcoholic drinks, such as fruit juice drinks, fruit wine, jam, cakes, and dairy products. In medicine and healthcare applications, it has been developed into therapeutic formulations for cardiovascular diseases, phlegm resolution, lung function enhancement, gastric care, spleen regulation, blood circulation improvement, and the treatment of burns, knife wounds, and frostbite. Seabuckthron also demonstrates unique value in light industry and other sectors. Skincare and household cleaning products have been developed to nourish the skin, promote cellular metabolism, stimulate epithelial tissue regeneration, and provide anti -

在食品加工方面，以沙棘为原料可制成多种饮料食品和酒类，如：果汁饮品、果酒、果酱、各种糕点及奶制品等；在医药保健方面，有用于治疗心脑血管系统病症、祛痰、利肺、养胃、健脾、活血化瘀、烧烫伤、刀伤及冻伤等方面的制剂；在轻工及其它方面，沙棘也显示了其独特的价值；开发了滋养皮肤、促进细胞代谢、促进上皮组织再生、具有抗过敏、抑菌、强渗透力和保护皮肤自然色泽的护肤用品及洗化用

allergic, antibacterial, and skin - penetrating properties while preserving the natural skin tone. Additionally, the hard woody branches of seabuckthron make it an ideal raw material for manufacturing construction materials like plywood (Table 2).

品；沙棘的枝干木质坚硬，可用于制作胶合板等建筑材料的原料。（详见表 2）

In recent years, the global market for seabuckthron extracts has witnessed significant growth. Key products include seabuckthron seed oil, fruit oil, powder, proanthocyanidins, flavonoids, and dietary fiber. Seabuckthorn seed oil and fruit oil are essential intermediates and raw materials in pharmaceuticals, cosmetics, and functional foods, showing vast market potential.The demand for natural extracts and juices, such as concentrated seabuckthron juice, powder, oil, and flavonoids, has increased exponentially. Leading international brands like Nestlé, Procter & Gamble, Yangshengtang, and Tianjin Tianshi have launched or developed multiple seabuckthron - based products.According to statistics, more than 200 kinds of seabuckthron - related products, such as functional food, beverage, medicine, beauty and skincare items, cleaning products, animal feed, and bait, have entered the commercial market.

近年来，国内外市场上的沙棘提取物主要为沙棘籽油、沙棘果油、沙棘果粉、原花青素、沙棘黄酮、沙棘膳食纤维等。沙棘籽油和果油作为药品、化妆品、功能食品的中间体和原辅料，应用领域广阔、市场潜力巨大。对各种天然沙棘提取物和果汁，如沙棘汁浓缩汁、沙棘果粉、沙棘油、沙棘黄酮等的需求成倍增长，一些国内外知名企业如美国雀巢公司、宝洁公司、养生堂、天津天狮等都已推出或开发了多个沙棘相关产品。据统计，目前市场上已形成销售的沙棘类相关产品有功能食品、饮料、药品、美容护肤产品、洗涤用品、饲料、饵料等八大类约 200 多种产品。

According to incomplete statistics, from 2016 to 2024, the sales revenue of seabuckthron extract products alone was 560 million yuan, 940 million yuan, 1.56 billion yuan, 2.1 billion yuan, 2.5 billion yuan, 3.1 billion yuan, 4.9 billion yuan, 5.2 billion yuan, and 5.5 billion yuan respectively. Data shows that the seabuckthron industry has experienced significant growth, and the sales revenue is expected to reach approximately 6 billion yuan by 2024.

据不完全统计，2016 年至 2024 年，仅沙棘提取物产品的销售收入分别为 5.6 亿元、9.4 亿元、15.6 亿元、21 亿元、25 亿元、31 亿、49 亿、52 亿元、55 亿元。数据显示，沙棘产业每年都有明显的增长，预计到 2024 年销售收入达到 60 亿元左右。

Table 2. The utilization of seabuckthorn in China
表 2. 沙棘应用情况

领域 Application sections	应用范围 Application scope	相关产品 Products
食品加工 Food processing	饮料、果酒、果醋、果酱、果粉、糕点、奶制品 drink,wine, vinegar, jam, powder, pastry, dairy products	沙棘醋、沙棘酒、沙棘茶、冻干粉，各种油脂的凝胶糖果、复合类食品 Seabuckthorn(SBT) vinegar, SBT wine, SBT tea，freeze-dried powder，gelatinous candies with various oils, composite food, etc.
医药保健 Healthcare	心脑血管、祛斑、润肺、健脾养胃、宫颈糜烂、外伤 Cardiovascular and cerebrovascular health, spot removal, lung moisturization, spleen and stomach tonification, cervical erosion, trauma	五味沙棘散、参芪沙棘合剂、心达康片、沙棘干乳剂，沙棘籽油栓剂等 Wuwei SBT power, SBT compounds with ginseng and jaundicen, Xin Da Kang tablets, SBT emulsion, SBT seed oil suppository, etc.
轻工业及其他方面 Light industry and other areas	化妆品、洗涤用品 cosmetic, Cleaning Products	沙棘护肤产品，沙棘日化类产品，比如肥皂、膏霜乳液、面膜、护手霜、洗面奶、护肤水、洗发液、护发素、防晒霜等 SBT skincare products and daily-use items, including soaps, creams, lotions, face masks, hand creams, facial cleansers, toners, shampoos, conditioners, and sunscreens, etc.
宠物相关 pet-related	食品及用品 Food and supplies	宠物粮 pet food

2.3 Market Development and Product Supply-Demand Analysis

Due to the special medical and health - care effects of seabuckthron products, the domestic and international markets are in short supply. In 2024, the price of seabuckthron seeds has been maintained at about 25 yuan/kg (depending on quality, impurity rate, oil content, acid value, and other factors). The dried fruits used as a medicinal herb were 70 yuan/kg. The total flavonoids extracted with a purity content of 10 - 30% were 2100 - 3500 yuan/kg. Seabuckthorn seed oil was 1000 yuan/kg. If the seed oil was capsulated, the price per kilogram was about 2000 yuan. The dried seabuckthron leaves were approximately 100,000 yuan/ton.

In 2024, the price of related raw materials of seabuckthron continued to fall. The main reasons are as follows:

2.3.1 Fluctuations in raw material supply: The harvesting of seabuckthron fruits is significantly influenced by the climate. In 2024, the high yield of

（三）市场开发与产品供求分析

由于沙棘产品具有特殊医疗保健作用，因此国内外市场供不应求。2024 年，沙棘种子的价格一直保持在 25 元 /kg 左右（根据品质、杂质率，含油率、酸价等区别）。沙棘药材干果的价格：70 元 /kg；沙棘总黄酮提取物的价格：10 – 30% 含量为 2100–3500 元 /kg；沙棘籽油：1000 元 /kg，制成沙棘油软胶囊后每公斤沙棘油的价格为 2000 元左右。沙棘干叶市场价大约 10 万元 / 吨。2024 年相关沙棘原料价格持续下跌，其主要原因是：

1. 原料供应波动：沙棘果采摘受气候影响大，

seabuckthron fruits resulted in a 20% decline in raw material prices, primarily because of the increased output from orchard-style planting of large-fruit seabuckthron.

2024 年沙棘果丰产导致原料价格下跌 20%，主要是大果沙棘果园式种植产量增加。

2.3.2 Elimination of low-end production capacity: From 2023 to 2024, approximately 10% to 13% of small workshop-style enterprises were eliminated from the market for failing to meet standardized production requirements (e.g., seabuckthorn oil purity testing).

2. 低端产能淘汰：2023–2024 年，约 10%–13% 的小型作坊式企业因无法满足标准化生产要求（如沙棘油纯度检测）被市场淘汰。

2.3.3 Ecological governance needs: Seabuckthron plays a significant role in desertification control and soil and water conservation. The government promotes the expansion of planting areas through policies such as returning farmland to forests and ecological compensation. For example, Burjin Songyuan Linguo Biotechnology Co., Ltd. has cultivated nearly 6,667 hectares (100,000 mu) of seabuckthron forests in Burqin County, Xinjiang, achieving a win - win situation for both ecological and economic benefits.

3. 生态治理需求：沙棘在荒漠化治理和水土保持中作用显著，政府通过退耕还林、生态补偿等政策推动种植面积扩大。例如新疆松源林果公司在新疆布尔津县种植近 10 万亩沙棘林丰产，形成生态与经济效益双赢。

2.3.4 Industrial Support Policies: The 2023 Central No. 1 Document clearly supports the deep processing of characteristic agricultural products, with seabuckthron included in the key development catalog. Local governments have introduced matching preferential policies such as tax reductions and subsidies to encourage the participation of planting and processing enterprises. In 2024, the seabuckthron planting area increased significantly compared with that in 2023.

4. 产业扶持政策：2023 年中央一号文件明确支持特色农产品深加工，沙棘被纳入重点发展目录，地方政府配套税收减免和补贴政策，刺激种植及加工企业入局。2024 年沙棘种植面积较 2023 年有较高增长幅度。

Based on market analysis and experts' predictions, the production of seabuckthron products in China only accounts for 1/5 of the international and domestic market demand. This shows that the market supply and demand of seabuckthron have great potential, and its demand is still increasing year by year due to the improvement of people's living conditions.The application of seabuckthron extractive compounds has also been expanding, and its functions have been recognized by more and more consumers. The demand is growing rapidly in the fields of food, functional food, cosmetics, and other industries.The

据国内市场分析和专家预测，我国生产沙棘产品仅占国际、国内市场需求量的 1/5，这说明沙棘市场供求潜力很大，随着人民生活水平的提高，其需求量还在逐年增加。沙棘提取物应用领域也不断扩大，并被广大消费者所认同，以食品、功能食品、化妆品和其他行业增长最快

proportion of the requirement for drugs has decreased due to the continuous expansion of the marketing technology of seabuckthron extract and the long time needed for application.

2.4 Development and Utilization Characteristics and Analysis

There are over 300 large-scale manufacturers specializing in seabuckthron processing nationwide, along with more than 7,000 seabuckthron-related enterprises. They have developed approximately 200 products in eight categories, including food, beverages, pharmaceutical and health care products, daily chemicals, feed, and bait, with an annual output value exceeding 28 billion yuan. Seabuckthorn products promote the rational utilization of resources, stimulate people's enthusiasm for seabuckthron planting, and create a new path for people in poor mountainous areas to escape poverty and achieve prosperity. In seabuckthron planting areas in China, farmers increase their per capita income by 200 yuan through harvesting fruits and leaves, as well as engaging in sheep and cattle breeding.

Although there are numerous enterprises in China's seabuckthron-related industries, most of them are small in scale. They have relatively low investment in research and development, production, and sales. Coupled with backward technologies, outdated equipment, and low brand awareness of their products, they have not yet formed a certain market scale or gained a market share.

In foreign trade, the main export countries of seabuckthron products are China and Russia, while the main importing countries and regions are developed ones such as the United States, Japan, the European Union, and Southeast Asia. It is reported that the annual growth rate of the seabuckthron market in countries and regions like the United States and the European Union exceeds 30%. Specifically, the annual demand for seabuckthron extracts in the U.S. market alone reaches 240 tons, but its domestic production can only meet 10% of this demand. In

而药品因沙棘提取物销售技术的不断扩大以及药品申报时间漫长而占比下降。

（四）开发利用特点与分析

全国有规模专门从事沙棘加工厂家 300 多家，有各类沙棘相关企业 7000 多家，已经开发出了食品、饮料、医药保健、日化、饲料、饵料等八大类约 200 多种产品，年产值 280 亿元以上。沙棘产品不仅促进了资源的合理利用，调动了群众种植沙棘的积极性，而且为贫困山区人民脱贫致富创出了一条新路，在我国沙棘种植区农民靠采果和叶及发展养羊、养牛，人均增收达 200 元。

虽然我国沙棘相关行业的企业众多，但这些企业一般都规模较小，用于研发、生产、销售的资金投入较少，工艺落后，设备陈旧，产品品牌知名度低，还没有形成一定的市场规模及市场占有率。

在对外贸易上，沙棘产品的出口国主要是俄罗斯和中国，进口国主要是美国、日本、欧盟、东南亚等发达国家和地区。据报道，美国、欧盟等市场年增长率在 30% 以上，仅美国市场

the Japanese market, the annual growth rate of the demand for seabuckthron extracts is over 20%. In recent years, with the large - scale entry of foreign giants into China's food and cosmetics industries, the market demand for seabuckthron extracts in China has been growing at a rate of 25% to 30%. According to incomplete statistics, the annual demand for seabuckthron seed oil and fruit oil at home and abroad has reached about 2,000 tons. The annual demand of the top 5 domestic enterprises that mainly use seabuckthron oil as raw material alone has reached nearly 200 tons per year. Currently, seabuckthron oil extracted by supercritical CO_2, with its advantages of no solvent residue and stable quality, is gradually replacing seabuckthron oil produced by traditional processes and shows a tendency to fully replace it.

Among the seabuckthron extracted products, seabuckthron seed oil and fruit oil are the most in - demand ones in the market at present, and the market supply is in shortage. Seabuckthorn fruit powder, as an additive or auxiliary material for emerging functional products, is currently being recognized and accepted by relevant industries and markets. In recent years, the market demand has been growing particularly rapidly.

3. Research and Development of Seabuckthorn

3.1 Introduction of major institutions for seabuckthron research and management in China

3.1.1 Management Center for Seabuckthorn Development, Ministry of Water Resources(MWR), P.R. China

Management Center for Seabuckthorn Development, Ministry of Water Resource (hereinafter referred to as the Seabuckthorn Center) is located at No. 1, Jia, Fuxing Road, Haidian District, Beijing. Its predecessor was the Seabuckthorn Coordination Office of the National Leading Group for Water Resources and Soil & Water Conservation (referred to as National Seabuckthorn Office), established in 1985, and was renamed as Management Center

对沙棘提取物每年需求量达 240 t，其国内产量仅能满足 10%；日本市场对沙棘提取物每年的需求量增加率为 20% 以上。近年来，我国食品、化妆品行业因国外巨头的大举进入，对沙棘提取物的市场需求量更是以 25% – 30% 的速度增长。据不完全统计，目前国内外沙棘籽油和果油的年需求量已达 2000 t 左右，仅国内主要使用沙棘油原料的前 5 名企业的需求量已达近 200t/ 年。目前超临界 CO_2 萃取的沙棘油及其无溶残、质量稳定等优点，正在逐步替代传统工艺生产的沙棘油，并有取代趋势。

沙棘提取物产品中，沙棘籽油和沙棘果油是目前市场需求最为旺盛的产品，市场处于供不应求的状态；沙棘果粉作为新兴功能产品添加剂或原辅料，目前正在被相关行业和市场所认识并接受，近年来市场需求增长尤为迅速。

三、沙棘研究与开发

（一）全国重点沙棘科研、管理机构介绍

1. 水利部沙棘开发管理中心

水利部沙棘开发管理中心（以下简称沙棘中心）坐落在北京市海淀区复兴路甲 1 号，前身是成立于 1985 年的全国水资源与水土保持工作领

for Seabuckthorn Development, Ministry of Water Resources (the Seabuckthorn Center) in 1997. The Center is responsible for the coordination and management of national seabuckthron resource development and utilization. Since 1985, the Center has been responsible for drafting 22 standards related to seabuckthron, including 8 industry standards of MWR and 14 Group Standards of International Seabuckthorn Association (ISA). And 8 national patents, 9 science and technology progress award have been achieved, including 4 provincial/ministerial awards and 5 others. The Center has edited and published 8 monographs and 4 anthologies, and approximately 150 scientific and technological papers have been published. It currently possesses 28 outstanding seabuckthron varieties, including 6 hybrid varieties, 10 introduced superior varieties, and 12 selected or bred varieties. Currently, the Seabuckthron Center has 9 full - time specialized staff members engaged in seabuckthron research and management. Among them, there are 6 Senior Research Fellows (Professor - level) and 3 Associate Senior Research Fellows.

As of 2024, in accordance with the “International Seabuckthorn Association Standard Management Measures” , three Group Standard proposals met the project initiation requirements and were formally approved. These standards include: Seabuckthorn leaf powder and technique specification for processing, Technical Regulation for Improving Quality and Efficiency of Seabuckthorn Forests and Seabuckthorn clear juice.

3.1.2 Rural Revitalization Science and Technology Institute, Heilongjiang Academy for Agricultural Science

Seabuckthorn Research Group of the Heilongjiang Academy of Agricultural Sciences was established in 1988, specializing in the collection, innovation, and utilization of seabuckthron germplasm resources, along with high-yield cultivation techniques. Over 30 years of scientific research accumulation, the Group has established the largest seabuckthron

导小组沙棘协调办公室（简称全国沙棘办），1997 年更名为水利部沙棘开发管理中心（简称沙棘中心），承担着全国沙棘资源建设、开发利用等方面的协调管理工作。1985 年以来，沙棘中心负责编制有关沙棘方面的标准 22个，其中水利部行业标准 8 个，国际沙棘协会团体标准 14 个。获得国家专利 8 项，获得各类科技进步奖 9 项，其中：省部级 4 项，其他 5 项。主编出版专著 8 部、文集 4 部； 发表科技论文约 150 篇。现有各类沙棘良种 28 个，其中杂交沙棘品种 6 个，引进沙棘良种 10 个，选育沙棘品种 12 个。目前，沙棘中心有专门从事沙棘研究和管理的专职人员 9 人，其中正高级 6 人，副高级 3 人。

2024 年，按照《国际沙棘协会标准管理办法》规定，组织制定了三项技术标准《沙棘叶粉加工技术规范 Seabuckthorn leaf powder and technique specification for processing》《沙棘林提质增效技术规程 Technical Regulation for Improving Quality and Efficiency of Seabuckthorn Forests》《沙棘清汁 Seabuckthorn clear juice》。

2. 黑龙江省农业科学院乡村振兴科技研究所

黑龙江省农业科学院沙棘课题组成立于 1988 年，专业从事沙棘种质资源搜集、创新及利用，

germplasm resource garden in Northeast China, collecting and preserving more than 200 domestic and international germplasm samples.They have independently registered and certified 6 seabuckthron cultivars and plant new varieties, and participated in the registration of 2 seabuckthron plant new varieties. Over 30 promising elite seabuckthron lines have been screened. In the field of seabuckthron research, the team has developed unique insights with research achievements reaching domestic and international leading levels, with over 50 published papers and participation in the compilation of 3 seabuckthron monographs. The Group has sequentially received 6 provincial/ministerial-level awards, 3 municipal/prefectural-level awards, and 2 awards from first-level academic societies. Notably, their collaborative project, “Genetic Improvement and Industrial Cultivation Technology Innovation of Seabuckthorn,” received a First Prize in the Liang Xi Forestry Science and Technology Progress Award. 6 excellent clonal lines of seabuckthron have been screened from the seedlings resulting from crosses between Chinese seabuckthron and Mongolian seabuckthron. These lines are predominantly mid-early maturing, featuring large, yellow or orange fruit, are thornless, and high-yielding, making them suitable for dedicated planting as raw material forests or for tourist-picking gardens. The group has also drafted 3 local standards and 3 related Group Standards. They hold 1 Utility Model Patent and 1 National Invention Patent. The Institute is the host unit for the Heilongjiang Provincial Seabuckthorn Engineering Technology Research Center.

In 2024, there are 3 ongoing research projects, including the sub - project "Screening and Demonstration of High - quality, High - efficiency Seabuckthorn Varieties (Lines)" under the National 14th Five - Year Plan Key R & D Program. To address the industrial development needs of Heilongjiang Province's seabuckthron industry, high - yield, high - resistance, and high - quality seabuckthron varieties are screened through late - maturing winter harvest, mid - early vibrating harvest, and selection of disease - resistant elite lines. This effort aims to resolve

沙棘高产栽培技术等相关研究。经过 30 余年科研积累，我们现已建成东北地区最大沙棘种质资源圃，搜集保存国内外各类沙棘种质资源 200 余份，独自登记审定沙棘品种及植物新品种权 6 个，参与登记沙棘植物新品种权 2 个。筛选苗头沙棘优良品系 30 余份。在沙棘研究领域形成了自己独到的见解，研究成果达到国内、国际领先水平，发表论文 50 余篇，参与编写沙棘著作 3 部、先后获得省部级奖 6 项，地市级奖 3 项，一级学会奖 2 项。其中参与的“沙棘遗传改良和产业化栽培技术创新”获得梁希林业科技进步一等奖 1 项。通过中国沙棘与蒙古沙棘杂交后的实生苗中筛选出沙棘优良无性系 6 个，成熟期以中早熟沙棘株系为主，果实为黄色或橘黄色，果大、无刺、产量高，适宜作为观光采摘园或生产原料林的专用品种。编写沙棘地方标准 3 个，相关团体标准 3 个。拥有实用新型专利 1 项，国家发明专利 1 项。该院是黑龙江省沙棘工程技术研究中心依托单位。

2024 年度在研项目 3 项，其中国家十四五重点研发项目子课题《优质高效沙棘品种（系）筛选与应用示范》，针对黑龙江省沙棘产业发展化需求，通过沙棘晚熟冬采、中早熟振动采收、

production issues such as the limited variety of winter - harvested seabuckthron, the decline in vigor of previously cultivated varieties, and poor disease/ stress resistance. The Group has published 4 related scientific papers and announced and implemented the Heilongjiang Provincial Local Standard “Operating Procedures for Seabuckthorn Hybrid Breeding Technology”. This standard facilitates the selection of excellent seabuckthron hybrid varieties through directional hybridization and seedling selection methods, which will increase the stock of superior varieties and optimize the planting structure, thereby providing a germplasm foundation for the development and promotion of the seabuckthron industry. The standard is comprehensive, well - structured, and highly operational.

3.1.3 Liaoning Dryland Agro-Forestry Institute

Liaoning Dryland Agro - Forestry Institute (hereafter referred to as the Dryland Institute), located in Chaoyang City, Liaoning Province, is affiliated with the Liaoning Academy of Agricultural Sciences. It was established in November 2018 through the optimized integration of the former Liaoning Soil and Water Conservation Institute and the former Liaoning Afforestation Institute for Arid Regions.The primary responsibilities of the institute include research on soil and water conservation, forest cultivation, and degraded ecosystem restoration technologies, as well as the breeding, cultivation, and processing technologies of new varieties of coarse grains, fruits, vegetables, and forest trees. Since 1959, the Dryland Institute has been conducting trials on seabuckthron cultivation. To date, it has received 10 various achievement awards related to seabuckthron, including 7 provincial/ministerial - level awards and 3 municipal/prefectural - level awards. It has participated in the compilation of 2 monographs and published over 60 scientific and technological papers. The institute holds 2 Utility Model Patents and has formulated 2 Local Standards of Liaoning Province. It currently possesses 3 excellent seabuckthron

抗病优良株系筛选，为我省沙棘产业提供高产、高抗、优质沙棘品种，解决生产栽培中冬采沙棘品种单一、以往主栽沙棘品种树势衰弱、抗病性抗逆性差等问题。发表相关科技论文 4 篇，发布并实施了黑龙江省地方标准《沙棘杂交育种技术操作规程》，有助于通过杂交育种手段，以定向杂交、实生选育等方法选育优良沙棘杂交品种，可增加沙棘优良品种，优化沙棘种植结构，为沙棘产业发展及优良品种推广提供种质基础。本标准内容齐全，结构合理，可操作性强。

3. 辽宁省旱地农林研究所

辽宁省旱地农林研究所（以下简称旱地所）坐落于辽宁省朝阳市，隶属于辽宁省农业科学院，由原辽宁省水土保持研究所和原辽宁省干旱地区造林研究所于 2018 年 11 月优化整合而成。主要工作职责是开展水土保持、 森林培育、退化生态系统恢复技术，及杂粮、果蔬、林木新品种选育、栽培和加工技术研究等。从 1959 年开始，旱地所即开始沙棘引种栽培试验，截止目前，已获有关沙棘方面的各类成果奖 10 项，其中：省部级 7 项，市厅级 3 项。参编专著 2 部， 发表科技论文 60 余篇。获得实用新型专利 2 项；制定辽宁省地方标准 2 项。现 拥有沙

varieties and over 40 strains/lines, with 2 multi - functional seabuckthron breeding nurseries and 5 mu (approximately 0.33 hectares) of seabuckthron nursery land, capable of supplying 100,000 high - quality seabuckthron seedlings annually, including large - fruited introduced varieties and Mongolian - Chinese hybrids. The team consists of 8 professionals: 2 senior - level experts, 2 associate senior - level experts, 3 mid - level experts, and 1 other staff member.

3.1.4 Xifeng Soil and Water Conservation Scientific Experimental Station, Yellow River Conservancy Commission

Xifeng Soil and Water Conservation Scientific Experimental Station, Yellow River Conservancy Commission (hereafter referred to as Xifeng S & WC Station) is located in Qingyang City, Gansu Province. Established in 1951, it is one of the three long - standing soil and water conservation stations under the MWR system. Its mandate is to conduct experimental research, integrated management, and demonstration/promotion of soil and water conservation in the Loess Plateau Hilly and Gully Region. Since 1957, experimental research on seabuckthron has covered various aspects, including seedling cultivation, breeding, and planting demonstration. To date, the Station has received 8 science and technology progress awards related to seabuckthron, including 1 national - level award, 3 provincial/ministerial - level awards, and 4 other awards. It has compiled or participated in the publication of 4 monographs and published over 50 scientific and technological papers. The Station maintains 2 multi - functional seabuckthron breeding nurseries covering 49 mu (approximately 3.27 hectares) and a 5 - mu (approximately 0.33 hectares) nursery, capable of producing 100,000 seedlings annually. Currently, 8 staff members are involved in sea - buckthorn - related work, including 1 senior - level experts, 2 associate senior - level experts, 3 mid - level experts, and 2 other staff members.

棘良种 3 个、品系 40 多个。建立有多功能沙棘育种圃 2 处。有沙棘苗圃地 5 亩，每年可提供引进大果、蒙中杂交等优质沙棘苗木 10 万株。目前，有 8 人参与沙棘工作，其中：正高级 2 人，副高级 2 人，中级 3 人，其他 1 人。

4. 黄河水利委员会西峰水土保持科学试验站

黄河水利委员会西峰水土保持科学试验站（以下简称西峰水保站）坐落在甘肃省庆阳市，成立于 1951 年，为水利部系统建站悠久的水保“三站”之一， 面向黄土高塬沟壑区从事水土保持试验研究、综合治理和示范推广等业务。从 1957 年开始，有关沙棘的试验研究涵盖了育苗、育种、种植示范等多方面工作。截止目前，已获有关沙棘方面的各类科技进步奖 8 项，其中：国家级 1 项，省部级 3 项，其他 4 项。编写或参编出版专著 4 部；发表科技论文 50 余篇。建立 多功能沙棘育种圃 2 处 49 亩，苗圃 5 亩，年产苗木 10 万株。 目前，全站有 8 人参与沙棘有关各项工作，其中：正高级 1 人，副高级 2 人，中级 3 人，其他 2 人。

3.1.5 Tianshui Soil and Water Conservation Scientific Experimental Station, Yellow River Conservancy Commission

Tianshui Soil and Water Conservation Scientific Experimental Station, Yellow River Conservancy Commission (hereafter referred to as Tianshui S&WC Station) is located in Tianshui City, Gansu Province. Established in 1942, it is the longest - standing S&WC station within the MWR system. Its work focuses on experimental research, integrated management, and demonstration/promotion of soil and water conservation in the Loess beam - shaped hilly and gully region. Seabuckthorn - related experimental research began shortly after the Station's establishment. To date, it has received 6 science and technology progress awards related to seabuckthron, including 1 National - level award, 2 provincial/ministerial - level awards, and 3 other awards. The Station has published over 20 scientific and technological papers. It maintains a dedicated seabuckthron nursery covering 5 mu (approximately 0.33 hectares), capable of producing 100,000 seedlings annually. Currently, 12 staff members are involved in seabuckthron - related work, including 1 senior - level expert, 1 associate senior - level expert, 2 mid - level experts, and 8 other staff members.

3.1.6 Institute of Wild Plant Resources of the Qinghai-Tibet Plateau, Qinghai Academy of Agricultural and Forestry Sciences

Qinghai Academy of Agricultural and Forestry Sciences (QAASS) is located in Xining City, Qinghai Province, and was established in 1951. It supervises 8 specialized research institutes. The Institute of Wild Plant Resources (the "Wild Plant Institute") was separated from the Forest Research Institute in 2001. The Forest Research Institute was one of the earliest institutions in China to conduct seabuckthron research. Before 1982, the Institute's seabuckthron research was already at the forefront of related national studies. During that period, 3 translated foreign intelligence reports and over 10 research reports were published. The Academy

5. 黄河水利委员会天水水土保持科学试验站

黄河水利委员会天水水土保持科学试验站（以下简称“天水水保站”）坐落在甘肃省天水市，成立于 1942 年，为水利部系统建站最为悠久的水保站，面向黄土梁状丘陵沟壑区从事水土保持试验研究、综合治理、示范推广等工作。建站后不久即开始了沙棘有关试验研究。截止目前，已获有关沙棘方面的各类科技进步奖 6 项，其中: 国家级 1 项，省部级 2 项，其他 3 项。发表科技论文 20 余篇。有沙棘专用苗圃地 5 亩，年产苗木 10 万株。目前，全站有 12 人参与沙棘有关的各项 工作，其中：正高级 1 人，副高级 1 人，中级 2 人，其他 8 人。

6. 青海省农林科学院青藏高原野生植物资源研究所

青海省农林科学院坐落在青海省西宁市，成立于 1951 年，下设 8 个专业研究所，野生所于 2001 年从林研所中分出。林研所是我国进行沙棘研究较早的一个研究机构，1982 年之前全所的沙棘研究已经走在了全国相关研究的前列，这一阶段发表的国外情报类译文就有 3 篇，研究报告有 10 余篇。全院设有综合分析实验室和生物技术实验室， 综合分析室有青海省技术质量监督局颁发的计量认证合格证书。从上世

has a Comprehensive Analysis Laboratory and a Biotechnology Laboratory. The Comprehensive Analysis Laboratory holds a Certification of Metrology Accreditation (CMA) issued by the Qinghai Provincial Bureau of Quality and Technical Supervision. Since the 1950s, the Institute has been involved in various aspects of seabuckthron work, including intelligence collection, community ecology, seedling cultivation, planting, and ecological studies. To date, the Wild Plant Institute (including the Forest Research Institute, hereinafter the same) has won 4 provincial/ministerial - level science and technology progress awards related to seabuckthron. It has participated in the compilation of 3 monographs and published over 60 scientific and technological papers. It has formulated 9 Local Standards of Qinghai Province, obtained 1 patent, and certified 1 Provincial - level Improved Variety. It maintains a dedicated seabuckthron nursery covering 5 mu (approximately 0.33 hectares), which can produce 100,000 high - quality seabuckthron seedlings annually. Currently, 7 researchers are engaged in seabuckthron research, including 2 senior - level experts, 2 associate senior - level experts, and 3 mid - level experts.

纪 50 年代开始，即开始沙棘情报、群落、育苗、种植及生态等多方面工作。截止目前，野生所（含林研所，下同）已获有关沙棘方面的省部级科技进步奖 4 项。参编出版 专著 3 部；发表科技论文 60 余篇。制定青海省地方标准 9 项。获得专利 1 项、省级良种 1 个。有沙棘专用育苗地 5 亩，年可产优质沙棘苗木 10 万株。 目前从事沙棘研究的人员有 7 人，其中正高级 2 人、副高级 2 人、中级 3 人。

3.1.7 Desert Forestry Experimental Center, Chinese Academy of Forestry

Desert Forestry Experimental Center, Chinese Academy of Forestry (hereafter referred to as the Desert Forestry Center) is located in Dengkou County, Inner Mongolia Autonomous Region. Established in 1979, the Center primarily focuses on the collection and improvement of tree species resources, afforestation techniques, shelterbelt construction in artificial oases, and experimental research on ecological and economic benefits within the Hetao Irrigation Area of the Yellow River. Experimental research on the breeding and selection of improved seabuckthron varieties commenced in 1986. The Desert Forestry Center possesses two laboratories for routine plant physiology analysis and soil physical/chemical analysis. It operates a

7. 中国林业科学研究院沙漠林业实验中心

中国林业科学研究院沙漠林业实验中心（以下简称“沙林中心”）坐落在内蒙古自治区磴口县，成立于 1979 年，面向黄河河套区主要从事树种资源收集与改良造林技术、人工绿洲防护林营造技术及生态经济效益试验研究，从 1986 年开始沙棘良种选育试验研究。沙林中心有实验室 2 个，可用于常规植物生理学实验分析和土壤理化实验分析；在第一实验场建有植物组培楼 1 座，面积 427 m2，现代化温室 1 座，面积 1200 m2；建有沙棘育苗棚 1 座，面积 480 m2。2022 年，中国林业科学研究院沙漠

plant tissue culture building (427 m2) and a modern greenhouse (1,200 m2) at its first experimental field. Additionally, it maintains a seabuckthron nursery shed (480 m2). In 2022, the Center's work mainly centered on the breeding of improved seabuckthron varieties, the production of seabuckthron clonal seedlings, and hybrid breeding trials. In 2021, the center collaborated with Forestry Research Institute of Chinese Academy of Forestry to approve three national-level superior varieties: Hongji No. 1 (Guo S-SV-HR-020-2021), Zhongji No. 3 (Guo S-SV-HR-21-2021), and Zhongji No. 4 (Guo S-SV-HR-022-2021). Relying on the project titled “Construction of the National Seabuckthorn Germplasm Resource Repository”, the Center established a preservation area for elite varieties within the existing resource base, achieving the scientific preservation and standardized management of seabuckthron germplasm. Additionally, 140 mu (approximately 9.33 hectares) of conservation forest for seabuckthron germplasm resources were planted.

林业实验中心主要围绕沙棘良种选育、沙棘无性系苗木生产和杂交选育试验等方面开展工作。2021 年，与中国林业科学研究院林业研究所合作，通过审核国家级良种 3 个，包括红棘 1 号（国 S-SV-HR-020 -2021）、中棘 3 号（国 S-SV-HR-21 -2021）和中棘 4 号（国 S-SV-HR-022 -2021）。该中心依托《沙棘国家种质资源库建设》项目，以现有资源为基础，进行沙棘资源库优良品种保存区建设，实现沙棘种质资源的科学保存与资源库规范化管理。完成沙棘种质资源保存林栽植 140 亩。

3.1.8 Shanxi Academy of Forestry and Grassland Sciences(Seabuckthorn Engineering Technology Research Center, National Forestry and Grassland Administration)

8. 山西省林业和草原科学研究院（国家林业草原局沙棘工程技术研究中心）

Shanxi Academy of Forestry and Grassland Sciences (hereafter referred to as Shanxi Forestry Academy) is located in Taiyuan City, Shanxi Province, and was established in 1959. Its primary focus is experimental research on economic forests, breeding of improved forest tree varieties, forestry ecology and landscape engineering, forest management and service functions, and resource protection and utilization in Shanxi Province. Its main base for seabuckthron breeding trials is located in Shouyang County. Since 1986, seabuckthron research has covered many aspects, including provenance trials, improved variety selection, asexual propagation, high-yield cultivation, as well as the extraction of flavonoids and proanthocyanidins, supercritical CO2 extraction, seabuckthron pomace drying, and product development. To date, the Academy has secured 2 provincial/ministerial-level science and technology

山西省林业和草原科学研究院（以下简称”山西省林科院”）坐落在山西省太原市，成立于 1959 年，面向山西省主要从事经济林、林木良种培育、林业生态与景观工程、森林经营与服务功能、资源保护及利用等方面试验研究。沙棘育种试验主要基地位于山西省寿阳县。从 1986 年开始，有关沙棘的试验研究涵盖了种源试验、良种选育、无性繁殖、丰产栽培以及黄酮和原花青素提取、超临界 CO_2 萃取、沙棘果渣干燥、产品研发等多方面工作。截止目前，已获有关沙棘方面的省部级科技进步奖 2 项，鉴定成果 2 项，审定良种 6 个，研制专利 6 项，制定行业标准、山西省地方标准及团体标准等 10 项，发表科技论文 70 余篇。建立沙棘种质

progress awards related to seabuckthron, achieved 2 scientific and technological evaluation certifications, certified 6 improved varieties, developed 6 patents, and formulated 10 standards (including industry, Shanxi local, and group standards). It has published over 70 scientific papers. The Academy maintains 4 seabuckthron germplasm resource nurseries covering 120 mu (approximately 8 hectares) and a dedicated 5 mu (approximately 0.33 hectares) seabuckthron nursery, capable of producing over 100,000 high-quality seabuckthron seedlings annually. Currently, 15 staff members are involved in seabuckthron-related work, including 4 senior - level expert, 4 associate senior - level expert, and 4 mid - level experts.

In 2024, the Seabuckthorn Engineering Center is undertaking 22 research projects, focusing on scientific research, achievement transformation, promotion, and technical services related to seabuckthron. In scientific research, the work includes variety selection, cultivation techniques, and product development. Regarding improved variety selection and high-yield cultivation, 13 seabuckthron clonal lines were introduced from Heilongjiang, Liaoning, and Gansu, and a new experimental garden for superior clonal lines (11.6 mu, approximately 0.77 hectares) was established. Additionally, 30,000 seedlings of 20 superior Chinese seabuckthron clonal lines were propagated. 82 accessions of high-yielding, large-fruited Chinese seabuckthron germplasm were collected from the upper reaches of the Yellow River, and their fruit's phenotypic traits and nutritional components were analyzed. Utilizing the improved varieties selected by the Center, such as "Jinji No. 1" and "Jinji No. 2," the Center is conducting demonstrations and breeding of superior seabuckthron lines, establishing cutting propagation gardens and cultivation demonstration parks, and researching the prevention and control of seabuckthron witches' broom disease. Having undertaken projects supported by the Central Fiscal Forestry Science and Technology Extension and Demonstration Fund and the Central Government Guided Local Science and Technology Development Fund, the Center cultivated 100,000 improved

资源圃 4 处 120 亩；有专用沙棘苗圃 5 亩，年可产优质沙棘苗木 10 万余株。目前，山西省林科院有 15 人参与沙棘有关各项工作，其中：正高级 4 人，副高级 4 人，中级 4 人。

2024 年，沙棘工程中心共承担科研项目 22 项，围绕课题研究任务，开展了沙棘科学研究、成果转化推广和技术服务等方面的工作。在沙棘科学研究方面，分别开展了沙棘良种选育、栽培技术及产品研发等研究。在良种选育及丰产栽培方面，从黑龙江、辽宁、甘肃等地引进 13 个沙棘无性系，新建沙棘优良无性系试验园 11.6 亩；扩繁 20 个中国沙棘优良无性系 30000 株。收集黄河上游地区丰产、果大的中国沙棘优良种质资源 82 份，并对采集的优良单株果实进行表型性状和营养成分测定分析。依托沙棘工程中心选育的“晋棘 1 号”、“晋棘 2 号”等良种，开展沙棘良种及优良无性系繁育示范，建立采穗圃和栽培示范园；开展沙棘丛枝病的防控技术研究。先后承担中央财政林业科技推广示范项目及中央引导地方科技发展资金项目，依托山西省地方标准《沙棘扦插育苗技术规程》及选育的“晋棘 1 号”、“晋

seabuckthron seedlings using its local standard “Technical Regulations for Seabuckthorn Cutting Propagation”, and certified varieties like "Jinji No. 1" and "Jinji No. 2." This resulted in 1,300 mu (approximately 86.67 hectares) of demonstration afforestation, over 700 technical training sessions, and the compilation of 900 technical manuals. This training significantly promoted standardized cultivation and garden establishment, achieving notable ecological, economic, and social benefits.

3.1.9 Dalian Minzu University

Dalian Minzu University, affiliated with the National Ethnic Affairs Commission, is the only national ethnic higher education institution situated in the Northeast and coastal open areas. It focuses on engineering science while coordinating multidisciplinary development. The University's National Ethnic Affairs Commission Innovation Team for "Innovation and Utilization of Woody Oilseed Germplasm Resources" has long been engaged in research on seabuckthron and other woody oilseeds, focusing on yield, quality, and the regulatory mechanisms of resistance formation, as well as breeding, cultivation, and utilization. The team has successively undertaken 1 EU Marie Curie IIF project, 12 projects funded by the National Natural Science Foundation of China (NSFC), 1 project under the National 863 Program, 2 sub - projects of the National Science and Technology Support Program, and 6 key provincial/ministerial projects. Using hybridization and molecular marker-assisted selection breeding methods, the team has bred 8 new forest tree varieties and 4 improved varieties. The team possesses a large inventory of germplasm resources for seabuckthron, Xanthoceras sorbifolia (Yellowhorn), and Camellia oleifera (Oil-tea camellia), particularly seabuckthron resources with excellent traits. In recent years, the team has focused on the regulatory mechanisms governing yield, quality, and resistance formation in woody oilseeds, identified a series of genes, transcription factors, and non - coding RNAs associated with important traits, and analyzed their functions and constructed their regulatory networks. The team has been granted

棘 2 号”等良种，培育沙棘良种苗木 10 万株，完成沙棘示范造林 1300 亩，开展技术培训 700 余人次，编制技术手册 900 册。通过培训，大大促进了栽培良种化、建园标准化，取得显著的生态、经济、社会效益。

9. 大连民族大学

大连民族大学隶属于国家民族事务委员会，是国家唯一设在东北和沿海开放地区、以工科为主多学科协调发展的民族高等学校。大连民族大学“木本油料种质资源创新与利用”国家民委创新团队长期从事沙棘等木本油料产量、品质和抗性形成与调控机制解析、育种、栽培和利用等方面的研究工作，先后承担的欧盟玛丽居里 IIF 项目 1 项、国家自然科学基金 12 项、国家 863 计划 1 项、国家科技支撑计划子课题 2 项及省部级重点项目 6 项，采用杂交和分子标记辅助选择育种方法培育出林木新品种 8 个、良种 4 个；持有大量的沙棘、文冠果和油茶资源，特别是具有优良性状的沙棘资源。近年来致力于木本油料产量、品质和抗性形成与调控机制的研究，鉴定了一系列重要性状相关的基因、转录因子和非编码 RNA 等；分析了它们的功能；构建了它们之间的调控网络；获授权发明专利 15 项，发表 SCI 收录论文 72 篇，制定地方标准 5 项、团标 2 项，获省部级科研

15 authorized invention patents, published 72 SCI-indexed papers, formulated 5 local standards and 2 group standards, and received 7 provincial/ministerial-level scientific research awards. The varieties and technologies have been extended over 273,600 mu (approximately 18,240 hectares), helping 107,600 people achieve sustainable prosperity, yielding significant economic, ecological, and social benefits.

奖励 7 项。品种和技术已推广 27.36 万亩，带动 10.76 万人长效致富，取得了显著的经济、生态和社会效益。

3.1.10 Gansu Agricultural University

10. 甘肃农业大学

Seabuckthron R & D team of Gansu Agricultural University's College of Food Science and Engineering has long been engaged in research on seabuckthron product processing, functional evaluation of active components, and comprehensive utilization of waste. The team currently consists of 10 permanent staff members, including 3 professors, 3 associate professors, and 4 lecturers, as well as 12 doctoral and master's students. The team relying on the "Gansu International Science and Technology Cooperation Base for China-Russia Seabuckthorn Processing Technology" and the "China-Russia Seabuckthorn Joint Research Center," achieved a series of research results supported by various projects. These projects include the Ministry of Science and Technology International Cooperation project “Research on Seabuckthorn Berry Harvesting Equipment and Key Non-Thermal Processing Technology” (2014DFR31230), the NSFC project “Study on Quick-Freezing De-fruiting Mechanism and Low-Damage De-fruiting Technology of Chinese Seabuckthorn” (52065006), the 2024 Gansu Provincial Science and Technology Program/Natural Science Foundation project “Research on the Mechanism of Seabuckthorn Leaf IGRh Retarding the Aging of C. elegans Mediated by DAF-16/FOXO-Activated Autophagy” (24JRRG027), and the 2023 Gansu Education Science and Technology Innovation Project/Graduate Innovation Star Program “Chemical Characterization and Activity Evaluation of High-Activity Seabuckthorn Leaf Flavonoids Extracted Using Emerging Technology” (2022CXZXB-033).

甘肃农业大学食品科学与工程学院沙棘研发团队长期从事沙棘产品的加工、活性成分功能评价以及废弃物综合利用等研究。现有固定人员 10 名，其中教授 3 人，副教授 3 人，讲师 4 人，在读博硕士研究生 12 名。研究团队以“中－俄沙棘加工技术甘肃省国际科技合作基地”，“中国－俄罗斯沙棘联合科研中心”为依托，在科技部国际合作项目“沙棘浆果采收设备与非热加工关键技术研究”（2014DFR31230）、国家自然科学基金项目“中国沙棘速冻脱果机理及低损伤脱果技术研究”（52065006）、2024 年度甘肃省科技计划项目甘肃省自然科学基金项目“沙棘叶 IGRh 通过 DAF-16/FOXO 介导的自噬激活延缓秀丽隐杆线虫衰老的机制研究”（24JRRG027）、2023 年度甘肃教育科技创新项目研究生创新之星项目“利用新兴技术提取高活性沙棘叶黄酮的化学表征和活性评价”（2022CXZXB-033）的支持下取得了一系列研究成果。

In 2023 and 2024, five products were successively developed using seabuckthron pulp and seabuckthron leaves as raw materials: Based on the research on the bio - acid reduction of seabuckthron pulp, a low - acid, low - sugar, and low - alcohol fermented seabuckthron drink was developed using a sequential fermentation process with Schizosaccharomyces pombe and Saccharomyces cerevisiae. A low - alcohol seabuckthron rose mead was developed using rapeseed nectar, seabuckthron, and Kushui rose. A seabuckthron ginseng fruit beverage was developed using seabuckthron and ginseng fruit. A seabuckthron goji berry beverage was developed using seabuckthron and goji berry. A seabuckthron tea designed to prevent alcoholic intestinal damage was made from seabuckthron leaves, seabuckthron seed proanthocyanidins, maltooligosaccharides, orange powder, and mango cubes. In addition, based on the analysis of seabuckthron fruits, leaves, and seed pomace components, functional evaluation, and fruits deacidification research, the team published 7 high - level papers. Among them, 6 are SCI - indexed papers (3 in CAS Zone 1 and 3 in CAS Zone 2). The team was granted 2 invention patents: “A Biological Deacidification Method for Seabuckthron Using Sequential Fermentation of Non - Saccharomyces Yeast and Lactic Acid Bacteria” (ZL 2022 1 0015582.5) and “seabuckthron Tea Rich in Seabuckthorn Seed Proanthocyanidins Capable of Preventing Alcoholic Intestinal Damage” (ZL 2021 1 0961064.8). The team successfully graduated 1 Ph.D. student and 3 Master's students, completing 1 doctoral thesis and 3 master's theses.

3.1.11 North University of China

The research team at the Institute of Biomaterials and Fermentation of North University of China is dedicated to the traceability of the seabuckthron industry's basic database, the construction of green processing systems, and the development of functional new products. The team has undertaken several seabuckthron research projects, including the Ministry of Education Key Development Fund project “Industrialization Application Demonstration

2023 年和 2024 年团队先后以沙棘原浆和沙棘叶为原料研发了 5 款产品：在沙棘原浆生物降酸研究的基础上，采用粟酒裂殖酵母和酿酒酵母顺序发酵工艺研发了一种降酸减糖低醇发酵沙棘饮品。以油菜花蜜、沙棘和苦水玫瑰为原料研发了低醇沙棘玫瑰蜂蜜酒；以沙棘、人参果为原料，研发了棘人参果饮料；以沙棘、枸杞为原料，研发了沙棘枸杞饮料；以沙棘叶、沙棘籽原花青素、低聚麦芽糖、橘子果粉、芒果丁等为原料，研发了预防酒精性肠道损伤沙棘茶。此外，团队基于对沙棘果实、叶片和籽粕成分分析、功能评价及果实降酸等方面的研究，2023 年和 2024 年先后发表高水平论文 7 篇，其中 SCI 论文 6 篇（中科院分区一区 3 篇，2 区 3 篇）。授权发明专利 2 项：一种非酿酒酵母与乳酸菌顺序发酵的沙棘生物降酸方法（ZL 2022 1 0015582.5）；富含沙棘籽原花青素的能够预防酒精性肠道损伤的沙棘茶（ZL 2021 1 0961064.8）。培养毕业博士研究生 1 名，硕士研究生 3 名，完成博士论文 1 篇，硕士论文 3 篇。

11. 中北大学

中北大学生物材料与发酵研究所研究团队致力沙棘产业基础数据库溯源、绿色加工体系建设及功能新品的开发等工作，先后承担了教育部重点开发基金项目“沙棘叶产业化应用示范”，山西省农业重点研发专项“沙棘叶功效成分评价及鉴定”，中国露酒研究院“中国露酒植物

of Seabuckthorn Leaves", the Shanxi Provincial Agricultural Key R&D Special Project "Evaluation and Identification of Functional Components in Seabuckthorn Leaves", and the China Dew Wine Research Institute project "Standardization Demonstration of Plant Extraction for Chinese Dew Wines". The team has completed the traceability and identification of the nutritional database for seabuckthron fruit and leaf resources across four representative production areas in Shanxi, characteristic seabuckthron production areas in north and south Xinjiang, and Panshi in Jilin. This work has led to the development of the basic database, providing data support and directional guidance for the development of specialized products. In the realm of green seabuckthron processing, the team has made several useful attempts. They developed a comprehensive utilization system for seabuckthron processing byproducts, greenly recycling seabuckthron peel, pomace, and leaves to enhance product efficacy and corporate profitability. In the development of functional new products, the team completed the development of a series of tonic wines, functional component testing, standardization of seabuckthron primary juice, and the development of characteristic products. The next step involves establishing standardized testing methods for seabuckthron components and conducting pilot-scale production process experiments for established products. The team has published over 20 academic papers on seabuckthron, won 1 Second Prize in the Shanxi Provincial Science and Technology Progress Award, achieved 2 Shanxi Provincial Science and Technology Achievements Certifications, and received 15 authorized national invention patents.

In 2024, the research team achieved a series of advancements in the refinement of seabuckthron oil, the development of novel structured lipids, and the development of seabuckthron functional peptides. They published 5 related research articles, were granted 3 national invention patents, filed 5 new invention patent applications, and completed the commercialization of 3 invention patents.

提取标准化示范”等沙棘科研项目。目前团队已经完成山西四个代表产区、新疆南北疆特色沙棘产区、吉林磐石等区域沙棘果、叶等资源的营养数据库溯源及鉴定判别工作，完成了基础数据库的开发建设，为特色产品的开发提供数据支撑和方向指引。在沙棘绿色加工体系方面也进行了多项有益尝试。开发了沙棘加工副产物综合利用体系，把沙棘果皮、渣，沙棘叶等进行了绿色回用，从而提升产品的功效品质和企业效益。功能新品开发方面团队完成了沙棘系列滋补酒的开发、沙棘功效成分检测，沙棘原汁的标准化，特色产品的开发等工作，下一步将对沙棘的成分进行标准化测试方法的建立，并开展既定产品的中试生产工艺实验。先后发表沙棘方面学术论文 20 余篇。荣获山西省科技进步二等奖 1 项，山西省科技成果鉴定 2 项，获国家授权发明专利 15 项。

2024 年，研究团队在沙棘油的精制，结构脂新品研发、沙棘功能肽开发等方面取得了系列进展，发表相关研究文章 5 篇，获批国家发明专利 3 项，新申报发明专利 5 项，并有三项发明专利完成了相关转化工作。

3.2 Scientific Research Achievements, Patented Technologies, and Scientific Papers

3.2.1 Patented Technologies

A conventional patent search and analysis was conducted on the website of the National Intellectual Property Administration (CNIPA) (https://pss-system.cponline.cnipa.gov.cn/). The search span, based on the application date, publication date, and authorization date, covered the period from January 1, 2024, to December 31, 2024, yielding 99 valid patents. The patents primarily focused on Seabuckthron are listed in Table 3 below:

（二）科研成果、专利技术、科技论文

1. 专利技术

在国家知识产权局网站（https://pss-system.cponline.cnipa.gov.cn/）专利检索及分析常规检索，从申请日、公开日和授权日均以2024年1月1日开始至2024年12月31日结束，有效型专利99件。其中以沙棘为主的专利如下表3：

Table 3. Valid Patents in the Seabuckthron Field in 2024
表 3. 2024 年沙棘领域有效专利

序号 No.	公开号 Publication No.	申请号 Application No.	日期 Date	发明名称 Title of Invention	申请人 Applicant
1	CN221656710U	CN202420011833.7	2024.01.03	一种沙棘冻干粉加工用研磨装置 A Grinding Device for Freeze-Dried Seabuckthron Powder Processing	新疆慧华沙棘生物科技有限公司 Xinjiang Huihua Seabuckthron Biotechnology Co., Ltd.
2	CN221611727U	CN202420013838.3	2024.01.04	一种沙棘干燥处理系统 A Seabuckthron Drying Treatment System	辽宁宇浩达生物医药科技有限公司 Liaoning Yuhaoda Biomedical Technology Co., Ltd.
3	CN221588522U	CN202420024160.9	2024.01.05	一种沙棘果酵素饮品无菌发酵罐 A Sterile Fermentation Tank for Seabuckthron Fruit Enzyme Beverage	甘肃天之山生物科技有限公司 Gansu Tianzhishan Biotechnology Co., Ltd.
4	CN221581456U	CN202420045399.4	2024.01.08	一种沙棘汁废料处理用装置 A Device for Treating Seabuckthron Juice Waste	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
5	CN221527082U	CN202420066822.9	2024.01.10	一种沙棘果加工用真空干燥装置 A Vacuum Drying Device for Seabuckthron Fruit Processing	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
6	CN222017669U	CN202420067070.8	2024.01.11	一种沙棘原浆加工用灭菌设备 A Sterilization Equipment for Seabuckthron Primary Juice Processing	青海隆福佳人农业产业化有限责任公司 Qinghai Longfujiaren Agricultural Industrialization Co., Ltd.
7	CN308958776S	CN202430020278.X	2024.01.12	包装盒（沙棘饮品） Packaging Box (Seabuckthron Beverage)	新疆吉萃元农业科技有限公司 Xinjiang Jicuiyuan Agricultural Technology Co., Ltd.
8	CN308884029S	CN202430021324.8	2024.01.12	体验装包装盒 (P1000+ 沙棘 VC 特膳饮） Experience Pack Packaging Box (P1000+ Seabuckthron VC Special Diet Drink)	上海上药信谊微生态科技有限公司 Shanghai Shangyaoxinyi Micro-Ecology Technology Co., Ltd.

9	CN221429606U	CN202420078335.4	2024.01.12	一种沙棘嫁接快繁固定结构 A Fast Propagation Fixing Structure for Seabuckthron Grafting	鄂尔多斯市林业和草原事业发展中心 Erdos Forestry and Grassland Development Center
10	CN221981583U	CN202420088394.X	2024.01.15	用于沙棘原浆加工的浓缩设备 Concentration Equipment for Seabuckthron Primary Juice Processing	青海隆福佳人农业产业化有限责任公司 Qinghai Longfujiaren Agricultural Industrialization Co., Ltd.
11	CN222116135U	CN202420099313.6	2024.01.15	一种沙棘油冷榨提取装置 A Cold Press Extraction Device for Seabuckthron Oil	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
12	CN221619329U	CN202420121785.7	2024.01.17	一种沙棘原汁加工用配料添加装置 An Ingredient Addition Device for Seabuckthron Primary Juice Processing	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
13	CN221711135U	CN202420129381.2	2024.01.18	一种沙棘果粉碎装置 A Seabuckthron Fruit Crushing Device	新疆戈壁记忆品牌管理有限公司 Xinjiang Gobi Memory Brand Management Co., Ltd.
14	CN222094177U	CN202420133421.0	2024.01.18	一种沙棘清洗装置 A Seabuckthron Cleaning Device	新疆远翔农业科技有限公司 Xinjiang Yuanxiang Agricultural Technology Co., Ltd.
15	CN221599139U	CN202420131289.X	2024.01.19	大蒜沙棘汁低温提取罐 Low-Temperature Extraction Tank for Garlic Seabuckthron Juice	新疆超越歆生物科技有限公司 Xinjiang Chaoyuexin Biotechnology Co., Ltd.
16	CN222032845U	CN202420140764.X	2024.01.19	一种量子医用沙棘创伤自粘敷料贴 A Quantum Medical Seabuckthron Trauma Self-Adhesive Dressing Patch	中瑞洁纳（上海）生物科技有限公司 Sino-Swiss Jie Na (Shanghai) Biological Technology Co., Ltd.
17	CN222267773U	CN202420160551.3	2024.01.22	一种沙棘筛选装置 A Seabuckthron Screening Device	瓜州郝氏粒道农业发展有限公司 Guazhou Haoshi Liduo Agricultural Development Co., Ltd.
18	CN221468954U	CN202420155559.0	2024.01.22	一种沙棘汁果渣分离装置 A Seabuckthron Juice Pomace Separation Device	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
19	CN221808808U	CN202420192656.7	2024.01.25	一种沙棘产品用过滤装置 A Filtering Device for Seabuckthron Products	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
20	CN221307145U	CN202420209387.0	2024.01.29	一种沙棘果自动除梗机 An Automatic De-stemming Machine for Seabuckthron Fruit	甘肃天之山生物科技有限公司 Gansu Tianzhishan Biotechnology Co., Ltd.
21	CN220611337U	CN202420199925.2	2024.01.29	一种新型沙棘果筛选装置 A Novel Seabuckthron Fruit Screening Device	吉林农业大学 Jilin Agricultural University

22	CN221563557U	CN202420218128.4	2024.01.29	一种沙棘产品用易拉罐灌装封罐机 An Easy-Pull Can Filling and Sealing Machine for Seabuckthron Products	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
23	CN221883103U	CN202420230319.2	2024.01.30	沙棘林土壤采集装置 Soil Collection Device for Seabuckthron Forest	黑龙江省林业科学院佳木斯分院 Jiamusi Branch of Heilongjiang Academy of Forestry Sciences
24	CN221821869U	CN202420244220.8	2024.01.31	一种沙棘汁无菌灌装装置 A Sterile Filling Device for Seabuckthron Juice	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
25	CN118045010A	CN202410136572.6	2024.01.31	一种含有植物复方精油组合物的保湿修复精华油及其制备方法 A Moisturizing and Repairing Essence Oil Containing a Botanical Compound Essential Oil Composition and its Preparation Method and Application	广州新丝美生物科技有限公司 Guangzhou Xinsimei Biotechnology Co., Ltd.
26	CN221822131U	CN202420260020.1	2024.02.02	一种改良过沙棘油过滤装置 An Improved Seabuckthron Oil Filtration Device	山西中医药大学 Shanxi University of Traditional Chinese Medicine
27	CN308910582S	CN202430081722.9	2024.02.06	包装盒(舒微清沙棘人参益生元粉) Packaging Box (Shuweiqing Seabuckthron Ginseng Probiotic Powder)	河北诺氢科技有限公司 Hebei Nuoqing Technology Co., Ltd.
28	CN117859834A	CN202410168406.4	2024.02.06	一种用于提高甲壳类水产动物免疫力的预混料及其制备方法 A Premix for Enhancing the Immunity of Shellfish and its Preparation Method	广州市联鲲生物科技有限公司；广东联鲲集团有限公司 Guangzhou Liankun Biotechnology Co., Ltd.; Guangdong Liankun Group Co., Ltd.
29	CN221733569U	CN202420289407.X	2024.02.07	一种沙棘籽加工用破碎装置 A Crushing Device for Seabuckthron Seed Processing	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
30	CN222040853U	CN202420308130.0	2024.02.19	一种沙棘产品包装用理瓶机 A Bottle Arranging Machine for Seabuckthron Product Packaging	延寿县鼎鑫生物工程有限公司 Yanshou County Dingxin Bioengineering Co., Ltd.
31	CN308918494S	CN202430087208.6	2024.02.20	包装盒 (沙棘全果油凝胶糖果) Packaging Box (Seabuckthron Whole Fruit Oil Gel Candy)	穆棱市蛙宝生物科技发展有限公司 Muling City WaBao Biological Technology Development Co., Ltd.
32	CN221836962U	CN202420340030.6	2024.02.23	一种沙棘全果浆渣发酵加工装置 A Seabuckthron Whole Fruit Pulp Residue Fermentation Processing Device	新疆维吾尔自治区分析测试研究院 Xinjiang Uygur Autonomous Region Analysis and Testing Research Institute
33	CN221749551U	CN202420350000.3	2024.02.26	一种沙棘果用打浆机 A Pulping Machine for Seabuckthron Fruit	新疆戈壁记忆品牌管理有限公司 Xinjiang Gobi Memory Brand Management Co., Ltd.
34	CN221964580U	CN202420365901.X	2024.02.28	用于沙棘加工的过滤设备 Filtering Equipment for Seabuckthron Processing	青海隆福佳人农业产业化有限责任公司 Qinghai Longfujiaren Agricultural Industrialization Co., Ltd.

35	CN222236565U	CN202420503125.5	2024.03.15	一种沙棘饮料加工榨汁装置 A Seabuckthron Beverage Processing Juice Device	新疆恩利德生物科技有限公司 Xinjiang Enlide Biotechnology Co., Ltd.
36	CN221901694U	CN202420529983.7	2024.03.19	一种收集沙棘绕实蝇蛹的装置 A Device for Collecting Seabuckthron Fruit Flies Pupae	石河子大学；新疆生产建设兵团第九师农业科学研究所（畜牧科学研究） Shihezi University; Institute of Animal Husbandry and Veterinary Science, 9th Division, Xinjiang Production and Construction Corps
37	CN222000012U	CN202420526240.4	2024.03.19	一种含沙棘果油成分生产制备用的自动化高效加工设备 An Automated High-Efficiency Processing Equipment for the Production and Preparation of Seabuckthron Fruit Oil Components	燕至是家商贸（常州）有限公司 Yanzhishijia Trading (Changzhou) Co., Ltd.
38	CN308835543S	CN202430145131.3	2024.03.20	蓄电池（沙棘植树机器人） Storage Battery (Seabuckthron Tree Planting Robot)	西南民族大学 Southwest Minzu University
39	CN221893475U	CN202420577599.4	2024.03.25	一种沙棘饮料生产的贴标装置 A Labeling Device for Seabuckthron Beverage Production	新疆恩利德生物科技有限公司 Xinjiang Enlide Biotechnology Co., Ltd.
40	CN221983098U	CN202420590212.9	2024.03.26	一种沙棘果除渣装置 A Seabuckthron Fruit Residue Removal Device	青海隆福佳人农业产业化有限责任公司 Qinghai Longfujiaren Agricultural Industrialization Co., Ltd.
41	CN222109189U	CN202420595835.5	2024.03.26	一种高效清洗沙棘的专用清洗装置 A Specialized High-Efficiency Cleaning Device for Seabuckthron	山西五台山沙棘制品有限公司 Shanxi Wutaishan Seabuckthron Products Co., Ltd.
42	CN221835765U	CN202420611375.0	2024.03.27	一种沙棘果加工转运装置 A Seabuckthron Fruit Processing and Transfer Device	新疆吉萃元农业科技有限公司 Xinjiang Jicuiyuan Agricultural Technology Co., Ltd.
43	CN222090388U	CN202420611354.9	2024.03.27	一种沙棘种植装置 A Seabuckthron Planting Device	甘肃艾康沙棘制品有限公司 Gansu Aikang Seabuckthron Products Co., Ltd.
44	CN221244289U	CN202322674717.1	2024.04.01	一种沙棘果酒发酵罐的果酒澄清装置 A Fruit Wine Clarification Device for a Seabuckthron Fruit Wine Fermentation Tank	青河县隆濠生物科技发展有限公司 Qinghe County Longhao Biological Technology Development Co., Ltd.
45	CN221893763U	CN202420665139.7	2024.04.02	一种便于清洗的沙棘汁生产储存罐 An Easy-to-Clean Storage Tank for Seabuckthron Juice Production	新疆喀纳斯亿嘉康生物科技有限公司；新疆农业科学院农产品贮藏加工研究所 Xinjiang Kanas Yijiakang Biotechnology Co., Ltd.; Agricultural Products Storage and Processing Institute, Xinjiang Academy of Agricultural Sciences
46	CN222112109U	CN202420681810.7	2024.04.03	一种沙棘冻干粉加工用粉碎装置 A Crushing Device for Freeze-Dried Seabuckthron Powder Processing	山西五台山沙棘制品有限公司 Shanxi Wutaishan Seabuckthron Products Co., Ltd.

47	CN118286349A	CN202410428141.7	2024.04.10	一种具有调节血糖作用的中药组合物及其制备方法和应用 A Chinese Medicinal Composition with the Effect of Regulating Blood Sugar and its Preparation Method and Application	山西献果园生物科技股份有限公司；山西中医药大学 Shanxi Xianguoyuan Biotechnology Co., Ltd.; Shanxi University of Chinese Medicine
48	CN222054489U	CN202420751090.7	2024.04.11	一种冻干沙棘粉的打浆设备 A Pulping Equipment for Freeze-Dried Seabuckthron Powder	丹东君宝生物科技有限公司 Dandong Junbao Biotechnology Co., Ltd.
49	CN222054539U	CN202420756506.4	2024.04.12	一种沙棘汁生产杀菌设备 A Sterilization Equipment for Seabuckthron Juice Production	新疆喀纳斯亿嘉康生物科技有限公司；新疆农业科学院农产品贮藏加工研究所 Xinjiang Kanas Yijiakang Biotechnology Co., Ltd.; Agricultural Products Storage and Processing Institute, Xinjiang Academy of Agricultural Sciences
50	CN309010342S	CN202430222204.4	2024.04.19	包装盒（垦小族雪莲虫草沙棘液） Packaging Box (Kenxiaozu Snow Lotus Cordyceps Seabuckthron Liquid)	南京复力食品有限公司 Nanjing Fuli Food Co., Ltd.
51	CN118542156A	CN202410482306.9	2024.04.22	一种基于二段法的沙棘嫩枝扦插方法 A Method for Tender Branch Cutting Propagation of Seabuckthorn Based on a Two-Stage Process	拉萨市汇慧农林科技有限公司 Lhasa Huihui Agro-Forestry Technology Co., Ltd.
52	CN308994783S	CN202430230394.4	2024.04.23	玻璃瓶（慧华沙棘） Glass Bottle (Huihua Seabuckthorn)	新疆慧华沙棘生物科技有限公司 Xinjiang Huihua Seabuckthorn Biotechnology Co., Ltd.
53	CN308987243S	CN202430230435.X	2024.04.23	玻璃瓶（慧华沙棘） Glass Bottle (Huihua Seabuckthorn)	新疆慧华沙棘生物科技有限公司 Xinjiang Huihua Seabuckthorn Biotechnology Co., Ltd.
54	CN308995092S	CN202430239411.0	2024.04.25	饮品包装盒（沙棘） Beverage Packaging Box (Seabuckthorn)	山东新华技工学校有限公司 Shandong Xinhua Technical School Co., Ltd.
55	CN118105317A	CN202410517651.1	2024.04.28	含鸸鹋油的祛疤组合物及其制备方法和应用 A Scar Removal Composition Containing Emu Oil and its Preparation Method and Application	广东粤港澳大湾区黄埔材料研究院；美匠生物医药（广州）有限公司 Guangdong Hong Kong-Macao Greater Bay Area Huangpu Materials Research Institute; Meijiang Biomedical (Guangzhou) Co., Ltd.
56	CN309010414S	CN202430253592.2	2024.04.30	包装盒（燕窝沙棘胶原蛋白肽饮品） Packaging Box (Bird's Nest Seabuckthorn Collagen Peptide Drink)	耒阳市刘燕酿制生物科技有限公司 Leiyang City Liuyan Brewing Biological Technology Co., Ltd.
57	CN118235863A	CN202410532584.0	2024.04.30	一种具有延缓衰老效果的特殊膳食及其制备方法 A Special Diet Food with Anti-Aging Effect and its Preparation Method	山东太爱肽生物科技股份有限公司 Shandong Taiai Peptide Biotechnology Co., Ltd.

58	CN222217106U	CN202420960974.3	2024.05.07	一种沙棘饮料生产用果汁渣分离装置 A Juice Residue Separation Device for Seabuckthorn Beverage Production	青海隆福佳人农业产业化有限责任公司 Qinghai Longfujiaren Agricultural Industrialization Co., Ltd.
59	CN118496188A	CN202410559344.X	2024.05.08	一种具有抗氧化、抗衰老功效的低聚原花青素及其制备方法 A Oligomeric Proanthocyanidin with Antioxidant and Anti-Aging Effects and its Preparation Method	广州柏为科技有限公司 Guangzhou Baiwei Technology Co., Ltd.
60	CN118511777A	CN202410576237.8	2024.05.10	一种沙化地区的治理方法 A Method for Desertification Control in Sandy Areas	内蒙古工业大学 Inner Mongolia University of Technology
61	CN309034618S	CN202430305813.6	2024.05.22	药品包装盒（沙棘糖浆） Medicine Packaging Box (Seabuckthorn Syrup)	浙江聚捷健康医药有限公司 Zhejiang Jujie Health Medicine Co., Ltd.
62	CN118526430A	CN202410656462.2	2024.05.24	一种含有山茶籽油提取物的紧致抗衰的精华油及其制作方法 A Firming and Anti-Aging Essence Oil Containing Camellia Seed Oil Extract and its Production Method	广州新丝美生物科技有限公司 Guangzhou Xinsimei Biotechnology Co., Ltd.
63	CN118236307A	CN202410680516.9	2024.05.29	一种抗氧化复合纳米乳液及其制备方法和在化妆品中的应用 An Antioxidant Compound Nanoemulsion, its Preparation Method, and Application in Cosmetics	广东依欧好化妆品有限公司；广东欧皓生物有限公司 Guangdong Yi Ou Hao Cosmetics Co., Ltd.; Guangdong Ou Hao Bio Co., Ltd.Seabuckthorn
64	CN118304788A	CN202410735841.0	2024.06.07	一种沙棘果汁自动化制备装置 An Automated Preparation Device for Seabuckthorn Juice	甘肃艾康沙棘制品有限公司 Gansu Aikang Products Co., Ltd.
65	CN118750454A	CN202410754980.8	2024.06.12	一种纳米脂肪乳包裹的维生素 D 干粉原料的制备方法和应用 A Preparation Method and Application of Vitamin D Dry Powder Raw Material Encapsulated in Nano-Lipid Emulsion	迈迪欣生物医药科技（西安）有限公司 Maidi Xin Biomedical Technology (Xi’an) Co., Ltd.
66	CN118556795A	CN202410827290.0	2024.06.25	一种增加肉牛肌内脂肪沉积的饲料及其制备方法 A Feed for Increasing Intramuscular Fat Deposition in Beef Cattle and its Preparation Method	山东省农业科学院畜牧兽医研究所 Institute of Animal Husbandry and Veterinary Medicine, Shandong Academy of Agricultural Sciences
67	CN118873569A	CN202410897859.0	2024.07.05	复合药物组合物及其应用和控制剑水蚤爆发的方法 A Compound Drug Composition, its Application, and a Method for Controlling Cyclops Outbreaks	广东海洋大学；海南康冠生物科技有限公司 Guangdong Ocean University; Hainan Kangguan Biotechnology Co., Ltd.
68	CN118845524A	CN202410921085.0	2024.07.10	一种淡纹紧致三重活性胶原组合物及其制备方法和应用 A Wrinkle-Fading and Firming Triple-Active Collagen Composition, its Preparation Method and Application	广州小姿电子商务有限公司；广州她她生物科技有限公司 Guangzhou Xiaozhi E-commerce Co., Ltd.; Guangzhou Tata Biotechnology Co., Ltd.

69	CN118902954A	CN202410953384.2	2024.07.16	一种淡红舒缓修护乳及其制备方法 A Redness-Reducing and Soothing Repair Lotion and its Preparation Method	珠海姗拉娜化妆品有限公司 Zhuhai Shalanana Cosmetics Co., Ltd.
70	CN118716538A	CN202410967323.1	2024.07.18	一种凡纳滨对虾饲料及其制备方法 A Feed for Litopenaeus vannamei and Its Preparation Method	广东海洋大学 Guangdong Ocean University
71	CN118853934A	CN202410966866.1	2024.07.18	一种西藏沙棘性染色体特异性分子标记的开发及应用 The Development and Application of Sex Chromosome Specific Molecular Markers for Tibetan Seabuckthorn	西藏大学 Tibet University
72	CN118754785A	CN202410979403.9	2024.07.22	一种防病促根微生物菌肥及其制备方法 A Disease-Preventing and Root-Promoting Microbial Bio-Fertilizer and its Preparation Method	湖北永壮生态科技有限公司 Hubei Yongzhuang Ecological Technology Co., Ltd.
73	CN118576628A	CN202411019308.0	2024.07.29	一种沙棘叶中提取苷类总黄酮的方法 A Method for Extracting Total Glycoside Flavonoids from Seabuckthorn Leaves	四川淇力康生物科技有限公司 Sichuan Qilikang Biotechnology Co., Ltd.
74	CN118543266A	CN202411016681.0	2024.07.29	一种航天员适用的含沙棘食品混合加工设备及制备方法 A Mixed Processing Equipment and Preparation Method for Seabuckthorn Food Suitable for Astronauts	津星宇医药科技有限公司 Jinxingyu Pharmaceutical Technology Co., Ltd.
75	CN118542218A	CN202411028943.5	2024.07.30	一种沙棘种植节水及均匀滴灌装置 A Water-Saving and Uniform Drip Irrigation Device for Seabuckthorn Planting	鄂尔多斯市林业和草原事业发展中心 Erdos Forestry and Grassland Development Center
76	CN118592206A	CN202411081441.9	2024.08.08	一种沙棘采收装置 A Seabuckthorn Harvesting Device	内蒙古工业大学 Inner Mongolia University of Technology
77	CN118910003A	CN202411099636.6	2024.08.12	一种具有高稳定性的脂肪酶及其应用 A Lipase with High Stability and its Application	杭州佳嘉乐生物技术有限公司 Hangzhou Jiajiale Biotechnology Co., Ltd.
78	CN119120676A	CN202411102766.0	2024.08.12	一种用于鉴别江孜沙棘雌雄株的分子标记、引物组及其应用 A Molecular Marker, Primer Set and Application for Distinguishing Female and Male Plants of Hippophae thibetana var. gyantsensis	中国科学院西双版纳热带植物园 Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences
79	CN118681249A	CN202411156283.9	2024.08.22	一种沙棘果油除乙醇的装置及方法 A Device and Method for Ethanol Removal from Seabuckthorn Fruit Oil	四川淇力康生物科技有限公司 Sichuan Qilikang Biotechnology Co., Ltd.
80	CN119015179A	CN202411193255.4	2024.08.28	一种复合植物油及其制备方法 A Compound Vegetable Oil and its Preparation Method	广州市澳莱化妆品有限公司 Guangzhou Aolai Cosmetics Co., Ltd.

81	CN118806612A	CN202411267133.5	2024.09.11	一种负载愈创奠的油包油微囊及其制备方法和应用 An Oil-in-Oil Microcapsule Loaded with Guaiazulene, its Preparation Method and Application	杭州岛屿星晴生物技术有限公司 Hangzhou Daoyuxingqing Biotechnology Co., Ltd.
82	CN118895349A	CN202411276086.0	2024.09.12	一种用于早期鉴别江孜沙棘性别的引物对、试剂盒及应用 A Primer Pair, Reagent Kit, and Application for Early Gender Identification of Hippophae thibetana var. gyantsensis	南京林业大学 Nanjing Forestry University
83	CN119074574A	CN202411284412.2	2024.09.12	一种防断发、低敏、修复用染发剂 A Hair Dye for Anti-Breakage, Low Sensitivity, and Repair	广州养怡堂医药科技有限公司 Guangzhou Yangyitang Pharmaceutical Technology Co., Ltd.
84	CN118787101A	CN202411284638.2	2024.09.13	一种用于沙棘加工的过滤装置 A Filtering Device for Seabuckthorn Processing	山西五台山沙棘制品有限公司 Shanxi Wutaishan Seabuckthorn Products Co., Ltd.
85	CN118995321A	CN202411303926.8	2024.09.19	一种唇油植物精油萃取设备 A Lip Oil Botanical Essential Oil Extraction Equipment	北京至乐界生物科技有限公司 Beijing Zhilejie Biotechnology Co., Ltd.
86	CN118813729A	CN202411312663.7	2024.09.20	一种甘油二酯的制备方法及应用 A Method for Preparing Diglycerides and its Application	广东善百年特医食品有限公司 Guangdong Shanbainian Special Medical Food Co., Ltd.
87	CN118806671A	CN202411317235.3	2024.09.20	微凝珠护肤品及其制备方法 Micro-Gel Bead Skin Care Product and its Preparation Method	科渼莳化妆品（宁波）有限公司 Kemeishi Cosmetics (Ningbo) Co., Ltd.
88	CN118844628A	CN202411339141.6	2024.09.25	一种抗糖化和延缓衰老的组合物及其制备方法 A Composition for Anti-Glycation and Anti-Aging and its Preparation Method	吉林衡美宇创健康科技有限公司；浙江衡美健康科技股份有限公司 Jilin Hengmeiyuchuang Health Technology Co., Ltd.; Zhejiang Hengmei Health Technology Co., Ltd.
89	CN118901370A	CN202411392267.X	2024.10.08	一种沙棘种植水溶肥施肥装置 A Water-Soluble Fertilizer Application Device for Seabuckthorn Planting	鄂尔多斯市林业和草原事业发展中心 Erdos Forestry and Grassland Development Center
90	CN118892032A	CN202411398356.5	2024.10.09	一种防破损的自动化沙棘脱果机 An Automated Seabuckthorn De-fruiting Machine for Damage Prevention	甘肃陇源红生物科技有限公司 Gansu Longyuanhong Biotechnology Co., Ltd.
91	CN119033056A	CN202411523725.9	2024.10.30	一种富硒姬松茸固体饮料及其制备方法 A Selenium-Enriched Agaricus blazei Solid Beverage and its Preparation Method	北京同仁堂科技发展成都有限公司 Beijing Tongrentang Technology Development Chengdu Co., Ltd.
92	CN222090203U	CN202422658723.2	2024.11.01	一种沙棘果实采摘装置 A Seabuckthorn Fruit Picking Device	内蒙古农业大学 Inner Mongolia Agricultural University

93	CN119033855A	CN202411545119.7	2024.11.01	一种润肠通便的中药复方口服液及其制备方法 A Traditional Chinese Medicine Compound Oral Liquid for Bowel Movement and its Preparation Method	内蒙古蒙氏纳药科技有限公司 Inner Mongolia Mengshinayao Technology Co., Ltd.
94	CN222248878U	CN202422895346.4	2024.11.27	一种输送沙棘原浆袋的皮带输送机的清理结构 A Cleaning Structure for the Belt Conveyor of Seabuckthorn Primary Juice Bags	内蒙古宇航人高技术产业有限责任公司 Inner Mongolia Yuhangren High-Tech Industry Co., Ltd.
95	CN222267288U	CN202422895340.7	2024.11.27	一种沙棘果皮的粉碎装置 A Crushing Device for Seabuckthorn Peel	内蒙古宇航人高技术产业有限责任公司 Inner Mongolia Yuhangren High-Tech Industry Co., Ltd.
96	CN222236561U	CN202422895345.X	2024.11.27	一种沙棘汁饮料加工用灭菌装置 A Sterilization Device for Seabuckthorn Juice Beverage Processing	内蒙古宇航人高技术产业有限责任公司 Inner Mongolia Yuhangren High-Tech Industry Co., Ltd.
97	CN222236600U	CN202422912473.0	2024.11.28	一种沙棘果干燥装置 A Seabuckthorn Fruit Drying Device	内蒙古宇航人高技术产业有限责任公司 Inner Mongolia Yuhangren High-Tech Industry Co., Ltd.
98	CN119229999A	CN202411748220.2	2024.12.0	一种沙棘全成分提取过程智能优化方法及系统 An Intelligent Optimization Method and System for the Extraction Process of All Seabuckthorn Components	南京优百安生物科技有限公司 Nanjing Youbaian Biotechnology Co., Ltd.
99	CN119220397A	CN202411749319.4	2024.12.02	一种沙棘籽料蛋白质提取装置 A SeaBuckthorn Seed Meal Protein Extraction Device	内蒙古宇航人高技术产业有限责任公司 Inner Mongolia Yuhangren High-Tech Industry Co., Ltd.

3.2.2 Published Papers

In 2024, a total of 251 papers focusing on seabuckthorn were published in various national scientific and technological journals. The scope of the research encompasses fields such as Forestry, Fundamental Agricultural Science, Agronomy, Plant Protection, Agricultural Economics, Biology, Light Industry, Traditional Chinese Medicine (TCM), Chinese Materia Medica, Animal Husbandry, and Veterinary Medicine, among others. (See Appendix 1 for details.)

3.2.3 Technical Standards

In 2024, three Group Standard proposals met the project initiation requirements and were newly approved. As of 2024, totally 16 group standards as the following have been implemented:

A. Seabuckthorn Flavonoids, T/ISAS 001—2019

B. Seabuckthorn juice, T/ISAS 002—2021

C. Seabuckthorn seed oil, T/ISAS 003—2021

D. Seabuckthorn fruit oil, T/ISAS 004—2021

E. Seabuckthorn seed procyanidins, T/ISAS 005—2021

2. 发表论文

2024 年，我国沙棘专家在全国各类科技杂志发表沙棘 251 篇，研究领域涵盖林业、农业基础科学、农艺学、植物保护、农业经济、生物学、轻工业、中医学、中药学、畜牧与动物医学等方面。（详见附件 1）

3. 技术标准

2024 年，按照《国际沙棘协会标准管理办法》规定，颁布实施了 3 项技术标准。截止 2024 年底，国际沙棘协会已颁布实施了以下 16 项团体标准：

（1）沙棘黄酮 Seabuckthorn Flavonoids，T/ISAS 001—2019，2019/4/23 施行
（2）沙棘原果汁 Seabuckthorn juice，T/ISAS 002—2021，2021/12/21 施行
（3）沙棘籽油 Seabuckthorn seed oil，T/ISAS 003—2021，2021/12/21 施行
（4）沙棘果油 Seabuckthorn fruit oil，T/ISAS 004—2021，2021/12/21 施行
（5）沙棘籽原花青素 Seabuckthorn seed procyanidins，T/ISAS 005—2021，2021/12/21 施行
（6）沙棘果粉 Seabuckthorn fruit powder，T/ISAS 006—2022，施行 2022/11/20
（7）沙棘叶茶 Seabuckthorn leaf tea，T/ISAS 007—2022，2023/1/29 施行
（8）果实丰产型沙棘新品种评价规范 Code for evaluation of high-yield seabuckthorn

F. Seabuckthorn fruit powder, T/ISAS 006—2022

G. Seabuckthorn leaf tea, T/ISAS 007—2022

H. Code for evaluation of high-yield seabuckthorn varieties, T/ISAS 008—2022

I. Code for evaluation of eco-economic seabuckthorn cultivars, T/ISAS 009—2023

J. Standard for evaluation of fresh eating type seabuckthorn cultivars, T/ISAS 010—2023

K. Technical regulation of seabuckthorn softwood cutting in alpineplateau regions, T/ISAS 011—2023

L. Technical regulations for cultivation and management of seabuckthorn plantations, T/ISAS 012—2023

M. Standard for raw materials of seabuckthorn leaf, T/ISAS 013—2023

N. Seabuckthorn leaf powder and technique specification for processing, T/ISAS 014—2024

O. Technical Regulation for Improving Quality and Efficiency of Seabuckthorn Forests, T/ISAS 015—2024

P. Seabuckthorn clear juice, T/ISAS 016—2024

varieties，T/ISAS 008—2022，2023/1/29 施行

（9）生态经济型沙棘新品种评价规范 Code for evaluation of eco-economic seabuckthorn cultivars，T/ISAS 009—2023，2023/8/31 施行

（10）鲜食型沙棘品种评价规范 Standard for evaluation of fresh eating type seabuckthorn cultivars，T/ISAS 010—2023，2023/11/30 施行

（11）青藏高原区沙棘嫩枝扦插技术规程 Technical regulation of seabuckthorn softwood cutting in alpineplateau regions，T/ISAS 011—2023，2023/11/30 施行

（12）种植园建设与管理技术规程 Technical regulations for cultivation and management of seabuckthorn plantations，T/ISAS 012—2023，2023/11/30 施行

（13）沙棘叶原料 Standard for raw materials of seabuckthorn leaf，T/ISAS 013—2023，施行 2023/11/30

（14）沙棘叶粉加工技术规范 Seabuckthorn leaf powder and technique specification for processing，T/ISAS 014—2024，2024/12/31 施行

（15. 沙棘林提质增效技术规程 Technical Regulation for Improving Quality and Efficiency of Seabuckthorn Forests，T/ISAS 015—2024，2024/12/31 施行

（16）沙棘清汁 Seabuckthorn clear juice，T/ISAS 016—2024，2024/12/31 施行。

4.Related Information of Seabuckthorn Enterprises in China

For over four decades, China's seabuckthorn development has cultivated a robust team of experts covering a wide range of technical specializations. There are approximately 15,000 professionals in the field, including over a dozen industries and sectors such as forestry, agriculture, soil and water conservation, horticulture, and public health. These experts, with profound qualifications, come from major universities and specialized research institutes across the country, giving China a significant advantage in expert resources compared to other countries. Through joint efforts, they have successfully carried out international cooperation projects on seabuckthorn, achieving remarkable results. The Enterprise Committee of the International Seabuckthorn Association (China), established in May 2017, is a secondary body of ISA. is an industry organization dedicated to promoting resource integration, technological upgrading, and international cooperation within China's sea - buckthorn industry. It focuses on key areas such as ecological conservation, the development of health products, and industrial growth. By the end of 2024, the Committee had reached a membership of 106 institutional members (as shown in Table 4).

四、中国沙棘企业相关信息

四十多年来，中国沙棘开发培养了一支强大的沙棘专家团队，涉及的技术专业领域广泛。沙棘从业人员约 15000 多人，包括林业、农业、水土保持、园艺、卫生等十多个行业和领域，专家资历深厚，来自全国各大高等院校及专业科研院所，专家力量较其他国家具有很强的优势，通过专家联合，共同开展沙棘国际合作项目，取得了很好的成效。国际沙棘协会（中国）企业委员会成立于 2017 年 5 月，是国际沙棘协会的二级机构，致力于推动中国沙棘产业资源整合、技术升级与国际合作的行业组织，聚焦生态保护、健康产品开发及产业化发展。截止 2024 年底有团体会员 106 家（详见表 4）。

表 4. 国际沙棘协会（中国）企业委员会团体会员名单
Table 4. Name list of Enterprise Committee (China) of ISA

序号 No	名称 Name of member	备注 Title in Committee	联系人 Contact person	职务 Title
1	高原圣果沙棘制品有限公司 Gaoyuanshengguo Seabuckthorn Co. Ltd	会长单位 Chairman	殷丽强 YIN Liqiang	总经理 General Manager
2	北京宝得瑞健康产业有限公司 Beijing Powder Health Industrial Co. Ltd	副会长单位 Vice Chairman	罗会兵 LUO Huibing	总经理 General Manager
3	河北神兴沙棘研究院 Hebei Shenxing Seabuckthorn Academy	副会长单位 Vice Chairman	苏慧丰 SU HuiFeng	副院长 Vice-President
4	吕梁野山坡食品有限责任公司 Lvliang Yeshanpo Food Co.Ltd	副会长单位 Vice Chairman	弓兴宇 Gong Xingyu	董事长 Chairman
5	陕西海天制药有限公司 Shaanxi Haitian Pharmaceutical Co.Ltd	副会长单位 Vice Chairman	宋凯乐 SONG Kaile	董事长助理 Assistan to Chairman
6	吉林吉隆东北沙棘产业有限责任公司 Jilin Jilong Seabuckthorn Industry Co., Ltd	副会长单位 Member	刘三利 LIU Sanli	董事长 Chairman
7	上海容邦企业集团有限公司 Shanghai Rongbang Enterprise Group Co., Ltd.	副会长单位 Vice Chairman	李相军 LI Xiangjun	董事长 Chairman
8	内蒙古宇航人高技术产业有限责任公司 Inner Mongolia Yuhangren High-tech Industry Co. Ltd	副会长单位 Vice Chairman	姚玉军 YAO Yujun	业务经理 Manager
9	黑龙江中福沙棘有限责任公司 Heilongjiang Zhongfu Seabuckthorn Co., Ltd	副会长单位 Vice Chairman	杜中元 DU Zhongyuan	董事长 Chairman
10	承德宇航人高山植物应用技术有限责任公司 Chengde Astronaut Alpine Plant Application Technology Co., Ltd.	副会长单位 Vice Chairman	刘春海 Liu Chunhai	董事长 Chairman
11	陕西黄龙国寿堂生物工程有限公司 Shaanxi Huan- glong Guoshoutang Bioengineering Co. Ltd	副会长单位 Vice Chairman	陈家顺 CHEN Jiashun	董事长 Chairman
12	新疆景华天宝科技发展有限公司 Xinjiang Jinghua- tianbao Tech-development Co. Ltd	副会长单位 Vice Chairman member	刘佳羽 LIU Jiayu	总经理 General Manager
13	新疆康元生物技术集团股份有限公司 Xinjiang Kangyuan Bio-tech Co. Ltd	副会长单位 Vice Chairman	刘宗浩 LIU Zonghao	董事长 Chairman
14	新疆中科沙棘科技有限公司 Xinjiang Zhongke Sea- buckthorn Tech Co. Ltd	副会长单位 Vice Chairman	徐均 XU Jun	董事长 Chairman
15	布尔津县松源林果生物科技有限公司 Burjin Songyuan Linguo Biotechnology Co., Ltd	副会长单位 Vice Chairman	靳慧林 JIN Huilin	董事长 Chairman
16	山西献果园生物科技有限公司 Shanxi Xianguoyuan Bio-tech Co. Ltd	副会长单位 Vice Chairman	曹满 CAO Man	董事长 Chairman
17	北京汇源食品饮料有限公司 Beijing Huiyuan Food & Beverage Co., Ltd	副会长单位 Vice Chairman	李生延 LI Shengyan	副总裁 Vice President

18	阿勒泰太阳石健康产业发展有限公司 Altay Sunstone Health Industry Development Co., LTD	副会长单位 Vice Chairman	邓惠中 DENG Huizhong	总经理 General Manager
19	青海康普生物科技股份有限公司 Qinghai CommScope Biotechnology Co., Ltd.	副会长单位 Vice Chairman	孙允武 SUN Yunwu	总经理 General Manager
20	山西待见生物科技有限公司 Shanxi Waitsee Biotechnology Co., Ltd	副会长单位 Vice Chairman	陈志辉 CHEN Zhihui	总经理 General Manger
21	鄂尔多斯市聚远创意农牧业有限公司 Ordos Juyuan Creative Agriculture and Animal Husbandry Co., Ltd	副会长单位 Vice Chairman	王志伟 WANG Zhiwei	总经理 General Manager
22	延寿县鼎鑫生物工程有限公司 Yanshou Xian Dingxin Bioengineering Co., Ltd	理事单位 Board Member	张建东 ZHANG Jiandong	总经理 General Manager
23	山西省林业和草原科学研究院 Shanxi Academy of Forestry and Grassland Sciences	理事单位 Board Member	贺义才 HE Yicai	所长 Director
24	内蒙古淳点实业有限公司 Inner Mongolia Chundian Industry Co. Ltd	理事单位 Board member	毕书杰 BI Shujie	董事长 Chairman
25	中国内蒙古森林工业集团有限责任公司 China Inner Mongolia Forest Industry Group Co., Ltd	理事单位 Board Member	许玉成 XU Yucheng	部门经理 Department Manager
26	内蒙古沙漠之花生态产业科技有限公司 Inner Mongolia Shamozhihua Bio-industry Tech Co. Ltd	理事单位 Board member	胥申 XU Shen	董事长 Chairman
27	大连民族植物研究所 Botalical Institute of Dalian Minzu University	理事单位 Board member	阮成江 RUAN Chengjiang	所长 Director
28	辽宁省旱地农林研究所 Liaoning Provincial Institue for Dryland Agro-forestry Research	理事单位 Board member	张东为 ZHANG Dongwei	副所长 Deputy Director
29	黑龙江省八面通林业局 Bamiantong Forestry Bereau of Helonngjian Province	理事单位 Board member	段国庆 DUAN Guoqing	副局长 Deputy Head
30	黑龙江省农业科学院 Heilongjiang Academy for Agricultural Science	理事单位 Board member	单金友 SHAN Jinyou	研究员 Researcher
31	兰州大学药学院 College of Pharmacy, Lanzhou University	理事单位 Board member	杨志刚 YANG Zhigang	副院长 Vice Dean
32	山西五台山沙棘制品有限公司 Shanxi Wutaishan Seabuckthorn Co. Ltd	理事单位 Board member	赵志侃 ZHAO Zhikan	董事长 Chairman
33	山西科林生物技术开发有限公司企业 Shanxi Kelin Bio-tech Development Co. Ltd	理事单位 Board member	宁聚保 NING Jubao	总经理 General Manager
34	山西助农药茶资源开发有限公司 Shanxi Zhunong Hherbal Tea Resources Devel- opment Co. Ltd	理事单位 Board member	宫铁军 GONG Tiejun	董事长 Chairman
35	林下产业黑龙江有限公司 Forest Industry Heilongjiang Co., Ltd.	理事单位 Board member	丛志甲 CONG Zhijia	总经理 General Manager
36	新疆戈壁记忆品牌管理有限公司 Xinjiang Gobi Memory Brand Management Co., Ltd.	理事单位 Board Member	张文莉 ZHANG Wenli	董事长 Chairman

37	康金蓓（深圳）科技有限公司 Xinjiang Kanas Yijiakang Biotechnology Co., Ltd.	理事单位 Board Member	刘政 LIU Zheng	总经理 General Manager
38	新疆昆仑天和国际贸易有限公司 Xinjiang Kunlun Tianhe International Trade Co., Ltd.	理事单位 Board Member	蒋剑飞 JIANG Jianfei	总经理 General Manager
39	江苏奥嘉网络科技有限公司 Jiangsu Aojia Network Technology Co., Ltd	理事单位 Boder Member	陈芳 CHEN Fang	经理 Manager
40	青海倍力甘草科技发展有限责任公司 Qinghai Beili Licorice Science and Technology Devel-opment Co., Ltd	理事单位 Board Member	骆俊才 LUO Juncai	董事长 Chairman
41	新疆益中园农业科技开发有限责任公司 Xinjiang Yizhong Park Agricultural Science and Technology Development Co., Ltd	理事单位 Board Member	余明会 YU Minghui	总经理 General Manager
42	南京优乐泉生物科技有限公司 Nanjing Youlequan Biotechnology Co., Ltd	理事单位 Board Member	李晓军 LI XiaoJun	总经理 General Manager
43	啊啦膳（上海）品牌管理有限公司 Alashan (Shanghai) Brand Management Co., Ltd	理事单位 Borard Member	胡晓晓 HU Xiaoxiao	总经理 General Manager
44	甘肃农业大学食品科学与工程学院 Gansu Agricultural University College of Food Sci-ence and Engineering	理事单位 Borard Member	蒋玉梅 JIANG Yumei	教授 Professor
45	中北大学生物材料与发酵研究所 Institute of Biomaterials and Fermentation, North University of China	理事单位 Borard Member	郭建峰 GUO Jianfeng	教授 Professor
46	新疆丰裕生物科技有限责任公司 Xinjiang Fengyu Biotechnology Co., Ltd.	理事单位 Board Member	曹庆武 CAO Qingwu	总经理 General Manager
47	每日元气（深圳）健康科技有限公司 Daily Genki (Shenzhen) Health Technology Co., Ltd	理事单位 Borard Member	张妍 ZHANG Yan	总经理 General Manager
48	威海品信生物科技有限公司 Weihai Pinxin Biotechnology Co., Ltd.	理事单位 Board Member	王星 WANG Xing	总经理 General Manger
49	杭州银曼电子商务有限公司 Hangzhou Yinman E-Commerce Co., Ltd.	理事单位 Borard Member	徐长应 XU Changying	总经理 General Manager
50	宁夏华信达健康科技有限公司 Ningxia Huaxinda Health Technology Co., Ltd.	理事单位 Board Member	武康宁 WU Kangning	总经理 General Manger
51	内蒙古大兴安岭重点国有林管理局 Inner Mongolia Daxinganling State-owned For- estry Bereau	会员单位 Member	周艳昌 ZHOU Yanchang	总会计师 Chief Accountant
52	内蒙古鄂尔多斯乌兰集团公司 Inner Mongolia Erdos Wulan Group Co.	会员单位 Member	康占义 KANG Zhanyi	副总经理 Deputy General Man-ager
53	黑龙江圣宝泰农业有限公司 Helongjiang Shengbaotai Agricuture Co. Ltd	会员单位 Member	赵胜臣 ZHAO Shengchen	董事长 Chairman

54	上海沃迪智能装备股份有限公司 Shanghai Wodizineng Equipment Corporation	会员单位 Member	王冲 WANG Chong	业务经理 Manager
55	清华德人西安幸福制药有限公司 Qinghua Deren Xi’an Happiness Pharmaceutical Co. Ltd	会员单位 Member	刘红娜 LIU Hongna	研究员 Researcher
56	新疆疆果四季科技有限公司 Xinjiang Jiangguo Siji technology Co., Ltd	会员单位 Member	步艳东 BU Yandong	总经理 General Manager
57	新疆慧华沙棘生物科技有限公司 Xinjiang Huihua Seabuckthorn Bio-tech Co. Ltd	会员单位 Member	蔡永国 CAI Yongguo	经理 Manager
58	山西维仕杰食品饮料有限责任公司 Shanxi Weishijie Food & Drink Co. Ltd	会员单位 Member	赵永卫 ZHAO Yongwei	董事长 Chairman
59	山西金科海生物科技有限公司 Shanxi Jinkehai Bio tech Co. Ltd	会员单位 Member	郭海利 GUO Haili	董事长 Chairman
60	山西恒义生物科技有限公司 Shanxi Hengyi Bio-tech Co. Ltd	会员单位 Member	许张兵 XU Zhangbing	总经理 General Manager
61	山西高原圣果沙棘生物有限公司 Shanxi Gaoyuanshengguo Seabuckthorn Biolod- ical Co. Ltd	会员单位 Member	武国昌 WU Guochang	总经理 General Manager
62	内蒙古万柳生态农业有限责任公司 Inner Mongolia Wangliu Eco-agriculture Co. Ltd	会员单位 Member	郭秋实 GUO Qiushi	董事长 Chairman
63	内蒙古大唐药业股份有限公司 Inner Mongolia Datang Pharmaceutical Co. Ltd	会员单位 Member	梁国栋 LIANG Guodong	总经理 General Manager
64	内蒙古吉文林业局 Inner Mongolia Jiwen Forestry Bereau	会员单位 Member	杨英新 YANG Yingxin	总经理 General Manager
65	内蒙古毕拉河林业局 Inner Mongolia Bilahe Forestry Bereau	会员单位 Member	杨静磊 YANG Jinglei	主任 Director
66	内蒙古库都尔林业局 Inner Mongolia Kuduer Forestry Bereau	会员单位 Member	王获玺 WANG Huoxi	主任 Director
67	内蒙古大杨树林业局 Inner Mongolia Dayangshu Forestry Bereau	会员单位 Member	王元成 WANG Yuancheng	主任 Director
68	内蒙古蒙鑫农林产业科技有限公司 Inner Mongolia Mengxin Agri-forestry Industrial Technical Co. Ltd	会员单位 Member	陈国香 CHEN Guoxiang	副总经理 Vice General Manager
69	内蒙古大沙棘实业（集团）有限公司 Inner Mongolia Big Seabuckthorn Industrial Co. Ltd	会员单位 Member	陈羿达 CHEN Yida	总经理 General Manager
70	内蒙古鄂尔多斯市天骄资源发展有限责任公司 Inner Mongolia Erdos Tianjiao Resource Develop- ment Co. Ltd	会员单位 Member	李云飞 LI Yunfei	董事长 Chairman

71	吉林修养堂药业保健品有限公司 Jilin Qiuyangtang Pharmaceutcal & Healthcare Pod-uct Co. Ltd	会员单位 Member	李晓光 LI Xiaoguang	董事长 Chairman
72	吉林省富智达生态科技发展有限公司 Jinlin Fuzhida Eco-tech development Co. Ltd	会员单位 Member	刘杰 LIU Jie	经理 Manager
73	黑龙江省长乐山大果沙棘开发有限公司 Helongjiang Changleshan Seabuckthorn Develop-ment Co. Ltd	会员单位 Member	王忠校 WANG Zhongxiao	董事长 Chairman
74	黑龙江延寿县御禄园茶业有限公司 HeilongjiangYan- shou Yuluyuan Tea Industry Co. Ltd	会员单位 Member	李承捷 LI Chengjie	董事长 Chairman
75	黑龙江盛农食品有限公司 Helongjiang Shengnong Food Co. Ltd	会员单位 Member	姚忠华 YAO Zhonghua	董事长 Chairman
76	黑龙江牡丹江东安区康利果蔬农民专业合作社 Mudanjiang Donganqu Kangli Fruit & Vegetable Farmer Cooperative	会员单位 Member	邵珠宽 SHAO Zhukuan	经理 Manager
77	江苏常州燕和堂商贸有限公司 Changzhou Yanhetang Trade Co. Ltd	会员单位 Member	陈从梅 CHEN Congmei	董事长 Chairman
78	江苏扬州福尔喜果蔬汁机械有限公司 Yangzhou Fuerxi Fruit & Vegetable Juice Machinery Co.Ltd	会员单位 Member	许荣华 XU Ronghua	董事长 Chairman
79	浙江杭州沙美生物科技有限公司 Hangzhou Shamei Bio-tech Co. Ltd	会员单位 Member	李云天 LI Yuntian	经理 Manager
80	深圳东润生物科技开发有限公司 (绿野全棘) Shenzhen Dongrun Biotechnology Development Co., Ltd.	会员单位 Member	赵晓峰 ZHAO Xiaofeng	总经理 General Manager
81	山东科举药业有限公司 Shandong Keju Pharmaceutical Co., Ltd	会员单位 Member	蔚方超 Wei Fangchao	总经理 General Manager
82	山东菏泽中禾健元生物科技有限公司 Shandong Heze Zhongehe Jianyuan Bio-Tech Co. Ltd	会员单位 Member	储文宾 CHU Wenbin	总经理 General Manager
83	河南胜景堂生物科技有限公司 Henan Shengjingtang Bio-tech Co. Ltd	会员单位 Member	韩宜冬 HAN Yidong	董事长 Chairman
84	四川成都川大华西保健品有限公司 Sichuan Chengdu Chuanda Healthcare Product Co. Ltd	会员单位 Member	黄祥芳 HUANG Xiangfang	经理 Manager
85	陕西尔林兔药业有限公司 Shanxi Erlintu Pharmaceutical Co. Ltd	会员单位 Member	李勇建 LI Yongjian	总经理 General Manager
86	甘肃甘农生物科技有限公司 Gabsu Gannong Bio-tech Co. Ltd	会员单位 Member	傅雨萌 FU Yumeng	经理 Manager
87	青海久实虫草生物科技有限公司 Qinghai Jlushichongcao Bio-tech Co. Ltd	会员单位 Member	曾静 ZENG Jing	经理 Manager
88	延安圆方 (集团) 公司 Yan’an Yuanfang (Group) Company	会员单位 Member	赵志强 Zhao Zhiqiang	总经理 General Manager

89	青海安旭生物科技集团有限公司 Qinghai Anxu Bio-tech Co. Ltd	会员单位 Member	马安成 MA Ancheng	经理 Manager
90	青海伊纳维康生物科技有限公司 Tangut (CHINA) Co Ltd	会员单位 Member	董树林 DONG Shulin	副总经理 Vice General Manager
91	宁夏隆薯闽宁助残商贸中心 Ningxia Longsu Minningzhucan Trade Center	会员单位 Member	辛同宝 XIN Tongbao	总经理 General Manager
92	新疆西域珍品生物科技有限公司 Xinjiang Xiyuzhenpin Bio-tech Co. Ltd	会员单位 Member	李婧 LI Jing	总经理 General Manager
93	新疆吉萃元农业科技有限公司 XinJiang Jicuiyuan Agricultural Science and Technology Co., Ltd	会员单位 Member	陶桐生 TAO Tongsheng	总经理 General Manager
94	甘肃艾康沙棘制品有限公司 Gansu Aikang Seabuck- thron Co. Ltd	会员单位 Member	马静 MA Jing	总经理 General Manager
95	新疆金圣果农业专业合作社 Xinjiang Jinshengguo Agricultural Professional Cooperative	会员单位 Member	赵军丰 ZHAO Junfeng	总经理 General Manager
96	黑龙江金科沙棘有限公司 Heilongjiang Jinke Sea-buckthorn Co. LTD	会员单位 Member	王忠国 WANG Zhongguo	董事长 Chairman
97	新疆青河县隆濠生物科技发展有限公司 Xinjiang Qing- he County Longhao Bio-tech Co. Ltd	会员单位 Member	孙文胜 SUN Wensheng	总经理 General Manager
98	新疆一七零团丝路沙棘生物科技有限公司 Xinjiang 170tuan Silk Road Seabuckthorn Biotechnology Co., Ltd.	会员单位 Member	王军扬 WANG Junyang	总经理 General Manager
99	中国农业科学院农业资源与农业区划研究所 Institute of Agricultural Resources and Zoning, CAAS	会员单位 Member	尤飞 YOU Fei	研究员 Rsearcher
100	内蒙古蒙鑫农林产业科技有限公司 Inner Mongolia Mengxin Agriculture and Forestry Industry Technology Co., Ltd.	会员单位 Member	高玉琼 GAO yuqiong	总经理 General Manager
101	中国内蒙古森工集团阿尔山森林工业有限公司 China Inner Mongolia Forest Industry Group Alshan Forest Industry Co. LTD	会员单位 Member	金玉鑫 JIN Yuxin	总经理 General Manager
102	牡丹江市大棘生物科技有限公司 Mudanjiang Daji Biotechnology Co., Ltd.	会员单位 Member	刘宇航 LIU Yuhang	总经理 General Manager
103	四川星瑞健康产业集团有限公司 Sichuan Xingrui Health Industry Group Co., Ltd.	会员单位 Member	莫勇 MO Yong	总经理 General Manager
104	纯真时代生物科技（广州）有限公司 Innocence Times Biotechnology (Guangzhou) Co., Ltd	会员单位 Member	关伟 GUAN Wei	董事长 Chairman
105	成都骏亿丰商贸有限公司 Chengdu Junyifeng Trading Co., Ltd	会员单位 Member	赵大勇 ZHAO Dayong	总经理 General Manager

106	新疆汇邦生物科技有限公司 Xinjiang Huibang Biotechnology Co., Ltd	会员单位 Member	李波 Li Bo	总经理 General Manger
107	新疆吉克普林沙棘生物科技有限公司 Xinjiang Jiqingprin Seabuckthorn Biotechnology Co., Ltd	会员单位 Member	赵丹 ZHAO Dan	总经理 General Manager
108	大山小果生物科技（山西省）有限公司 Dashan Xiaoguo Biotechnology (Shanxi Province) Co., Ltd	会员单位 Member	邢如乐 XING Rule	总经理 General Manager
109	新疆达尔生物科技有限公司 Xinjiang Dar Biotechnology Co., Ltd	会员单位 Member	张杰 ZHANG Jie	总经理 General Manager
110	新乡市新亦兴机械设备有限公司 Xinxiang Xinyixing Machinery Equipment Co., Ltd	会员单位 Member	岳新亮 YUE Xinliang	总经理 General Manager
111	新疆大唐西域农业生态 科技有限公司 Agricultural ecology of Da Tang Xi Yu, Xinjiang Technology Co., Ltd	会员单位 Member	潘玮 PAN Wei	总经理 General Manager
112	新疆甄美西域食品有限公司 Xinjiang Zhenmei Xiyu Food Co., Ltd	会员单位 Member	宗浩 ZONG Hao	总经理 General Manager
113	新疆远古戈壁农业科技有限公司 Xinjiang YuanGuGeBi Agricultural Technology Co., Ltd	会员单位 Member	宋鹏 SONG Peng	总经理 General Manager
114	山西益健生物科技有限公司 Shanxi Yijian Biotechnology Co., Ltd	会员单位 Member	崔易 CUI Yi	总经理 General Manager
115	山东棘溢生物科技有限公司 Shandong JiYi Biotechnology Co., Ltd	会员单位 Member	王林建 WANG Linjian	总经理 General Manager
116	甘孜州鲜水金谷科技有限公司 Ganzi Zhou Xian Shui Jingu Technology Co., Ltd	会员单位 Member	曹雁飞 CAO YanFei	总经理 General Manager
117	孙吴县聚创科技有限公司 Sunwu Juchuang Technology Co., Ltd	会员单位 Member	齐会滨 QI Huibin	总经理 General Manager
118	汾阳汇维果汁饮品有限公司 Fenyang Huiwei Juice Beverage Co., Ltd	会员单位 Member	崔汝智 CUI Ruzhi	总经理 General Manager
119	四川省中梦佳汇泰生物科技有限责任公司 Sichuan Zhongmeng Jiahui Tai Biological Technology Co., Ltd.	会员单位 Member	孔祥瑞 KONG Xiangrui	经理 Manager
120	山西天汁然生物科技有限公司 Shanxi Tianjuran Biotechnology Co., Ltd	会员单位 Member	吕润生 Lv Runsheng	总经理 General Manager
121	山西合笙财餐饮管理有限公司 Shanxi Heshengcai Catering Management Co., Ltd	会员单位 Member	张永明 ZHANG Yongming	经理 Manager
122	活力善生物科技（武汉）有限公司 Vitality Biotechnology (Wuhan) Co., Ltd	会员单位 Member	丁勇 DING Yong	总经理 General Manager
123	西安派生生物科技有限公司 Xi’an Derivation Biotechnology Co., Ltd	会员单位 Member	尤烨龙 YOU Ye long	经理 Manager
124	四川淇力康生物科技有限公司 Sichuan Qilikang Biotechnology Co., Ltd	会员单位 Member	赵雄 ZHAO Xiong	总经理 General Manager
125	北京凭栏商贸有限公司 Beijing Pinglan Trading Co., Ltd.	会员单位	段东阳 DUAN Dongyang	总经理 General Manager

5. International Seabuckthorn Association and Its Main Activities

China has now established initial collaborative partnerships in the field of seabuckthorn with a diverse array of countries, including Russia, Germany, the United Kingdom, France, Greece, Latvia, Romania, Finland, Sweden, Mongolia, Japan, North Korea, India, Nepal, Pakistan, Kyrgyzstan, Iran, Canada, the United States, Chile, Peru, and Bolivia. Furthermore, China has previously obtained crucial technical and financial support from international organizations such as the World Bank, the United Nations Development Programme (UNDP), the European Union, the Perez - Guerrero Trust Fund for South - South Cooperation (PGTF), and the International Centre for Integrated Mountain Development (ICIMOD). Annual scientific and technological exchanges or economic cooperation related to seabuckthorn are carried out with various countries.

The Chinese government attaches great importance to the construction of ecological civilization and has proposed the “Belt and Road” development strategy. Seabuckthorn is an efficient soil and water conservation plant that can improve the ecological environment and promote economic development. Given its substantial ecological and economic value, it is imperative to capitalize on major policy opportunities, particularly by aligning with the Belt and Road Initiative, to advance bilateral and multilateral international exchange and cooperation in seabuckthorn. Among the 65 countries and regions associated with the “Belt and Road”, more than a dozen, including Russia, Mongolia, Kazakhstan, Tajikistan, Uzbekistan, Iran, India, Nepal, Pakistan, Germany, Finland, and Latvia, have already established seabuckthorn cultivation and industrial development and have certain basic conditions.

5.1 ISA Council and Secretariat

The International Seabuckthorn Association

五、国际沙棘协会及其主要活动

目前，中国已初步建立了与俄罗斯、德国、英国、法国、希腊、拉脱维亚、罗马尼亚、芬兰、瑞典、蒙古、日本、朝鲜、印度、尼泊尔、巴基斯坦、吉尔吉斯斯坦、伊朗、加拿大、美国、智利、秘鲁、玻利维亚等国家的合作联系，并曾经获得了世界银行、联合国开发署、欧盟、77 国集团佩罗基金、国际山地综合开发中心等国际组织的技术和资金支持，每年与各国开展沙棘科技交流或经济合作。

中国政府高度重视生态文明建设，提出“一带一路”发展战略。沙棘是一种高效的水土保持植物，可以改善生态环境建设，促进经济发展。沙棘具有巨大的生态价值和经济价值。我们必须抓住政策上的重大机遇，特别是与“一带一路”战略相结合，推动双边和多边沙棘国际交流与合作。在“一带一路”相关的65个国家和地区中，有十多个国家（包括俄罗斯、蒙古、哈萨克斯坦、塔吉克斯坦、乌兹别克斯坦、伊朗、印度、尼泊尔、巴基斯坦、德国、芬兰、拉脱维亚等）已经开展沙棘种植和产业发展，具备一定的基础条件。

（一）国际沙棘协会理事会及其秘书处

国际沙棘协会是由中国、德国、俄罗斯、芬兰等国专家于 2001 年发起成立，由全球积极开

was initiated in 2001 by experts from China, Germany, Russia, Finland and other countries. It is an academic and industrial international non-governmental, non-profit organization voluntarily composed of enterprises, institutions, individuals and other organizations globally that actively engage in seabuckthorn research and development. Approved by the Chinese Ministry of Foreign Affairs and authorized by the Ministry of Water Resources, it was formally registered with the Ministry of Civil Affairs of China in 2011, becoming the 27th international association headquartered in China.

On October 15, 2019, during the General Assembly of the ISA convened in Berlin, Germany, the Second Council was elected, comprising 14 members from seven countries: China, Germany, Russia, Finland, Latvia, India, and Canada. Subsequently, at the first meeting of this Council, Zhao Dongxiao, Director of Management Center for Seabuckthorn Development, MWR of China, and Lu Shunguang, Deputy Director of Management Center for Seabuckthorn Development, MWR of China, were elected as the Chair and Secretary-General of the ISA Council, respectively. Veli-Markku Korteniemi (Finland), Jörg-Thomas Mörsel (Germany), and Yury A. Zubarev (Russia) were elected as Vice-Chairs. Professor Baoru Yang from the University of Turku, Finland, was elected as the Chair of the Scientific Committee of the ISA for the new term. During the 2022 Annual Meeting of the ISA Council, Zhang Wencong, Director of Management Center for Seabuckthorn Development, MWR of China, was elected as the Council Chair, and Ms. Dorothee Berger from Germany was added as a new Council member.

On August 26, 2024, the Third General Assembly of the ISA was convened in Pruszków, a town near Warsaw, Poland. The assembly was attended by over 30 delegates from various countries, including Germany, Poland, France, Finland, Lithuania, Latvia, Romania, Mongolia, and China. Following proactive recommendations from member countries in the early stage and thorough deliberation by

展沙棘研究与开发的企事业单位、个人和其他组织自愿组成的学术性、行业性国际非政府、非营利组织，是经中国外交部同意、水利部批准，于 2011 年在中国民政部正式注册、第 27 个总部设在中国的国际性社团机构。

2019 年 10 月 15 日，在德国柏林召开的国际沙棘协会会员代表大会上，选举产生了由来自中国、德国、俄罗斯、芬兰、拉脱维亚、印度、加拿大等 7 个国家的 14 名成员组成的第二届理事会。在随后召开的国际沙棘协会第二届理事会第一次会议上，水利部沙棘开发管理中心主任赵东晓、副主任卢顺光分别当选为国际沙棘协会理事会主席、秘书长。来自芬兰的 Veli-Markku Korteniemi、德国的 Jörg-Thomas Mörsel、俄罗斯的 Yury A. Zubarev 分别当选为副主席。芬兰图尔库大学杨宝如 Baoru YANG 教授当选为新一届国际沙棘协会科技委员会主席。在 2022 年国际沙棘协会理事会年会上，水利部沙棘开发管理中心主任张文聪当选理事会主席，并增补来自德国的多萝西·贝克 Dorothee Berger 女士为理事。

2024 年 8 月 26 日，国际沙棘协会第三届会员代表大会在波兰华沙小镇普鲁斯科夫（Pruszkow）召开，来自德国、波兰、法国、芬兰、立陶宛、拉脱维亚、罗马尼亚、蒙古和中国等国家的 30 多名代表出席大会。通过前期各会员国的积极推荐和理事会的充分酝酿，

the council, the Third Council of the Association was elected at the conference. It consists of 16 members from 7 countries, including Canada, China, Finland, Germany, India, Latvia, Mongolia, and Russia (shown in Table 5).

大会上选举产生了由加拿大、中国、芬兰、德国、印度、拉脱维亚、蒙古和俄罗斯等 7 个国家的 16 名成员组成的第三届理事会（详见附表 5）。

During the subsequently held first meeting of the Third Council of the ISA, Mr. Zhang Wencong, Director of the Management Center for Seabuckthorn Development, MWR of China, and Mr. Lu Shunguang, Deputy Director of Management Center for Seabuckthorn Development, MWR of China , were elected as the Chair and Secretary-General of the ISA Council, respectively. Dr. Jörg-Thomas Mörsel from Germany, Dr. Yury A. Zubarev from Russia, and Professor Baoru Yang from Finland were elected as Vice-Chairs. Professor Baoru Yang, a renowned expert in the field of international seabuckthorn food chemistry from the University of Turku, Finland, was reappointed as the Chair of the ISA Scientific Committee. Chinese seabuckthron experts including Professor Zhang Yumei from Peking University, Professor Bi Yang from Gansu Agricultural University, and Professor Ruan Chengjiang from Dalian Minzu University continued to serve as members of the Scientific Committee.

在随后召开的国际沙棘协会第三届理事会第一次会议上，水利部沙棘开发管理中心主任张文聪、副主任卢顺光分别当选为国际沙棘协会理事会主席、秘书长。来自德国的 Jörg-Thomas Mörsel 博士、俄罗斯的 Yury A. Zubarev 博士和芬兰的杨宝茹教授分别当选为副主席。国际沙棘食品化学领域知名专家、芬兰图尔库大学杨宝茹教授连任国际沙棘协会科技委员会主席，北京大学张玉梅教授、甘肃农业大学毕阳教授、大连民族大学阮成江教授等中国沙棘专家继续担任科技委员会委员。

Upon application, the 2023 Council Meeting of the ISA decided that the 10th ISA Conference, under the theme “Innovation of Seabuckthorn for Ecology, Nutrition and Health of Human Beings”, will be held in early September 2025 in Ordos City, Inner Mongolia, China. Currently, under the guidance of the ISA Council and Secretariat, the relevant local departments in Ordos and the conference host institutions are actively carrying out various preparatory work for the event.

经申请，国际沙棘协会 2023 年理事会议决定，主题为“沙棘创新与生态、营养、健康（Innovation of Seabuckthorn for Ecology, Nutrition and Health of Human Beings）”的第十届国际沙棘协会大会将于 2025 年 9 月初在我国内蒙古鄂尔多斯市召开。目前，在国际沙棘协会理事会和秘书处的指导下，鄂尔多斯市有关部门和大会承办单位正在积极开展各项筹备工作。

Since the establishment of the ISA and up to 2024, the ISA has successfully convened nine biennial international academic conferences in India, Germany, Canada, Russia, China, and Greece.

国际沙棘协会自成立以来到 2024 年，已先后在印度、德国、加拿大、俄罗斯、中国和希腊成功举办了 9 届两年一次的国际学术大会。

On November 1, 2022, Zhu Chengqing, the Vice

Minister of the Ministry of Water Resources, pointed out during his investigation of the ISA that international seabuckthorn cooperation is very important. As one of the four international organizations managed by the MWR, the ISA has carried out a series of international seabuckthorn cooperation and exchange activities. It has effectively used seabuckthorn to tell the water - sector chapter of “China Stories” and has played a significant role as an international platform. Entering the new stage, we must strengthen our confidence. The seabuckthorn cause initiated by Vice Chairperson Qian Zhengying holds great promise! We should further strengthen international cooperation in seabuckthorn, enhance China's influence and voice through mutual exchanges and learning with other countries, actively serve China's major - country diplomacy strategy, and support the construction of the Belt and Road.

2022 年 11 月 1 日，水利部副部长朱程清调研国际沙棘协会时指出：沙棘国际合作很重要，国际沙棘协会作为水利部管理的四个国际组织之一，开展一系列国际沙棘合作交流业务，用沙棘讲好“中国故事”水利篇章，很好发挥了国际平台作用。进入新阶段，一定要坚定信心，钱正英副主席开创的沙棘事业大有可为！要进一步加强国际间沙棘合作，在与其他国家相互交流借鉴的基础上，着力增强中国的影响力、话语权，主动服务中国大国外交战略，服务“一带一路”建设。

表 5. 第三届国际沙棘协会理事会成员名单（2024–2029）
Table 5: Name List of Board Members of International Seabuckthorn Association for Third Term (2025–2029)

序号 Serial NO.	姓名 Name	性别 Sex	国家 Country	工作单位 Employed Institution	职 务 Title	协会任职 Title in ISA
1	维里 · 马尔库 · 科特涅米 Veli–Markku Korteniemi	男 M	芬兰 Finland	Aromtech Ltd 有限公司	总经理 General Man–ager	名誉主席 Honorary Chair–man
2	纳塔莉亚 · 杰米多娃 Natalia Demidova	女 F	俄罗斯 Russia	俄罗斯北方林业研究所 Northern Research Institute of Forestry	副所长 Deputy Direc–tor on Sciences	名誉理事 Honorary Board member
3	阿尔芬斯 • 乌提欧 Alphonsus Utioh	男 M	加拿大 Canada	农业食品部食品研发中心 ACU Food Technology Services Inc.	首席技术官 Chief Technology Officer	名誉理事 Honorary Board member
4	张文聪 ZHANG Wencong	男 M	中国 China	水利部沙棘开发管理中心 Management Center for Seabuckthorn Development, Ministry of Water Resources	主任 Director General	主席、理事 Chairman
5	约尔 • 托马斯 • 莫塞尔 Jörg–Thomas Mörsel	男 M	德国 Germany	德国沙棘协会主席 UBF Ltd 有限公司	首席执行官 CEO	副主席、理事 Vice Chairman
6	尤里 · 祖巴列夫 Yury A. Zubarev	男 M	俄罗斯 Russia	西伯利亚利萨文科园艺研究所 Lisavenko Research Institute of Horticulture for Siberia	高级研究员 Senior Researcher	副主席、理事 Vice Chairman

7	杨宝茹 YANG Baoru	女 F	芬兰 Finland	图尔库大学 University of Turku	教授，食品科学系主任 Professor, Head of Dept. of Food Science	副主席、理事 Vice Chairman
8	维伦德拉 • 辛格 Virendra Singh	男 M	印度 India	印度沙棘协会秘书长 喜马偕尔邦农业大学 CSK Himachal Pradesh Agricultural University	教授 Professor	理事 Board member
9	吕荣森 LU Rongsen	男 M	中国 China	中国科学院成都生物研究所 Biology Institute,Chinese Academy of Science	教授 Professor	理事 Board member
10	安德烈 · 布鲁威利斯 Andrejs Bruvelis	男 M	拉脱维亚 Latvia	拉脱维亚沙棘协会 Seabuckthorn Association of Latvia	主席 Head	理事 Board member
11	达里加 瑟格丽娜 Dalija Seglina	女 F	拉脱维亚 Latvia	拉脱维亚园艺研究所 Institute of Horticulture, Latvia	加工生化部主任 Head of Unit of Processing and Biochemistry	理事 Board member
12	多萝西 • 贝克 Dorothee Berger	女 F	德国 Germany	克里斯汀 • 贝克有限公司 Christine Berger GmbH	首席执行官 CEO	理事 Board member
13	卢顺光 LU Shunguang	男 M	中国 China	水利部沙棘开发管理中心 Management Center for Seabuckthorn Development, Ministry of Water Resources	副主任 Deputy Director General	秘书长、理事 Board member Secretary General
14	夏静芳 XIA Jingfang	女 F	中国 China	水利部沙棘开发管理中心 Management Center for Seabuckthorn Development, Ministry of Water Resources	处长 Division Chief	副秘书长、理事 Board member Deputy Secretary General
15	谢雨轩 XIEYuxuan	女 F	中国 China	水利部水土保持司 Dep.of Soil and Water Conservation, Ministry of Water Resources	副处长 Deputy Division Chief	理事 Board member
16	尤克瑞尔 • 普列夫 Uchral Purev	男 M	蒙古 Mongolia	“Harhorin” JSC 公司	首席执行官 CEO	理事 Board member
17	伊芙基尼 • 尼奇汀 Evgeny Nikitin	男 M	俄罗斯 Russia	OOO TPC SAVA 公司	首席执行官 CEO	理事 Board member
18	拉尤 • 苏拉拉亚卡那哈里 Raju Y. Soolanayakanahally	男 M	加拿大 Canada	农业食品部萨斯卡通研发中心 Agriculture and Agri-Food Canada, Saskatoon Research & Development Centre	研究员 Research Scientist	理事 Board member
19	玛利亚 • 科特斯涅米 Maaria Kortesniemi	女 F	芬兰 Finland	图尔库大学 University of Turku	助教 Assistant Professor	理事 Board member

5.2 Major Activities of the ISA and its (China) Enterprise Committee

5.2.1 Leaders of the MWR fully affirmed the work on sea buckthorn.

In January 2024, the Management Center for Seabuckthorn Development of the Ministry of Water Resources submitted a written report to the ministry's leadership, detailing the national progress in seabuckthorn development and the work of the ISA in 2023. Both Minister Li Guoying and Vice - Minister Zhu Chengqing, who is in charge of soil and water conservation, provided written instructions in response. They fully affirmed the achievements made in 2023 and set higher requirements for the work in the new year.

5.2.2 The ISA held a 2024 Sea Buckthorn Expert Symposium

On January 16, 2024, the Secretariat of the ISA convened the 2024 Seabuckthorn Expert Symposium. The meeting reviewed the association's 2023 work, analyzed existing challenges, and outlined key priorities for 2024. Participants emphasized that under the guidance of higher authorities and with active support from members, the Secretariat has thoroughly implemented Xi Jinping's diplomatic philosophy. Focusing on serving members and advancing the seabuckthorn industry, the association has fulfilled its core functions through standardization, academic exchanges, innovation, and capacity building. These efforts successfully achieved all 2023 targets and yielded significant results.

The meeting emphasized that the upcoming year poses new tasks and challenges for seabuckthorn development both at home and abroad. In 2025, China will host the 10th International Seabuckthorn Conference and also commemorate the 40th anniversary of national seabuckthorn development. The Association should further leverage its platform role, expedite the improvement of its domestic

（二）国际沙棘协会及其（中国）企业委员会会员重大活动

1. 水利部领导对沙棘工作给予充分肯定

2024 年 1 月，水利部沙棘开发管理中心向水利部领导书面汇报 2023 年全国沙棘开发和国际沙棘协会工作开展情况，李国英部长和分管水土保持工作的朱程清副部长分别作了批示，对 2023 年取得的成果给予充分肯定，对新一年的工作提出了更高要求。

2. 国际沙棘协会召开 2024 年沙棘专家座谈会议

2024 年 1 月 16 日，国际沙棘协会秘书处召开 2024 年沙棘专家座谈会，总结 2023 年国际沙棘协会工作，分析目前存在问题，部署 2024 年重点工作。会议认为，国际沙棘协会秘书处在上级部门的关心指导下，在广大会员的积极参与和支持下，深入贯彻落实习近平外交思想，锚定全面服务会员、服务沙棘事业目标，充分履行协会各项职能，积极开展标准制定、学术交流、创新发展和能力建设等工作，圆满完成了 2023 年度目标任务，取得了丰硕成果。

会议指出，新的一年国内外沙棘开发面临新的任务和挑战，2025 年我国将举办第十届国际沙棘大会，也将迎来全国沙棘开发 40 周年，协会应进一步发挥平台作用，加快提升国内外

and international industry influence, and more closely unite and guide all members to organize and execute various tasks, including seabuckthorn technology research and development, industrial integration, science popularization, and expert team building. These efforts will contribute to articulating the seabuckthorn chapter of the “Belt and Road” with high quality, thereby making greater contributions to the high-quality development of China's seabuckthorn sector, rural revitalization, and ecological civilization construction.

行业影响力，更加紧密团结带领全体会员，组织开展沙棘科技研发、产业融合、科普宣传、专家队伍建设等各项工作，高质量讲好“一带一路”中国故事沙棘篇章，为我国沙棘事业高质量发展、乡村振兴和生态文明建设做出更大贡献。

5.2.3 The Ant Forest China Foundation for Rural Development (CFRD) Seabuckthorn Afforestation Project in Liangcheng County has successfully completed its 2024 planting target

3. 蚂蚁森林中国乡村发展基金会凉城县沙棘造林项目圆满完成 2024 年种植项目

In 2024, the Seabuckthorn Afforestation Project of the Ant Forest China Rural Development Foundation in Liangcheng County had a total investment of RMB 4.185 million yuan. The project planned an area of 6,772 mu (approximately 451.5 hectares) in Caonian Manchu Township, Liangcheng County, Ulanqab City, Inner Mongolia Autonomous Region, with had an afforestation area of 6,025 mu (approximately 401.7 hectares) and involved the planting of 1 million seabuckthorn seedlings. Currently, the 2024 Seabuckthorn Afforestation Project of the Ant Forest China Rural Development Foundation in Liangcheng County has been fully completed.

2024 年，蚂蚁森林中国乡村发展基金会凉城县沙棘造林项目总投入 418.5 万元，在内蒙古自治区乌兰察布市凉城县曹碾满族乡规划地块面积 6772 亩，其中可造林面积 6025 亩，种植沙棘 100 万株。目前，2024 年蚂蚁森林中国乡村发展基金会凉城县沙棘造林项目已全部完成种植。

The completion of the project has significantly expanded the shrubland area in Caonian Manchu Township, Liangcheng County, realizing comprehensive greening of wastelands and effectively controlling soil erosion within the project area. As a result, it has played a positive role in enhancing the regional ecological environment. The seabuckthorn afforestation project enables villagers in Daquan Village to earn income through afforestation labor services as well as subsequent maintenance and nurturing work. Once the planted seabuckthorn plants start to bear fruit, local farmers and herders will obtain a stable income by harvesting seabuckthorn fruits.

项目的完成大幅增加了凉城县曹碾满族乡的灌木林地面积，使项目区内的荒地得到全面的绿化，水土流失得到治理，对于改善区域内的生态环境方面有着积极的作用。沙棘造林项目可以使实施区域大泉村的村民在短时间内获得造林劳务报酬和管护、抚育的报酬等收入。待项目区栽植沙棘结果后，当地农牧民可通过采收沙棘果实获得稳定收入。

5.2.4 Arbor Day in Action: The Enterprise Committee(China) of the ISA Launches “Internet + Nationwide Voluntary Tree Planting” Campaign

In March, as voluntary tree - planting initiatives gathered momentum, the scope of public tree - planting responsibilities expanded to eight categories: afforestation and greening, forest management, natural conservation, adoption programs, facility construction, financial and material donations, volunteer services, and other forms. In recent years, the nationwide voluntary tree - planting campaign has entered a new phase of integrated online and offline development. The “Internet + Nationwide Voluntary Tree Planting” initiative has gradually made it possible to plant trees at any time, anywhere, and at will. In 2022, the first “Internet + Nationwide Voluntary Tree Planting” project under the direct affiliates of the Ministry of Water Resources—the Tending and Management Project for the Seabuckthorn Raw Material Forest Base in Lan County, Shanxi Province—was launched. This initiative has provided a new pathway for water conservancy staff to participate in voluntary tree - planting, enriching and expanding the ways to fulfill tree - planting obligations.

The project was initiated by the ISA Enterprise Committee (China), which raised 530,000 yuan from the public through the National Voluntary Tree Planting Network Platform. The funds were used to establish a seabuckthorn raw material forest cultivation base in Lan County, implementing management practices including pruning, weeding, pest control, and thinning/rejuvenation for new hybrid seabuckthorn varieties. The project covers an area of 110 mu (approximately 7.33 hectares) with a management period of two years.

5.2.5 The 3rd Members' Congress of the ISA Enterprise Committee (China) was successfully convened in Beijing

On May 8, 2024, the 3rd Members’ Congress and

4. 植树节在行动：国际沙棘协会（中国）企业委员会发起“互联网 + 全民义务植树”活动

3 月份，随着义务植树的不断推进，全民义务植树尽责形式已扩展到造林绿化、抚育管护、自然保护、认种认养、设施修建、捐资捐物、志愿服务、其他形式等 8 类。近年来，全民义务植树运动进入了线上线下融合发展新阶段，“互联网 + 全民义务植树”让随愿、随处、随时植树逐步变为现实。2022 年，水利部直属系统首个“互联网 + 全民义务植树”项目——山西省岚县沙棘原料林种植基地抚育管护项目开始实施，为水利干部职工义务植树提供了新路径，丰富拓展了履行植树义务的实现形式。

该项目由国际沙棘协会（中国）企业委员会作为发起单位，在全民义务植树网络平台面向社会公众募集资金 53 万元，在岚县建立沙棘原料林培育基地，通过修剪、除草、病虫害防治、间疏复壮等对沙棘杂交新品种管护，项目规模 110 亩，管护期两年。

5. 国际沙棘协会（中国）企业委员会第三次会员代表大会在北京顺利召开

2024 年 5 月 8 日，国际沙棘协会（中国）企业委员会（以下简称委员会）第三次会员代表

Council Renewal Conference of the ISA Enterprise Committee (China) (hereinafter referred to as the "Committee") was successfully held in Beijing. Lu Jian, the second - term president of the Committee, and Secretary - General Zhang Bin respectively presented the work report and the financial report of the second council. The meeting announced the list of election staff and the "Working Rules of the Enterprise Committee (China) of the International Seabuckthorn Association".

大会暨理事会换届大会在北京成功召开。第二届委员会会长卢健和秘书长张滨分别作了第二届理事会工作报告和财务工作报告。会议宣读了换届选举工作人员名单和《国际沙棘协会（中国）企业委员会工作规则》。

At the meeting, the chairperson announced the proposed list of candidates for the 3rd council. The attending delegates then elected the council members. Subsequently, the committee's president, vice - president, and secretary - general were elected. Lu Jian was elected as the President of the 3rd Committee, and Zhang Bin was elected as the Secretary - General. The new Council consists of numerous leading figures in the industry, who are jointly dedicated to promoting the high - quality development of the seabuckthorn sector.

会上，主持人宣读了第三届理事会理事候选人建议名单，由参会代表选举产生了第三届理事会成员，随后理事会选举产生了委员会会长、副会长和秘书长。卢健当选为第三届委员会会长，张滨当选为第三届委员会秘书长。新一届理事会成员包括多位行业领军人物，他们将共同致力于推动沙棘产业的高质量发展。

5.2.6 Leaders of Management Center for Seabuckthorn Development, MWR conducted a survey on Beijing Huiyuan Food & Beverage Co., Ltd.

6. 水利部沙棘中心领导调研北京汇源食品饮料公司

On June 4, 2024, a delegation led by Zhang Wencong, Director of the Management Center for Seabuckthorn Development, MWR and Chairman of the ISA, and Lu Shunguang, Deputy Director of the Center and Secretary - General of the ISA, conducted an investigation at Beijing Huiyuan Food & Beverage Co., Ltd. in Miyun, Beijing. They exchanged views with Zhu Xinli, Chairman of the company, on approaches and initiatives for the development and utilization of seabuckthorn resources both at home and abroad. The symposium was attended by relevant responsible persons from Gaoyuanshengguo Seabuckthorn (CONSECO) Co., Ltd., the Secretariat of the ISA, and Huiyuan Company.

2024 年 6 月 4 日，水利部沙棘开发管理中心主任、国际沙棘协会主席张文聪和水利部沙棘开发管理中心副主任、国际沙棘协会秘书长卢顺光一行，前往北京密云调研北京汇源食品饮料公司开展调研，并与公司董事长朱新礼交流了国内外沙棘资源开发利用的思路与举措。高原圣果沙棘制品有限公司、国际沙棘协会秘书处和汇源公司有关负责人参加调研座谈。

Since 2016, Beijing Huiyuan Food & Beverage

北京汇源食品饮料公司自 2016 年开始，在山

Co., Ltd. has invested in developing seabuckthorn products in Youyu County, Shanxi Province, boosting the economic utilization of local seabuckthorn resources and increasing residents' income. In 2010, the company established Xinjiang Burjin Huiyuan Biotechnology Co., Ltd. in the Altay region of Xinjiang. It planned and constructed a 50,000 - mu (3333.3 - hectare) high - standard industrialized seabuckthorn plantation and a 100,000 - ton comprehensive seabuckthorn processing and utilization base. The company has made significant investments in developing a series of products including seabuckthorn pulp, seabuckthorn oil, and blended seabuckthorn juices. Simultaneously, leveraging the premium ecological environment and high - end tourism resources of the Altay region, the company aims to build an industrial chain based on local agricultural resources, integrating planting, breeding, tourism, leisure, and cultural education. This way, it achieves the deep integration of primary, secondary, and tertiary industries. This initiative has become a model for the seabuckthorn industry both domestically and internationally.

西省右玉县投资开发沙棘产品，助力当地沙棘资源经济利用和群众增收致富。2010 年，汇源公司在新疆阿勒泰地区新建新疆布尔津汇源生物科技有限公司，规划建立了 5 万亩高标准沙棘工业化种植园和 10 万吨沙棘综合加工利用基地，大力度投资开发沙棘果浆、沙棘油、沙棘复合果汁等系列产品。同时，公司瞄准新疆阿勒泰地区优质生态、高端旅游资源，规划打造以当地农业资源为依托，集种植、养殖、旅游休闲、科普文化为一体，一二三产业深度融合的产业链，成为国内外沙棘行业的典范。

5.2.7 Inner Mongolia Yuhangren Sand Industry Co., Ltd. has filed a prospectus and plans to go public in Hong Kong

7. 内蒙古宇航人沙产业股份有限公司递交招股书，拟赴香港上市

On June 25, 2024, Inner Mongolia Yuhangren Sand Industry Co., Ltd. submitted the prospectus to the Hong Kong Stock Exchange, seeking an IPO on the main board. Bank of China International served as the sole sponsor for the company. With nearly thirty years of operation, Yuhangren is committed to the development, production, supply, and marketing of high - quality seabuckthorn products, concentrating on health and nutritional foods, such as beverages, purees, and health supplements. From 2021 to 2023, Yuhangren's revenues were RMB 147 million, RMB 186 million, and RMB 220 million respectively, with net profits attributable to owners of RMB 21 million, RMB 31 million, and RMB 46 million during the same periods.

2024 年 6 月 25 日，内蒙古宇航人沙产业股份有限公司向港交所递交招股书，拟香港主板 IPO 上市，中银国际为公司独家保荐人。宇航人公司成立近三十年，公司致力于开发、生产、供应及营销高质量的沙棘产品，专注于健康及营养食品，包括饮料、原浆及保健食品。2021 年至 2023 年，宇航人的收入分别为 1.47 亿元、1.86 亿元和 2.20 亿元，同期归母净利润分别为 0.21 亿元、0.31 亿元和 0.46 亿元。

5.2.8 The film “Home by the Seabuckthorn Thickets” commenced filming at Miaogong in Weichang County, Hebei Province

On August 11, 2024, the youth inspirational feature film “Home by the Seabuckthorn Thickets” held its grand launch ceremony at the Miaogong Hotel in Weichang County, Hebei Province. The film tells the story of a young protagonist who grows up healthily by overcoming insecurities and bravely facing difficulties and challenges under the influence of the school, family, and the broader societal environment. Guided by the philosophy of “respecting individual differences and encouraging everyone to become their best self,” the film embodies rich ideological, artistic, and cultural values, aiming to help adolescents better understand themselves and establish a proactive outlook on life and values.

The film is produced by Chengde Yizhonghe Culture Media Co., Ltd., and co-produced by the Publicity Department of the Weichang Manchu and Mongolian Autonomous County Committee of the Communist Party of China and Chengde Yizhonghe Culture Media Co., Ltd. It is scheduled to be officially released early next year. Weichang, the birthplace of the “Saihanba Spirit,” boasts a sound ecological environment, profound cultural heritage, and outstanding resource endowment. Filming in Weichang will not only showcase its local customs, folk culture, and natural landscapes but also further enhance its reputation and prestige, leveraging the power of culture and arts to promote the high-quality development of Weichang’s cultural and tourism industries.

5.2.9 The 2024 Annual Meeting of the Enterprise Committee (China) of the ISA was successfully convened

From September 24 to 25, 2024, the Enterprise Committee (China) of the ISA successfully held its 2024 Annual Meeting and Seabuckthorn Academic Exchange Conference in Youyu County, Shanxi

8. 电影《沙棘丛旁是故乡》在河北省围场庙宫开机

2024 年 8 月 11 日，少年励志院线电影《沙棘丛旁是故乡》在河北省围场庙宫酒店隆重开机。电影《沙棘丛旁是故乡》讲述了小主人公在学校、家庭、社会大环境影响下，克服自卑心理、勇于面对困难和挑战，健康成长的故事。影片秉持“尊重个体差异，鼓励每个人成为最好的自己”的理念，蕴含着丰富的思想、艺术和文化价值，帮助青少年正确认识自己，建立积极进取的人生观和价值观。

该片由传媒公司承德艺众合文化传媒出品，中共围场满族蒙古族自治县委宣传部、承德艺众合文化传媒有限公司联合制作，预计明年初正式上映。围场是塞罕坝精神的发源地，生态环境优良，文化底蕴深厚，资源禀赋突出。此次电影拍摄聚焦围场，既能展示围场风土人情、民俗文化、自然风貌，更将进一步提升围场知名度、美誉度，用文化艺术的力量助推围场文旅产业高质量发展。

9. 国际沙棘协会（中国）企业委员会 2024 年年会圆满召开

2024 年 9 月 24 日至 25 日，国际沙棘协会

Province. Themed “Development and Prospects of the Seabuckthorn Industry,” the annual meeting focused on enhancing processing technologies and deepening the integration of seabuckthorn with the nutrition and health industries, aiming to promote the sustainable development of the seabuckthorn sector. The event was organized by the Enterprise Committee(China) of the ISA, hosted by the People's Government of Youyu County, Shanxi Province, and co-organized by companies including Shanxi Xianguoyuan Biological Technology Co., Ltd. Over 150 experts, entrepreneurs, and government representatives from across the country gathered in Youyu, a plateau town beyond the Great Wall, to discuss the future development direction of the seabuckthorn industry.

During the conference, which coincided with the 2024 National Science Popularization Day, the Enterprise Committee (China) of the ISA also organized a seabuckthorn science popularization lecture to further disseminate knowledge about seabuckthorn and enhance public awareness of its value. The event also featured an entrepreneur forum and academic exchanges. At these, eight renowned seabuckthorn experts from various fields introduced cutting - edge technologies, market trends, and successful cases in the seabuckthorn industry. Twelve leading entrepreneurs in the seabuckthorn sector, including Cao Man, General Manager of Shanxi Xianguoyuan Biological Technology Co., Ltd., delivered insightful speeches, showcasing innovative achievements and market potential within the industry.The conference also arranged a field visit, enabling participants to tour local seabuckthorn planting bases and processing enterprises, and providing them with a firsthand understanding of the full industrial chain development of the seabuckthorn industry in Youyu County.

5.2.10 The “Academicians’ Heilongjiang Tour” visited the Seabuckthorn Germplasm Resource Nursery at the National Modern Agricultural Demonstration Base of the Heilongjiang Academy

（中国）企业委员会在山西右玉县成功举办了2024 年年会暨沙棘学术交流会。本次年会以“沙棘产业发展及展望”为主题，聚焦沙棘产业的工艺提升与营养健康产业的深度融合，旨在推动沙棘产业的可持续发展。会议由国际沙棘协会（中国）企业委员会主办，山西省右玉县人民政府承办，山西献果园生物科技股份有限公司等多家企业协办。来自全国各地的沙棘产业专家、企业家以及政府代表 150 多人齐聚塞外高原小城右玉，共同探讨沙棘产业的未来发展方向。

会议期间，正值 2024 年全国科普日，国际沙棘协会（中国）企业委员会同时举办了沙棘科普讲座，进一步普及沙棘知识，提升公众对沙棘价值的认识。会议还举行企业家论坛和学术交流，来自不同领域的 8 位沙棘知名专家介绍了沙棘产业的前沿技术、市场趋势和成功案例。山西献果园生物科技股份有限公司总经理曹满等 12 位沙棘龙头企业家发表了精彩演讲，展示了沙棘产业的创新成果和市场潜力。大会还安排了实地考察活动，与会代表参观了当地的沙棘种植基地和加工企业，实地了解了右玉县沙棘产业的全产业链发展情况。

10. “院士龙江行”走进黑龙江省农业科学院国家现代农业示范展示基地沙棘种质资源圃考察调研

of Agricultural Sciences for investigation and research

On September 3, the "Chinese Academy of Engineering - Heilongjiang Province Grain Production Capacity Enhancement Academician Tour" visited the National Modern Agricultural Science and Technology Demonstration Base of the Heilongjiang Academy of Agricultural Sciences for an investigation and research. A delegation of academicians, including Deng Xiuxin, Vice - President of the Chinese Academy of Engineering; Liu Xu, former Vice - President of the Chinese Academy of Engineering; Chen Wenfu from Shenyang Agricultural University; Zhang Shougong, Director of the Agriculture Division of the Chinese Academy of Engineering and Academician of the Chinese Academy of Forestry; Jin Ningyi from the Academy of Military Medical Sciences; Jiang Jianchun from the Chinese Academy of Forestry; Zhang Jiabao from the Nanjing Institute of Soil Science, Chinese Academy of Sciences; Bao Zhenmin from Ocean University of China; and Zhang Hongcheng from Yangzhou University, conducted a survey of the Seabuckthorn Germplasm Resource Nursery, DUS testing area, exhibition zone, black soil conservation area, and rice innovation zone. They were accompanied by the members of the Heilongjiang Academy of Agricultural Sciences, including Shen Jia, Secretary of the Party Leadership Group and President; Wang Zeyin, Deputy Secretary of the Party Leadership Group; and Lu Shuwen, Member of the Party Leadership Group and Vice - President.

At the Seabuckthorn Germplasm Resource Nursery, Tang Ke, the Director of the Seabuckthorn Research Group, gave a detailed introduction to the delegation about the collection, innovation, and utilization of seabuckthorn germplasm resources at the Provincial Academy of Agricultural Sciences. He said, “The Seabuckthorn Germplasm Resource Nursery is a unique resource of our Provincial Academy of Agricultural Sciences. Since 1988, after more than 30 years of scientific research

9 月 3 日，“中国工程院黑龙江省粮食产能提升院士行”走进黑龙江省农业科学院国家现代农业科技示范展示基地考察。中国工程院副院长邓秀新院士，中国工程院原副院长刘旭院士，沈阳农业大学陈温福院士，中国工程院农业学部主任、中国林业科学研究院张守攻院士，军事医学科学院金宁一院士，中国林业科学研究院蒋剑春院士，中国科学院南京土壤研究所张佳宝院士，中国海洋大学包振民院士和扬州大学张洪程院士一行深入沙棘资源圃、DUS 测试区、展览展示区、黑土保护区及水稻创新区开展调研。省农科院党组书记、院长申甲，党组副书记王泽胤，党组成员、副院长卢淑雯陪同调研。

在沙棘种质资源圃，沙棘课题组主任唐克向院士行调研团详细介绍了目前省农科院的沙棘种质资源搜集、创新及利用情况，“沙棘资源圃是我们省农科院独有的种质资源，从 1988 年起，经过 30 余年的科研积累，搜集、保存国内外优良沙棘种质资源 200 余份，登记审定沙

accumulation, we have collected and preserved over 200 superior seabuckthorn germplasm resources from domestic and international sources. Six high - quality seabuckthorn varieties have been registered and certified, and we have participated in the registration of two different varieties. It has now become the largest seabuckthorn germplasm resource base in Northeast China, serving as a comprehensive seabuckthorn research platform integrating scientific research, education, and demonstration extension." Academician Deng Xiuxin further asked the researchers about seabuckthorn product processing and industry - academia collaboration, providing guidance for the future development of seabuckthorn research. Meanwhile, Academician Jiang Jianchun explored the pathogenic conditions, control measures, and extent of damage of seabuckthorn wilt disease, offering insights for its management and prevention.

棘优良品种 6 个，参与登记沙棘特异性品种 2 个，现已成为东北地区最大的沙棘种质资源基地，是集科研、教学、推广示范于一体的综合沙棘科研平台"。邓秀新院士向科研人员进一步了解了沙棘产品加工以及院企合作情况，为沙棘研究未来发展提供指导。同时蒋剑春院士深入了解了沙棘干缩病的治病条件，防治措施，危害程度等情况，为干缩病治理及预防提出了指导意见。

5.2.11 The 2024 Asian Berry Technology Conference was held in Mongolia

From October 30 to November 2, 2024, the Asian Berry Conference 2024 and the 70th Anniversary Celebration of Berry Development in Mongolia were grandly held in Ulaanbaatar, Mongolia. The conference attracted over 150 experts, scholars, and enterprise representatives from seven countries, including approximately 20 Chinese delegates, to discuss the development of the seabuckthorn and other berry industries. The Vice President of the ISA, Dr. Thomas Moersel and Yury, attended the conference. Dr. Thomas Moersel delivered an opening speech. Subsequently, experts from various countries introduced the development history and current status of their respective seabuckthorn industries. Chinese enterprises, Zhongke Seabuckthorn Technology Co., Ltd. and Shenxing Seabuckthorn Research Institute, actively shared their company development experiences. Zhang Bin, Deputy Secretary - General of the ISA, elaborated on the development of China's seabuckthorn industry, showcasing the achievements China has made in

11. 2024 年亚洲浆果科技大会在蒙古国举办

2024 年 10 月 30 日至 11 月 2 日，2024 年亚洲浆果会议暨蒙古国浆果开发 70 周年庆祝大会在蒙古乌兰巴托盛大召开。本次会议吸引了来自 7 个国家的 150 多位专家学者和企业代表，其中包括约 20 名中国代表，共同探讨沙棘及其他浆果产业的发展。国际沙棘协会副主席 Dr.Thomas Moersel 与副主席 Yury 共同出席了会议，Dr Thomas Moersel 并进行了致辞。随后，各国专家分别介绍了本国沙棘产业的发展历程和现状。中国企业代表中科沙棘与神兴沙棘也积极介绍了公司发展情况，国际沙棘协会副秘书长张滨在交流会议上阐述了中国沙棘产业的发展情况，也展示了中国在该领域取得的成果。

the seabuckthorn field.

During the conference, experts conducted in - depth discussions on various aspects of seabuckthorn, including cultivation, pest and disease control, product processing, and market development. Specialists from countries like Russia and Mongolia shared their research findings and practical experiences. Chinese representatives actively participated in the exchanges on each topic, collaborating with participants from other countries to explore future directions for the seabuckthorn industry.

The conference also featured a poster session, displaying a series of research achievements on seabuckthorn. This event provided a platform for exchange and cooperation among countries, facilitating the dissemination of science and technology related to the seabuckthorn industry. The active participation of Chinese enterprises, including member units of the Enterprise Committee (China) of the ISA, such as Hebei Shenxing Seabuckthorn Research Institute, Xinjiang Zhongke Seabuckthorn Technology Co., Ltd., Xinjiang Gobi Memory Brand Management Co., Ltd., Gansu Longyuanhong Biotechnology Co., Ltd., and Shanxi Seabuckthorn Impression Brand Operation Co., Ltd., demonstrated China's emphasis on the seabuckthorn industry. Their involvement effectively communicated the story of seabuckthorn to the global community and laid the foundation for cooperation between China and other countries in the seabuckthorn field. The conference is expected to further promote the development of the seabuckthorn industry worldwide.

5.2.12 Chinese Academy of Agricultural Mechanization Sciences training program "adds wings" to the China-Bolivian Plateau agricultural cooperation

The “Overseas Short - Term Training Program on Seabuckthorn Cultivation and Utilization Technology in Bolivia,” organized by the Chinese

会议期间，专家们围绕沙棘的种植、病虫害防治、产品加工以及市场等多个方面展开深入讨论。俄罗斯、蒙古等国的专家分享了各自的研究成果和实践经验。中国代表们在各个议题的讨论中也积极交流，与各国参会者共同探索沙棘产业的发展方向。

会议还设置了海报展示环节，展示了一系列关于沙棘研究的成果。此次会议为各国提供了一个交流合作的平台，促进了沙棘产业相关科学和技术的传播。由国际沙棘协会（中国）企业委员会会员单位河北神兴沙棘研究院、新疆中科沙棘科技有限公司、新疆戈壁记忆品牌管理有限公司、甘肃陇源红生物科技有限公司、山西沙棘印象品牌运营公司等中国企业代表的积极参与，体现了中国对沙棘产业的重视，更向世界讲好了沙棘故事，并为中国与其他国家在该领域的合作奠定了基础。会议将推动沙棘产业在全球范围内的进一步发展。

12. 中国农机院培训项目为中玻高原农业合作“添翼”

中国农机院承办的“玻利维亚沙棘种植与利用技术境外短期培训项目”在玻利维亚首都拉巴斯市圣安德烈斯市长大学礼堂圆满结束。该项目自 2024 年 11 月 19 日启动，为期 30 天，

Academy of Agricultural Mechanization Sciences, successfully concluded at the auditorium of the Universidad Mayor de San Andrés in La Paz, Bolivia. The 30 - day program, which commenced on November 19, 2024, received strong support from the Chinese Embassy in Bolivia, the Bolivian Ministry of Agriculture, and local governments and universities. During the training, 120 experts and technicians from the Faculty of Agronomy of the Universidad Mayor de San Andrés and the Santiago de Chayapa Technical Institute conducted field visits and practical sessions at seabuckthorn cultivation bases and comprehensive demonstration farms. They highly praised the program, noting that it marked the first joint inspection and guidance by Chinese experts and high-level Bolivian government officials in Bolivia's 20-year sea buckthorn cultivation history, which greatly motivated local farmers.

得到了中国驻玻利维亚大使馆、玻利维亚农业部及当地政府、高校的大力支持。培训期间，来自圣安德烈斯市长大学农学院及圣地亚哥德卡亚帕市技术学院的 120 名专家和技术人员深入沙棘种植基地与综合示范农场考察实践，并高度评价此次项目，称这是沙棘在玻利维亚种植 20 年来首次迎来中方专家与玻政府高层联合考察指导，为当地种植人员带来极大激励。

On November 19, President Xi Jinping of China emphasized during his meeting with President Luis Alberto Arce of Bolivia that the two sides would align the “Belt and Road” Initiative with Bolivia's 2025 development plan, and expand cooperation in areas such as infrastructure construction, highland agriculture, green development, and the digital economy. This training earnestly implements the spirit of General Secretary Xi Jinping's important speech and is an important practice in promoting agricultural cooperation between China and Bolivia. Wang Liang, the Chinese Ambassador to Bolivia, Counselor Liu Xiaofeng, Jock, the First President of the Chamber of Deputies of Bolivia, and Fidel, the Mayor of Santiago de Cayapa in Bolivia, respectively attended the opening and closing ceremonies and delivered speeches.

11 月 19 日，中国国家主席习近平会见玻利维亚阿尔塞总统时强调，双方将共建“一带一路”倡议同玻利维亚 2025 年发展规划对接，拓展基础设施建设、高原农业、绿色发展、数字经济等领域合作。此次培训认真落实习近平总书记重要讲话精神，是推动中玻农业合作的重要实践。中国驻玻利维亚大使王亮、参赞刘晓峰，玻利维亚众议院第一众议长乔克，玻利维亚圣地亚哥德卡亚帕市市长费德尔分别出席开班和结业仪式并致辞。

5.2.13 The ISA released the “International Seabuckthorn Development 2023” (in both Chinese and English)

13. 国际沙棘协会发布《2023 年度国际沙棘发展报告》（中英文）

To enhance information exchange among members of the ISA and share successful experiences in seabuckthorn development globally, the

为加强国际沙棘协会各成员之间的信息交流，分享世界各国沙棘发展成功经验，国际沙棘协会秘书处成立了《国际沙棘发展报告》专门工作组，组织邀请了国际知名沙棘专家撰写其所

Secretariat of the ISA established a dedicated task group for the " Annual Report of International Seabuckthorn Development". The task group invited internationally renowned seabuckthorn experts to contribute the 2023 annual seabuckthorn development reports of their respective countries. After thorough work on translation, expert review, and editing, the report encompasses the latest 2023 research and development achievements from seven countries: China, France, Germany, India, Latvia, Lithuania, and Poland. TheAnnual Report of International Seabuckthorn Development in 2023" (in both Chinese and English) was officially released in December 2024. This marks the fifth consecutive year that the ISA, in collaboration with the Management Center for Seabuckthorn Development, MWR, has published the annual International Seabuckthorn Development Report in bilingual format.

在国家的 2023 年度沙棘发展报告。经过充分组织开展翻译、专家审核和编辑等工作，共收录了来自中国、法国、德国、印度、拉脱维亚、立陶宛和波兰等 7 个国家 2023 年沙棘研究开发最新成果，《2023 年度国际沙棘发展报告》（中英文）于 2024 年 12 月正式对外发布。这是国际沙棘协会联合水利部沙棘开发管理中心连续第五年以中英文双语发布《国际沙棘发展年度报告》。

6. Other Matters

六、其他

Seabuckthorn in the Internet (2024)

互联网中的沙棘（2024）

On Taobao, a search using the keyword "seabuckthorn" shows that the majority of the top 10 stores in terms of sales are located in provinces such as Shanxi, Xinjiang, Ningxia, and Inner Mongolia. Their main product categories are seabuckthorn puree and seabuckthorn juice.

在淘宝上搜索，搜索关键字 "沙棘" 收集成交数量前十的店铺信息，这些网络店铺的厂址多数位于山西，新疆、宁夏、内蒙古等，主要销售的商品品类是沙棘原浆，沙棘果汁。

On JD.com, search results for "seabuckthorn" show that the primary products sold are predominantly dried seabuckthorn berries and freshly squeezed seabuckthorn juice, with a significant concentration in brand-specific stores and health supplement specialty shops.

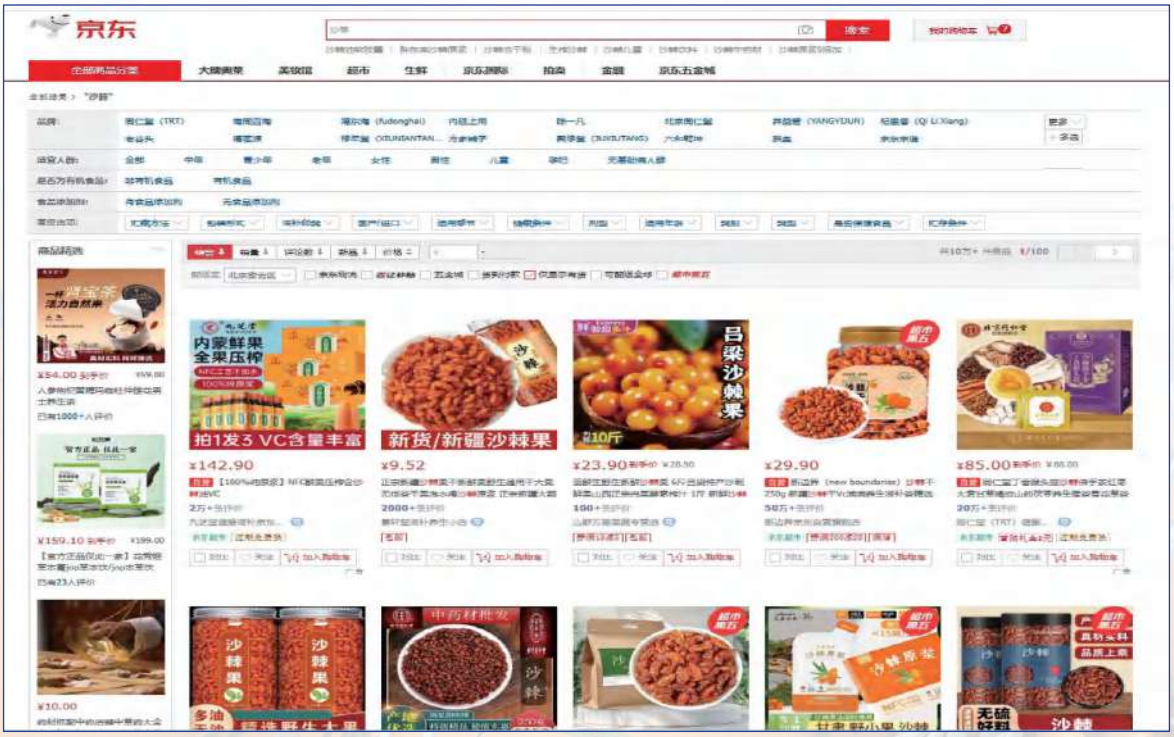
在京东上搜索关键词 "沙棘"，主要销售产品更多的集中在沙棘干果、鲜榨沙棘汁等产品，更多的是品牌专卖和滋补专卖。

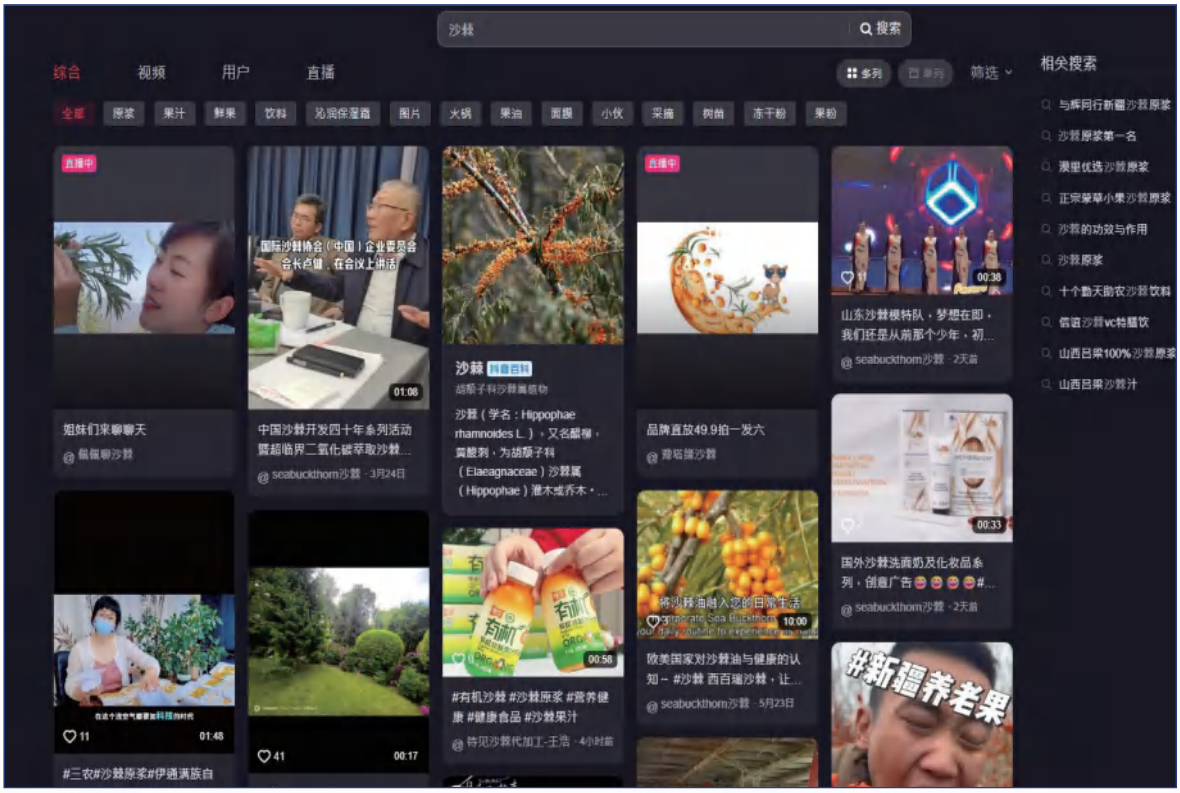
On short - video platforms such as TikTok and Kuaishou, searches for the keyword "seabuckthorn" mainly result in live - streams from seabuckthorn bases and factories, as well as content from influential seabuckthorn - focused influencers. On content - sharing platforms like Rednote and Bilibili, search results are dominated by seabuckthorn -

在抖音、快手等短视频品平台，搜索沙棘关键词，更多的是沙棘基地直播、沙棘工厂直播，以及沙棘网红大咖，在小红书、B 站等分享平台搜索，

based cosmetic product lines, with a greater focus on targeted marketing among female users.

更多的是沙棘系列化妆品，更多的注重在女性之间种草营销。




沙棘
搜索
综合
视频
用户
直播
相关搜索
与辉同行新疆沙棘原浆
沙棘原浆第一名
源里优选沙棘原浆
正宗蒙草小果沙棘原浆
沙棘的功效与作用
沙棘原浆
十个勤天助农沙棘饮料
信诺沙棘vc特醋饮
山西吕梁100%沙棘原浆
山西吕梁沙棘汁
#新疆养老果


小红书
沙棘
发现
发布
通知
我
更多
地球上最古老的植物之一沙棘
维C含量=8个橙子
喝沙棘
竟然还有人不知道
乱喝沙棘的后果
根本
相关搜索

Appendix 1 : 251 Scientific articles on seabuchthorn published in 2024 in Chinese Journal

[1]Liu Yingcui, Research on flavonoid enrichment technology through biological fermentation of seabuckthorn fruit residues [J]. Food Engineering, 2024,(04):61-65.

[2]Chen Haiying, Research on high-efficiency cultivation techniques of seabuckthorn and their application in ecological restoration [J]. Seed Science & Technology, 2024,42(24):67-69.

[3]Zhang Panpan, Wu Yahui, The development and market prospect forecast of seabuckthorn leaf xylitolchiffon cake. [J]. Jiangsu Condiment and Subsidiary Food, 2024,(04):24-29.

[4]Gao Pei, Xu Shuqin, He Xi, et al. Screening and identification of pseudomonas rhizozoides strains from wild seabuckthorn and their effects on the growth promotion of Yongcai vegetable. [J]. Fujian Journal of Agriculture sciences, 2024,39(12):1402-1411.

[5]Tian Ye, Bao Qingfeng, Research on the economic effects of seabuckthorn industry in Wenshui county: based on the grey relational model. [J]. Shanxi Agricultural Economy, 2024,(24):37-40+95.

[6]Li Fengwu. Cultivation and management techniques of large-fruit seabuckthorn [J]. Hebei Agriculture, 2024,(12):85-86.

[7]Gao Ruijuan, Discussion on seabuckthorn seedling raising technology in Datong and Shuozhou Area [J]. Shanxi Forestry Science and Technology, 2024,(06):32-33.

附件 1：2024 年中国科研人员公开发表的沙棘论文（共 251 篇）

[1] 刘英翠 . 沙棘果渣生物发酵黄酮富集技术研究 [J]. 食品工程 ,2024,(04):61-65.

[2] 陈海英 . 沙棘高效栽培技术及其在生态修复中的应用研究 [J]. 种子科技 ,2024,42(24):67-69.

[3] 张盼盼 , 吴亚辉 . 沙棘叶木糖醇戚风蛋糕的研制与市场前景预测 [J]. 江苏调味副食品 ,2024,(04):24-29.

[4] 高佩 , 徐淑琴 , 贺曦 , 等 . 野生中国沙棘根际假单胞属菌株的筛选鉴定及其对雍菜促生效果的影响 [J]. 福建农业学报 ,2024,39(12):1402-1411.

[5] 田晔 , 包庆丰 . 文水县沙棘产业的经济效应研究——基于灰色关联模型 [J]. 山西农经 ,2024,(24):37-40+95.

[6] 李凤梧 . 大果沙棘种植及管理技术 [J]. 河北农业 ,2024,(12):85-86.

[7] 高瑞娟 . 同朔地区沙棘育苗技术探讨 [J]. 山西林业 ,2024,(06):32-33.

[8]Yu Chunkai, Cui Yuxin, Zheng Yinlin, et al. Optimization of fermentation process for seabuckthorn and grape compound fruit wine [J]. China Brewing, 2024,43(12):189-195.

[9]Chi Qingjun, Cultivation techniques and management measures for seabuckthorn seedlings [J]. Practical Techniques and Information on Fruit Trees, 2024,(12):19-21.

[10]Zhao Xindan, Zhang Dongwei, Jiang Xin, et al. Comparison of phenolic acid and flavonoid components in leaves and fruits of different varieties of seabuckthorn [J]. Non-wood Forest Research, 2024,42(04):247-256.

[11]Zhang Zulin, Ma Yunxia, Alatanhu, The influence of stubble on the growth of seabuckthorn. [J]. Journal of Green Science and Technology, 2024,26(23):63-67.

[12]Hong Bin, Zhou Yanbing, Li Weiwei, et al. Optimization of lutein ester candy preparation process by response surface method. [J]. Modern Food, 2024,30(23):63-70.

[13]Wei Lu, Research on the effects of different drying methods on seabuckthorn fruit powder and its antioxidant activity [J]. Shanxi Forestry Science and Technology, 2024,53(04):8-10+38.

[14]Liu Yingcui, Research on husking technology of seabuckthorn seeds [J]. Shanxi Forestry Science and Technology, 2024,53(04):18-20+54.

[15]Wang Min, Cui Yaqin,Effects analysis of field control by different treatments on seabuckthorn bush branch disease [J]. Shanxi Forestry Science and Technology, 2024,53(04):39-40+46.

[8] 于春凯，崔宇欣，郑尹林，等. 沙棘葡萄复合果酒发酵工艺优化 [J]. 中国酿造，2024,43(12):189-195.

[9] 池青俊. 沙棘苗木培育技术及管理措施 [J]. 果树实用技术与信息，2024,(12):19-21.

[10] 赵鑫丹，张东为，姜鑫，等. 不同品种沙棘叶片和果实中酚酸类及黄酮类成分的比较 [J]. 经济林研究，2024,42(04):247-256.

[11] 张祖琳，麻云霞，阿拉坦呼. 平茬对沙棘生长的影响 [J]. 绿色科技，2024,26(23):63-67.

[12] 洪宾，周彦兵，李维维，等. 响应面法优化叶黄素酯糖果制备工艺 [J]. 现代食品，2024,30(23):63-70.

[13] 魏璐. 不同干燥方式对沙棘果粉及其抗氧化活性的影响研究 [J]. 山西林业科技，2024,53(04):8-10+38.

[14] 刘英翠. 沙棘籽脱壳技术研究 [J]. 山西林业科技，2024,53(04):18-20+54.

[15] 王敏，崔亚琴. 不同处理对沙棘丛枝病的田间防治效果分析 [J]. 山西林业科技，2024,53(04):39-40+46.

[16]Ji Zhihong, Zhang Na, Ma Jialin, Research on the selection of seedlings in seabuckthorn families [J]. Shanxi Forestry Science and Technology, 2024,53(04):41-43.

[17]Xu Bin, Wang Zheng, Song Zhanteng, et al., Analysis and comprehensive evaluation of fruit quality for 11 wild seabuckthorn germplasm resources [J]. Xinjiang Agricultural Sciences,2024,61(12):3020-3031.

[18]Ge Shihui, Detection of pesticide residues and risk assessment of ingestion of seabuckthorn which is a plant with medicinal and edible properties [J]. Specialty Research, 2024,46(06):1-6.

[19]Guo Quanfu, Key points of seabuckthorn cultivation techniques in cold and high-altitude areas of Gansu province [J]. South China Agriculture, 2024,18(23):240-243.

[20]Yan Qiang, Cao Guobin, Research on seabuckthorn planting technology and resource development and utilization in Dingbian county [J]. Cotton Sciences, 2024,46(08):47-49.

[21]Zhao Zhenwei, Lei Kaiyu,Evaluation of drought resistance and afforestation experiment of several tree and shrub species in the sandy area of Yulin [J]. Farmers' Consultant,2024,(34):26-28.

[22]Zhang Jun, Wu Tonghua, Xu Jun, et al. Optimization of key processes for manufacturing high-quality green tea from seabuckthorn leaves [J]. Rural Science and Technology, 2024,(06):51-54.

[23]Lu Minmin, Zhang Guo 'an, Song Wen, et al. Research on the hydraulic structure and photosynthetic characteristics of male and female seabuckthorn plants [J]. Tianjin Agriculture Science,

[16] 冀志宏 , 张娜 , 马佳琳 . 沙棘家系苗期选择研究 [J]. 山西林业科技 ,2024,53(04):41-43.

[17] 徐斌 , 王征 , 宋占腾 , 等 .11 份野生沙棘种质资源果实品质分析与综合评价 [J]. 新疆农业科学 ,2024,61(12):3020-3031.

[18] 葛世辉 . 药食同源植物沙棘农药残留检测与食入风险评估 [J]. 特产研究 ,2024,46(06):1-6.

[19] 郭全福 . 甘肃省高寒高海拔地区沙棘栽培技术要点 [J]. 南方农业 ,2024,18(23):240-243.

[20] 闫强 , 曹国斌 . 定边县沙棘种植技术及资源开发与利用研究 [J]. 棉花科学 ,2024,46(08):47-49.

[21] 赵振伟 , 雷凯宇 . 榆林沙区几种乔灌木树种抗旱性评价及造林试验 [J]. 农家参谋 ,2024,(34):26-28.

[22] 张军 , 吴同华 , 徐均 , 等 . 沙棘叶制造优质绿茶关键工艺优化 [J]. 农村科技 ,2024,(06):51-54.

[23] 卢敏敏 , 张国安 , 宋雯 , 等 . 沙棘雌雄株的水力结构和光合特性研究 [J]. 天津农业科

2024,30(12):1-5.

[24]Wang Qiuping, Four measures to boost the revitalization of seabuckthorn industry in Muling City, Heilongjiang province [J]. China Fruit News, 2024,41(11):62.

[25]Chen Yanhui, Li Yafeng, Li Puyu, et al. Lactobacillus plantarum YHG1-155 ferments seabuckthorn juice to promote the bio-transformation of glycoside polyphenols [J]. Journal of Chinese Institute of Food Science and Technology, 2024,24(11):289-299.

[26]Zhu Jiaying, Fu Leyi, Zhao Qian, et al. The changes in the content of major phenolic compounds and their antibacterial activities during the fermentation process of seabuckthorn enzymes [J]. China Brewing, 2024,43(11):144-150.

[27]Zhou Jianan, Zheng Yingjuan, Ma Su, et al. Plant diversity characteristics under different restoration modes in Shendong mining [J]. Research of Environmental Sciences, 2024,37(12):2771-2781.

[28]Zhang Haiwang, Liu Lina, Wang Hongjiang, et al. A new variety of seabuckthorn, 'Xuedihuang' [J]. Acta Horticulturae Sinica,2024,51(11):2727-2728.

[29]Zhao Yuming. Analysis of seabuckthorn seedling raising and afforestation techniques in Guyuan Area [J]. Guangdong Sericulture, 2024,58(11):45-47.

[30]Chen Xiaona, Zhao Naqi, Liu Xiangjie, et al. Hybrid seabuckthorn breeding between H.R.ssp mongolica and ssp. sinenses and comprehensive evaluation of its fruit quality [J]. Chinese Wild Plant Resources, 2024,43(11):37-43.

学 ,2024,30(12):1-5.

[24] 王秋萍 . 黑龙江：穆棱市四项举措助推沙棘产业振兴 [J]. 中国果业信息 ,2024,41(11):62.

[25] 陈彦辉 , 李亚凤 , 李璞钰 , 等 . 植物乳杆菌 YHG1-155 发酵沙棘汁促糖苷类多酚生物转化 [J]. 中国食品学报 ,2024,24(11):289-299.

[26] 朱家莹 , 傅乐祎 , 赵倩 , 等 . 沙棘酵素发酵过程中主要酚类化合物含量及其抑菌活性变化 [J]. 中国酿造 ,2024,43(11):144-150.

[27] 周甲男 , 郑颖娟 , 马苏 , 等 . 神东矿区不同恢复模式下植物多样性特征 [J]. 环境科学研究 ,2024,37(12):2771-2781.

[28] 张海旺 , 刘丽娜 , 王洪江 , 等 . 沙棘新品种‘雪地黄’[J]. 园艺学报 ,2024,51(11):2727-2728.

[29] 赵玉明 . 固原地区沙棘育苗与造林技术分析 [J]. 广东蚕业 ,2024,58(11):45-47.

[30] 陈晓娜 , 赵纳祺 , 刘湘杰 , 等 . 蒙中杂交沙棘选育及其果实品质综合评价 [J]. 中国野生植物资源 ,2024,43(11):37-43.

[31]Li Qian, Gao Yan, Zhang Dongwei, et al. The influence of different substrates on the rooting of seabuckthorn hardwood cuttings [J]. Liaoning Forestry Science and Technology, 2024,(06):23-26.

[31] 李前 , 高岩 , 张东为 , 等 . 不同基质对沙棘硬枝扦插生根的影响 [J]. 辽宁林业科技 ,2024,(06):23-26.

[32]Jin Liqun, Zou Mingchun. Seabuckthorn hardwood cutting seedling technology of Shenqiuhong variety [J]. Jilin Forestry Science and Technology, 2024,53(06):44-46.

[32] 金丽群 , 邹明春 . 深秋红沙棘硬枝扦插育苗技术 [J]. 吉林林业科技 ,2024,53(06):44-46.

[33]Luo Huixin, Su Tingting. Optimization of the total flavonoid extraction process from seabuckthorn leaves by response surface method [J]. Journal of Food Safety & Quality, 2024,15(21):243-251.

[33] 罗慧馨 , 苏婷婷 . 响应面法优化沙棘叶中总黄酮提取工艺 [J]. 食品安全质量检测学报 ,2024,15(21):243-251.

[34]Tang Ke, Wang Rui, Wu Yuxi, et al. Overview and development countermeasures of seabuckthorn industry in Heilongjiang province [J]. Heilongjiang Agricultural Sciences, 2024,(11):72-75.

[34] 唐克 , 王蕊 , 吴雨蹊 , 等 . 黑龙江省沙棘种植产业概况及发展对策 [J]. 黑龙江农业科学 ,2024,(11):72-75.

[35]Gao Qing. Problems and suggestions for the development of the fruit and forestry industry in Zhunger County, Inner Mongolia [J]. Journal of Fruit Resources, 2024,5(06):110-112.

[35] 高卿 . 准格尔旗林果产业发展中存在的问题及建议 [J]. 果树资源学报 ,2024,5(06):110-112.

[36]Li Shi, Yang Siqi, Zhao Xinxin, et al. The quality of seabuckthorn compound beverage influenced by preparation and sterilization methods [J]. Cereals & Oils, 2024,37(11):82-88.

[36] 李诗 , 杨思琦 , 赵馨馨 , 等 . 沙棘复合饮料的制备及杀菌方式对其品质的影响 [J]. 粮食与油脂 ,2024,37(11):82-88.

[37]Fan Siqi, Wu Zongyao, Chen Jizhi, et al. Research progress on the anti-hypoxia effects of Tibetan medicine [J]. Modern distance education of Traditional Chinese Medicine in China, 2024,22(22):191-193.

[37] 范思琪 , 吴宗耀 , 陈计智 , 等 . 藏药抗缺氧作用研究进展 [J]. 中国中医药现代远程教育 ,2024,22(22):191-193.

[38]Zhang Jun, Xu Jun, Wu Tonghua, et al. The layout and strategy for the construction of the

[38] 张军 , 徐均 , 吴同华 , 等 . 新疆沙棘产业链

seabuckthorn industry in Xinjiang [J]. Forestry of Xinjiang, 2024,(05):4-7.

[39]Xie Fabing, Zhang Jianguo. Key points of breeding and cultivation techniques for superior varieties of seabuckthorn cultivation in Xinjiang [J]. Forestry of Xinjiang, 2024,(05):27-30.

[40]Gao Jianxin. Main pest and disease control methods for seabuckthorn [J]. Modern Rural Science and Technology, 2024,(11):42.

[41]Zhang Sanping. The efficacy of seabuckthorn and countermeasures for the development of seabuckthorn industry in Taiyuan city [J]. Shanxi Forestry, 2024,(05):28-29.

[42]Miao Xiuqin. A brief analysis of the application of modern technology in seabuckthorn seedling cultivation in Dingbian county [J]. South China Agriculture, 2024,18(20):131-133.

[43]Li Peizhong · Wurigemu, Wang Xu, Wang Kang, et al. The main diseases & pests and their control measures of seabuckthorn in E 'min Reclamation Area of Xinjiang Production and Construction Corps [J]. Plant Doctor, 2024,3(05):88-96.

[44]Ling Na, Guo Chunqiu, Tian Haiyan, et al. Visual analysis of the current research status and development trends of seabuckthorn polysaccharides based on bibliometrics [J]. Chinese Traditonal drug, 2024,55(20):7047-7061.

[45]Lu Liangyu, Shi Jianjun, Cai Zongcheng, et al. Analysis of the typical community structure and species diversity of *Cymbidium goeringii* in the dry river Habitat of the Sanjiangyuan Region [J]. Journal of Qinghai University, 2024,42(05):1-8.

建设的布局与策略[J]. 新疆林业 ,2024,(05):4-7.

[39] 谢发兵 , 张建国 . 新疆沙棘属植物良种选育及栽培技术要点 [J]. 新疆林业 ,2024,(05):27-30.

[40] 高建新 . 沙棘主要病虫害防治方法 [J]. 现代农村科技 ,2024,(11):42.

[41] 张三平 . 沙棘功效及太原市沙棘产业发展对策 [J]. 山西林业 ,2024,(05):28-29.

[42] 苗秀琴 . 现代化技术在定边县沙棘育苗中的应用浅析 [J]. 南方农业 ,2024,18(20):131-133.

[43] 李培忠 · 乌日格木 , 王旭 , 王康 , 等 . 新疆生产建设兵团额敏垦区沙棘主要病虫害及其防治措施 [J]. 植物医学 ,2024,3(05):88-96.

[44] 凌娜 , 郭春秋 , 田海燕 , 等 . 基于文献计量学的沙棘多糖研究现状与发展动态的可视化分析 [J]. 中草药 ,2024,55(20):7047-7061.

[45] 吕亮雨 , 施建军 , 蔡宗程 , 等 . 三江源区干枯河道生境下光稃茅香典型群落结构及其物种多样性分析[J]. 青海大学学报 ,2024,42(05):1-8.

[46]Zhu Xueyang, Tao Jin, Chen Yanjun, et al. Optimization of the fermentation process of the new type of seabuckthorn enzyme [J]. The Food Industry, 2024,45(10):29-36.

[47]Li Xiguang, Li Xiaoting, Wang Lei, et al. The effects of different spraying periods and selenium sources on selenium absorption and fruit quality of seabuckthorn [J]. Journal of Arid Land Resources and Environment, 2024,38(11):179-186.

[48]Wang Jiankang, Guo Shiqiong, Wang Jing, et al. Research progress on the biological activity and application of berry seed oil [J]. Journal of Food Science and Biotechnology, 2024,43(10):32-43.

[49]Li Yong, Lin Caili, Liu Chunhai, et al. The occurrence pattern of seabuckthorn top disease and phytoplasma detection in Weichang County [J]. Journal of Terrestrial Ecosystems and Conservation, 2024,4(05):25-29.

[50]Gu Yuting, The current situation and development plan of economic forest production in Shandan county [J]. Forest By-product and Speciality in China, 2024,(05):91-93.

[51]Li Zeqi, Li Haibo, Liu Yongqiang, et al. The influence of branch angles on water carbon metabolism and growth and fruiting of *Hippophae rhamnoides subsp.sinensis* [J]. Forestry Research, 2024,37(05):94-104.

[52]Zhang Liang, Li Long, Wang Jing, et al. Seasonal variations of water utilization strategies of different plants in open-pit mine waste dumps in semi-arid areas [J]. Bulletin of Soil and Water Conservation, 2024,44(05):28-37+47.

[46] 朱雪洋，陶瑾，陈彦君，等．新型沙棘酵素的发酵工艺优化[J]. 食品工业，2024,45(10):29-36.

[47] 李曦光，李萧婷，王蕾，等．不同喷施时期、硒源对沙棘硒素吸收及果实品质的影响 [J]. 干旱区资源与环境，2024,38(11):179-186.

[48] 王建康，郭诗琼，王静，等．浆果籽油的生物活性与应用研究进展 [J]. 食品与生物技术学报，2024,43(10):32-43.

[49] 李永，林彩丽，刘春海，等．围场县人工栽植沙棘簇顶病发生规律与植原体检测 [J]. 陆地生态系统与保护学报，2024,4(05):25-29.

[50] 顾玉婷．山丹县经济林生产现状及发展规划 [J]. 中国林副特产，2024,(05):91-93.

[51] 李泽淇，李海波，刘永强，等．枝条角度对中国沙棘水碳代谢和生长结实的影响 [J]. 林业科学研究，2024,37(05):94-104.

[52] 张亮，李龙，王婧，等．半干旱区露天矿排土场不同植物水分利用策略的季节变化 [J]. 水土保持通报，2024,44(05):28-37+47.

[53]Ding Hao, Luo Zhe, Tang Zhihao, et al. Structural design and analysis of portable seabuckthorn planting device [J]. Machine China, 2024,(29):12-16.

[53] 丁浩，罗哲，唐志好，等 . 便携式沙棘种植装置的结构设计与分析 [J]. 中国机械 ,2024,(29):12-16.

[54]Yao wuyangmei, Zhuo Macao, Yuan Jianyu, et al. The influence of different land use patterns in the loess hilly area on soil carbon pool and carbon pool management index [J]. Journal of Gansu Agricultural University, 2024,59(05):277-285.

[54] 姚武扬眉，卓玛草，袁建钰，等 . 黄土丘陵区不同土地利用方式对土壤碳库及碳库管理指数的影响 [J]. 甘肃农业大学学报 ,2024,59(05):277-285.

[55]Zhou Xuehai, Wang Xuerong Research on high-quality and high-yield cultivation techniques of seabuckthorn fruit harvesting forests in Gulang county [J]. Special Economic Animal and Plant, 2024,27(10):27-30.

[55] 周学海，王雪蓉 . 古浪县沙棘采果林优质丰产栽培技术研究 [J]. 特种经济动植物 ,2024,27(10):27-30.

[56]Sun Jingzhao, Wang Yonggang. The effect of seabuckthorn seed oil regulating NLRP3 inflammasome on inflammatory injury in renal tissue of exhausted exercise rats [J]. Chinese Journal of Gerontology, 2024,44(19):4837-4840.

[56] 孙景召，王勇刚 . 沙棘籽油调节 NLRP3 炎性小体对力竭运动大鼠肾组织炎症损伤的影响 [J]. 中国老年学杂志 ,2024,44(19):4837-4840.

[57]Cai Liangliang, He Miao, Jin Youcun, et al. The therapeutic effect of recombinant human interferon α-2b vaginal effervescence capsules combined with compound seabuckthorn seed oil suppositories on human papillomavirus positive cervical precancerous lesions after conization of the cervix [J]. Journal of Shaanxi Medicines, 2024,53(10):1391-1393+1397.

[57] 蔡良良，何苗，金友存，等 . 阴道内重组人干扰素 α-2b 阴道泡腾胶囊联合复方沙棘籽油栓对行宫颈锥切术后人乳头瘤病毒阳性宫颈癌前病变的治疗效果 [J]. 陕西医学杂志 ,2024,53(10):1391-1393+1397.

[58]Yu Xiaona, CAI Yanmei. The development of seabuckthorn and carrot compound beverage [J]. Journal of Xuchang University, 2024,43(05):70-74.

[58] 余小娜，蔡艳美 . 沙棘胡萝卜复合饮料的研制 [J]. 许昌学院学报 ,2024,43(05):70-74.

[59]Ren Jintao, Zhang Wenhuan, Feng Yongji, et al. Inferring the tending time of seabuckthorn forests from the diversity of understory vegetation and

[59] 任锦涛，张文欢，冯永吉，等 . 从林下

fruit yield: A Case Study taking the northern part of Qingyang City as the example in semi-arid zone [J]. Modern Horticulture, 2024,47(21):86-88.

植被多样性和果实产量推测沙棘林抚育时间——以庆阳市北部半干旱区为例 [J]. 现代园艺 ,2024,47(21):86-88.

[60]Li Xiaohua, Sun Jinkui, Xie Xiaoxia. Research on the preservation, storage and processing technology of seabuckthorn juice [J]. Modern Food, 2024,30(18):107-109.

[60] 李晓华 , 孙金奎 , 谢晓霞 . 沙棘果汁保鲜贮藏加工技术研究 [J]. 现代食品 ,2024,30(18):107-109.

[61]Luo Hongmei, Liu Xiangjie, Duan Aiguo, et al. Ecological and economic seabuckthorn superior variety 'Shenqiuhong'[J]. Forestry Science and Technology, 2024,(09):95-96.

[61] 罗红梅 , 刘湘杰 , 段爱国 , 等 . 生态经济型沙棘良种‘深秋红’[J]. 林业科技通讯 ,2024,(09):95-96.

[62]An Meiling, Chen Qi, Yu Wenli, et al. Research and development on the production and quality control of seabuckthorn milk beer [J]. China Dairy, 2024,(09):85-89+96.

[62] 安美玲 , 陈琪 , 喻文丽 , 等 . 沙棘奶啤的研制生产与质量控制 [J]. 中国乳业 ,2024,(09):85-89+96.

[63]Zhang Peng, Cheng Ping, Manafu Saiyiti, et al. Evaluation of the effects of different water collection afforestation techniques for Hippophae rhamnoides ssp mongolica in the front mountain belt of the northern slope of Tianshan Mountains [J]. Journal of Hunan Ecological Science, 2024,11(03):56-64.

[63] 张鹏 , 程平 , 玛纳甫 · 赛依提 , 等 . 天山北坡前山带蒙古沙棘不同集水造林技术的效果评价 [J]. 湖南生态科学学报 ,2024,11(03):56-64.

[64]Meiduo Zhuoga, Shen Sifan, Cao Fuliang, et al. Study on the phenotypes and germination characteristics from different provenance of Hippophae gyantsensis [J]. Seed, 2024,43(09):40-47.

[64] 美朵卓嘎 , 沈思凡 , 曹福亮 , 等 . 不同种源江孜沙棘种子表型及萌发特性研究 [J]. 种子 ,2024,43(09):40-47.

[65]Ding Yuhong, Ju Ning, Li Yafeng, et al. Process optimization of probiotic compound fermentation seabuckthorn yogurt and study on its in vitro antioxidant activity [J]. Journal of Agricultural Science, 2024,45(03):62-69.

[65] 丁雨红 , 剧柠 , 李亚凤 , 等 . 益生菌复合发酵沙棘酸奶的工艺优化及其体外抗氧化活性研究 [J]. 农业科学研究 ,2024,45(03):62-69.

[66]Che Xiaofang. Propagation and high-yield cultivation and management techniques of large-fruit seabuckthorn in western Liaoning region [J]. Forestry Prospect and Design, 2024,53(05):71-74.

[66] 车晓芳 . 辽西地区大果沙棘繁殖及丰产栽培管理技术 [J]. 林业勘查设计 ,2024,53(05):71-74.

[67]Chen Shichao, Liu Tongtong, Zhang Qing, et al. Soil quality changes in seabuckthorn forests with different ages in open-pit coal mine waste dumps [J]. Northern Horticulture, 2024,(17):76-83.

[67] 陈士超 , 刘彤彤 , 张庆 , 等 . 露天煤矿排土场不同林龄沙棘林下土壤质量变化 [J]. 北方园艺 ,2024,(17):76-83.

[68]Zhao Xu, Lu Lin, Lian Junwen, et al. Research on the technology of atractylodes planting under seabuckthorn forests [J]. New Farmers, 2024,(26):96-98.

[68] 赵旭 , 吕琳 , 连俊文 , 等 . 沙棘林下种植苍术技术研究 [J]. 新农民 ,2024,(26):96-98.

[69]Wang Haojia. Research on seabuckthorn cutting seedling raising and afforestation technology in western Liaoning region [J]. Horticulture & Seed, 2024,44(09):42-44.

[69] 王浩佳 . 辽西地区沙棘扦插育苗及造林技术研究 [J]. 园艺与种苗 ,2024,44(09):42-44.

[70]Shang Tiange, Yu Nannan, Xue Lizhong, et al. A comprehensive evaluation to the influence of mixed modes with different tree species on the physical properties of soil based on the entropy weight TOPSIS method [J]. Forest Inventory and Planning, 2024,49(05):191-197.

[70] 尚天歌 , 于楠楠 , 薛利忠 , 等 . 基于熵权 TOPSIS 法综合评价不同树种的混交方式对土壤物理性质的影响 [J]. 林业调查规划 ,2024,49(05):191-197.

[71]Nan Zhengzheng, Ai Ning, Liu Changhai, et al. Soil organic carbon content and its influencing factors of different vegetation types in Yuyang district [J]. Ecological Science, 2024,43(05):169-174.

[71] 南正正 , 艾宁 , 刘长海 , 等 . 榆阳区不同植被类型土壤有机碳含量及其影响因素 [J]. 生态科学 ,2024,43(05):169-174.

[72]Chen Feiyan, Huang Cheng, Li Weilue, et al. Research on the extraction and purification process of total flavonoids from seabuckthorn peel and their antioxidant activity [J]. Modern Food, 2024,30(17):93-99+115.

[72] 陈飞燕 , 黄成 , 李伟略 , 等 . 沙棘果皮总黄酮提取纯化工艺及抗氧化活性研究 [J]. 现代食品 ,2024,30(17):93-99+115.

[73]Ge Xiaojun, Wang Qian, Liu Huijie. Research on the problems and solutions for the high-quality development of the large fruit seabuckthorn industry in Altay prefecture, Xinjiang [J]. Northern China Horticulture, 2024,(22):116-121.

[73] 葛晓军 , 王茜 , 刘慧捷 . 新疆阿勒泰地区大果沙棘产业高质量发展问题与解决进路研究 [J]. 北方园艺 ,2024,(22):116-121.

[74]Ma Kun, Zhong Guanlan, Wang Yue, et al. Network meta-analysis of the treatment of cervical human papillomavirus infection with Chinese patent medicine combined with recombinant human interferon α-2b [J]. Journal of Chinese Materia Medica, 2024,49(24):6784-6802.

[74] 马堃 , 钟观兰 , 王越 , 等 . 中成药联合重组人干扰素 α-2b 治疗宫颈人乳头瘤病毒感染的网状 Meta 分析 [J]. 中国中药杂志 ,2024,49(24):6784-6802.

[75]Li Luyu, Feng Zhipeng, Jin Yaxing, et al. The effects of seabuckthorn fruit residue extraction the slaughter performance, meat quality, antioxidant capacity and intestinal health of yellow-feathered broilers fed with oxidized soybean oil [J].Journal of Chinese Animal Nutrition, 2024,36(09):5656-5668.

[75] 李露宇 , 冯志鹏 , 靳亚星 , 等 . 沙棘果渣提取物对饲喂氧化大豆油黄羽肉鸡屠宰性能、肉品质、抗氧化能力和肠道健康的影响 [J]. 动物营养学报 ,2024,36(09):5656-5668.

[76]Su Laixue. High-yield cultivation techniques for large-fruit seabuckthorn in Xiaolongshan, Gansu Province [J]. Practical rural technologies, 2024,(09):61-62+60.

[76] 苏来学 . 甘肃小陇山大果沙棘高产栽培技术 [J]. 农村实用技术 ,2024,(09):61-62+60.

[77]Hou Bingbing, Wang Caixia, Zhou Ying, et al. The development of seabuckthorn leaf hydrogel mask [J]. Shandong Chemical Industry, 2024,53(17):97-99+104.

[77] 侯冰冰 , 王彩霞 , 周莹 , 等 . 沙棘叶水凝胶面膜的研制 [J]. 山东化工 ,2024,53(17):97-99+104.

[78]Ma Shu, Zhao Yunxiang, Zhu Xiaoping, et al. The influence of seabuckthorn polysaccharides on the preservation effect of frozen semen from pigs [J]. Journal of Chinese Animal Science, 2024,60(10):216-223.

[78] 马姝 , 赵云翔 , 朱晓萍 , 等 . 沙棘多糖对猪冷冻精液保存效果的影响 [J]. 中国畜牧杂志 ,2024,60(10):216-223.

[79]Ji Lirong, Wang Duowen, Lu Xiaoxia, et al. Investigation on afforestation site conditions and selection of main afforestation tree species

[79] 季立荣 , 王多文 , 吕晓霞 , 等 . 祁连山东端浅山区造林立地条件调查及主要造林树种选择

in the shallow mountainous area at the eastern end of Qilian Mountains [J]. Gansu Science and Technology, 2024,40(08):94-97+106.

[80]Wang Lina. Research on mixed afforestation technology of seabuckthorn and pine tree in Fuxin city [J]. Agricultural Science-Technology and Information, 2024,(08):61-64.

[81]Shen Aibin, Jiang Jiyuan, Ding Junjie, et al. Development and quality evaluation of lactobacillus plantarum fermented seabuckthorn beverage [J]. Packaging and Food Machinery, 2024,42(04):8-13.

[82]Wu Hanzhu, Yu Yanying, Liu Yuyang, et al. The protective effect of seabuckthorn flavonoids on liver cell damage in chickens caused by aflatoxin B1 [J]. Feed Review, 2024,(04):21-25.

[83]Bai Quan. Seabuckthorn pruning and stubble renewal techniques [J]. Shanxi Forestry, 2024,(04):40-41.

[84]Wang Haishan. Cultivation and management techniques of seabuckthorn and its role in wind prevention and sand control [J]. New Agriculture, 2024,(08):41-42.

[85]Wang Yuting, Nan Jibin, Shan Zengluo Bu, et al. Study on the germination characteristics of three shrub seeds in Tibet [J]. Journal of West China Forestry Science, 2024,53(04):98-104.

[86]Wang Wenqiang, Yang Bo, Li Xiaowei, et al. The potential geographical distribution of seabuckthorn in China affected by future climate change [J]. Chinese Journal of Applied Ecology, 2024,35(10):2813-2821.

[J]. 甘肃科技 ,2024,40(08):94-97+106.

[80] 王丽娜 . 阜新市沙棘与油松混交造林技术研究 [J]. 农业科技与信息 ,2024,(08):61-64.

[81] 沈艾彬 , 姜继元 , 丁俊杰 , 等 . 植物乳杆菌发酵沙棘饮料的研制及其品质评价 [J]. 包装与食品机械 ,2024,42(04):8-13.

[82] 伍涵竹 , 玉颜英 , 刘宇洋 , 等 . 沙棘黄酮对黄曲霉毒素 B1 致鸡肝细胞损伤的保护作用 [J]. 饲料博览 ,2024,(04):21-25.

[83] 白权 . 沙棘修剪及平茬更新技术 [J]. 山西林业 ,2024,(04):40-41.

[84] 王海山 . 沙棘栽培管理技术和防风治沙的作用 [J]. 新农业 ,2024,(08):41-42.

[85] 王玉婷 , 南吉斌 , 单增罗布 , 等 . 西藏 3 种灌木种子萌发特性研究 [J]. 西部林业科学 ,2024,53(04):98-104.

[86] 王文强 , 杨博 , 李小伟 , 等 . 未来气候变化对中国沙棘潜在地理分布的影响 [J]. 应用生态学报 ,2024,35(10):2813-2821.

[87]Zhao Chen, Wang Yan, Abxhaiman Mubarak, et al. The effect of compound additives on rumen fermentation and apparent nutrient digestibility of sheep in cold season [J]. Xinjiang Agricultural Sciences, 2024,61(08):2054-2062.

[88]Zhang Shuisheng, Tian Pengbo, Fan Yu, et al. Design of seabuckthorn quality monitoring system based on apriori multi-dimensional sensing parameters [J]. Chinese Journal of Sensors and Actuators, 2024,37(08):1466-1472.

[89]Hou Sihan. Comparative analysis of fatty acid composition in five vegetable oils [J]. Food Safety Guide, 2024,(23):44-46.

[90]Li Xiaoli, Lai Hongsheng. Key technologies for propagation by cuttings and establishment of orchards of "Chaoyang" seabuckthorn variety in the western Liaoning regions [J]. Horticulture & Seed, 2024,44(08):33-35+61.

[91]Guo Yan, Zhao Fenrong, Liu Bin. The effect of seabuckthorn syrup combined with terbutaline on oxidative stress and the levels of ANXA1, CysLTs and SP-A in patients with bronchiolitis [J]. Journal of Disease Monitor & Control, 2024,18(04):253-257+263.

[92]Zhang Jingpeng, Zhang Dejun. To explore the mechanism of seabuckthorn in preventing and treating hypertension based on network pharmacology - molecular docking - in vitro antioxidation [J]. Journal of Practical Clinic with Integrated Traditional Chinese and Western Medicine, 2024,24(15):1-9.

[93]Zhao Lei, Ding Xue, Sun Yanjie, et al. The content of fatty acids in seabuckthorn determined

[87] 赵晨，王彦，阿不夏合满·穆巴拉克，等 . 复合添加剂对冷季绵羊瘤胃发酵及养分表观消化率的影响 [J]. 新疆农业科学 ,2024,61(08):2054-2062.

[88] 张水胜，田朋博，樊玉，等 . 基于 Apriori 多维传感参量沙棘质量监测系统设计 [J]. 传感技术学报 ,2024,37(08):1466-1472.

[89] 侯思涵 .5 种植物油脂肪酸组成的比较分析 [J]. 食品安全导刊 ,2024,(23):44-46.

[90] 李小利，赖宏生 . 辽西地区‘朝阳’沙棘扦插育苗及建园关键技术 [J]. 园艺与种苗 ,2024,44(08):33-35+61.

[91] 郭彦，赵粉荣，刘斌 . 沙棘糖浆联合特布他林对毛细支气管炎患者氧化应激及 ANXA1、CysLTs、SP-A 水平的影响 [J]. 疾病监测与控制 ,2024,18(04):253-257+263.

[92] 张靖鹏，张得钧 . 基于网络药理 - 分子对接 - 体外抗氧化探究沙棘防治高血压的作用机制 [J]. 实用中西医结合临床 ,2024,24(15):1-9.

[93] 赵磊，丁雪，孙艳杰，等 . 柱前衍生 - 气相色谱法测定沙棘中脂肪酸的含量 [J]. 特产研

by pre-column derivatization - gas chromatography [J]. Specialty Research, 2024,46(04):116-127.

[94]Zhang Chunping, He Ye, Huang Di, et al. Comparison of nutritional components of seabuckthorn from different origins in Xinjiang [J]. Modern Agricultural Science and Technology, 2024,(15):134-136+140.

[95]Wang Qingmei, Xu Yuan, Zhang Yujie, et al. The influence of different mass ratios of whey protein powder and soybean milk on the quality of coagulated seabuckthorn yogurt [J]. Cereals & Oils, 2024,37(08):90-93+99.

[96]Chen Songqing, Dong Hongfang, Yue Yifeng, et al. Prediction of the geographical distribution and dynamic changes of *Hippophae rhamnoides subsp. sinensis* under different climate scenarios [J]. Arid Zone Research, 2024,41(09):1560-1571.

[97]Xin Jihang, Cui Yaqin, Liu Hongxia, et al. Molecular identification of two diseases of forest plant phytolites [J]. Plant Protection, 2024,50(04):91-100.

[98]Jia Pengbo, Li Chunxiao, Cui Liyong. Feasibility study on precise cultivation of artificial seabuckthorn fruit orchards in Sanjiang area[J]. Forestry Prospect and Design, 2024,53(04):77-82.

[99]Zhang Jun, Wu Tonghua, Xu Jun, et al. Optimized cultivation techniques for high-yield and high-quality seabuckthorn production [J]. Rural Science & Technology, 2024,(04):34-38.

[100]Xu Xuemin. Orchard establishment and management techniques of the superior seabuckthorn variety 'Shenqiuhogn' [J]. Forestry

究 ,2024,46(04):116-127.

[94] 张春平 , 何叶 , 黄迪 , 等 . 新疆不同产地沙棘营养成分对比 [J]. 现代农业科技 ,2024,(15):134-136+140.

[95] 汪清美 , 徐源 , 张雨洁 , 等 . 乳清蛋白粉与豆乳不同质量比对凝固型沙棘酸奶品质的影响 [J]. 粮食与油脂 ,2024,37(08):90-93+99.

[96] 陈松清 , 东红芳 , 岳怡锋 , 等 . 不同气候情景下中国沙棘的地理分布及动态变化预测 [J]. 干旱区研究 ,2024,41(09):1560-1571.

[97] 辛霁航 , 崔亚琴 , 刘红霞 , 等 . 两种林木植原体病害的分子鉴定 [J]. 植物保护 ,2024,50(04):91-100.

[98] 贾鹏博 , 李春晓 , 崔立勇 . 三江地区沙棘人工果林精准培育可行性研究 [J]. 林业勘查设计 ,2024,53(04):77-82.

[99] 张军 , 吴同华 , 徐均 , 等 . 沙棘丰产优质优化栽培技术 [J]. 农村科技 ,2024,(04):34-38.

[100] 徐学敏 . 沙棘优良品种‘深秋红’果园建植及管理技术 [J]. 林业科技通

Science and Technology, 2024,(07):102-105.

讯 ,2024,(07):102-105.

[101]Xu Shusheng. Seedling raising techniques of seabuckthorn variety 'Yulu' [J]. Hebei Forestry, 2024,(07):33.

[101] 徐树生 . 宇璐沙棘育苗技术 [J]. 河北林业 ,2024,(07):33.

[102]Dong Yani. A single seabuckthorn leads a new chapter in economic development - A record of the seabuckthorn in Kaizha village, Wenshui County, Shanxi Province[J]. Cun Wei Zhu Ren, 2024,(14):15-20.

[102] 董亚泥 . 一粒沙棘引领经济发展新篇章——记山西省吕梁市文水县开栅村沙棘 [J]. 村委主任 ,2024,(14):15-20.

[103]Wang Wenfu. Technology for the transformation of degraded seabuckthorn forests in Datong and Shuozhou areas [J]. Shanxi Forestry, 2024,(S2):62-63.

[103] 王文富 . 同朔地区沙棘退化林改造技术 [J]. 山西林业 ,2024,(S2):62-63.

[104]Qu Wei, Hao Dihui, Li Wenjia, et al. The fermentation process of birch SAP and seabuckthorn compound wine optimized by the response surface method [J]. Forestry Science & Technology, 2024,49(04):36-42.

[104] 曲薇 , 郝迪荻 , 李文佳 , 等 . 响应面法优化桦树液沙棘复合酒发酵工艺 [J]. 林业科技 ,2024,49(04):36-42.

[105]Yu Miao. Research on the development of seabuckthorn resources and their pharmacological effects in Heilongjiang Province [J]. Modern Horticulture, 2024,47(14):122-124.

[105] 于淼 . 黑龙江省沙棘资源开发及其药理作用探究 [J]. 现代园艺 ,2024,47(14):122-124.

[106]Guo Hairong, Yu Wenling. Analysis of key points of seabuckthorn propagation and afforestation techniques in Gulang county [J]. Modern Horticulture, 2024,47(14):62-64.

[106] 郭海荣 , 于文玲 . 古浪县沙棘繁殖及造林技术要点分析 [J]. 现代园艺 ,2024,47(14):62-64.

[107]Gao Juanjuan, Lu Mengsi, Yue Lihua, et al. The effect of palmitic acid on the intestinal flora of mice with ulcerative colitis [J]. Food Research and Development, 2024,45(14):79-86.

[107] 高娟娟 , 吕梦思 , 岳丽华 , 等 . 棕榈油酸对溃疡性结肠炎小鼠肠道菌群的作用 [J]. 食品研究与开发 ,2024,45(14):79-86.

[108]Sun Meng. High-yield seedling raising and pest control techniques for seabuckthorn in northern Hebei regions [J]. Modern Rural Science and Technology, 2024,(08):73-74.

[109]Huang Jiancun. High-quality and high-yield cultivation techniques for seabuckthorn fruit harvesting forests in the shallow mountainous area at the northern foot of the eastern end of the Qilian mountains [J]. Practical Techniques and Information on Fruit Trees, 2024,(07):10-12.

[110]Wu Yaqiong, Xuan Zhenguo. Effects of 5-ALA on chlorophyll synthesis and photosynthesis of seabuckthorn under drought stress [J]. Journal of Jilin Forestry Science and Technology, 2024,53(04):14-20.

[111]Wei Bin. Seabuckthorn cutting seedling raising and cultivation management techniques [J]. Liaoning Forestry Science and Technology, 2024,(04):73-74.

[112]Zhu Haoming, Lu Linlin, Guo Lijun, et al. The active ingredients of seabuckthorn and its anti-tumor and anti-aging activities [J]. Journal of Nantong University(Medical Edition), 2024,44(04):367-374.

[113]Qian Xiyong, Wang Zhiqiang. Yanshou county takes the lead in creating "black soil premium products" with seabuckthorn [J]. China's Construction of Old Revolutionary Areas, 2024,(07):32.

[114]Wu Haiyan. Analysis of the clinical value of combined treatment of compound seabuckthorn seed oil suppositories and tinidazole suppositories

[108] 孙猛 . 冀北地区沙棘高产育苗及病虫害防治技术 [J]. 现代农村科技 ,2024,(08):73-74.

[109] 黄建存 . 祁连山东端北麓浅山区沙棘采果林优质丰产栽培技术 [J]. 果树实用技术与信息 ,2024,(07):10-12.

[110] 武亚琼 , 宣振国 .5-ALA 对干旱胁迫下沙棘叶绿素合成和光合作用的影响 [J]. 吉林林业科技 ,2024,53(04):14-20.

[111] 魏斌 . 沙棘扦插育苗及栽培管理技术 [J]. 辽宁林业科技 ,2024,(04):73-74.

[112] 朱浩铭 , 芦琳琳 , 郭丽君 , 等 . 沙棘活性成分以及抗肿瘤和抗衰老活性 [J]. 南通大学学报 (医学版),2024,44(04):367-374.

[113] 钱玺勇 , 王志强 . 延寿县打造“黑土优品”沙棘一马当先 [J]. 中国老区建设 ,2024,(07):32.

[114] 吴海燕 . 复方沙棘籽油栓与替硝唑栓联合治疗老年性阴道炎的临床价值分析 [J]. 智慧健

for senile vaginitis [J]. Smart Healthcare, 2024,10(20):44-46.

康 ,2024,10(20):44-46.

[115]Wang Dongli, Xu Yuan, Yu Baihe, et al. Soil ecological stoichiometric characteristics under different restoration modes in the initial stage of reclamation of the wasteland in the Loess regions [J]. Ecological Science, 2024,43(04):166-175.

[115] 王东丽 , 徐源 , 于百和 , 等 . 黄土区排土场复垦初期不同恢复模式下土壤生态化学计量特征 [J]. 生态科学 ,2024,43(04):166-175.

[116]Yang Hong, Gao Wenyu, Lyu Qingxin, et al. Ecological stoichiometric characteristics of carbon, nitrogen and phosphorus in seabuckthorn leaves and soil under the different growing condition in the Qinghai-Xizang Plateau [J]. Journal of Northeast Forestry University, 2024,52(08):110-119.

[116] 杨红 , 高文于 , 吕庆鑫 , 等 . 青藏高原不同生境沙棘叶片及土壤碳、氮、磷的生态化学计量特征 [J]. 东北林业大学学报 ,2024,52(08):110-119.

[117]Liu Tun, Zhai Jietao. Experiment on the effects of different treatments on the germination of *Hippophae rhamnoides subsp.sinensis* seeds [J]. South China Agriculture, 2024,18(13):262-264+273.

[117] 刘暾 , 翟婕陶 . 不同处理对中国沙棘种子萌发的影响试验 [J]. 南方农业 ,2024,18(13):262-264+273.

[118]Jiang Weiping. Characteristics and comprehensive control of seabuckthorn wood moth (cossidae) in Gannan Prefecture, Gansu province [J]. Agricultural Engineering Technology, 2024,44(19):53-54.

[118] 蒋渭平 . 甘肃甘南州沙棘木蠹蛾发生特点与综合防治 [J]. 农业工程技术 ,2024,44(19):53-54.

[119]Shi Yanchao, Xu Wanxin, Zhao Lei, et al. The effects of seabuckthorn polysaccharides on lipopolysaccharide-induced serum immunity, liver antioxidant and anti-inflammatory functions in mice [J]. Feed Industry, 2024,45(19):93-98.

[119] 时言超 , 许万鑫 , 赵磊 , 等 . 沙棘多糖对脂多糖诱导小鼠血清免疫、肝脏抗氧化和抗炎功能的影响 [J]. 饲料工业 ,2024,45(19):93-98.

[120]Gao Pei, Ma Yaqiong, He Yongchao, et al. Isolation, identification and comparison of growth promoting ability of nitrogen-fixing bacteria in the rhizosphere of *Hippophae rhamnoides subsp. sinensis* stands [J]. Journal of Fujian Agriculture and Forestry University (Natural Science Edition), 2024,53(04):522-531.

[120] 高佩 , 马亚琼 , 何永超 , 等 . 中国沙棘根际固氮菌的分离、鉴定及促生能力比较 [J]. 福建农林大学学报 (自然科学版),2024,53(04):522-531.

[121]Zhao Huimei, Tang Zhishu, Quan Xinyu, et al. The protective effect and mechanism of Five-flavor Seabuckthorn Powder on ovalbumin induced allergic bronchial asthma in rats [J].Chinese Traditional drug, 2024,55(13):4423-4433.

[122]Wang Lei. Analysis and suggestions on the current development status of seabuckthorn industry in Xinjiang [J]. Forestry of Xinjiang, 2024,(03):25-27.

[123]Ma Jianbo, Tao Hongbin, Du Chanyuan, et al. Study on the growth, fruit characteristics and soil physicochemical properties of Yulu seabuckthorn under different site conditions[J]. The Journal of Hebei Forestry Science and Technology, 2024,(02):21-25.

[124]Zhou Yong, Yan Suping, Li Shan, et al. Optimization of seabuckthorn yogurt fermentation process and its impact on functional components[J]. Modern Food, 2024,30(12):199-201.

[125]Wang Guilin, Li Mingchao, Bi Yinli, et al. The cumulative effect of organic carbon in aggregates of different fertilization models for waste dumps [J]. Bulletin of Soil and Water Conservation, 2024,44(03):307-316.

[126]Li Shixin, Lu Penglong, Ren Shangkun, et al. Efficient water-saving cultivation techniques for seabuckthorn [J]. China Forestry Industry, 2024,(06):25-26.

[127]Dong Yugong. Analysis of species diversity characteristics of plant communities in the Loess Plateau of northern Shaanxi [J]. Journal of Shaanxi Agricultural Sciences, 2024,70(06):58-62.

[121] 赵慧梅 , 唐志书 , 全心雨 , 等 . 五味沙棘散对卵清蛋白诱导的过敏性支气管哮喘大鼠的保护作用及机制 [J]. 中草药 ,2024,55(13):4423-4433.

[122] 王磊 . 新疆沙棘产业发展现状分析及建议 [J]. 新疆林业 ,2024,(03):25-27.

[123] 马建波 , 陶宏彬 , 杜婵媛 , 等 . 不同立地条件下宇璐沙棘生长、果实特性及其土壤理化性质研究 [J]. 河北林业科技 ,2024,(02):21-25.

[124] 周勇 , 闫素平 , 李珊 , 等 . 沙棘酸奶发酵工艺优化及其对功能性成分的影响 [J]. 现代食品 ,2024,30(12):199-201.

[125] 王桂林 , 李明超 , 毕银丽 , 等 . 排土场不同培肥模式团聚体有机碳的累积效应 [J]. 水土保持通报 ,2024,44(03):307-316.

[126] 李仕新 , 陆鹏龙 , 任尚坤 , 等 . 沙棘高效节水栽培技术 [J]. 中国林业产业 ,2024,(06):25-26.

[127] 董育公 . 陕北黄土高原植物群落物种多样性特征分析 [J]. 陕西农业科学 ,2024,70(06):58-62.

[128]Liang Yuhao, Chen Chunxia, Kong Xiangjin, et al. Optimization of brewing process forlow-alcohol flavored honey wine and analysis of its aroma composition [J]. Food and Fermentation Science & Technology, 2024,60(03):64-75.

[129]Zhang Liangming. Optimization of extraction process and development and application of isorhamnetin from seabuckthorn leaves [J]. Food Industries at Home and Abroad, 2024,(12):4-6.

[130]Liu Ruoqi, Liu Rui, Ma Fulin, et al. Research on the extraction and purification of flavonoids from *Hippophae rhamnoides subsp.sinensis* leaves [J]. Northern Horticulture, 2024,(23):88-96.

[131]Shi Jiahao, Yan Huiling, Wang Siyi, et al. Characteristics of large soil animal communities in typical vegetation of the returned farmland to forest areas on the Loess Plateau [J]. Journal of Yan'an University (Natural Science Edition), 2024,43(03):68-75.

[132]Xiong Qingshan, Wei Dingyi, Wen Yaya, et al. Research progress on the chemical components and pharmacological effects of seabuckthorn fruits [J]. Journal of Northern Agriculture, 2024,52(03):57-63.

[133]Mu Qier, Batu, Zheng Yankai, et al. A comparative study on the nutritional components and feed value of several shrub plants in the Ordos area [J]. Feed Industry, 2024,45(23):23-31.

[134]Liu Zhenhua, Ren Li Chengcheng, Wang Yue, et al. Six tryptamine alkaloids in seabuckthorn simultaneously determined by HPLC [J]. Journal of Huaxi Pharmaceutical Sciences, 2024,39(03):321-323.

[128] 梁玉浩 , 陈春霞 , 孔祥锦 , 等 . 低醇加香蜂蜜酒酿造工艺优化及其香气构成分析 [J]. 食品与发酵科技 ,2024,60(03):64-75.

[129] 张良明 . 沙棘叶中异鼠李素的提取工艺优化及开发应用 [J]. 中外食品工业 ,2024,(12):4-6.

[130] 刘若琪 , 刘瑞 , 马福林 , 等 . 中国沙棘叶黄酮的提取及纯化研究 [J]. 北方园艺 ,2024,(23):88-96.

[131] 史嘉豪 , 闫慧玲 , 王思艺 , 等 . 黄土高原退耕还林区典型植被大型土壤动物群落特征 [J]. 延安大学学报 (自然科学版),2024,43(03):68-75.

[132] 熊青山 , 卫丁一 , 温娅娅 , 等 . 沙棘果实化学成分及其药理作用研究进展 [J]. 北方农业学报 ,2024,52(03):57-63.

[133] 木其尔 , 巴图 , 郑彦楷 , 等 . 鄂尔多斯地区几种灌木类植物营养成分及饲用价值的比较研究 [J]. 饲料工业 ,2024,45(23):23-31.

[134] 刘振华 , 任李成城 , 王月 , 等 .HPLC 同时测定沙棘中的 6 种色胺类生物碱 [J]. 华西药学杂志 ,2024,39(03):321-323.

[135]Hao Dihui, Li Peishan, Zhou Min. Growth investigation and growth performance analysis of large fruit eabuckthorn [J]. Forest By-product and Speciality in China, 2024,(03):28-30.

[135] 郝迪荻 , 李佩珊 , 周敏 . 大果沙棘的生长调查及生长表现分析 [J]. 中国林副特产 ,2024,(03):28-30.

[136]Feng Kai. Seabuckthorn seedling raising and afforestation techniques in northern China [J]. Forest By-product and Speciality in China, 2024,(03):48-50.

[136] 冯凯 . 北方地区沙棘育苗及造林技术 [J]. 中国林副特产 ,2024,(03):48-50.

[137]Hai Lu, Shang Min, Luo Hongmei, et al. Research progress on the response of seabuckthorn to abiotic stress [J]. Journal of Temperate Forestry Research, 2024,7(02):57-60+67.

[137] 海鹭 , 尚敏 , 罗红梅 , 等 . 沙棘对非生物胁迫的响应研究进展 [J]. 温带林业研究 ,2024,7(02):57-60+67.

[138]Ma Jialin. The Effects of fertilizer application amount and tree shape on the growth of different *Hippophae rhamnoides subsp.sinensis* clones [J]. Shanxi Forestry Science and Technology, 2024,53(02):1-4.

[138] 马佳琳 . 追肥量和树形对不同中国沙棘无性系生长的影响 [J]. 山西林业科技 ,2

[139]Li Xin, Adili Shatar, Li Ziang, et al. Analysis of the occurrence and damage of two types of seabuckthorn burrowing pests [J]. Xinjiang Agricultural Sciences, 2024,61(06):1454-1460.

[139] 李欣 , 阿地力 · 沙塔尔 , 李子昂 , 等 . 两种沙棘钻蛀性害虫发生与危害分析 [J]. 新疆农业科学 ,2024,61(06):1454-1460.

[140]Luo Yuen. Cultivation and management techniques of seabuckthorn in state-owned forest areas of Shanxi province [J]. Special Economic Animal and Plant, 2024,27(06):174-176.

[140] 罗玉恩 . 山西国有林区沙棘的栽培与管理技术 [J]. 特种经济动植物 ,2024,27(06):174-176.

[141]Liu Junjun, Tian Jiayi, Li Kun, et al. Study on the effects and mechanisms of seven Chinese herbal extracts in inhibiting *Sstaphylococcus aureus* in vitro [J]. Animal Husbandry & Veterinary Medicine, 2024,56(06):130-138.

[141] 刘俊俊 , 田佳仪 , 李坤 , 等 .7 种中药提取物体外抑制金黄色葡萄球菌的效果及机制研究 [J]. 畜牧与兽医 ,2024,56(06):130-138.

[142]Luo Hanrui, Wang Luoyun, Zhang Jianguo, et al. Phylogenetic analysis and evolutionary trend inference of the chloroplast genome of the *Elaeagnaceae* family [J]. Acta Botanica Boreali-Occidentalia Sinica, 2024,44(06):891-903.

[142] 罗晗睿 , 王罗云 , 张建国 , 等 . 胡颓子科叶绿体基因组系统发育分析与演化趋势推断 [J]. 西北植物学报 ,2024,44(06):891-903.

[143]Bai Jian, Xue Bowen. Research progress on the application of seabuckthorn fruit residue in animal raising [J]. China Feed, 2024,(13):22-27.

[143] 白建 , 薛博文 . 沙棘果渣在动物养殖中的应用研究进展 [J]. 中国饲料 ,2024,(13):22-27.

[144]Zhao Jiaying, Chen Jiao, Hao Yudong. Phenological observation of superior seabuckthorn varieties in the Loess Plateau gully region [J]. Agriculture and Technology, 2024,44(10):31-34.

[144] 赵嘉莹 , 陈娇 , 郝玉东 . 黄土高塬沟壑区良种沙棘物候观测 [J]. 农业与技术 ,2024,44(10):31-34.

[145]Wang Shuqing. Seabuckthorn seedling raising and cultivation techniques in northwest China [J]. China Fruit News, 2024,41(05):89-90.

[145] 王树青 . 西北地区沙棘育苗与造林技术 [J]. 中国果业信息 ,2024,41(05):89-90.

[146]Gao Pei, Wang Binxian, Ma Yaqiong, et al. Isolation, identification of phosphorus-solubilizing bacteria in the rhizosphere of *Hippophae rhamnoides subsp.sinensis* in Qinghai and their promoting effects on water spinach growth [J]. Jiangsu Agricultural Sciences, 2024,52(11):247-253.

[146] 高佩 , 王彬贤 , 马亚琼 , 等 . 青海野生中国沙棘根际解磷菌的分离、鉴定及其对蕹菜的促生作用 [J]. 江苏农业科学 ,2024,52(11):247-253.

[147]Fu Yongwu. Suggestions for the development of seabuckthorn industry in Datong city [J]. Shanxi Forestry,2024,(S1):32-33.

[147] 富勇武 . 大同市沙棘产业发展建议 [J]. 山西林业 ,2024,(S1):32-33.

[148]Wang Yali. High-yield management techniques for seabuckthorn gardens in Guandi Mountain forest area [J]. Shanxi Forestry Shanxi Forestry, 2024,(S1):60-61.

[148] 王亚丽 . 关帝山林区沙棘园丰产管理技术 [J]. 山西林业 ,2024,(S1):60-61.

[149]Jiangchu Zhuoma. Investigation on seabuckthorn resources distribution and its

[149] 江初卓玛 . 云南沙棘分布调查及发展建议

development suggestions of Yunnan province [J]. China Forestry Industry, 2024,(05):47-49.

[150]Liu Song, Zhao Yan, Li Zongshu, et al. The improvement effect of seabuckthorn leaf polysaccharides on the learning and memory ability of rats with vascular dementia [J]. Modern Food Science and Technology, 2024,40(09):12-19.

[151]Ai Ying, Liu Haikun, Yu Linhong, et al. Study on the distribution strategy of non-structural carbohydrates in xerophytic plants in southeastern of Xizang under drought stress [J]. Plant Science Journal, 2024,42(05):602-611.

[152]Su Xufei, Zhang Guanghui, Zeng Rongchang. Vegetation growth characteristics of the typical plant community of the trench-cutting system in the Loess hilly and gully regions [J].Journal of Soil and Water Conservation, 2024,38(04):1-10.

[153]Lin Yiran, Feng Zhexuan, Hu Si, et al. Research progress on the extraction methods, purification techniques and pharmacological effects of flavonoids from seabuckthorn leaves [J]. Central South University of Forestry and Technology, 2024,45(05):252-258.

[154]Yang Hong, Gao Wenyu, Lyu Qingxin, et al. The influence of different substrates on the rooting process and seedling quality of tender cuttings of *Hippophae rhamnoides subsp. yunnanensis* [J]. Journal of Northeast Forestry University, 2024,52(06):12-19+26.

[155]Ma Yuwen, Ma He, Wang Shulin. The organic acids extraction and their components analysis from seabuckthorn by Ultrasonic-assisted [J]. Food Industry, 2024,45(05):105-111.

[J]. 中国林业产业 ,2024,(05):47-49.

[150] 刘松 , 赵燕 , 李宗树 , 等 . 沙棘叶多糖对血管性痴呆大鼠学习记忆能力的改善作用 [J]. 现代食品科技 ,2024,40(09):12-19.

[151] 艾盈 , 刘海坤 , 于林宏 , 等 . 干旱胁迫下藏东南沙生植物非结构性碳水化合物分配策略研究 [J]. 植物科学学报 ,2024,42(05):602-611.

[152] 苏旭飞 , 张光辉 , 曾荣昌 . 黄土丘陵沟壑区典型植物群落切沟系统植被生长特性 [J]. 水土保持学报 ,2024,38(04):1-10.

[153] 林奕然 , 冯哲轩 , 胡思 , 等 . 沙棘叶黄酮类化合物提取方法、纯化技术及其药理作用研究进展 [J]. 中南农业科技 ,2024,45(05):252-258.

[154] 杨红 , 高文于 , 吕庆鑫 , 等 . 不同基质对云南沙棘嫩枝扦插生根过程及苗木品质的影响 [J]. 东北林业大学学报 ,2024,52(06):12-19+26.

[155] 麻玉雯 , 马贺 , 王树林 . 超声波辅助提取沙棘有机酸及其成分分析 [J]. 食品工业 ,2024,45(05):105-111.

[156]Dong Shirong, Xu Wei, Sha Shanshan, et al. The biological functions of seabuckthorn extract and its application in livestock and poultry production [J]. Feed Research, 2024,47(09):168-172.

[157]Song Ankang, Xu Zhixin, Ma Yue, et al. Seabuckthorn fruit oil extraction and analysis of lipid components by Ultrasonic-assisted [J]. Journal of the Chinese Cereals and Oils Association, 2024,39(10):143-150.

[158]Sun Meimei, Tian Li, Qiao Ziwei, et al. Physicochemical properties and fungal community characteristics of the rhizosphere and non-rhizosphere soils of seabuckthorn in the Arsenic sandstone area of Inner Mongolia [J]. Acta Microbiologica Sinica, 2024,64(06):1747-1765. DOI:10.13343/j.cnki.wsxb.20230810.

[159]He Jing, Yang Ying, Luo Ling, et al. Study on the influencing factors of the extraction process of flavonoids from seabuckthorn leaves [J]. Modern Food, 2024,30(09):64-67.

[160]Lang Ligang. Research on High-yield cultivation techniques of *'Chaoyang'* seabuckthorn [J]. Inner Mongolia Forestry Investigation and Design, 2024,47(03):37-40+33.

[161]Yu Dandan, Yue Chunfang, Zhang Shengjiang, et al. Research on the influence of groundwater burial depth on the growth and water consumption of seabuckthorn in arid areas [J]. Journal of Ecology and Rural Environment, 2024,40(05):683-690.

[162]Chen Xuetao, Zhao Sanhu, Zhang Xianting, et al. The effects of different extraction methods on the content of active components, antioxidant

[156] 董世荣 , 徐微 , 沙珊珊 , 等 . 沙棘提取物的生物学功能及其在畜禽生产中的应用 [J]. 饲料研究 ,2024,47(09):168-172.

[157] 宋安康 , 徐智昕 , 马越 , 等 . 超声辅助沙棘果油提取及脂质组分分析 [J]. 中国粮油学报 ,2024,39(10):143-150.

[158] 孙美美 , 田丽 , 乔紫薇 , 等 . 内蒙古砒砂岩地区沙棘根际和非根际土壤理化性质及真菌群落特征 [J]. 微生物学报 ,2024,64(06):1747-1765.DOI:10.13343/j.cnki.wsxb.20230810.

[159] 何静 , 杨英 , 罗玲 , 等 . 沙棘叶中提取黄酮类化合物工艺影响因素研究 [J]. 现代食品 ,2024,30(09):64-67.

[160] 郎立刚 .‘朝阳’沙棘丰产栽培技术研究 [J]. 内蒙古林业调查设计 ,2024,47(03):37-40+33.

[161] 俞丹丹 , 岳春芳 , 张胜江 , 等 . 地下水埋深对干旱区沙棘生长及耗水的影响研究 [J]. 生态与农村环境学报 ,2024,40(05):683-690.

[162] 陈雪涛 , 赵三虎 , 张先廷 , 等 . 不同提取方法对沙棘叶茶活性成分含量、抗氧化能力及

capacity and inhibitory activity of α-glycosidase in seabuckthorn leaf tea [J]. Food Research and Development, 2024,45(14):35-42.

α－糖苷酶抑制活性的影响 [J]. 食品研究与开发 ,2024,45(14):35-42.

[163]Gao Pei, Wang Binxian, Guo Siyu, et al. Isolation, identification and comparison of their growth-promoting abilities of potassium-solubilizing bacteria in the rhizosphere of *Hippophae rhamnoides subsp.sinensis* in Qinghai [J]. Journal of Fujian Agriculture and Forestry University (Natural Science Edition), 2024,53(03):401-409.

[163] 高佩 , 王彬贤 , 郭思雨 , 等 . 青海野生中国沙棘根际解钾菌的分离、鉴定及其促生能力比较 [J]. 福建农林大学学报 (自然科学版),2024,53(03):401-409.

[164]Zhang Qianglin, Hu Jingming, Yang Mei, et al. Parameter optimization and analysis of vibration cleaning device for seabuckthorn frozen berries based on EDEM [J]. Agricultural Research in the Arid Areas, 2024,42(03):276-286+298.

[164] 张强林 , 胡靖明 , 杨梅 , 等 . 基于 EDEM 的沙棘冻浆果振动清选装置参数优化与分析 [J]. 干旱地区农业研究 ,2024,42(03):276-286+298.

[165]Ling Na, Tian Haiyan, Gao Mingze, et al. Research progress on the preparation, structural characterization and pharmacological activity of seabuckthorn polysaccharides [J]. Journal of Chinese Pharmacy, 2024,59(09):757-767.

[165] 凌娜 , 田海燕 , 高铭泽 , 等 . 沙棘多糖的制备、结构表征与药理活性研究进展 [J]. 中国药学杂志 ,2024,59(09):757-767.

[166]Liu Chao. Watering techniques for seabuckthorn seedlings [J]. Modern Rural Science and Technology, 2024,(05):91.

[166] 刘超 . 沙棘苗木浇水技术 [J]. 现代农村科技 ,2024,(05):91.

[167]Zu Yaqi, Li Jinghua, Wang Yimeng, et al. Meta-analysis of the efficacy and safety of compound seabuckthorn seed oil suppositories in the treatment of chronic cervicitis complicated with high-risk HPV infection [J]. Chinese Journal of Library and Information Science for Traditional Chinese Medicine, 2024,48(03):102-106.

[167] 祖雅琪 , 李敬华 , 王一萌 , 等 . 复方沙棘籽油栓治疗慢性宫颈炎合并高危型 HPV 感染有效性和安全性 Meta 分析 [J]. 中国中医药图书情报杂志 ,2024,48(03):102-106.

[168]Li Bo, Gao Xiaomin, Wang Nan, et al. Analysis of the composition and diversity of endophytic bacterial communities in seabuckthorn seeds

[168] 李铂 , 高晓敏 , 王楠 , 等 . 不同产地沙棘种子内生菌群落组成与多样性分析 [J]. 北方园

from different origins [J]. Northern Horticulture, 2024,(08):94-101.

艺 ,2024,(08):94-101.

[169]Fang Fang, Wang Sheng. High-yield cultivation techniques of 'Chaoyang' seabuckthorn in western Liaoning region [J]. Seed Science & Technology, 2024,42(08):45-48.

[169] 方芳 , 王升 . 辽西地区‘朝阳’沙棘丰产栽培技术 [J]. 种子科技 ,2024,42(08):45-48.

[170]Jia Qingchao. Research and development of black Goji berry and seabuckthorn fermented milk and the influence of chicken mushroom polysaccharides on its quality [J]. Packaging and Food Machinery, 2024,42(02):9-17.

[170] 贾庆超 . 黑枸杞沙棘发酵乳研制及鸡枞菌多糖对其品质影响 [J]. 包装与食品机械 ,2024,42(02):9-17.

[171]Shi Qian, Zhao Qi, Shengbumonixia et al. Optimize the extraction process of Phyllanthus emblica and Glycyrrhiza uralensis in seabuckthorn sore throat lozenges based on the concept of quality coming from design [J]. Journal of Chinese Medicinal Materials, 2024,47(04):957-962.

[171] 石倩 , 赵琪 , 省布么你呷 , 等 . 基于质量源于设计理念优化沙棘利咽含片中余甘子和甘草的提取工艺 [J]. 中药材 ,2024,47(04):957-962.

[172]Zhao Lei, Ding Xue, Sun Yanjie, et al. Extraction of isorhamnetin and its amphoteric polymer structure modification from fresh seabuckthorn fruits by response surface methodology [J].Chinese Journal of Drug Evaluation, 2024,41(02):141-147.

[172] 赵磊 , 丁雪 , 孙艳杰 , 等 . 响应面优化提取新鲜沙棘果中异鼠李素及其两性聚合物结构修饰 [J]. 中国药物评价 ,2024,41(02):141-147.

[173]Chang Yuan, Mao Biyu, Yang Ruilei, et al. The influence on the quality of pear jam by adding seabuckthorn juice [J].China Fruit & Vegetable, 2024,44(04):30-36.

[173] 常远 , 毛碧钰 , 杨瑞蕾 , 等 . 添加沙棘汁对梨果酱品质的影响 [J]. 中国果菜 ,2024,44(04):30-36.

[174]Carina Lau, Li Hongyan, Liu Li 'e, et al. Identification of the NRAMP gene family in seabuckthorn and expression analysis under lead stress [J]. Biotechnology Bulletin, 2024,40(05):191-202.

[174] 李嘉欣 , 李鸿燕 , 刘丽娥 , 等 . 沙棘 NRAMP 基因家族鉴定及铅胁迫下表达分析 [J]. 生物技术通报 ,2024,40(05):191-202.

[175]Deng Ziyi, Yue Lihua, Liu Chunhai, et al. Comparison of leaf morphology and photosynthetic characteristics of three seabuckthorn varieties [J]. Forestry and Ecological Sciences, 2024,39(02):215-222.

[176]Lin Jiahui, Liu Hongxia, Liang Jiajun, et al. To explore the immune-related mechanism of seabuckthorn in the treatment of liver injury based on network pharmacology and molecular docking [J]. Food and Fermentation Science & Technology, 2024,60(02):53-63.

[177]Kong Tianci, Zhang Haiyan, Bai Fuying, et al. Screening, identification and cellulase activity analysis of endogenous fungi for the control of seabuckthorn [J]. Plant Doctor, 2024,3(02):49-57.

[178]Suo Mingli. Research on high-efficiency water-saving cultivation techniques of seabuckthorn in Aohan county [J]. China Forestry Industry, 2024,(04):45-46.

[179]Kong Haijun, Chen Xiao 'an, Li Xinlong. Study on the mechanism of the protective effect of seabuckthorn flavonoids on the myocardium of rats engaged in long-term exhaustive exercise [J]. Natural Product Research and Development, 2024,36(06):954-962.

[180]Wang Feng. Research on cutting propagation technology of large fruit seabuckthorn [J].Food Industries at Home and Abroad, 2024,(08):96-98.

[181]Han Haoyu. The effects to the growth of pine trees by different mixed patterns with seabuckthorn [J].Modern Horticulture, 2024,47(09):6-8.

[175] 邓子易 , 岳丽华 , 刘春海 , 等 .3 个沙棘品种叶片形态与光合特性比较 [J]. 林业与生态科学 ,2024,39(02):215-222.

[176] 林嘉慧 , 刘洪霞 , 梁家俊 , 等 . 基于网络药理学和分子对接探究沙棘治疗肝损伤的免疫相关作用机制 [J]. 食品与发酵科技 ,2024,60(02):53-63.

[177] 孔天赐 , 张海艳 , 白发莹 , 等 . 沙棘生防内生真菌的筛选、鉴定及产纤维素酶活性分析 [J]. 植物医学 ,2024,3(02):49-57.

[178] 索明礼 . 敖汉旗沙棘高效节水栽培技术研究 [J]. 中国林业产业 ,2024,(04):45-46.

[179] 孔海军 , 谌晓安 , 李新龙 . 沙棘黄酮对长期力竭运动大鼠心肌保护作用的机制研究 [J]. 天然产物研究与开发 ,2024,36(06):954-962.

[180] 王锋 . 大果沙棘扦插育苗技术研究 [J]. 中外食品工业 ,2024,(08):96-98.

[181] 韩皓玉 . 不同油松 - 沙棘混交模式对油松人工林林木生长的影响 [J]. 现代园艺 ,2024,47(09):6-8.

[182]Huo Yan, Ge Sufen, Chen Shaohui. The potential application of seabuckthorn in the control of soil erosion in the Kerqin sandy land [J]. Technology of Soil and Water Conservation, 2024,(02):16-18.

[183]Wang Zhicheng, Wang Honglun, Hu Na, et al. The preparation process of ethanol dehydrogenase activating peptide in seabuckthorn seed meal [J]. The Food Industry, 2024,45(04):101-108.

[184]Chen Chao, Zhang Najun, Song Lulu, et al. Study on preparation, quality evaluation and antioxidant activity of seabuckthorn seed oil nanoemulsion [J]. China Food Additives, 2024,35(04):124-130.

[185]Sun Jiali, Zhao Wenyan, Zhu Dongliang, et al. Study on the lipid-lowering activity of total flavonoids from seabuckthorn peel residue in vivo and in vitro [J]. Science and Technology of Food Industry, 2024,45(24):353-363.

[186]Wang Hairong, Meng Ke, Tegxi Baiyin, et al. Determination of monoammonium glycyrrhizinate and total flavonoids in seabuckthorn granules of Mongolian medicine compound [J]. Chinese Journal of Ethnomedicine and Ethnopharmacy, 2024,33(07):37-40.

[187]Zhai Yanmin. Afforestation techniques in poor soil types [J]. Modern Rural Science and Technology, 2024,(04):67.

[188]Li Zhanchao, Guan Qing, Zhang Shanqing, et al. Research on climate quality certification technology of seabuckthorn in Yiwu county of Xinjiang [J]. Desert and Oasis Meteorology, 2024,18(02):169-174.

[182] 霍研 , 戈素芬 , 陈绍辉 . 沙棘在科尔沁沙地水土流失治理中的应用潜力 [J]. 水土保持应用技术 ,2024,(02):16-18.

[183] 王志成 , 王洪伦 , 胡娜 , 等 . 沙棘籽粕中乙醇脱氢酶激活肽的制备工艺 [J]. 食品工业 ,2024,45(04):101-108.

[184] 陈超 , 张娜郡 , 宋露露 , 等 . 沙棘籽油纳米乳的制备、质量评价及其抗氧化活性研究 [J]. 中国食品添加剂 ,2024,35(04):124-130.

[185] 孙嘉莉 , 赵文燕 , 朱东亮 , 等 . 沙棘果皮渣总黄酮体内外降血脂活性研究 [J]. 食品工业科技 ,2024,45(24):353-363.

[186] 王海荣 , 孟柯 , 特格喜白音 , 等 . 蒙药复方沙棘颗粒剂中甘草酸单铵盐、总黄酮的含量测定 [J]. 中国民族民间医药 ,2024,33(07):37-40.

[187] 翟艳民 . 贫瘠土壤类型造林技术 [J]. 现代农村科技 ,2024,(04):67.

[188] 李战超 , 关清 , 张山清 , 等 . 新疆伊吾县沙棘气候品质认证技术研究 [J]. 沙漠与绿洲气象 ,2024,18(02):169-174.

[189]Wang Jianbin. Research on the application of planting techniques in post-harvest preservation of seabuckthorn fruits [J]. Seed Science & Technology, 2024,42(07):155-157.

[189] 王建斌 . 种植技术在沙棘果实采后保鲜中的应用研究 [J]. 种子科技 ,2024,42(07):155-157.

[190]Gao Bingxiang, Jin Shiqi, Liang Xiaoqing. The design of a portable seabuckthorn picker suitable for the seabuckthorn planting area in Gannan [J]. Journal of Gansu Normal Colleges, 2024,29(02):52-55.

[190] 高秉祥 , 金世启 , 梁小青 . 适用于甘南沙棘种植区的便携沙棘采摘器的设计 [J]. 甘肃高师学报 ,2024,29(02):52-55.

[191]Li Lidan, Liang Dandan, Zheng Shuaiyin, et al. Optimization of the process for extracting flavonoids from seabuckthorn leaves by complex enzyme synergistic microwave [J]. Guangdong Sericulture, 2024,58(04):38-43.

[191] 李丽丹 , 梁丹丹 , 郑帅印 , 等 . 复合酶协同微波提取沙棘叶黄酮工艺优化 [J]. 广东蚕业 ,2024,58(04):38-43.

[192]Gao Jianli, Yue Lihua, Liu Chunhai, et al. Research on the cultivation techniques of Yulu seabuckthorn [J]. Hebei Fruit, 2024,(02):12-14.

[192] 高剑利 , 岳丽华 , 刘春海 , 等 . 宇璐沙棘栽培技术研究 [J]. 河北果树 ,2024,(02):12-14.

[193]Chen Haipeng, Chen Xiaolin, Liu Chunhai, et al. The growth and physiological responses of Yulu and Shenqiuhong seabuckthorn varieties to drought stress [J]. Journal of Northwest Forestry University, 2024,39(06):104-112.

[193] 陈海鹏 , 陈晓琳 , 刘春海 , 等 . 宇璐沙棘与深秋红沙棘对干旱胁迫的生长与生理响应 [J]. 西北林学院学报 ,2024,39(06):104-112.

[194]Cheng Ping, Tang Dong, Wang Kai, et al. Physiological responses to drought stress and drought resistance evaluation of 12 plant species in the front mountain belt of the Northern Slope of the Tianshan Mountains [J] .Acta Botanica Boreali-Occidentalia Sinica, 2024,44(05):691-705.

[194] 程平 , 汤东 , 王凯 , 等 . 天山北坡前山带 12 种植物对干旱胁迫和复水的生理响应及抗旱性评价 [J]. 西北植物学报 ,2024,44(05):691-705.

[195]Tian Xiaoping, Luo Zheng, Xia Jun, et al. The mechanism of action of seabuckthorn polyphenols in the treatment of Alzheimer's disease explored based on network pharmacology and molecular docking technology [J].Journal of Hainan Medicines, 2024,35(07):982-990.

[195] 田小平 , 罗郑 , 夏军 , 等 . 基于网络药理学和分子对接技术探讨沙棘多酚治疗阿尔茨海默病的作用机制 [J]. 海南医学 ,2024,35(07):982-990.

[196]Xu Tian, Wu Meng, Ge Shihui, et al. Research progress on seabuckthorn fruits and leaves [J]. Pharmacy Today, 2024,34(06):466-472.

[197]Jiao Yihao, Gao Tengyu, Gong Jiangang, et al. Research on process optimization of mixed bacteria solid-state fermentation for improving the nutritional value of seabuckthorn fruit residue [J]. Feed Research, 2024,47(24):75-79.

[198]Yang Xingjing, Liu Yanru, Tang Zhishu, et al. A Study on the differences between large-fruit seabuckthorn and Hippophae rhamnoides subsp. sinensis based on the "primary - secondary metabolite" interaction pathway [J].Chinese Traditional drug, 2024,55(07):2383-2396.

[199]Qi Huijuan, Guo Yuefeng, Yao Yunfeng, et al. The response of the soil microbial community to the stubble in the rhizosphere of seabuckthorn in Arsenic sandstone area [J]. Journal of Chinese Soil Science, 2024,55(02):437-447.

[200]Wang Qingze, Yang Mei, Xiang Jintian, et al. Parameter calibration of discrete elements of seabuckthorn tea downy based on particle scaling theory [J]. Agricultural Research in the Arid Areas, 2024,42(02):284-292.

[201]Bai Chunxu. Ecological decoding of seabuckthorn seeds: exploring the mechanism of preventing soil erosion in wetlands and mountainous areas of north China [J]. Seed Science & Technology, 2024,42(06):152-154.

[202]Chen Keming, Ma Decai, He Jiafu Ruzi, et al. Seabuckthorn seed oil improves polycystic ovary syndrome by regulating autophagy levels [J]. Journal of Chinese Medicinal Materials,2024,47(03):719-723.

[196] 许甜 , 吴萌 , 葛世辉 , 等 . 沙棘果、叶的研究进展 [J]. 今日药学 ,2024,34(06):466-472.

[197] 焦奕豪 , 高腾雨 , 龚建刚 , 等 . 混菌固态发酵对改善沙棘果渣营养价值工艺优化的研究 [J]. 饲料研究 ,2024,47(24):75-79.

[198] 杨兴晶 , 刘妍如 , 唐志书 , 等 . 基于“初生 - 次生代谢产物”互作途径的大果沙棘和中华沙棘差异性研究 [J]. 中草药 ,2024,55(07):2383-2396.

[199] 祁慧娟 , 郭月峰 , 姚云峰 , 等 . 砒砂岩区沙棘根际土壤微生物群落对平茬的响应 [J]. 土壤通报 ,2024,55(02):437-447.

[200] 王清泽 , 杨梅 , 向金田 , 等 . 基于颗粒缩放理论的沙棘茶毫离散元参数标定 [J]. 干旱地区农业研究 ,2024,42(02):284-292.

[201] 白春旭 . 沙棘种子的生态解码：在华北湿地与山地中防止水土流失的机理探索 [J]. 种子科技 ,2024,42(06):152-154.

[202] 陈科明 , 马德才 , 贺嘉夫茹孜 , 等 . 沙棘籽油通过调节自噬水平改善多囊卵巢综合征 [J]. 中药材 ,2024,47(03):719-723.

[203]Quan Min, Du Xinpeng, Bi Yinli. The effects of AMF inoculation in open-pit mine dump on the root development of three plant species and the stability of soil aggregates [J]. Research of Soil and Water Conservation, 2024,31(03):187-194.

[203] 全民，杜昕鹏，毕银丽．露天矿排土场接种 AMF 对 3 种植物根系发育与土壤团聚体稳定性的影响 [J]. 水土保持研究，2024,31(03):187-194.

[204]Chen Ying. The influence of different soil moisture on the germination of seabuckthorn seeds [J]. Forestry of Gansu, 2024,(02):43-44.

[204] 陈英．不同土壤湿度对沙棘种子萌发的影响 [J]. 甘肃林业，2024,(02):43-44.

[205]Bai Guangyuan. Seabuckthorn cutting seedling raising and high-yield cultivation techniques [J]. New Agriculture, 2024,(03):35-36.

[205] 白光远．沙棘扦插育苗及丰产栽培技术 [J]. 新农业，2024,(03):35-36.

[206]Yan Xiaoling, Hao Ying. Cultivation experiment of seabuckthorn under different site conditions in the Loess Plateau gully region [J]. Modern Agricultural Science and Technology, 2024,(06):81-83+88.

[206] 闫晓玲，郝莹．黄土高塬沟壑区不同立地条件下沙棘栽培试验 [J]. 现代农业科技，2024,(06):81-83+88.

[207]Wang Yuanyuan, Feng Yongrong, Sun Qingzhan, et al. Quality analysis and comprehensive evaluation of seabuckthorn leaf tea from different regions [J]. Food and Fermentation Industries, 2024,50(24):331-338.

[207] 王媛媛，冯勇荣，孙青占，等．不同产地沙棘叶茶品质分析及综合评价 [J]. 食品与发酵工业，2024,50(24):331-338.

[208]Sun Jiali, Jiang Junfeng, Mu Xiaojuan, et al. Purification, component analysis of total flavonoids from seabuckthorn peel residue and inhibitory effect on pancreatic lipase [J]. Food Industry Science and Technology, 2024,45(19):206-215.

[208] 孙嘉莉，江峻峰，牟晓娟，等．沙棘果皮渣总黄酮的纯化、成分分析及对胰脂肪酶的抑制作用 [J]. 食品工业科技，2024,45(19):206-215.

[209]Li Jitong, Chu Jinguo, Dingding. Research progress on anti-aging effects of seabuckthorn polysaccharides [J]. Practical Geriatrics, 2024,38(03):228-231.

[209] 李纪彤，褚金国，丁丁．沙棘多糖抗衰老的研究进展 [J]. 实用老年医学，2024,38(03):228-231.

[210]Li Yonghong. Exploration of cultivation techniques for superior seabuckthorn cuttings in Heicha mountain forest area [J]. Journal of Temperate Forestry Research, 2024,7(01):64-67.

[211]Li Fu, Duanmu Xuelei, Li Xiangtao, et al. "Desert Flower" unlocked the wealth code of seabuckthorn [J]. Business Culture, 2024,(05):62-65+5.

[212]Yang Bo, Yang Jun, Ding Ning, et al. A comparative study on the amino acid content of seabuckthorn fruits of H. R. ssp. sinensis and H. thibetana [J].Agricultural Science & Technology,2024,25(01):7-13.

[213]Zhang Yunxiang, Lyu Shiqi, Liu Tairui, et al. The differences in nitrogen utilization strategies of dominant species in three typical forest communities in Guandi mountain [J]. Scientia Silvae Sinicae, 2024,60(02):12-20.

[214]Wang Rui, Tang Ke, Wu Yuxi, et al. Identification and selection of superior hybrid germplasm resources of seabuckthorn [J]. Heilongjiang Agricultural Sciences, 2024,(03):51-57.

[215]Huang Qian, Zhu Shiying, Li Mingyan, et al. The characteristics and correlation with environmental factors of Ciliate communities in the soil of seabuckthorn forests in the Nianchu River Basin J]. Journal of Arid Land Resources and Environment, 2024,38(05):152-162.

[216]Zhang Yu, Xu Ziqi, Chen Guangming, et al. The influence to the grain size characteristics of sediments in saline-alkali sandy land by different forest and grassland sand control models [J]. Soil and Water Conservation in China, 2024,(03):29-33.

[210] 栗永红 . 黑茶山林区优良沙棘扦插苗栽培技术探索 [J]. 温带林业研究 ,2024,7(01):64-67.

[211] 李富 , 端木学磊 , 李祥涛 , 等 . “沙漠之花”开启沙棘财富密码 [J]. 商业文化 ,2024,(05):62-65+5.

[212] 杨博 , 杨钧 , 丁宁 , 等 . 中国沙棘和西藏沙棘果实氨基酸含量比较研究（英文）[J].Agricultural Science & Technology,2024,25(01):7-13.

[213] 张芸香 , 吕世琪 , 刘泰瑞 , 等 . 关帝山 3 个典型森林群落优势种的氮素利用策略差异 [J]. 林业科学 ,2024,60(02):12-20.

[214] 王蕊 , 唐克 , 吴雨蹊 , 等 . 沙棘优良杂交种质资源鉴定及筛选 [J]. 黑龙江农业科学 ,2024,(03):51-57.

[215] 黄倩 , 朱时应 , 李明燕 , 等 . 年楚河流域沙棘林土壤纤毛虫群落特征及环境因子相关性 [J]. 干旱区资源与环境 ,2024,38(05):152-162.

[216] 张瑜 , 徐子棋 , 陈光明 , 等 . 不同林草治沙模式对盐碱沙地沉积物粒度特征的影响 [J]. 中国水土保持 ,2024,(03):29-33.

[217]Li Min, Zhou Shanshan, Wang Pu, et al. Research on the erosion reduction mechanism and influencing factors of seabuckthorn in the arsenic sandstone area [J]. Soil and Water Conservation in China, 2024,(03):51-54+72-73.

[218]Wang Xuerong, Yang Xiaozhong, Zhou Xuehai, et al. Investigation and research on the adaptability of the seabuckthorn from Gulang county under different geographical habitats [J]. Gansu Science and Technology, 2024,40(02):95-98.

[219]Li Yao, Tian Lihui, Wang Haijiao, et al. The spatio-temporal variation characteristics and their influencing factors of δ13C and δ15N in the leaves of seabuckthorn growing in alpine sandy land [J/OL]. Acta Ecologica Sinica, 2024,(10):1-12[2025-07-01].

[220]Jia Lihong, Xue Lu, Ma Chunyan, et al. Investigation on the current situation and management countermeasures of ten gullies ecological sand reduction project of seabuckthorn in Ordos arsenic sandstone area [J]. Environment and Development, 2024,36(01):9-13.

[221]Niu Zhibo. Seabuckthorn [J]. Hebei Forestry, 2024,(02):32-33.

[222]Fan Xiuhe, Tang Zhishu, Song Zhongxing, et al. Research on the quality evaluation method of seabuckthorn particles based on thin-layer chromatography and one-test multi-evaluations method [J]. Modern Chinese Medicine, 2024,26(03):494-498.

[223]Li Muchun, Abulizi Aili, Shao Jiali, et al. The influence of different extraction methods on the fatty acid components and element migration of seabuckthorn seed oil [J]. Food and Fermentation Science & Technology, 2024,60(01):105-112.

[217] 李敏 , 周珊珊 , 王普 , 等 . 砒砂岩区沙棘减蚀机理及其影响因子研究 [J]. 中国水土保持 ,2024,(03):51-54+72-73.

[218] 王雪蓉 , 杨晓忠 , 周学海 , 等 . 中国沙棘古浪种源在不同地理生境的适应性调查研究 [J]. 甘肃科技 ,2024,40(02):95-98.

[219] 李耀 , 田丽慧 , 汪海娇 , 等 . 高寒沙地沙棘叶片 δ13C 和 δ15N 的时空变化特征及其影响因素 [J/OL]. 生态学报 ,2024,(10):1-12[2025-07-01].

[220] 贾利红 , 薛璐 , 马春艳 , 等 . 砒砂岩区十大孔兑沙棘生态减沙工程现状调查及管理对策研究 [J]. 环境与发展 ,2024,36(01):9-13.

[221] 牛志波 . 沙棘 [J]. 河北林业 ,2024,(02):32-33.

[222] 樊修和 , 唐志书 , 宋忠兴 , 等 . 基于薄层色谱与一测多评法的沙棘颗粒质量评价方法研究 [J]. 中国现代中药 ,2024,26(03):494-498.

[223] 李慕春 , 阿不力孜 · 艾力 , 邵佳丽 , 等 . 不同提取方法对沙棘籽油脂肪酸成分及元素迁移的影响 [J]. 食品与发酵科技 ,2024,60(01):105-112.

[224]Ren Jingnan, Jia Xiao, Zhang Zhifeng, et al. Analysis of the flavor and nutritional quality of fresh seabuckthorn juice and seabuckthorn puree [J]. Food Science, 2024,45(04):164-170.

[225]Xue Wenxiu. Analysis of seabuckthorn cultivation techniques and their application value [J]. Modern Rural Science and Technology, 2024,(02):57-58.

[226]Zeng Ao, Xu Bingye, Wang Xue, et al. The flavor characteristics of the original pulp, seed oil and fruit oil of large-fruit seabuckthorn in Xinjiang and the correlation among the products [J]. Journal of Beijing Forestry University, 2024,46(02):132-142.

[227]Dang Jun, Wang Yanli, Tian Qing, et al. Analysis of phenotypic diversity of Hippophae rhamnoides subsp. sinensis in different populations in Gansu province [J]. Journal of Gansu Agricultural University, 2024,59(01):252-263.

[228]Liu Rui, Zhao Lang, Ye Guisheng, et al. The relationship between HrANR gene and flavonoid accumulation and drought resistance in *Hippophae rhamnoides subsp. sinensis* [J]. Guihaia, 2024,44(02):235-244.

[229]Lu Xiaojing. Efficient cultivation and management techniques of large-fruit seabuckthorn in Altay prefecture [J]. Special Economic Animal and Plant, 2024,27(02):76-78.

[230]Yang Ying, Bai Song, He Jing, et al. Research on the optimization of ultrasonic-assisted extraction process of seabuckthorn leaf polyphenols by response surface method [J]. Food Safety Guide, 2024,(04):143-147.

[224] 任婧楠 , 贾潇 , 张智锋 , 等 . 新鲜沙棘果汁和沙棘原浆的风味和营养品质分析 [J]. 食品科学 ,2024,45(04):164-170.

[225] 薛文秀 . 沙棘栽培技术及应用价值分析 [J]. 现代农村科技 ,2024,(02):57-58.

[226] 曾奥 , 许炳烨 , 王雪 , 等 . 新疆大果沙棘原浆、籽油和果油气味特征及产品间相关性 [J]. 北京林业大学学报 ,2024,46(02):132-142.

[227] 党军 , 王艳莉 , 田青 , 等 . 甘肃省不同居群中国沙棘表型多样性分析 [J]. 甘肃农业大学学报 ,2024,59(01):252-263.

[228] 刘瑞 , 赵浪 , 冶贵生 , 等 . 中国沙棘 HrANR 基因及黄酮类累积与抗旱的关系 [J]. 广西植物 ,2024,44(02):235-244.

[229] 吕小静 . 阿勒泰地区大果沙棘高效栽培管理技术 [J]. 特种经济动植物 ,2024,27(02):76-78.

[230] 杨英 , 柏松 , 何静 , 等 . 响应面法优化沙棘叶多酚超声波辅助提取工艺研究 [J]. 食品安全导刊 ,2024,(04):143-147.

[231]Ning Ke, Huang Jianzhi, Ren Zhili, et al. Evaluation of the feed value of seabuckthorn by-products and study on the antibacterial effect of their extracts[J]. Feed Research, 2024,47(03):85-89.

[231] 宁可 , 黄建智 , 任智力 , 等 . 沙棘副产品的饲用价值评定及其提取物抑菌效果研究 [J]. 饲料研究 ,2024,47(03):85-89.

[232]Xiao Shasha, Fei Fan, Dong Jiawei, et al. Bioinformatics analysis of HrNHX6 gene *Hippophae rhamnoides subsp. sinensis* and its expression pattern under salt stress [J]. Shandong Agricultural Sciences, 2024,56(01):17-23.

[232] 肖莎莎 , 费凡 , 董佳伟 , 等 . 中国沙棘 HrNHX6 基因的生物信息学分析及其在盐胁迫下的表达模式 [J]. 山东农业科学 ,2024,56(01):17-23.

[233]Cheng Ying, Niu Zhibo, Jia Ning, et al. Propagation and high-yield cultivation techniques of Yulu seabuckthorn superior varieties in the cold and high-altitude areas of northern Hebei [J]. Anhui Agricultural Science Bulletin, 2024,30(02):27-30.

[233] 程瑛 , 牛志波 , 贾宁 , 等 . 冀北高寒地区宇璐沙棘优种扩繁及丰产栽培技术 [J]. 安徽农学通报 ,2024,30(02):27-30.

[234]Wang Yujing, Du Zhixiang, Zhang Xia, et al. Seabuckthorn flavonoids improve polycystic ovary syndrome in rats by regulating the TLR4/NF-κB signaling pathway [J]. Food Industry Science and Technology, 2024,45(16):340-347.

[234] 王玉净 , 都治香 , 张霞 , 等 . 沙棘黄酮通过调控 TLR4/NF-κB 信号通路改善大鼠多囊卵巢综合征的作用 [J]. 食品工业科技 ,2024,45(16):340-347.

[235]Shi Zhixi. Research on seabuckthorn seedling raising technology in arid areas of Gansu province [J]. China Forestry Industry, 2024,(01):104-106.

[235] 石志玺 . 甘肃干旱地区沙棘育苗技术研究 [J]. 中国林业产业 ,2024,(01):104-106.

[236]Wang Xuan, Zhang Zhiwei, Chen Zhixi, et al. Research progress and development countermeasures on the utilization and development of seabuckthorn fruit food [J]. Storage and Process, 2024,24(01):75-82.

[236] 王璇 , 张志伟 , 陈志玺 , 等 . 沙棘果食品开发利用研究进展与发展对策 [J]. 保鲜与加工 ,2024,24(01):75-82.

[237]Zhu Xiaoji. Standardized seedling raising and afforestation techniques of seabuckthorn [J]. Modern Rural Science and Technology, 2024,(01):49-50.

[237] 朱晓基 . 沙棘标准化育苗及造林技术 [J]. 现代农村科技 ,2024,(01):49-50.

[238]Li Yan, Li Rui, Lu Shaomin, et al. Human trial study on the regulation of intestinal flora by fructooligosaccharide seabuckthorn black tea powder [J]. The Food Industry, 2024,45(01):83-87.

[238] 李艳 , 李蕊 , 陆少敏 , 等 . 低聚果糖沙棘红茶粉调节肠道菌群人体试验研究 [J]. 食品工业 ,2024,45(01):83-87.

[239]An Yu, Han Xinsheng, Guo Yongzhong, et al. Soil moisture variation characteristics of different vegetation types in the mountainous area of Ningnan [J]. Northern Horticulture, 2024,(08):59-65.

[239] 安钰 , 韩新生 , 郭永忠 , 等 . 宁南山区不同植被类型土壤水分变化特征 [J]. 北方园艺 ,2024,(08):59-65.

[240]Wu Cuifang, Liu Yaxuan, Li Yuhui, et al. Extraction of flavonoids from seabuckthorn and their antioxidant activities [J]. Journal of Anhui Science and Technology University, 2024,38(01):88-96.

[240] 吴翠芳 , 刘雅宣 , 李宇辉 , 等 . 沙棘中黄酮类化合物提取及抗氧化活性 [J]. 安徽科技学院学报 ,2024,38(01):88-96.

[241]Ren Zichao, Lei Jin, Peng Xia, et al. Experimental study on the mechanical properties of seabuckthorn branches and stems [J]. 2024,46(07):146-151.

[241] 任子超 , 雷金 , 彭霞 , 等 . 沙棘枝杆力学特性试验研究 [J]. 农机化研究 ,2024,46(07):146-151.

[242]Deng Bin, Chen Jie, Li Xiang, et al. Exploration to the action mechanism of seabuckthorn in the treatment to alcoholic liver injury based on network pharmacology [J]. Food Industry Science and Technology , 2024,45(14):25-33.

[242] 邓斌 , 陈洁 , 李想 , 等 . 基于网络药理学探讨沙棘治疗酒精性肝损伤的作用机制 [J]. 食品工业科技 ,2024,45(14):25-33.

[243]Zhang Ruigang, Wang Chaoyue. Optimization of polysaccharide extraction process from seabuckthorn leaf tea and study on its in vitro lipid-lowering activity [J]. Northern Horticulture, 2024,(01):93-99.

[243] 张瑞刚 , 王超越 . 沙棘叶茶多糖提取工艺优化及体外降脂活性研究 [J]. 北方园艺 ,2024,(01):93-99.

[244]Zhou Chuang. Rapid propagation techniques for the superior seabuckthorn variety 'Hongji No.1' [J]. Forestry Science and Technology, 2024,(01):100-101.

[244] 周闯 . 沙棘良种‘红棘 1 号’快速繁育技术 [J]. 林业科技通讯 ,2024,(01):100-101.

[245]Huang Huilin, Xia Qile, Wu Dan. Optimization of seabuckthorn and bayberry compound juice by response surface method [J]. Chemical Engineering, 2024,52(01):1-5+17.

[246]Chen Meijing, Xiong Huan, Li Rui, et al. The influence of different supercritical CO_2 extraction conditions on the antioxidant activity of seabuckthorn fruit oil [J]. Food Safety Guide, 2024,(02):94-97.

[247]Gao Huiyan, Yuan Peng, Li Jiangmin, et al. Study on the liver-protective effect of Kudzu root and seabuckthorn granules on mice with acute alcoholic liver injury [J]. Modern Disease Control and Prevention, 2024,35(01):39-42.

[248]Tian Jiangchuan. The effects of drought stress on the growth of seabuckthorn seedlings [J]. Rural Science and Technology, 2024,15(01):97-99.

[249]Dai Yongxin, Xue Jingru, Yang Nan, et al. The influence of different altitudes and seasons of Guandi mountain on the flavonoid content of seabuckthorn [J]. Journal of Nuclear Agriculture Sciences, 2024,38(02):374-383.

[250]Wang Chenxi, Li Ganhong, Liu Yangzhou, et al. The transformation effect of lactobacillus plantarum fermentation on bitter substances of seabuckthorn juice [J]. Food Industry Science and Technology, 2024,45(16):159-167.

[251]Guo Jiang, Yuan Jianyu, Zhuoma Cao, et al. The influence to soil nitrogen components and enzyme activities by different land uses in the Loess Plateau of central Gansu province [J]. Journal of Gansu Agricultural University, 2024,59(06):186-194.DOI:10.13432/j.cnki.jgsau.2024.06.020.

[245] 黄卉林 , 夏其乐 , 吴丹 . 响应面法优化沙棘杨梅复合果汁 [J]. 化学工程 ,2024,52(01):1-5+17.

[246] 陈美静 , 熊欢 , 李睿 , 等 . 不同超临界 CO_2 萃取条件对沙棘果油抗氧化活性的影响 [J]. 食品安全导刊 ,2024,(02):94-97.

[247] 高慧艳 , 袁鹏 , 李江敏 , 等 . 葛根沙棘颗粒对急性酒精性肝损伤小鼠的护肝作用研究 [J]. 现代疾病预防控制 ,2024,35(01):39-42.

[248] 田江钏 . 干旱胁迫对沙棘苗木生长的影响 [J]. 乡村科技 ,2024,15(01):97-99.

[249] 代永欣 , 薛静茹 , 杨楠 , 等 . 关帝山不同海拔和季节对沙棘黄酮含量的影响 [J]. 核农学报 ,2024,38(02):374-383.

[250] 王晨曦 , 李乾弘 , 刘阳洲 , 等 . 植物乳杆菌发酵对沙棘果汁中苦味物质的转化作用 [J]. 食品工业科技 ,2024,45(16):159-167.

[251] 郭疆 , 袁建钰 , 卓玛草 , 等 . 陇中黄土高原不同土地利用方式对土壤氮组分及酶活性的影响 [J]. 甘肃农业大学学报 ,2024,59(06):186-194.DOI:10.13432/j.cnki.jgsau.2024.06.020.

2. Country Report of Finland

芬兰沙棘发展报告

Drafted by:

Baoru Yang, Heikki Kallio, Maaria Kortesniemi
Food Sciences, Department of Life Technologies, University of Turku, Finland
Veli-Markku Korteniemi, Kari Pihlajamaa
Aromtech Ltd, Finland

撰稿人：

杨宝茹，海基·卡里奥，玛丽亚·科特斯涅米，
芬兰图尔库大学生命技术系食品科学系
Veli-Markku Korteniemi, Kari Pihlajamaa
芬兰 Aromtech 有限公司

SeaBuckthorn Research and Development in Finland in 2023 & 2024，Country Report
2023 与 2024 年芬兰沙棘研发情况

In Finland, there were active developments in research, cultivation, industrial processing and utilization of sea buckthorn.

芬兰在沙棘的研究、栽培、工业加工和利用方面持续取得了积极进展。

一 Research 关于科学研究

University of Turku (UTU) has been a leading institute in the research on sea buckthorn in Finland. The research on sea buckthorn has been active, yielding one peer-reviewed scientific paper, one doctoral dissertation and two master's theses in 2023, and two master's thesis in 2024. Assistant Professor Qinxue Ni (Zhejiang A&F University, Hangzhou, China) visited University of Turku in 2023 and contributed to tocopherol analysis of sea buckthorn seeds. In 2024, Professor Baoru Yang attended the ISA meeting in Poland and Associate Professor Maaria Kortesniemi joined the ISA board.

图尔库大学（UTU）一直以来是芬兰沙棘研究的领先机构。沙棘的研究一直很活跃，2023 年发表了一篇同行评审的科学论文、一篇博士论文和两篇硕士论文，2024 年发表了两篇硕士学位论文。Qinxue Ni 助理教授（浙江农林科技大学，中国杭州）于 2023 年访问了图尔库大学，并就沙棘种子的生育酚成分分析做学术分享。2024 年，Baoru Yang 教授出席了在波兰举行的 ISA 会议，Maaria Kortesniemi 副教授加入了 ISA 董事会。

1.Kakko, T. (2023) Alternative approaches to improve the processing and quality of under-utilized fish. Doctoral dissertation, University of Turku. https://www.utupub.fi/handle/10024/174966

2.Palani, N. (2023) Proteiinien eristäminen alihyödynnetyistä kaloista. Master's thesis, University of Turku. https://www.utupub.fi/handle/10024/175360

1. Kakko, T.（2023），提升未充分利用鱼类加工和质量的其他方法，图尔库大学博士论文。https://www.utupub.fi/handle/10024/174966

2. Palani, N.（2023），《从低价值鱼类中提取蛋白质》，图尔库大学硕士论文，https://www.utupub.fi/handle/10024/175360

3.Kakko, T., Damerau, A., Rios, C.M., Laaksonen, O. & Yang, B. (2023) Reutilization of berry press residues in minced Baltic herring (*Clupea harengus membras*) – Effect on lipid oxidation and sensory characteristics during cold storage. LWT 184: 115044, https://doi.org/10.1016/j.lwt.2023.115044.
The doctoral thesis and related publication and master's thesis focused on novel processing methods to increase the utilization of Baltic herring and roach. Addition of natural antioxidants was also investigated as a means of inhibiting lipid oxidation and degradation of sensory quality during frozen and refrigerated storage of minced Baltic herring. Sea buckthorn juice press residue (3% w/w) retarded lipid oxidation more effectively than EDTA or combination of α-tocopherol and ascorbic acid.

3. Kakko, T., Damerau, A., Rios, C.M., Laaksonen, O. & Yang, B.（2023），浆果压榨残渣在波罗的海鲱鱼（Clupea harengus membras）中的再利用：对冷藏过程中脂质氧化和感官特性的影响。LWT 184: 115044, https://doi.org/10.1016/j.lwt.2023.115044。
该博士论文和相关出版物以及硕士论文的重点是提高波罗的海鲱鱼和红鳍鱼利用率的新加工方法。还研究了添加天然抗氧化剂作为抑制波罗的海鲱鱼碎冷冻和冷藏期间脂质氧化和感官质量下降的一种手段。沙棘汁压榨残渣（3%w/w）比 EDTA 或 α－生育酚和抗坏血酸的组合更有效地抑制了脂质氧化。

4.Pajunen, L. (2023) UHPLC Method Development for Studying the Impact of Northern Growth Latitude and Environmental Factors on Tocopherols and Tocotrienols of Sea Buckthorn. Master's Thesis in Technology, University of Turku. https://www.utupub.fi/handle/10024/176010

New faster and more environmentally friendly ultra high-performance liquid chromatography (UHPLC) method was developed for the analysis of tocochromanols and applied in the analysis of sea buckthorn berry pulp.

4.Pajunen，L.（2023），研究芬兰北部高纬度和环境因素对沙棘生育酚和生育酚影响的 UHPLC 方法开发，图尔库大学技术硕士论文，https://www.utupub.fi/handle/10024/176010

该论文开发了一种新的更快、更环保的超高效液相色谱法（UHPLC）用于分析生育酚，并应用于沙棘果肉的分析。

5.Iboi, Osagie (2024). Impact Of Northern Growth Latitude and Environmental Factors on Tocopherols and Phenolic Compounds in Sea Buckthorn (Hippophaë Rhamnoides) Leaves. Master's Thesis in Technology, University of Turku. https://www.utupub.fi/handle/10024/178369

The tocopherols and phenolics of sea buckthorn leaves were analyzed with liquid chromatographic methods. Two Finnish cultivars Terhi and Tytti from Kittilä (north) and Turku (south) were compared.

5.Iboi, Osagie（2024），芬兰北部生长纬度和环境因素对沙棘叶片中生育酚和酚类化合物的影响，图尔库大学技术硕士论文，https://www.utupub.fi/handle/10024/178369

该论文采用液相色谱法对沙棘叶中的生育酚和酚类物质进行了分析。比较了来自 Kittilä（芬兰北部）和图尔库（芬兰南部）的两个芬兰沙棘品种 Terhi 和 Tytti。

6.Stachnik, M. (2024). Utilization of brewer's spent grain and other selected by-products to create edible cutlery. Master's Thesis in Technology, University of Turku. https://www.utupub.fi/handle/10024/178428

This research used 3D printing technology to develop prototypes of edible spoons from side streams of food and beverage production, including sea buckthorn fruit residue and seed residue.

6.Stachnik，M.（2024），利用酿酒商的废渣和其他精选副产品制造可食用餐具。图尔库大学技术硕士论文，https://www.utupub.fi/handle/10024/178428

这项研究使用 3D 打印技术从食品和饮料生产的副产品（包括沙棘果渣和种子渣）中开发可食用勺子的原型。

TYRNIRAKI project

关于 TYRNIRAKI 项目

2023 was the 4th follow-up year of the TYRNIRAKI project aiming to sequester nutrients at the Finnish Archipelago Sea drainage basins with the help of sea buckthorn stands. Soil and plant sampling and weather monitoring continued and two of the test fields produced good harvest that allowed the farmers commercially utilize and sell the berries. Cultivar 'Terhi' has shown better stress tolerance e.g. against drought than the cultivar 'Tytti'. Both cultivars are of Finnish origin.

2023 年是 TYRNIRAKI 项目实施的第四个年份，该项目旨在借助沙棘林在芬兰群岛海流域封存营养物质。土壤和植物采样及气象监测工作持续进行，其中两个试验地沙棘收成良好，农民可以商业利用和销售浆果。沙棘品种“Terhi”表现出比品种“Tytti”更好的抗逆性，例如抗旱性。这两个品种种源都是来自芬兰。

Figure 1. On the left: The weather conditions at the TYRNIRAKI test fields are monitored with local, solar–powered weather stations. On the right: After the research samples have been collected, consumers can pay a small fee to the farmer and go pick the berries. Photos: Maaria Kortesniemi.
图 1 左图：TYRNIRAKI 试验场的天气状况由当地太阳能气象站监测。右图：收集研究样本后，消费者可以向农民支付少量费用，然后去采摘浆果。照片由 Maaria Kortesniemi 提供。

During the summer of 2024, unripe/semiripe/ripe berries were harvested for volatile compound analysis. The aim was to investigate volatile compounds attractive to the sea buckthorn fly (Rhagoletis batava) and relevant to sensory properties. Soil sampling was continued as well as hyperlocal weather monitoring. The results will be presented the ISA Conference 2025.

2024 年夏天，研究人员采集了未成熟及半成熟 / 成熟的沙棘浆果进行挥发性化合物分析，目的是研究对沙棘果蝇（Rhagoletis batava）有吸引力的挥发化合物及其与感官特性的关系。土壤采样和超局部天气监测仍在继续中。相关结果将在 2025 年第十届国际沙棘大会（ISA2025）会议上进行学术交流。

三 SeaBuckthorn Plantation in Utsjoki and Kittilä

关于 Utsjoki 和 Kittilä 的沙棘种植园

The northernmost Utsjoki plantation was established by University of Turku in 2021 for studying the impact of subartic latitude on the composition and physiology of sea buckthorn. This research received funding support from the Turku University Foundation in 2023. The sea buckthorns have survived two winters at 69 degrees northern latitude.

2021 年，图尔库大学在芬兰最北端的 Utsjoki 种植园建立了研究基地，以研究亚纬度对沙棘成分和生理的影响。这项研究于 2023 年获得了图尔库大学基金会的资助。沙棘已成功在北纬 69 度的环境中存活了两个冬季。

The Kittilä plantation at 68 degrees northern latitude has been under investigation since its establishment in 2003. Sadly, the farmer Bärtil Lappalainen, passed away in April 2023 and the continuation of the plantation is uncertain. The collaboration with Bärtil Lappalainen has enabled the longitudinal research on the effects of the unique northern conditions to sea buckthorn and the comparison to their southern clones, as shown by the list of numerous publications and theses below. Kittilä test field proved that sea buckthorn can survive and thrive in high latitudes, and has encouraged testing the boundaries of sea buckthorn even further north.

在芬兰北纬 68 度的基蒂莱 Kittilä 种植园，自 2003 年建立以来一直在开展调查。遗憾的是，种植园主 Bärtil Lappalainen 于 2023 年 4 月去世，种植园的延续尚不确定。与 Bärtil Lappalainen 的合作使我们能够对芬兰北部独特条件对沙棘的影响进行纵向研究，并将其与南部的克隆植株进行比较，相关结果如以下众多出版物和论文所示。在 Kittilä 的试验结果证明，沙棘可以在高纬度地区生存和茁壮成长，这一成果更有助于科研人员将沙棘的种植边界向更北区域推广。

四 Scientific articles 近年发表的科研论文

1.Ma, X., Yang, W., Marsol-Vall, A., Laaksonen, O., Yang, B. (2020) Analysis of flavour compounds and prediction of sensory properties in sea buckthorn (*Hippophaë rhamnoides* L.) berries. Int J Food Sci Technol, 55: 1705-1715. https://doi.org/10.1111/ijfs.14442

1.Ma, X., Yang, W., Marsol-Vall, A., Laaksonen, O., Yang, B（2020），沙棘浆果风味化合物分析和感官特性预测。《国际食品科学技术杂志》，55:1705-1715。https://doi.org/10.1111/ijfs.14442

2.Pariyani, R., Kortesniemi, M., Liimatainen, J., Sinkkonen, J., Yang, B. (2020), Untargeted metabolic fingerprinting reveals impact of growth stage and location on composition of sea buckthorn (*Hippophaë rhamnoides*) leaves. Journal of Food Science, 85: 364-373. https://doi.org/10.1111/1750-3841.15025

2.Pariyani，R.，Kortesniemi，M.，Liimatainen，J.，Sinkkonen，J.，Yang，B.（2020），非靶向代谢指纹图谱揭示了生长阶段和位置对沙棘叶片组成的影响。食品科学杂志，85:364-373。https://doi.org/10.1111/1750-3841.15025

3.Xueying Ma, Johanna Moilanen, Oskar Laaksonen, Wei Yang, Elina Tenhu, Baoru Yang (2019) Phenolic compounds and antioxidant activities of tea-type infusions processed from sea buckthorn (*Hippophaë rhamnoides*) leaves. Food Chemistry, 272, 1-11. https://doi.org/10.1016/j.foodchem.2018.08.006

3.Xueying Ma, Johanna Moilanen, Oskar Laaksonen, Wei Yang, Elina Tenhu, Baoru Yang（2019）沙棘叶加工茶型浸液的酚类化合物和抗氧化活性。食品化学，272，1-11。https://doi.org/10.1016/j.foodchem.2018.08.006

4.Anna Puganen, Heikki P. Kallio, Karen M. Schaich, Jukka-Pekka Suomela, Baoru Yang (2018) Red/Green Currant and Sea Buckthorn Berry Press Residues as Potential Sources of Antioxidants for Food Use. Journal of Agricultural and Food Chemistry, 66 (13), 3426-3434. DOI: 10.1021/acs.jafc.8b00177

4.Anna Puganen、Heikki P.Kallio、Karen M.Schaich、Jukka Pekka Suomela、Baoru Yang（2018）红/绿醋栗和沙棘浆果压榨残留物作为食品抗氧化剂的潜在来源。农业与食品化学杂志，66（13），3426-3434。DOI:10.1021/acs.jafc.8b00177

5.Wei Yang, Oskar Laaksonen, Heikki Kallio, Baoru Yang (2017) Effects of latitude and

5.Wei Yang，Oskar Laaksonen，Heikki Kallio，Baoru Yang（2017），纬度和天气

weather conditions on proanthocyanidins in berries of Finnish wild and cultivated sea buckthorn (*Hippophaë rhamnoides* L. ssp. rhamnoides). Food Chemistry, 216, 87-96. https://doi.org/10.1016/j.foodchem.2016.08.032

6.Xueying Ma, Oskar Laaksonen, Jari Heinonen, Tuomo Sainio, Heikki Kallio, Baoru Yang (2017) Sensory profile of ethyl β-d-glucopyranoside and its contribution to quality of sea buckthorn (*Hippophaë rhamnoides* L.). Food Chemistry, 233, 263-272. https://doi.org/10.1016/j.foodchem.2017.04.073

7.Xueying Ma, Wei Yang, Oskar Laaksonen, Merja Nylander, Heikki Kallio, Baoru Yang (2017) Role of Flavonols and Proanthocyanidins in the Sensory Quality of Sea Buckthorn (*Hippophaë rhamnoides* L.) Berries. Journal of Agricultural and Food Chemistry, 65 (45), 9871-9879. DOI: 10.1021/acs.jafc.7b04156

8.Maaria Kortesniemi, Jari Sinkkonen, Baoru Yang, Heikki Kallio (2017) NMR metabolomics demonstrates phenotypic plasticity of sea buckthorn (*Hippophaë rhamnoides*) berries with respect to growth conditions in Finland and Canada. Food Chemistry, 219, 139-147. https://doi.org/10.1016/j.foodchem.2016.09.125

9.Xueying Ma, Oskar Laaksonen, Jie Zheng, Wei Yang, Martin Trépanier, Heikki Kallio, Baoru Yang (2016) Flavonol glycosides in berries of two major subspecies of sea buckthorn (*Hippophaë rhamnoides* L.) and influence of growth sites. Food Chemistry, 200, 189-198. https://doi.org/10.1016/j.foodchem.2016.01.036

条件对芬兰野生和栽培沙棘浆果中原花青素的影响。食品化学，216，87-96。https://doi.org/10.1016/j.foodchem.2016.08.032

6.Xueying Ma, Oskar Laaksonen, Jari Heinonen, Tuomo Sainio, Heikki Kallio, Baoru Yang（2017），乙基 β-d- 吡喃葡萄糖苷的感官特征及其对沙棘质量的贡献。食品化学，233263-272。https://doi.org/10.1016/j.foodchem.2017.04.073

7.Xueying Ma, Wei Yang, Oskar Laaksonen, Merja Nylander, Heikki Kallio, Baoru Yang（2017），黄酮醇和原花青素在沙棘果实感官品质中的作用。农业与食品化学杂志，65（45），9871-9879。DOI:10.1021/acs.jafc.7b04156

8.Maaria Kortesniemi、Jari Sinkkonen、Baoru Yang、Heikki Kallio（2017），核磁共振代谢组学表明，沙棘（Hippophaë rhamnoides）浆果在芬兰和加拿大的生长条件下具有表型可塑性。食品化学，219139-147。https://doi.org/10.1016/j.foodchem.2016.09.125

9.Xueying Ma, Oskar Laaksonen, Jie Zheng, Wei Yang, Martin Trépanier, Heikki Kallio, Baoru Yang（2016），两个主要沙棘亚种浆果中的黄酮醇苷和生长部位的影响。《食品化学》，第 200 期，第 189-198 页。https://doi.org/10.1016/j.foodchem.2016.01.036

10.Jie Zheng, Heikki Kallio, Baoru Yang (2016) Sea Buckthorn (*Hippophaë rhamnoides* ssp. *rhamnoides*) Berries in Nordic Environment: Compositional Response to Latitude and Weather Conditions. Journal of Agricultural and Food Chemistry, 64 (24), 5031-5044. DOI: 10.1021/acs.jafc.6b00682

11.Wei Yang, Oskar Laaksonen, Heikki Kallio, Baoru Yang (2016) Proanthocyanidins in Sea Buckthorn (*Hippophaë rhamnoides* L.) Berries of Different Origins with Special Reference to the Influence of Genetic Background and Growth Location. Journal of Agricultural and Food Chemistry, 64 (6), 1274-1282. DOI: 10.1021/acs.jafc.5b05718

12.Anssi L. Vuorinen, Niko Markkinen, Marika Kalpio, Kaisa M. Linderborg, Baoru Yang, Heikki P. Kallio (2015) Effect of growth environment on the gene expression and lipids related to triacylglycerol biosynthesis in sea buckthorn (*Hippophaë rhamnoides*) berries. Food Research International, 77, 608-619. https://doi.org/10.1016/j.foodres.2015.08.023

13.Jie Zheng, Baoru Yang, Martin Trépanier, Heikki Kallio (2012) Effects of Genotype, Latitude, and Weather Conditions on the Composition of Sugars, Sugar Alcohols, Fruit Acids, and Ascorbic Acid in Sea Buckthorn (*Hippophaë rhamnoides* ssp. mongolica) Berry Juice. Journal of Agricultural and Food Chemistry, 60 (12), 3180-3189. DOI: 10.1021/jf204577g

14.Heidi M. Leskinen, Jukka-Pekka Suomela, Baoru Yang, Heikki P. Kallio (2010)

10.Jie Zheng, Heikki Kallio, Baoru Yang（2016），北欧环境中的沙棘浆果：对纬度和天气条件的成分响应。农业与食品化学杂志，64（24），5031-5044。DOI:10.1021/acs.jafc.6b00682

11.Wei Yang, Oskar Laaksonen, Heikki Kallio, Baoru Yang（2016），不同来源沙棘浆果中的原花青素，特别是遗传背景和生长位置的影响。农业与食品化学杂志，64（6），1274-1282。DOI:10.1021/acs.jafc.5b05718

12.Anssi L.Vuorinen，Niko Markkinen，Marika Kalpio，Kaisa M.Linderborg，Baoru Yang，Heikki P.Kallio（2015），生长环境对沙棘浆果中与三酰甘油生物合成相关的基因表达和脂质的影响。国际食品研究，77608-619。https://doi.org/10.1016/j.foodres.2015.08.023

13.Jie Zheng, Baoru Yang, Martin Trépanier, Heikki Kallio（2012），基因型、纬度和天气条件对沙棘浆果汁中糖、糖醇、果酸和抗坏血酸组成的影响。农业与食品化学杂志，60（12），3180-3189。DOI:10.1021/jf204577g

14.Heidi M.Leskinen，Jukka-Pekka Suomela，Baoru Yang，Heikki P.Kallio（2010），沙棘（*Hippophaë rhamnoides*）

Regioisomer Compositions of Vaccenic and Oleic Acid Containing Triacylglycerols in Sea Buckthorn (*Hippophaë rhamnoides*) Pulp Oils: Influence of Origin and Weather Conditions. Journal of Agricultural and Food Chemistry, 58 (1), 537-545. DOI: 10.1021/jf902679v

果肉油中含真空酸和油酸的三酰基甘油的区域异构体组成：来源和天气条件的影响。农业与食品化学杂志，58（1），537–545。DOI:10.1021/jf902679v

五 Doctoral theses 近年的博士论文

1.Xueying Ma (2018) Non-volatile Bioactive and Sensory Compounds in Berries and Leaves of Sea Buckthorn (*Hippophaë rhamnoides*). Turun yliopisto. https://www.utupub.fi/handle/10024/145832

1.Xueying Ma（2018），沙棘（*Hippophaë rhamnoides*）浆果和叶子中的非挥发性生物活性和感官化合物，Turun yliopisto，https://www.utupub.fi/handle/10024/145832

2.Wei Yang (2017) Effects of Genetic and Environmental Factors on Proanthocyanidins in Sea Buckthorn (*Hippophaë rhamnoides*) and Flavanol Glycosides in Leaves of Currants (Ribes spp.). Turun yliopisto. https://www.utupub.fi/handle/10024/133965

2.Wei Yang（2017），遗传和环境因素对沙棘（*Hippophaë，rhamnoides*）原花青素和醋栗（Ribes spp.）叶片黄烷醇糖苷的影响，Turun yliopisto，https://www.utupub.fi/handle/10024/133965

3.Maaria Kortesniemi (2016) NMR Metabolomics of Foods – Investigating the Influence of Origin on Sea Buckthorn Berries, Brassica Oilseeds and Honey. Turun yliopisto. https://www.utupub.fi/handle/10024/128281

3.Maaria Kortesniemi（2016），食品的核磁共振代谢组学：研究原产地对沙棘浆果、芸薹属油料和蜂蜜的影响，Turun yliopisto，https://www.utupub.fi/handle/10024/128281

4.Jie Zheng (2013) Sugars, acids and phenolic compounds in currants and sea buckthorn in relation to the effects of environmental factors. Turun yliopisto. https://www.utupub.fi/handle/10024/92219

4.Jie Zheng（2013），醋栗和沙棘中的糖、酸和酚类化合物与环境因素的关系。Turun yliopisto。https://www.utupub.fi/handle/10024/92219

5.Heidi Leskinen (2010) Positional Distribution of Fatty Acids in Plant Triacylglycerols: Contributing Factors and Chromatographic/Mass Spectrometric Analysis. Turun yliopisto. https://www.utupub.fi/handle/10024/50696

6.Jukka-Pekka Suomela (2006) Effects of Dietary Fat Oxidation Products and Flavonols on Lipoprotein Oxidation. Turun yliopisto. https://www.utupub.fi/handle/10024/33919

5.Heidi Leskinen（2010），植物三酰基甘油中脂肪酸的位置分布：影响因素和色谱/质谱分析。Turun yliopisto。https://www.utupub.fi/handle/10024/50696

6.Jukka-Pekka-Suomela（2006），膳食脂肪氧化产物和黄酮醇对脂蛋白氧化的影响。Turun yliopisto。https://www.utupub.fi/handle/10024/33919

六 Cultivation and Crops in Finland 芬兰的沙棘种植和采收

Numbers in number of growers (farms or enterprises), total area in cultivation and total crop in Finland have changed as in the table below:

2019-2024 年，芬兰的沙棘种植者（农场或企业）数量、种植总面积和果实总产量如下表所示：

	2019	2020	2021	2022	2023	2024
Number of growers 种植户数量	176	172	164	160	152	137
Area total (ha) 面积（公顷	118	95	92	94	86	79
Yield (1,000 kg) 产量（公斤）	35	30	25	50	34	43

Overall, the cultivated area and yield are small. There is no analysis so far which has caused the changes.

In addition to growers there are many small home growers with some bushes, and these are not included in statistics. In the coastal area of Finland there are wild sea buckthorn bushes and people have right to pick berries. This crop is also not included in statistics.

总的来说，芬兰的沙棘种植面积和产量都很小。到目前为止，还没有分析是什么原因导致这些变化。除了种植者，还有许多小型家庭种植者种植了少量沙棘，这些都不包括在统计数据中。

芬兰沿海地区有野生沙棘灌丛，人们有权采摘沙棘浆果。这种产量也不包括在统计数据中。

七 Industrial Volumes of SeaBuckthorn Berries 关于沙棘果实加工

In Finland the biggest volumes in sea buckthorn products are juices and beverages. Because cultivation is so small, berries and juice are mainly imported. About 500 tons of frozen berries were imported. Also in Finland there is special production of products based on sea buckthorn. These are sea buckthorn oils produced by supercs of tons calculated as weight of fresh berries. Products are food supplements and products for different symptoms. ritical fluid extraction process by Aromtech Ltd. Use of sea buckthorn material in these products is thousand.

在芬兰，沙棘产品的产量最大的是果汁和饮料。由于种植面积很小，沙棘浆果和果汁主要是依靠进口。每年进口量为 500 吨冷冻沙棘浆果。芬兰也有专门生产基于沙棘的产品，包括 Aromtech 有限公司通过超临界流体萃取工艺生产的沙棘油。在这些产品中，以新鲜浆果的重量计算，沙棘材料的使用量为数千吨。产品是食品补充剂和针对不同症状的产品。

八 SeaBuckthorn Pilot Cultivation in Lapland 在 Lapland 的沙棘栽培试验

Aromtech Ltd started in 2019 co-operation with the Lappia vocational college to boost sea buckthorn cultivation in Northern part of Finland. The way is to combine education and pilot cultivation. Aromtech has invested on sea buckthorn bushes. Students of the college can get experience of cultivation, crops, handle and sales of crops before starting their own cultivation on their home fields.

Aromtech 有限公司于 2019 年开始与 Lappia 职业学院合作，通过教育与示范种植相结合的方式开展项目，投资种植沙棘灌木。该学院的学生可以在自己的田地开始沙棘种植之前，获得沙棘种植、采收、处理和销售的经验。

Aromtech established sea buckthorn plantation in 2019. The purpose of the plantation is to show to local farmers that sea buckthorn is a suitable crop for northern conditions as well. The two-hectare farm is located in Tervola, north of the 66th latitude, in connection with the agricultural vocational school of Lappia.

Aromtech 于 2019 年建立了 Lapland 沙棘种植园。建立种植园的目的是向当地农民展示，沙棘也是一种适合芬兰北方条件的作物。这个占地两公顷的农场位于芬兰北纬 66 度以北的 Tervola 地区，与 Lappia 农业职业学校相邻。

Finnish varieties were planted on a flat organic field of two hectares. Used varieties are: 1600 pcs. Tytti (female), 1600 pcs. Terhi (female) and 250 pcs. Tarmo (male). The plant rows are 250 meters long, the row spacing 4.5 meters, the spacing between the plants 1.2 m for females and 2 m for males. The boys were planted in their own rows on the east and west sides of the plantation and girls in the middle. Later, the boys were also placed at the ends of the girls' rows, so now the boys are surrounding the girls.

沙棘种植在两公顷的平坦有机地上，使用的芬兰沙棘品种有：1600 株 Tytti（雌株）、1600 株 Terhi（雌株）和 250 株 Tarmo（雄株）。种植园沙棘林长 250 米，带间距 4.5 米，雌株间距 1.2 米，雄株间距 2 米。雄株分别种在种植园的东西两侧，雌株种植在中间。后来，雄株加种在雌株排的两端，这样雄株都围着雌株。

The ground surface in the plant rows is covered with woven polypropylene fabric, drip irrigation pipes are installed underneath. The entire area is fenced to keep out moose, roe deer and reindeer, as well as over-eager pickers. During the planting phase, the pH of the soil was adjusted to the right level by liming and fully matured compost was given as fertilizer.

植物行的地面覆盖着聚丙烯编织物，下面安装了滴灌管。整个地区都围了起来，以防止驼鹿、狍和驯鹿以及过于性急的采摘者进入。在种植阶段，通过施加石灰将土壤的 pH 值调节到适当的水平，并将施用完全成熟的堆肥作为肥料。

The first berry crop was harvested by cutting branches in September 2022. At that time, the average height of shrubs was about 170 cm. The harvesting method is to cut 60–70% of the plant, saving 40–30%, so that the green leaf surface remains to gather strength for regrowth. The purpose is to cut 1/3 of the plants every year. The bushes are allowed to rest for two intervening years (original idea).

2022 年 9 月，通过修剪树枝收获了种植园第一批沙棘浆果。当时，灌木的平均高度约为 170 厘米。采收方法是砍伐 60–70% 的枝条，保留 40%–30% 的枝条，使绿叶表面保持活力，以便再生。我们的目标是每年砍伐三分之一的枝条。按照最初的设计方案，每两年会给沙棘灌木安排休整期。

The second harvesting was in September 2023 and the last rows of bushes were harvested in September 2024. In 2024 was observed that there were a lot of berries in the bushes, which were cut the first time in 2022. A test harvesting was done and the results are promising. Total yield in 2024 of 2 hectares are was 6 tons.

第二次采收是在 2023 年 9 月，最后一次采收是在 2024 年 9 月。到 2024 年，仍然还可以看到沙棘植株上存留很多果实，这些残留的果实正是 2022 年首次采摘时留下的。经过采摘试验，结果令人鼓舞。2024 年，2 公顷沙棘种植园的总产量达到了 6 吨。

Based on three years of experience, the harvesting strategy will be reassessed in order to sustainably optimize the annual yield that can be collected. It is likely that the basic cutting will continue on a three-year cycle, but it will be supplemented by annual additional cuttings of berry-bearing branches from the sides of the bushes. The yield can be 5–10 tons per hectare.

根据三年的种植经验，我们将重新评估沙棘果实采收策略，以便可持续地优化可以收集的沙棘年产量。基本修剪很可能会以三年为一个周期继续进行，但作为补充采收，每年还会从沙棘植株两侧额外采收，产量可达每公顷 5–10 吨。

Lappia has been developing methods and machinery for detaching berries from frozen branches. The initial trials have been promising, but further development is necessary. The goal is to develop appropriately scaled methods for harvesting crops from 5–10-hectare plantations.

在 Lappia，我们一直在开发利用冷冻果枝分离沙棘果的方法和机器。最初的试验很有希望，但还需要进一步的开发。目标是开发适合 5–10 公顷种植园规模的沙棘采收方法。就收益预期而言，迄今为止的结果非常有希望。当前目标是让大约 20 名感兴趣的种植者开始在自己的农场种植。为此，我们将使用一个试验种植园作为培训场地。预期十年内这些新种植区的总产量将达到 500 吨，这比芬兰当前的沙棘产量高出数倍之多。

The results so far have been so promising in terms of yield expectations. Now the goal is to get about 20 interested growers to start cultivation on their own farms. A trial cultivation site will be used as a training ground for this purpose. The aim is that within ten years, the total harvest from these new cultivation areas will be 500 tons - many times greater than the current sea buckthorn yields in Finland.

If the targeted cultivation area is achieved, it will also be possible to develop berry processing so that 100% of the berries are utilized in high value-added products. Operational models and business concepts have already been developed for this.

如果达到预期种植面积，我们就可以发展沙棘浆果加工，使 100% 的沙棘浆果用于开发高附加值产品。为此，我们已经开发了相应的运营模式和商业概念。

Figure 2. On the left: Berry harvest in Loue (Lapland, Finland). Sea buckthorn branches with berries packed in boxes ready to be taken to a freezer. On the right: Cutting sea buckthorn branches with berries.
图 2: 左图：在 Loue（芬兰 Lapland）的沙棘采收现场。从植株上剪下的沙棘果枝装在果框里，准备运往冷冻果实脱粒。右图：采收沙棘果枝。

3. Country Report of India

印度沙棘发展报告

Drafted by:

Dr. Virendra Singh
President, Seabuckthorn Association of India
Email: virendrasingh.sbt@gmail.com

撰稿人：

维伦德拉·辛格博士

印度沙棘协会主席
邮箱：virendrasingh.sbt@gmail.com

Research and Development on Seabuckthorn of India in 2024

2024 年印度沙棘研究与开发

1.Characterisation of genetic diversity in Seabuckthorn populations using molecular and morphological approaches

1. 利用分子和形态学方法研究沙棘种群的遗传多样性

Parneeta Chaudhary and Prakash Chand Sharma
University School of Biotechnology, Guru Gobind Singh Indraprastha University, Dwarka Sector-16C, New Delhi, India

帕尼塔·乔杜里，普拉卡什·钱德·夏尔马
古鲁·戈宾德·辛格因陀罗补罗湿多大学，生物技术学院，德瓦卡 16C 区，新德里，印度

Seabuckthorn (*Hippophae* sp.), an ecologically important medicinal plant, is widely distributed across the rugged terrains of the Great Indian Himalayas. Known for its rich bioactive compounds, it provides significant nutritional and therapeutic benefits. The plant exhibits remarkable agronomic traits that allow it to thrive under extreme environmental conditions, such as drought, salinity, and fluctuating temperatures. However, as a dioecious species, determining sex at the juvenile stage is not possible, as the plant reaches maturity in 3-4 years. Despite growing interest in its conservation and improvement, genomic and transcriptomic research on seabuckthorn remains limited. Evaluating the genetic diversity of seabuckthorn populations from various geographical regions is crucial, especially with the increasing exploitation of the species. Over-exploitation could threaten its genetic diversity and lead to inbreeding depression. Female plants are more valued, as they produce nutrient-rich fruits. Therefore, the development of reliable molecular markers for sex identification at early growth stages is essential. While significant populations of

沙棘（*Hippophae sp.*），一种具有重要生态价值的药用植物，广泛分布于崎岖的印度喜马拉雅山脉地带。因其富含的生物活性化合物、具有显著营养和治疗功效而闻名。沙棘的农艺性状表现卓越，能在干旱、盐碱和温度变化等极端环境条件下顽强生长。然而，作为一种雌雄异株的物种，其幼苗阶段（植株需 3-4 年才能成熟）无法确定雌雄异株。尽管人们对沙棘物种的保护和改良日益关注，但针对沙棘的基因组学和转录组学研究仍然有限。评估不同地理区域的沙棘种群的遗传多样性至关重要，尤其是在该沙棘开发利用备受关注的背景下。过度开发利用可能会威胁其沙棘的遗传多样性或导致近交衰退。雌株因其能结出营养丰富的果实而更具价值。因此，开发用于幼苗生长阶段此雄株鉴定的可靠分子标记方法至关重要。尽管在印度喜马拉雅山脉的西北部和东部地区存

seabuckthorn exist in the north-western and eastern Himalayan regions of India, limited research has been conducted on their genetic diversity and population structure. In this study, microsatellite markers were developed and assessed alongside morphological traits to evaluate the genetic diversity of 226 seabuckthorn collections from regions such as Ladakh, Lahaul and Spiti, Garhwal, Kumaon, and Tawang. The study identified significant allelic polymorphism, with amplicon sizes ranging from 110-490 bp. Statistical analyses indicated considerable genetic variation, and the STRUCTURE software tool provided insights into the population structure. Microsatellite markers tested on *Hippophae salicifolia* also demonstrated transferability to *H. rhamnoides* and *H. tibetana*. Other genetic parameters, including Polymorphic Information Index (PIC), expected heterozygosity (He), Wright's fixation index (FIS), and Shannon's informative index (I), were calculated. A UPGMA-based dendrogram was created, revealing clustering patterns of the collections. Microsatellite markers were shown to be more effective than morphological markers in assessing genetic diversity. The findings from this study contribute valuable insights into the genetic diversity and population structure of seabuckthorn in the north-western and eastern Himalayan regions of India. These results are crucial for future breeding programs and molecular biology research related to seabuckthorn and other *Hippophae* species.

在大量沙棘种群，但对其遗传多样性和种群结构的研究仍然有限。本研究本采用微卫星标记和形态特征对来自拉达克、拉哈尔和斯皮提、加尔瓦尔、库马翁和达旺等地区的 226 份沙棘标本进行了遗传多样性评价。该研究发现了显著的等位基因多态性，扩增子大小在 110-490 bp 之间。统计分析显示了相当大的遗传变异，STRUCTURE 软件工具分析揭示了种群结构信息。在柳叶沙棘上的微卫星标记证实其与鼠李沙棘和西藏沙棘的可转移性。此外，计算了其他遗传参数，包括多态信息指数（PIC）、期望杂合度（He）、Wright's 固着指数（FIS）和和 Shannon's 信息指数 (I) 等遗传参数。构建了基于非加权组平均法（UPGMA）的系统树状图，揭示了种质资源的聚类模式。研究证明，微卫星标记在评估遗传多样性方面比形态标记更有效。本研究结果可为了解印度喜马拉雅山脉西北部和东部地区沙棘的遗传多样性与种群结构提供宝贵见解。结果对于未来沙棘及其他沙棘属物种的育种和分子生物学研究具有重要意义。

2.Nuclear Magnetic Resonance (NMR) Based Metabolome Diversity of Seabuckthorn (*H.rhamnoides* L.) Berries Originating from Two Geographical Regions of Indian Himalayas

2. 基于核磁共振 (NMR) 的印度喜马拉雅山脉两个地理区域沙棘 (*H.rhamnoides* L.) 果实的代谢组多样性研究

Sugandh Singh and Prakash Chand Sharma
University School of Biotechnology, Guru Gobind Singh Indraprastha University, Dwarka Sector-16C, New Delhi

苏甘德 · 辛格，普拉卡什 · 钱德 · 夏尔马
古鲁 · 戈宾德 · 辛格因陀罗补罗湿多大学，生物技术学院，德瓦卡 16C 区，新德里，印度

A comprehensive analysis of metabolites in seabuckthorn (*Hippophae rhamnoides* L.) was conducted by analyzing the methanolic extract of berries originating from 37 geographical sites of the Indian Himalayas by using 1H NMR-based metabolome profiling. The concentration of 103 metabolites was annotated. The quantified peak intensity matched with standard compounds present in the different databases, including Madison-Qingdao Metabolomics Consortium Database (MMCD), Human Metabolome Database (HMDB), and Spectral Database of Organic Compounds (SBDS). Multivariate data analysis was performed, and a heat map was generated, which provided direct visualization of the prevailing metabolomic diversity allowing the identification of metabolomic discriminators of seabuckthorn berries representing different geographical regions. The overall results indicated higher expression of metabolites in the Jammu and Kashmir region, excluding some metabolites such as spermidine and beta-alanine, which showed a higher expression in Himachal Pradesh. The metabolomic information generated from seabuckthorn berries originating from different regions provides a valuable resource, which food industrialists could exploit to identify metabolites related to the assessment of food safety and quality of different food products, nutraceuticals, pharmaceuticals, and cosmeceuticals. Further, our

基于氢谱核磁共振（1H NMR）的代谢组分析技术，对源自印度喜马拉雅山脉 37 个地理位点的沙棘（*Hippophae rhamnoides* L.）果实的甲醇提取物进行了全面代谢物分析。103 种代谢物被定性定量。其定量峰强度通过与多个数据库中的标准品进行比对实现，数据库包括麦迪逊 - 青岛代谢组学联盟数据库（MMCD）、人类代谢组数据库（HMDB）以及有机化合物光谱数据库（SDBS）。研究进行了多变量数据分析并生成热图，热图直观显示了主要代谢组的多样性，从而能够识别代表不同地理区域沙棘果实的代谢标志物。总体结果表明，大多数代谢物在查谟和克什米尔地区的表达水平较高，但亚精胺和 β- 丙氨酸等代谢物在喜马偕尔邦的表达水平更高。本研究分析不同地理来源沙棘果实所生成的代谢组信息，为食品工业提供了宝贵资源，可用于鉴定与评估不同食品、营养保健品、药品及化妆品的安全性及质量评价。此外，研究结果表明，基于 1H NMR 的代谢组学是

results suggest that 1H NMR-based metabolomics is a promising approach for comprehensive metabolome profiling, source discrimination, and quality assessment in plant species.

一种用于植物物种全面代谢组分析、溯源和质量评估的有效方法。

3.Proteome Analysis to understand physiological adaptations in Indian Seabuckthorn

3. 蛋白质组分析印度沙棘的生理适应性

Bhavana Sharma and Renu Deswal
Molecular Physiology and Proteomics Laboratory, Department of Botany, University of Delhi

芭瓦纳·夏尔马，雷努
德里大学，植物学系，分子生理学与蛋白质组学实验室

Since last one decade, we are trying to analyse and understand the stress modulatory pathways in seabuckthorn using proteomics tool. Cold/freeze modulated proteome from lab grownseedlings was deciphered using Gel and LCMS/MS based proteome analysis. The proteo-map (2-D gels) of H. rhamnoides seedlings secretome is available on world 2D-PAGE repository (ExPASy Bioinformatics Resource Portal). Currently, we are trying to understand the stress tolerance traits in naturally growing seabuckthorn populations. A custom-built Proteome database was developed using label free (nano LC MS/MS) approach for better annotation of proteins Nano LCMS/MS analysis led to identification of 4870 proteins clustered into 1035 protein groups indicating differential abundance of metabolic, regulatory and stress responsive proteins in Trans-Himalayan and Sikkim germplasm. Comparative gel-based and gel-free shotgun proteomics approach to dissect stress acclimation strategies in high-altitude Trans-Himalayan (H. rhamnoides, H. tibetana) and lower altitude adapted Sikkim (H.salicifolia) germplasm

过去的十年中，我们一直致力于通过蛋白质组学解析沙棘的胁迫调节通路。基于凝胶和液相色谱 – 质谱 / 质谱联用技术（LC–MS/MS）的蛋白质组学分析，解析了实验室培育冷 / 冻胁迫调控沙棘幼苗的蛋白质组。柳叶沙棘幼苗的蛋白质图谱（2D 凝胶）可在世界 2D–PAGE 库中获取（ExPASy 生物信息学资源门户）。目前，我们正致力于研究自然生长沙棘种群的胁迫耐受特性研究。为了更好地分析蛋白质，我们采用无标记（纳米液相色谱 – 串联质谱）方法构建了一个专项蛋白质组数据库。纳米液相色谱 – 串联质谱共分析定性 4870 种蛋白质，聚类为 1035 个蛋白质组，呈现了跨喜马拉雅和锡金地区沙棘种质的代谢相关蛋白、调控蛋白及胁迫响应蛋白的丰度及差异。基于凝胶与非凝胶鸟枪蛋白质组学的比较分析，剖析高海拔跨喜

showed differential regulation of proteins associated with metabolic processes, stress signalling,defense responses, redox regulation, protein remodelling, and secondary metabolite or fatty acid biosynthesis. Validation of downstream metabolic signatures also supported the proteomic plasticity suggesting their probable involvement in differential stress acclimation strategies. These findings showed an interesting trade-off between growth and stress tolerance in diverse populations. High-altitude Trans-Himalayan populations repress their growth and divert energy resources towards better stress responses to survive extreme climatic conditions. In contrast, Sikkim populations at lower elevations invest in resource allocation or growth-promoting pathways in response to milder stress conditions. To the best of our knowledge, this is the first comprehensive proteome analysis to examine the altitudinal gradient associated stress acclimation strategies.

马拉雅地区沙棘种质（鼠李沙棘、西藏沙棘）和低海拔锡金地区种质（柳叶沙棘 ）的胁迫适应策略，结果揭示了与代谢过程、胁迫信号传导、防御反应、氧化还原调控、蛋白质重塑以及次级代谢物或脂肪酸生物合成相关的蛋白质的差异调控。同时，下游代谢特征的验证支持了蛋白质组的可塑性，表明其可能参与差异化的胁迫适应策略。研究揭示了不同种群在生长和胁迫耐受之间存在有趣的权衡关系。高海拔跨喜马拉雅种群会抑制沙棘生长，将能量资源转向更有效的胁迫响应，以适应极端气候条件下的生存。相比之下，低海拔的锡金种群则响应较温和的胁迫条件，将资源分配至促进生长的通路。据我们所知，这是首次通过全面的蛋白质组学分析研究海拔梯度相关的沙棘胁迫适应策略。

4.Hippophae salicifolia aqueous extract protects C2C12 cells from hypoxia by restoring myogenic differentiation markers

4. 柳叶沙棘水提物通过恢复肌源性分化标志物保护 C2C12 细胞免受缺氧损伤

Rajkumar Tulsawani
Defence Institute of Physiology and Allied Sciences, 110054, Delhi, India

拉吉库马尔 · 图尔萨瓦尼
国防生理学与联合科学研究所，110054，德里，印度

C2C12, muscle cell line, was exposed to hypoxia [0.5% O2 for 24 h] alone and with treatment of aqueous extract of H. salicifolia at various concentrations; 12.5-100 µg/ml based on the studies. Cell viability and death assays [MTT, ROS

不同浓度（基于前期研究确定为 12.5–100 µg/mL）柳叶沙棘水提物处理的肌细胞系 C2C12 和对照肌细胞系 C2C12 暴露于缺氧环境（0.5% 氧气，持续 24 小时）。观察

and LDH], inflammatory markers [TNFα, NF κ B and IL6] and muscle markers [MyoD and MyoG] were assessed after exposing cells to hypoxia. C2C12 cells maintained in 0.5% oxygen displays cell death that co-exist with higher reactive oxygen species and enhanced leakage of lactate dehydrogenase evidencing necrotic cell death. Additionally, higher levels of inflammatory response were recorded in C2C12 exposed to 0.5% oxygen. The expression of MyoD and MyoG [myogenic differentiation markers] were suppressed in C2C12 cells cultured on 0.5% oxygen. C2C12 cells exposed to hypoxia and treated with H. Salicifolia reduced hypoxia associated cell death and protective effects were further evident with reduced reactive oxygen species, and lactate dehydrogenase leakage. The pro-inflammatory markers (TNFα, NF κ B and IL6) in hypoxia exposed C2C12 cells were normalized with the H. Salicifolia treatment. The expression of MyoD and MyoG, myogenic markers, were normalized in hypoxic cells with the co-administration of aqueous extract of H. Salicifolia.

细胞缺氧后的细胞活力和死亡测定 [MTT、ROS 和 LDH]、炎症标志物 [TNF α、NF(B 和 IL6)] 和肌肉标志物 [MyoD 和 MyoG]。0.5% 氧浓度下培养的 C2C12 细胞出现了细胞死亡现象，同时伴有较高水平的活性氧（ROS）和乳酸脱氢酶（LDH）溶出增加，证明存在坏死性细胞死亡。此外，暴露于 0.5% 氧气浓度的 C2C12 细胞中检测到了更强的炎症反应；肌源性分化标志物 MyoD 和 MyoG 的表达受到抑制。但是暴露于缺氧环境的柳叶沙棘水提物处理 C2C12 细胞因缺氧导致的细胞死亡减少，活性氧水平降低、乳酸脱氢酶溶出减少，证实了柳叶沙棘对 C2C12 细胞的保护作用。同时，缺氧环境下，柳叶沙棘水提物处理的 C2C12 细胞的促炎标志物（TNF α、NF－κ B 和 IL6）和肌源性标志物 MyoD 和 MyoG 恢复至正常水平。

5.Combination of seabuckthorn phenolics and probiotics protect against intestinal inflammation in vivo studies

5. 沙棘酚类物质与益生菌联用预防肠道炎症的体内研究

Gargi Dey
School of Biotechnology, KIIT University, Bhubaneswar-751024,India

加尔吉 · 戴伊
KIIT 大学，生物技术学院 ，布巴内斯瓦尔－751024，印度

Dietary polyphenols and probiotic bacteria are two of the most potential bioactivecomponents known to influence human health. The reciprocal interaction of probioticstrains and polyphenols appears to have an additive or synergistic effect

膳食多酚和益生菌是两种已知的对人体健康具有潜在影响的重要生物活性物质。益生菌与多酚的相互作用似乎对宿主健康具有叠加或协同效应。多酚与益生菌结合，两种生物

on host health.Coupling of polyphenols with probiotic bacteria, with synergistic benefits of bothbioactive components can be considered as a promising approach in the managementof a number of gastrointestinal diseases.The present work was conceptualized keeping in view the two-way interaction betweenprobiotics and dietary polyphenols. The aim of the current study was to developprobiotic-fortified, sea buckthorn-based functional beverage that would effectivelyeliminate or render protection against intestinal inflammation. The effects of malt supplemented sea buckthorn juice (SBT+M), on the protective andin vivo anti-inflammatory effect of Lacticaseibacillusrhamnosus GG (LR) againstintestinal inflammation using the trinitrobenzene sulfonic acid (TNBS) induced colitismodels were investigated in zebrafish (Danio rerio). Fishes were fed with the standardfish pellets coated with the experimental beverages twice a day for 30 days. Intra rectaladministration of 170mM of TNBS was conducted to develop TNBS-induced colitis.The intestinal tissues were sampled for further assessment. Administration of the testbeverages attenuated several effects of TNBS-induced colitis, including disruptedintestinal barrier integrity, impaired tissue anti-oxidant status and expression of colitisassociated pro-inflammatory markers. The results reveal that SBT+M+LR had asignificant protective effect against mucosal damage, as demonstrated by a reductionin histopathological score. SBT+M+LR exhibited remarkable anti-oxidant propertiesby increasing the activity of the CAT, SOD, GPx, and GSH enzymes, which wereimpaired due to TNBS administration. SBT+M+LR treatment substantially preventedtoll-like receptor (TLR)-2, TLR-4, and TLR-5 expression in the colon. Inflammatorymediators (NF-κB, TNF-α, IL-1β, IL-6, IL-8, CCL20, MPO and MMP9) as well as anti-inflammatory cytokine (IL-10) were measured in colonic tissue. Administration of thetest beverages resulted in a decrease of NF-κB, TNF-α, IL-1β, IL-6, IL-8, CCL20, MPOand MMP9 and an increase of IL-10 expression. The greater protective impact ofSBT+M+LR confirms that SBT phenolics play a supporting role in

活性物质的协同效益，可视为一种前景广阔的调理多种胃肠道疾病的方法。本研究围绕益生菌与膳食多酚之间的相互作用展开，旨在开发一种富含益生菌、以沙棘为基础的功能性饮料，以期有效消除肠道炎症或提供保护作用。研究通过三硝基苯磺酸（TNBS）诱导的斑马鱼（Danio rerio）结肠炎模型，评估了添加麦芽的沙棘汁（SBT+M）对鼠李糖乳杆菌 GG 菌株（LR）在保护肠道免受炎症及体内抗炎方面的影响。实验期间，每日两次给斑马鱼喂食涂有实验饮料的标准鱼饲料，持续 30 天，直肠注射 170mM 的 TNBS 诱导结肠炎，随后采集肠道组织进行进一步分析。结果显示，受试饮料可减轻 TNBS 诱导结肠炎的多种症状，包括肠道屏障完整性破坏、组织抗氧化状态受损以及结肠炎相关促炎标志物的表达异常。结果表明，SBT+M+LR 对黏膜损伤具有显著保护作用，组织病理学评分的降低证明了这一点。SBT+M+LR 具有显著的抗氧化特性，提高了因 TNBS 注射而受损的过氧化氢酶（CAT）、超氧化物歧化酶（SOD）、谷胱甘肽过氧化物酶（GPx）和谷胱甘肽（GSH）等酶的活性。此外，SBT+M+LR 处理显著抑制了结肠中 Toll 样受体（TLR）-2、TLR-4 和 TLR-5 的表达。研究还检测了结肠组织中的炎症介质（核因子 κB（NF-κB）、肿瘤坏死因子 α（TNF-α）、白细胞介素 1β（IL-1β）、白细胞介素 6（IL-6）、白细胞介素 8（IL-8）、趋化因子 CCL20、髓过氧化物酶（MPO）和基质金属蛋白酶 9（MMP9）以及抗炎

improving theimmunomodulatory activities of LR in vivo. These findings provide a betterknowledge of the mechanisms involved in modulating inflammatory cytokines bysynergistic probiotic-phenolic combinations vs individual components in the treatmentof experimental colitis. In addition, the current study emphasizes the importance ofSBT+M as a carrier matrix for LR in order to retain and enhance its functional potentialagainst experimentally induced colitis.Future research efforts should be focused on designing tailored and technologicallypossible non-dairy products that target specific diseases along with meeting marketneeds.

细胞因子（白细胞介素10（IL-10））。结果显示，受试饮料的施用降低了NF-κB、TNF-α、IL-1β、IL-6、IL-8、CCL20、MPO和MMP9的表达，同时促进了IL-10表达的升高。SBT+M+LR组合更强的保护作用证实，沙棘中的酚类物质在增强LR的体内免疫调节活性方面发挥着辅助作用。研究发现了在实验性结肠炎治疗中，协同益生菌－多酚组合相较于单一物质调节炎症细胞因子所涉及的机制。此外，本研究强调了SBT+M作为LR载体基质的重要性，以保留并增强LR抗实验诱导结肠炎的功能潜力。未来的研究工作应侧重于设计定制化且技术上可行的针对特定疾病的非乳制品，同时满足市场需求。

6.Wound healing formulations from Seabuckthorn

6. 沙棘伤口愈合制剂

Dattatraya Dinkar Gore, Nisha Sharma, Prashant Parmar, Nidhi Mishra, Soni Ranjana, Dinesh Kumar, Sanjay Madhukar Jachak, Gopabandhu Jena, Kulbhushan Tikoo, Arvind Kumar Bansal, Inder Pal Singh
National Institute of Pharmaceutical Education and Research (NIPER), Sector 67, S. A. S. Nagar 160062, Punjab, India

达塔特雷亚 · 丁卡尔 · 戈尔，妮莎 · 夏尔马，普拉尚特 · 帕尔玛，尼迪 · 米什拉，索尼 · 兰贾纳，迪内什 · 库马尔，桑杰 · 马杜卡尔 · 贾查克，戈帕班德胡 · 杰纳，库尔布尚 · 蒂库，阿尔温德 · 库马尔 · 班萨尔，因德尔 · 帕尔 · 辛格
国家药物教育与研究学院（NIPER），67 区，S.A.S. 纳加尔 160062，旁遮普邦，印度

Seabuckthorn (SBT) (*Hippophae rhamnoides* L.) is a wonder plant of temperate Himalayan region rich in large number of bioactive substances including vitamins, carotenoids, fatty acids, flavonoids, amino acid, organic acid, phytosterol, polyphenols, lipids, carbohydrates, folic acid, terpenes, etc. which have very high nutritional and unique medicinal values. SBT fruits are reported to possess many bioactivities such as radioprotection, cancer prevention, wound healing, antiulcer, anti-inflammatory, immunomodulation, antiviral, anti-hyperlipidaemic and beneficial effects in cardiovascular conditions. This research presents a comprehensive investigation into SBT fruit oil. Initially, a quantitative nuclear magnetic resonance (qNMR) method was developed for the quantitative analysis of triacylglycerols (TAGs) within SBT oil. Subsequently, NMR was employed to determine the fatty acyl composition of TAGs, complemented by gas chromatography-mass spectrometry (GC-MS) and Fourier-transform infrared (FTIR) spectroscopy. Commercial SBT oil samples were analyzed, revealing discrepancies between labelled content and actual composition. Concurrently, we evaluated the efficacy and safety of topical nanoemulsion-loaded cream and gel formulations of SBT fruit oil

沙棘（*Hippophae rhamnoides* L.）作为温带喜马拉雅地区的珍稀植物，富含维生素、类胡萝卜素、脂肪酸、黄酮类、氨基酸、有机酸、植物甾醇、多酚、脂质、碳水化合物、叶酸、萜类化合物等多种生物活性物质，具有极高的营养价值和独特的药用特性。研究表明，沙棘果实具有辐射防护、癌症预防、伤口愈合、抗溃疡、抗炎、免疫调节、抗病毒、降血脂及改善心血管功能等多种生物活性。本研究对沙棘果油进行了系统分析。首先，建立了基于定量核磁共振（qNMR）的沙棘果油中甘油三酯（TAGs）的定量分析方法。随后，联合核磁共振（NMR）、气相色谱 - 质谱联用（GC-MS）及傅里叶变换红外光谱（FTIR）技术，解析了 TAGs 的脂肪酰基组成。市售沙棘果油样品分析显示，标示组成含量与实际组成存在显著差异。同时，我们评估了外用纳米乳液负载的 SBT 果油乳膏和凝胶制剂对伤口愈合的疗效和

for wound healing. These formulations exhibited remarkable wound healing potential, with significant wound contraction. Importantly, they demonstrated a favourable acute dermal toxicity profile, indicating their safety for therapeutic applications. In conclusion, this study highlights the importance of employing a multifaceted analytical approach for SBT oil assessment. Moreover, the topical formulations of SBT fruit oil showed promise in wound healing with no adverse effects, reinforcing their safety and effectiveness.

安全性。这些制剂表现出显著的伤口愈合潜力，能有效促进伤口收缩。重要的是，其急性皮肤毒性特征良好，表明治疗应用是安全的。综上所述，本研究强调采用多维度分析方法评估沙棘果油的重要性。此外，沙棘果油外用制剂在伤口愈合中展现出良好前景且无不良反应，进一步证实了其安全性和有效性。

7.Exploring the Anticancer Potential of Seabuckthorn Phytochemicals Against Pancreatic Cancer Using Computational Approach

7. 量子化学计算方法探究沙棘植物化学物质对胰腺癌的抗癌潜力

Bhawana Yadav, Pranjal Singh, Kumud Pant, Pallavi Singh
Department of Biotechnology, Graphic Era Deemed to be University, Dehradun, 248002, Uttarakhand, India

芭瓦纳 · 亚达夫，普兰贾尔 · 辛格，库穆德 · 潘特，帕拉维 · 辛格
图形时代大学，生物技术系，德拉敦，248002，北阿坎德邦，印度

Pancreatic cancer is one of the lethal malignancies with poor treatment options and high drug resistance. Thus, it is crucial to establish non-surgical treatment methods for the effective treatment of pancreatic cancer. Therapeutic resistance is a constant problem and it is necessary to uncover the mechanisms of therapeutic resistance and seek new therapy strategies. Sea Buckthorn has been shown to possess anticancer activity due to its high phytochemical content in flavonoids, carotenoids, polyphenols, and essential fatty acids. These bioactive compounds are shown to exert their antitumor activities through a variety of mechanisms like inducing apoptosis, inhibiting cell proliferation, and modulating crucial signalling pathways responsible for the growth of a tumor. The genes responsible for pancreatic cancer were

胰腺癌是一种致死率高的恶性肿瘤，治疗选择有限且耐药性强。因此，建立有效的非手术治疗方法至关重要。治疗耐药是一个长期存在的问题，有必要揭示治疗耐药的机制，寻求新的治疗策略。沙棘因其富含黄酮类、类胡萝卜素、多酚及必需脂肪酸等植物化学成分而具有抗癌活性。这些生物活性化合物通过诱导细胞凋亡、抑制细胞增殖、调控肿瘤生长关键信号通路等多种机制发挥抗肿瘤作用。本研究通过 cBioPortal 平台分析二级数据确定胰腺癌相关靶基因，选用西藏沙棘的植物化学成分对主要致病基因进行筛选，

identified by analysing the secondary data available on cBioPortal. *Hippophae tibetana* phytochemicals were tested against some of the major genes that are accountable for pancreatic cancer. Additionally, these phytochemicals' pharmacokinetics, drug likeness and toxicity were assessed by ADMETlab 2.0 and ProTox 3.0. Molecular docking revealed 2 genes with high binding affinities (≤ -8.0 kcal/mol) against 3 phytochemicals present in *Hippohaetibetana*. Isorhamnetin and Kaempferol demonstrated favourable interactions against KRAS and JAK1 gene. ADMET analysis validated that these 2 compounds possessed drug-like properties. Further, MM-PBSA and MM-GBSA studies were conducted to validate the stable binding interactions. The promising binding properties of these compounds indicate potential therapeutic uses in pancreatic cancer. This research identifies the potential of phytochemicals found in *Hippophae tibetana* species as promising therapeutic molecules against pancreatic cancer.

并利用 ADMETlab 2.0 和 ProTox 3.0 评估其药代动力学特性、类药性及毒性。分子对接结果显示，西藏沙棘中的 3 种植物化学成分与 2 个靶基因具有高亲和力（结合能≤ −8.0 kcal/mol）。其中异鼠李素和山柰酚与 KRAS、JAK1 基因呈现良好相互作用。ADMET 分析证实这两种化合物具有类药性。此外，研究还通过 MM−PBSA（分子力学泊松 − 玻尔兹曼表面积法）和 MM−GBSA（分子力学广义玻恩表面积法）方法验证了稳定的结合相互作用。这些化合物展现的良好结合特性表明其在胰腺癌治疗中具有潜在应用价值。本研究揭示了西藏沙棘的植物化学成分作为抗胰腺癌治疗分子的潜力。

8.Effect of Different Temperature Regimes and Pretreatments on Seed Germination Behaviour of *Hippophae salicifolia* D. Don

8. 温度及预处理对柳叶沙棘（*Hippophae salicifolia* D. Don）种子萌发特性的影响

Ruchika, Ajay Hemdan, R.S. Chauhan and Ruchi
Department of Horticulture, Shree Guru Ram Rai University Dehradun, 248002

露琪卡，阿贾伊 · 赫姆丹，R.S. 乔汉，鲁奇
圣古鲁 · 拉姆 · 莱大学，园艺系，德拉敦，248002

Hippophae spp. (commonly known as Seabuckthorn) is a hardy deciduous shrub of family Elaeagnaceae, native to the temperate regions of Europe and Asia. H. salicifolia D. Don is a lesser explored high value medicinal species commonly grows as a medium to tall tree. It is one of the important wild plants of Uttarakhand Himalayas with

沙棘属（*Hippophae spp*.）是胡颓子科（Elaeagnaceae）的耐寒落叶灌木，原产于欧洲和亚洲温带地区。柳叶沙棘（H. salicifolia D. Don）形态通常为中大型乔木，作为高价值药用树种尚未被充分研究。该物种是北阿坎德

nutritious fruits which are having huge medicinal and pharmaceutical importance. The fruits of H. salicifolia are very rich in nutrients and other vital bio-synthetics or biologically active compounds. The present investigation was carried out to improve seed germination. We applied different chemicals GA3 (5mM, 10mM, 15mM, 20mM) KNO3 and thiourea (50 mM, 75 mM, 100 mM, 125 mM). Seeds were soaked for 24hr in different chemicals solutions of desired concentration at room temperature for 24h. Treated seeds placed in Petri plates containing moistened Whatman filter paper. Petri plates were kept at different temperature regimes (room, 20°C, 25°C and 30°C) in incubator and moistened as per need with distilled water. The experiment was carried out in Control Randomized Block Design with three replications. Various germination as well as growth parameters were observed and results indicated that among different treatments combinations T4U4, (temperature 30°C × thiourea @ 100 mM) was found effective in all seed germination parameters but negative effect of this temperature were seen on survival of seedlings therefore treatment combination T3U4, (temperature 25°C × thiourea @ 100 mM) was found more suitable for early germination (8.00 days), mean daily germination (0.85 per cent seeds/day), germination per cent (94.67).

邦喜马拉雅山区重要的野生植物之一，其果实营养丰富，具有显著的药用价值和制药潜力。柳叶沙棘的果实富含营养物质及其他重要的生物合成或生物活性成分。本研究旨在提高其种子发芽率，为此我们采用了不同的化学试剂处理，包括赤霉素 GA3（浓度分别为 5mM、10mM、15mM、20mM）、硝酸钾 KNO3 及硫脲（浓度分别为 50mM、75mM、100mM、125mM）。种子在室温下用不同浓度的化学试剂浸泡 24 小时，随后，置于装有湿润华特曼滤纸的培养皿中，于培养箱内在不同温度梯度（室温、20°C、25°C、30°C）下培养，并适时补充蒸馏水保持湿度。试验采用完全随机区组设计，设置三次生物学重复。对各项发芽及生长参数的观察结果显示，在不同处理组合中，T4U4 组合（30°C × 100mM 硫脲）的种子萌发参数表现最优，但该温度会对幼苗存活率产生负面影响。综合分析表明，T3U4 组合（25°C × 100mM 硫脲）为最佳处理方案，萌发启动时间为 8.00 天，平均日萌发率为 0.85%/ 天，最终萌发率达 94.67%。

9.Isolation and characterization of rhizospheric bacteria from Seabuckthorn (*Hippophae rhamnoides*) from high altitude of Uttarakhand

9. 北阿坎德邦高海拔地区沙棘 (*Hippophae rhamnoides*) 根际细菌的分离与鉴定

Anshuman Rawat, Manmohan Patel, Saloni Kunwar and Neha Pandey
Department of Biotechnology, Graphic Era (Deemed to be University), Dehradun, Uttarakhand

安舒曼 · 拉瓦特，曼莫汉 · 帕特尔，萨洛尼 · 昆瓦尔，内哈 · 潘迪
图形时代大学，生物技术系，德拉敦，北阿坎德邦

A plant with significant nutritional and therapeutic value, Seabuckthorn (*Hippophae rhamnoides*; Family- Elaeagnaceae; local name- Badri fal) is recognized for its abundance of bioactive substances, including vitamins, flavonoids, polyphenols, and vital fatty acids and possesses various health benefits and has the potential to cure diabetes and cardiovascular disorder. Seabuckthorn is a drought-resistant shrub flourishes in harsh environments as climate change is a major driver of biodiversity loss. Seabuckthorn's capacity to fix nitrogen and adapt to damaged areas makes it an essential component of soil conservation and environmental rehabilitation. Naturally occurring in cold, dry, high-altitude regions of Europe and Asia, it can endure temperatures as low as -43°C. In India, it is primarily found in high altitude of Indian Himalayan region (IHR) such as Uttarakhand, Himachal Pradesh, Sikkim, and Arunachal Pradesh. In the present study, microorganisms have been isolated from rhizospheric soil of seabuckthorn from Malla Khet Langasu, Chamoli District, Uttarakhand (Altitude:1209 m).Microbial community associated with the sea-buckthorn's rhizosphere plays an important impact on plant's health and soil fertility. Total 12 microorganisms have been isolated and purified using serial dilution along with spread plate method in three different media i.e. Nutrient Agar media (NAM), Potato Dextrose Agar (PDA), and Actinomycetes Isolation Agar

沙棘（*Hippophae rhamnoides*；胡颓子科；地方名：Badri fal）是一种具有重要营养和药用价值的植物，因其富含维生素、黄酮类化合物、多酚类物质、必需脂肪酸等生物活性成分而广受关注。该植物具有多种健康益处，在治疗糖尿病和心血管疾病方面具有潜力。作为耐旱灌木，沙棘能在气候变化的恶劣环境中茁壮成长，而气候变化正是生物多样性丧失的主要驱动因素之一。沙棘的固氮能力和在退化区域的适应性，使其成为土壤保持和环境修复的关键物种。沙棘自然生长于欧洲和亚洲高海拔寒冷干燥地区，可耐受 -43℃的低温。在印度，沙棘主要分布于印度喜马拉雅区域（IHR）的高海拔地区，如北阿坎德邦、喜马偕尔邦、锡金邦和阿鲁纳恰尔邦（注：我国藏南地区）。本研究从北阿坎德邦杰莫利县马拉凯特兰加苏地区（海拔 1209 米）采集的沙棘根际土壤中分离并纯化微生物。沙棘根际微生物群落对其植物健康和土壤肥力具有重要影响。研究采用稀释涂布平板法，在营养琼脂培养基（NAM）、马铃薯葡萄糖琼脂（PDA）和放线菌分离琼脂（AIA）

(AIA). Further, identification was done using Gram's staining and morphology was observed under the trinocular microscope. In addition, biochemical characterization such as siderophore production, IAA production, phosphate solubilization, and antagonistic properties of all 12 isolated microorganisms were performed. This study helps to know the role of microorganisms in survival of seabuckthorn under harsh climatic conditions caused due to climate change.

三种培养基中分离纯化得到了 12 株微生物。通过革兰氏染色和三目显微镜观察形态特征进行初步鉴定，同时进行了产铁载体、吲哚乙酸（IAA）合成、溶磷能力及拮抗特性等生化表征分析。本研究有助于了解气候变化引起的恶劣条件下，微生物在沙棘生存中的作用。

10.Impact of edaphic factors on the phytochemical and antioxidant potential of Seabuckthorn berries: A nutraceutical source

10. 土壤因子对沙棘浆果植化组分及抗氧化潜力的影响：一种营养保健品来源

Pranjali Bhatt, Amol Vasishth, I.D. Bhatt, Basant Singh
College of Forestry, V.C.S.G Uttarakhand University of Horticulture & Forestry, Ranichauri, 249199, Tehri Garhwal, UK, India

普兰贾莉 · 巴特，阿莫尔 · 瓦西斯，I.D. 巴特，巴桑特 · 辛格
V.C.S.G 北阿坎德邦园艺与林业大学，林学院，拉尼乔里，249199，泰赫里加瓦尔，UK（北阿康德州），印度

Seabuckthorn (*Hippophae salicifolia*; Family-Elaeagnaceae) is a wild edible fruit, known for its nutraceutical and pharmaceutical values. In this study, the influences of edaphic factors and solvents on the phytochemical and antioxidant potential of Seabuckthorn, collected from different locations of Uttarakhand were studied. The phytochemical (TPC, TFC, & TTC) and antioxidant (DPPH, ABTS, FRAP) potential of Seabuckthorn in various solvents (i.e., methanol, ethanol, acetone and distilled water) were measured spectrophotometrically. Results revealed that the TPC (9.064±0.097 mg GAE/g FW) and TFC (9.612±0.186 mg QE/g FW) content was significantly ($p<0.05$) higher in acetone solvent of the Malari site. In contrast, the highest TTC (5.605±0.125 mg TAE/g FW) content was recorded

沙棘（*Hippophae salicifolia*；胡颓子科）是一种野生的可食用水果，具有很高的营养保健和药用价值。本研究以采自印度北阿坎德邦不同地区的沙棘为材料，研究了土壤因子和溶剂对沙棘植化组分和抗氧化活性的影响。采用分光光度法测定沙棘在多种溶剂（甲醇、乙醇、丙酮和蒸馏水）中的植化成分（总酚含量、总黄酮含量和总单宁含量）及抗氧化潜力（DPPH 自由基清除能力、ABTS 自由基清除能力和铁离子还原能力 FRAP）。结果表明，在马拉里采样点的丙酮提取物的总酚含量（TPC）为

in the Bhimbali site and lowest was recorded in Jhelum site. Align with the TPC and TTC, the antioxidant potential in terms of DPPH (51.82±0.161 mg AAE/g FW), ABTS (30.555±1.535 mg AAE/g FW), and FRAP (17.499±0.032 mg AAE/g FW) was also found highest in acetone solvent of the Malari site. Overall, the influence of various edaphic factors (i.e., altitude, soil characteristics, & climate variability) significantly affects the phytochemical yield of Seabuckthorn berries. Identified sites with the highest phytochemical content can facilitate targeted harvesting, and their genetic material can be preserved for future research and conservation efforts.

9.064±0.097 mg GAE/g FW，总黄酮含量（TFC）为 9.612±0.186 mg GAE/g FW，二者均显著高于其他处理（$p<0.05$）。相比之下，总单宁含量（TTC）最高值出现在宾巴利采样点，为 5.605±0.125 mg GAE/g FW，最低值则出现在杰赫勒姆采样点。与总酚含量（TPC）和总单宁含量（TTC）的结果一致，马拉里采样点的丙酮提取物在抗氧化潜力方面也表现出最高值，具体为 DPPH 自由基清除能力为 51.82±0.161 mg AAE/g FW、ABTS 自由基清除能力为 30.555±1.535 mg AAE/g FW 和 FRAP 铁离子还原能力为 17.499±0.032 mg AAE/g FW。总体而言，各种土壤因子（海拔高度、土壤特性和气候变异性）的影响显著影响了沙棘浆果的植化组分的含量。已确定的植化成分含量最高的地点有助于开展针对性采收，其遗传物质可用于未来的研究和保护工作。

11.*H. salicifolia* D. Don: An endangered, medicinal plant of Uttarakhand.

11. 柳叶沙棘 (*H. salicifolia* D. Don): 北阿坎德邦的一种濒危药用植物

Jaya Bisht and B.P. Chamola
Department of Forestry and Natural Resources, H.N.B Garhwal University, Srinagar

贾亚·比什特， B.P. 查莫拉
H.N.B. 加尔瓦尔大学，林业与自然资源系，斯利那加

The natural propagation of *Hippophae salicifolia* is limited due to its dioecious nature. In situ conservation of this elite species is challenging, as it predominantly occurs in the Himalayan region at elevations of up to 1,500-3800 m asl, posing significant barriers to its preservation in its native habitat. To address these challenges, ex situ conservationefforts have been undertaken through inoculation with arbuscular mycorrhizal fungi (AMF) and Air-layering to enhance growth and improve survival rates. Arbuscularmycorrhizal fungi (AMF) play a crucial role in enhancing plant growth and survival by improving nutrient uptake and promoting root development. This study investigates the effects of two AMF species, Glomus macrocarpum and Glomus fasciculatum, on the growth and survival of Hippophae salicifolia (Seabuckthorn). Seedlings inoculated with AMF exhibited significant improvements in key growth parameters, including root length 10.04±0.507, shoot height 14.06±1.105, and number of leaves 14.4±0.547, compared to non-inoculated control treatments. Among the AMF treatments, Glomus macrocarpum demonstrated superior performance, yielding higher mean values across all measured parameters than Glomus fasciculatum. Air-layering propagation without the use of PGR's have also shown the highest roots 2.42±0.651 in monsoon season as compared to spring season. These findings highlight the potential of AMF inoculation as an effective strategy to enhance the

柳叶沙棘的自然繁殖因其雌雄异株特性而受到限制。这一优良物种的就地保护颇具挑战性，因其主要分布于喜马拉雅地区海拔 1500 – 3800 米处，显著影响了对其原生栖息地的保护。为应对这些挑战，已通过接种丛枝菌根真菌（Arbuscular Mycorrhizal Fungi, AMF）和空中压条进行迁地保护，以促进其生长并提高存活率。丛枝菌根真菌（AMF）通过改善养分吸收和促进根系发育，在增强植物生长和存活方面发挥关键作用。本研究探讨了大果球囊霉（Glomus macrocarpum）和聚生球囊霉（Glomus fasciculatum）两种 AMF 对沙棘生长和存活的影响。与未接种的对照组相比，接种 AMF 的幼苗的关键生长参数均显著改善，包括根长 10.04 ± 0.507 cm、株高 14.06 ± 1.105 cm 和叶片数 14.4 ± 0.547 片。AMF 处理中，大果球囊霉（Glomus macrocarpum）性能优异，所有测量参数的平均值均高于聚生球囊霉（Glomus fasciculatum）。此外，未使用植物生长调节剂（PGR）的空中压条繁殖法在季风季节

establishment and growth of Hippophae salicifolia, with implications for ecological restoration and cultivation. These methods provide a viable strategy for the conservation and sustainable management of *Hippophae salicifolia*.

也具有最高的生根数（2.42 ± 0.651 条），优于春季。这些研究结果指出了接种 AMF 作为增强柳叶沙棘定植和生长的有效策略潜力，对生态恢复和人工栽培具有重要意义。这些方法为柳叶沙棘的保护和可持续管理提供了可行的策略。

12. National Conference of Seabuckthorn held on March 5-6, 2025 held at Graphic Era University, Dehradun, Uttarakhand, India

12. 全国沙棘大会于 2025 年 3 月 5 日至 6 日在图形时代大学举行，德拉敦，北阿坎德邦，印度

A 2-day 4th National Conference on Seabuckthorn was inaugurated by Dr Dhananjai Mohan, Principal Chief Conservator of Forest, Uttarakhand state at Graphic Era University, Dehradun, Uttarakhand, India. Others present were Dr. Narpinder Singh, Vice Chancellor of Graphic Era Deemed University, Dr Madhu Bala, Vice President of Seabuckthorn Association of India and Prof Virendra Singh Secretary, Seabuckthorn Association of India,. Over 100 seabuckthorn experts, officials of various agencies, farmers and several industries participated in the conference. Industries displayed over 80 seabuckthorn foods, cosmetics and oil capsules during the conference. The Experts have emphasised promoting the cultivation of Seabuckthorn (Badri Fruit) to improve the environment and boost the economy of Himalayan regions. Dr. Dhananjai Mohan told that seabuckthorn will be planted as priority species in high altitude areas of Uttarakhand state. The book on “Seabuckthorn-A Multipurpose Himalayan Berry” edited by Dr. Virendra Singh, was also released by the guests at the occasion.

第四届全国沙棘会议于印度北阿坎德邦德拉敦图形时代大学召开，会议为期两天。会议由北阿坎德邦首席森林保护官 Dhananjai Mohan 博士主持。与会嘉宾包括：图形时代大学副校长 Narpinder Singh 博士，印度沙棘协会副主席 Madhu Bala 博士以及印度沙棘协会秘书长 Virendra Singh 教授。逾百名沙棘领域专家、政府机构代表、农户及企业界人士参与本次会议。会议期间企业展示了 80 余种沙棘食品、化妆品及沙棘油胶囊产品。专家强调需推广沙棘（Badri 果）种植以改善喜马拉雅地区生态环境并促进区域经济发展。Dhananjai Mohan 博士表示沙棘将列为北阿坎德邦高海拔地区优先种植物种。会议现场发布了由 Virendra Singh 教授主编的学术著作《沙棘 – 喜马拉雅地区多功能浆果》。

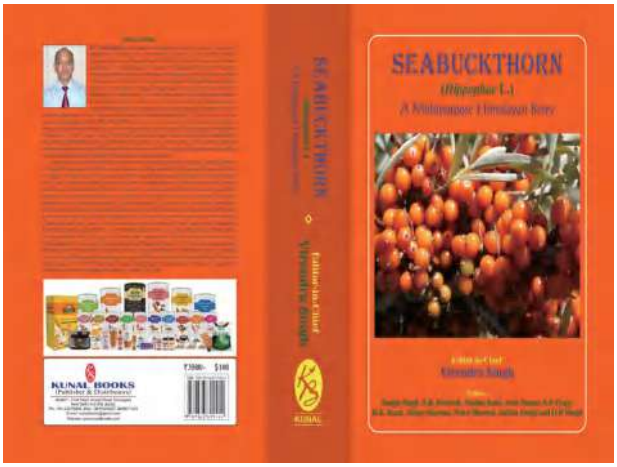


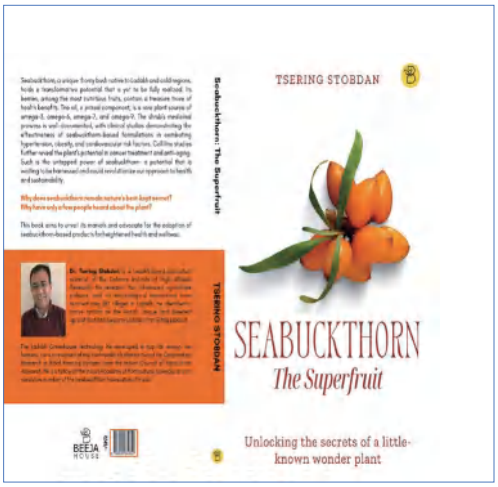



4th National Conference of Seabuckthorn, March 5–6, 2025, GEU, Dehradun.
第四届全国沙棘会议，2025 年 3 月 5–6 日，图形时代大学，德拉敦

13. Books on seabuckthorn published in India

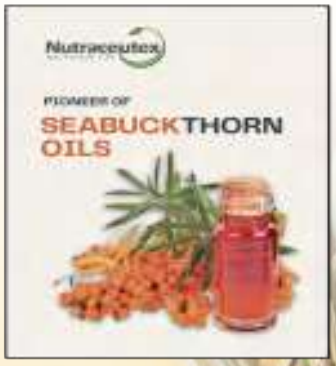
13. 印度出版的沙棘专著





14. Some of companies on Seabuckthorn, India

14. 印度沙棘产业的相关企业



4. Country Report of Mongolian

蒙古沙棘发展报告

Country Report of Mongolian Seabuckthorn Development Year 2024

2024 年蒙古沙棘发展国家报告

Mongolian National Association of Fruit and Berries (MNAFB)
蒙古国家水果和浆果协会（MNAFB）

1.The nationwide seabuckthorn resources of plantations and berry yield.

1.1.The total area of seabuckthorn resources up to the year 2024, including the natural stands and the artificial plantations, and the increased areas in the year 2024.

As of 2024, Mongolia's seabuckthorn resource comprises 14,367.7 hectares of natural stands and 6,550.4 hectares of cultivated orchards, distributed across 22 aimags. Within the country's 11,110.6 ha of fruit-and-berry plantings overall, seabuckthorn orchards account for 6,550.4 ha, with the remaining 4,560.2 ha planted to pome fruits (apple, pear), stone fruits (plum, cherry, peach), and other berries.

Natural stands are concentrated along major river basins and in the west–north of the country, with the largest extents in Uvs (5,183.7 ha), Zavkhan (4,575.9 ha), Selenge (2,216.0 ha), and Khovd (1,171.8 ha), and smaller tracts in Bayan-Ölgii (857.5 ha), Bulgan (309.5 ha), and Govi-Altai (53.3 ha). Cultivated orchards are broadly distributed nationwide, with larger areas in Selenge (967.1 ha), Töv (877.2 ha), Övörkhangai (827.0 ha), Uvs (744.3 ha), Bulgan (725.9 ha), Ulaanbaatar (695.6 ha), and Khovd (513.4 ha). Most fruit and berry plantings are rainfed (93.8%), with 6.2% under irrigation. The aimag-by-aimag breakdown appears in the table below.

一、全国沙棘人工林资源及浆果产量

（一）截至 2024 年沙棘资源总面积

截至 2025 年，蒙古国的沙棘资源包括 14367.7 公顷的天然林和 6550.4 公顷的栽培果园，分布在 22 个省。在全国 11110.6 公顷的水果和浆果种植面积中，沙棘果园占 6550.4 公顷，其余 4560.2 公顷种植柚子（苹果、梨）、核果（李子、樱桃、桃）和其他浆果。

天然林分集中在主要河流流域和该国西北部，面积最大的是 Uvs（5183.7 公顷）、Zavkhan（4575.9 公顷）、Selenge（2216.0 公顷）和 Khovd（1171.8 公顷），以及 Bayan-Ölgii（857.5 公顷）、Bulgan（309.5 公顷）和 Govi-Altai（53.3 公顷）的较小区域。栽培果园广泛分布于全国各地，面积较大的有 Selenge（967.1 公顷），Töv（877.2 公顷），Övörkhangai（827.0 公顷），Uvs（744.3 公顷），Bulgan（725.9 公顷），Ulaanbaatar（695.6 公顷）和 Khovd（513.4 公顷）。全国 93.8% 水果和浆果种植是雨养的，6.2% 采用灌溉种植。下表列出了各省的具体分布情况。

Table 1. Total area of Mongolia’s natural and cultivated seabuckthorn (as of 2024)
表 1：蒙古国天然和栽培沙棘总面积（截至 2024 年）

№	Aimag 省	Area (ha) 面积（公顷）	
		Cultivated seabuckthorn 人工林	Natural seabuckthorn 天然林
1	Arkhangai	42.1	
2	Bayan-Ölgii	93.5	857.5
3	Bayankhongor	204.5	
4	Bulgan	725.9	309.5
5	Govi-Altai	92.9	53.3
6	Govis ü mber	2.9	
7	Darkhan-Uul	164	
8	Dornogovi	14.1	
9	Dornod	93.4	
10	Dundgovi	8.8	
11	Zavkhan	132.2	4575.9
12	Orkhon	142.2	
13	Övörkhangai	827	
14	Ömnögovi	31	
15	S ü khbaatar	34.1	
16	Selenge	967.1	2216.0
17	Töv	877.2	
18	Uvs	744.3	5183.7
19	Ulaanbaatar	695.6	
20	Khovd	513.4	1171.8
21	Khövsgöl	97	
22	Khentii	47.2	
	Total area 总面积	6550.4	14367.7

1.2.The harvest and the estimated amounts of total production of seabuckthorn berries in your country in 2024.

（二）2024 年全国沙棘浆果的收获量和估计总产量。

As of 2024, approximately 3495,3 tons of seabuckthorn berries were harvested.

2024 年，共收获约 3495.3 吨沙棘浆果。

Table 2. Share in total harvest, 2024
表 2：2024 年蒙古各区域沙棘采收份额

	Western 西部地区	Central 中部地区	Mountain 山区	Eastern 东部地区	Gobi region 戈壁地区
Share of total harvest 总采收量占百分比	60.13	11.55	23.44	4.07	0.8

Source: MoFALI, 2024 数据来源：蒙古农业与林业部（MoFALI，2024）

Going forward, because seabuckthorn resources can be used more efficiently through innovation, the “Mongolian National Association of Fruit and Berries” (MNAFB) is working to scale up training in Good Agricultural Practices for “fruit-farming entrepreneurs” nationwide.

展望未来，由于可以通过创新更有效地利用沙棘资源，因此“蒙古国家水果和浆果协会”（MNAFB）正在努力扩大对全国“果农企业家”的良好农业实践培训的规模。

1.3. A brief introduction of the main seabuckthorn plantations in your country.

（三）蒙古国主要的沙棘种植园简介

According to the results of the 2024 national consolidated report of the Unified Land Fund, the total planted area of fruits and berries is 11,110.6 ha, which is 0.82% of the total agricultural cultivated land. Of the fruit-growing area, 93.8% is rainfed and 6.2% is irrigated. (Table 3)

根据统一土地基金 2024 年国家综合报告的结果，水果和浆果的种植总面积为 11110.6 公顷，占农业耕地总量的 0.82%。在水果种植面积中，93.8% 为雨养种植区的，6.2% 为灌溉种植区。（见表 3）

Table 3. Total area planted with fruits and berries in Mongolia, 2024
表 3：2024 年蒙古水果和浆果种植总面积

№	Agricultural zone 农业分区	Aimag 省	Irrigated fruit area (ha) 灌溉果园面积（公顷）	Non-irrigated fruit area (ha) 无灌溉果园面积（公顷）
1	Western 西部区	Bayan-Ölgii	0.9	38.1
2		Govi-Altai	12.4	1644.3
3		Zavkhan	0.5	98.6
4		Uvs	145.9	1004.3
5		Khovd	68.4	715.9
		Subtotal	228.1	3501.2
6	Central 中部区	Arkhangai		131.8
7		Bayankhongor	4.7	268.6
8		Övörkhangai	1.1	2273.9
9		Töv	6.1	447.8
10		Ulaanbaatar	44.3	1493.0
		Subtotal	56.2	4615.1
11	Mountain 山区	Bulgan	10.0	159.2
12		Orkhon		27.6
13		Darkhan-Uul		535.5
14		Selenge	59.5	489.7
15		Khövsgöl	325.5	2.0
		Subtotal	395.0	1214.0
16	Eastern 东部区	Dornod	4.0	55.0
17		Khentii	1.0	476.9
18		S ü khbaatar	0.3	24.9
		Subtotal	5.3	556.8
19	Gobi 戈壁区	Dundgovi		220.0
20		Ömnögovi	0.5	20.4
21		Dornogovi	4.8	21.0
22		Govis ü mber		272.2
		Subtotal	5.3	533.6
Total 合计			689.9	10420.7

Source: Unified Land Fund, National Consolidated Report, 2024
数据来源：统一土地基金 2024 年国家综合报告

2.THE GENETIC RESOURCES OF SEABUCKTHORN IN YOUR COUNTRY

2.1 Introduction of natural seabuckthorn species and subspecies of Hippophae.

In Mongolia, natural seabuckthorn (*Hippophae rhamnoides*) occurs from floodplains and meadow–steppe transition zones to continental high-mountain environments, especially along the Orkhon–Selenge system and western basins (e.g., Ider, Tes, Khovd, Buyant, Bulgan, Bukhmoerön). Earlier national estimates put the natural area at ~21.1 thousand ha; updated survey results indicate ~14.3 thousand ha.

Within *H. rhamnoides*, the Mongolian subspecies (*H. rhamnoides subsp. mongolica*) is recognized as native to Mongolia. It is widespread in floodplains, river valleys, and adjoining mountain systems, and also occurs in taiga, forest–steppe, and Gobi–desert zones. Typical elevation is 1,200–1,800 m a.s.l. Principal centers of distribution are river systems originating in the Khentii/Khantai and Khangai ranges and draining toward the Great Lakes Depression, with additional populations in transboundary valleys to the west and southwest.

Subspecies and distributions (after Panteleeva, 2006):

1.Riverside greenish seabuckthorn (*Hippophae rhamnoides L. ssp. fluviatilis v.soest*)

2.Carpathian greenish seabuckthorn (*H.rhamnoides L. ssp. Carpatica* Rousi). Distribution: the Carpathians; the lower part of the Danube River.

3.Caucasian greenish seabuckthorn (*H.rhamnoides L. ssp Caucasian*). Distribution: the Caucasus, Turkey, Iran.

二、蒙古国沙棘的遗传资源

（一）天然沙棘种类和沙棘亚种的介绍

在蒙古，天然沙棘（沙棘）分布范围从洪泛平原和草甸 – 草原过渡带到大陆高山环境，特别是沿着鄂尔浑 – 硒热系统和西部盆地广泛分布（例如，Ider, Tes, Khovd, Buyant, Bulgan, Bukhmoerön）。早期的国家统计数据估计其自然面积约为 21.1 万公顷；最新调查结果显示约 1.43 万公顷。

在沙棘属中，蒙古沙棘亚种（*H.rhamnoides subsp.mongolica*）被认为是蒙古的本地原生种。它广泛分布于洪泛平原、河谷和毗邻的山地系统，也出现在针叶林、森林草原和戈壁沙漠地带。典型海拔高度为 1200–1800 米。主要分布中心是发源于肯蒂 / 坎泰和坎盖山脉的河流系统，流向大湖区洼地，西部和西南部的跨界山谷中也有分布。

根据 2006 年 Panteleeva 的沙棘亚种分类和地理分布：

（1）溪生沙棘 (*Hippophae rhamnoides L. ssp. fluviatilis v.soest*)

（2）喀尔巴阡山沙棘（*H.rhamnoides L.ssp. Carpatica* Rousi），分布在喀尔巴阡山脉；多瑙河的下游。

（3）高加索沙棘（*H.rhamnoides L.ssp Caucasia*），分布：高加索、土耳其、伊朗。

4.Turkestani greenish seabuckthorn (*Hippophae rhamnoides L.ssp. Turkestanica* Rousi). Distribution: Kyrgyzstan, Tajikistan, Western Himalaya, Hindu Kush.

5.Mongolian greenish seabuckthorn (*Hippophae rhamnoides L.ssp. Mongolica* Rousi). Distribution: MONGOLIA, Tuva, Buryatia, Altai Republic.

6.Chinese greenish seabuckthorn (*Hippophae rhamnoides L.ssp. Sinensis* Rousi). Distribution: China, the western part of Inner Mongolia.

7.Yunnan greenish seabuckthorn (*Hippophae rhamnoides L.ssp. Yunnansis* Rousi). Distribution: Southeastern Tibet, Yunnan, Sichuan.

8.Zhangden greenish seabuckthorn (*Hippophae rhamnoides L.ssp. guantsensis* Rousi). Distribution: Zhangden

9.Mongolian greenish seabuckthorn (*Hippophae rhamnoides L.ssp.mongolica* Rousi). Distribution: along the river basins in Mongolia listed above

2.2. Names of newly bred seabuckthorn varieties and introduced cultivars from other countries and their performance, including morphological/biochemical features.

Seabuckthorn cultivation has expanded across Mongolia's ecological zones through the introduction of foreign cultivars and local selection under Mongolian conditions. Trials focused on agronomic suitability (cold/drought tolerance, bearing stability) and economic efficiency (yield, processing quality).

（4）中亚沙棘（*Hippophae rhamnoides L.ssp.Turkestanica* Rousi），地理分布：吉尔吉斯斯坦、塔吉克斯坦、西喜马拉雅山、兴都库什山。

（5）蒙古沙棘(*Hippophae rhamnoides L.ssp. Mongolica* Rousi)，地理分布：蒙古、图瓦、布里亚特、阿尔泰共和国。

（6）中国沙棘(*Hippophae rhamnoides L.ssp. Sinensis* Rousi)，地理分布：中国、内蒙古西部。

（7）云南沙棘(*Hippophae rhamnoides L.ssp. Junnansis* Rousi)，地理分布：中国西藏东南部、云南、四川。

（8）江孜沙棘(*Hippophae rhamnoides L.ssp. guantsensis* Rousi)，地理分布：中国西藏

（二）新培育的沙棘品种和从其他国家引进的品种的名称及其表现，包括形态 / 生化特征。

通过引进外国品种并在蒙古本土条件下进行当地选育，沙棘种植已扩展至蒙古各个生态区。试验侧重于考察农艺适宜性（耐寒 / 耐旱，生育稳定性）和经济效益（产量，加工质量）。

Table 2. Seabuckthorn cultivars (2024)
引进的沙棘品种介绍（到 2024 年）

№	Cultivar 品种名称	Sugars (%) 糖度	Acidity (%) 酸度	Oil (%) 含油率	Vitamin C (mg/100 g) VC 含量	Carotene (mg/100 g) 胡萝卜素	Yield (t/ha) 产量
1	**Maslichnaya** (*Масличная*)	4,0	1,5	5,7	64	10,6	19,0
2	**Dar-Katuni** (*Дар-Катуни*)	5,3	1,6	6,9	66	13,0	
3	**Zolotoy Pochatok** (*Золотой Початок*)	4,8	1,5	7,1	68	12,8	20,0
4	**Vitaminnaya** (*Витаминная*)	4,6	1,6	5,9	125	13,0	
5	**Ayaganga** (*Аяганга*)	9,5	2,0	5,6	180	4,6	
6	**Sayana** (*Саяна*)	8,3		3,6	194	3,7	
7	**Obilnaya** (*Обильная*)	4,9	1,4	4,9	140	4,5	14,0
8	**Chuyskaya** (*Чуйская*)	6,4	1,7	6,2	134	13,7	18,0
9	**Chechek** (*Чечек*)	7,8	1,3	7,8	157	24,7	15,1
10	**Inya** (*Инья*)	5,2	1,7	4,0	80	25,0	14,9
11	**Elizabeta** (*Елизавета*)	10,0	1,3	4,8	71	19,0	12,7
12	**Altayskaya** (*Алтайская*)	9,7	1,1	7,0	98	18,0	13,0
13	Djemovaya (Джемовая)	7,6	1,0	8,0	154	29,3	7,5
14	**Tenga** (*Теньга*)	7,0	1,5	4,9	110	21,0	13,0
15	**Velikan** (*Великан*)	6,6			157	3,1 мг/%	13,0
16	**Novost Altaya** (*Новость-Алтая*)	5,4	1,6	5,5	50	4,3 мг/%	13,0
17	Oranzhevaya (Оранжевая)	5,4	1,2	6,0	330 мг/%	4,3 мг/%	17,1
18	**Lyubimaya** (*Любимая*)	7,2	0,8	5,0	138	15,2	13,9

3.Enterprises and processing

3.1. In the year 2024, the number of seabuckthorn enterprises, the gross output, and the total value of seabuckthorn products in your country.
This was blank.

3.2. A brief introduction to the main enterprises and their main products of seabuckthorn.

The table below lists the main seabuckthorn enterprises active in 2023 and their principal product lines (oils, juices/concentrates, jams/confections, teas/infusions, fermented beverages, dairy-based products, cosmetics). The list is representative, not exhaustive; entries reflect verified processors with market presence. Company names and product descriptors are shown as submitted.

三、企业及加工

（一）2024 年，贵国沙棘企业数量、总产量和沙棘产品总价值。

无。

（二）沙棘的主要企业及其核心产品简介。
下表列出了活跃的沙棘企业及其主要产品线（油、果汁 / 浓缩液、果酱 / 糖果、茶 / 花草茶、发酵饮料、乳制品、化妆品）。该表具有代表性，但并非详尽；所列企业均为经核实并且具有市场占有率的加工企业。公司名称和产品以提交内容为准。

序号	Companies 公司名称	Products 产品名称
1	Uvs Khuns JSC	Pure seabuckthorn oil 纯沙棘油 Seabuckthorn seed oil (CO_2 extraction) 沙棘籽油（CO_2 萃取） Concentrated seabuckthorn juice 浓缩沙棘汁 Seabuckthorn jam 沙棘果酱 Seabuckthorn chocolate 沙棘巧克力 Seabuckthorn candy 沙棘糖果 Seabuckthorn biscuits/cookies (baked goods) 沙棘饼干 / 曲奇（烘焙食品） Seabuckthorn tea blend (tea preparation) 沙棘茶饮（茶饮配方）
2	Shar Doctor LLC	Seabuckthorn juice 沙棘汁 Seabuckthorn oil 沙棘油
3	Khaan Jims LLC	Seabuckthorn extract (essence) 沙棘提取物（精华） Seabuckthorn oil 沙棘油 Seabuckthorn pur é e 沙棘果泥
4	Eco Erdene LLC	Seabuckthorn juice 沙棘汁 Seabuckthorn jam 沙棘果酱
5	Eden LLC	□ Concentrated seabuckthorn juice 浓缩沙棘汁
6	Monos Khuns JSC	Seabuckthorn oil 沙棘油 Seabuckthorn beverage 沙棘饮料 Instant seabuckthorn tea 速溶沙棘茶 Seabuckthorn leaf tea 沙棘叶茶 BIOMON / MOIL brand cosmetics BIOMON/MOIL 牌化妆品
7	TESO LLC	Seabuckthorn pellets (fruit candies) 沙棘糖豆（果味糖果） Seabuckthorn curd-based drink 沙棘凝乳饮料 Seabuckthorn dried curd 沙棘干凝乳 Seabuckthorn ice cream 沙棘冰淇淋 Dried seabuckthorn 沙棘干
8	Tses Khairkhan LLC	Seabuckthorn sparkling wine 沙棘起泡酒 Seabuckthorn wine 沙棘果酒
9	Zavkhan Bayalag LLC	Concentrated seabuckthorn juice 浓缩沙棘汁 Seabuckthorn jam 沙棘果酱
10	Vitafit	□ Concentrated seabuckthorn juice 浓缩沙棘汁
11	Us-Erdene LLC	Seabuckthorn oil 沙棘油 Seabuckthorn juice 沙棘汁 Seabuckthorn jam 沙棘果酱 Seabuckthorn tea 沙棘茶
12	Khatny Ulaan LLC	Seabuckthorn oil 沙棘油 Seabuckthorn juice 沙棘汁 Seabuckthorn tea 沙棘茶
13	Jiguur Bogd LLC	Seabuckthorn oil 沙棘油 Seabuckthorn juice 沙棘汁

4.Scientific research

四、科学研究

4.1.The status of seabuckthorn scientific institutions in your country in terms of the number of institutes and their scientists, and their research field.

（一）全国沙棘科研机构的数量、科研人员规模及其研究领域的现状。

Mongolia's seabuckthorn R&D is anchored in a small set of university-based units and public research institutes, complemented by private research groups. Work spans natural-stand ecology, agronomy of cultivated orchards, product/compound chemistry, harvesting equipment, and cluster development. Based on the entries below, there are at least 19 named researchers directly engaged across the listed units (institutional HR totals may be higher; national aggregation is not yet consolidated).

蒙古国的沙棘研发工作由一小部分以大学附属单位和公共研究机构进行，并辅以私营研究团队。研究领域涵盖自然林生态学、栽培果园农学、产品 / 化合物化学、采收设备和产业集群开发。根据以下数据统计，至少有 19 名被提名的研究人员直接参与了各单位工作（机构总人数可能更高；全国数据汇总尚未完成）。

4.2.A brief introduction of main research institutes/universities and enterprises, the main research programs and updated achievements on seabuckthorn.

№	Institution 机构名称	Research focus 研究领域	Researchers 研究人员
1	Mongolian University of Life Sciences (MULS) — Dept. of Plant Science 蒙古生命科学大学（MULS）植物科学系	Natural seabuckthorn; cultivated sea-buckthorn; fruit & vegetable agronomy 天然沙棘；栽培沙棘；果蔬农学	BSc. 15 MSc. 4 PhD 7
2	National University of Mongolia (NUM) — School of Chemistry & Chemical Engineering 蒙古国立大学（NUM）——化学与化工学院	Laboratory research (compounds/ processing) 实验室研究（化合物 / 加工）	2
3	Plant & Crop Research Institute (Darkhan) — Fruit & Berry Sector 植物与作物研究所（Darkhan）——水果与浆果部门	Fruit/berry research; seabuckthorn studies 水果 / 浆果研究；沙棘研究	5
4	NUM — Institute of Economics NUM- 经济研究所	Advisory & training for Seabuckthorn Cluster Initiative 沙棘产业集群发展咨询与培训	2
5	Mongolian Univ. of Science & Technology (MUST) — School of Technology 蒙古科技大学（MUST）——技术学院	Harvesting equipment; experimental trials 采收设备；实验性试验	5

In addition, under the Mongolian National Association of Fruit and Berries (MNAFB), there is a “Professor Research Team” dedicated to genetic resources of high-performing plants and to cluster development.

此外，蒙古国家水果和浆果协会（MNAFB）下设“教授研究团队”，致力于高产作物的遗传资源和集群发展研究。

5.Human resources

五、人力资源

The total personnel involved in seabuckthorn research, manufacturing, marketing planting, public management, etc. in your country

（一）全国从事沙棘研究、生产、营销种植、公共管理等的人员

Mongolia’s seabuckthorn value chain involves actors from the public sector, private processors and growers, universities and research institutes, NGOs, and international projects. However, there is no consolidated national census of personnel by function (research, cultivation/harvest, processing/QA, marketing, public administration, training).

蒙古的沙棘产业链涉及公共部门、私营加工企业和种植户、大学和研究机构、非政府组织以及国际合作项目等多方参与者。但是，没有按职能（研究、培养 / 收获、加工 / 质量保证、营销、公共管理、培训）对人员进行统一的全国人口普查。

To coordinate stakeholders and partially bridge this data gap, the Seabuckthorn Cluster Initiative was launched in 2015 by the Ministry of Food, Agriculture and Light Industry (MoFALI) together with the Mongolian National Association of Fruit and Berries (MNAFB). As of 2020, the Initiative included 19 organizations and institutions spanning policy bodies, universities/research units, processors, and cultivation enterprises.

为了协调利益相关者并填补这一数据空白，粮食、农业和轻工业部（MoFALI）与蒙古国家水果和浆果协会（MNAFB）于 2015 年共同发起了沙棘产业集群倡议。截至 2020 年，该倡议已汇聚了包括 19 个组织和机构，涵盖政策机构、大学 / 研究单位、加工者和种植企业。

The member list below serves as a proxy for engaged entities along the chain. A dedicated HR census (with standardized role categories and FTE counts) has not yet been conducted; this remains a priority for sector planning and capacity development.

下表中的成员机构是整条产业链上参与主体的代理。目前尚未进行具有标准化的岗位分类和全职员工统计的人力资源普查；这仍然是行业规划和能力建设的重点工作。

№	Organization 机构名称	Activity area 工作领域
1	Ministry of Food, Agriculture and Light Industry (MOFALI)	Policy, regulation 政策，监管
2	Mongolian National Association of Fruit and Berries (MNAFB)	Sectoral professional association 行业专业协会
3	National University of Mongolia, Institute of Economics	Training and research institution 培训和研究机构
4	Khaan Jims	Processing enterprise 加工企业
5	Uvs Khuns	Cultivation; processing enterprise 种植；加工企业
6	Shar Doctor	Processing enterprise 加工企业
7	Eco-Erdene	Processing enterprise 加工企业
8	UFC Trade	Processing enterprise 加工企业
9	Eden	Processing enterprise 加工企业
10	Vitafit Invest	Processing enterprise 加工企业
11	Monos Khuns	Processing enterprise 加工企业
12	TESO	Processing enterprise 加工企业
13	Mongolian University of Science and Technology, School of Energy and Industrial Technology	Scientific research institution 科研机构
14	Mongolian University of Science and Technology, Transport and Technology School	Training and research institution 培训和研究机构
15	Mongolian University of Life Sciences, School of Agricultural Economics	Training and research institution 培训和研究机构
16	Mongolian University of Life Sciences, Plant & Agricultural Research Institute	Scientific research institution 科研机构
17	Kharkhorin JSC	Cultivation 种植
18	Polivit	Cultivation 种植
19	Bayamb ü rd Nogoon Tögöl	Cultivation 种植

5.2. The members of National Seabuckthorn Association if provided, including institutional and individual members.

（二）国家沙棘协会的成员（如有），包括机构成员和个人成员。

The Mongolian National Association of Fruit and Berries (MNAFB)—previously the National Association of Seabuckthorn Growers and Producers (2007–2015)—maintains close cooperation with MoFALI and MULS. As of 2023, the Association comprises 90 individual members and 73 institutional members and operates two internal teams: a Fruit & Crops Research Team and a Seabuckthorn Cluster Initiative Team.

蒙古国家水果和浆果协会（MNAFB）– 前身是国家沙棘种植和生产者协会（2007–2015）– 与 MoFALI 和 MULS 保持密切合作。截至 2024 年，该协会由 90 名个人成员和 73 名机构成员组成，并拥有两个内部团队：水果与作物研究团队和沙棘产业集群倡议团队。

From 2012–2022, MNAFB implemented a facilitator-guided business model; public awareness of the Association's activities increased during this period, supported by project/program funding (100%). In 2020, the First Seabuckthorn Cluster Forum provided a platform that strengthened cooperation, collective action, and mutual understanding among stakeholders.

从 2012 年到 2022 年，MNAFB 实施了一种由协调员引导的商业模式；在此期间，在项目或计划资金的全力支持下，公众对协会活动的认识显著提升。2020 年，首届沙棘产业集群论坛搭建了加强合作、凝聚共识、增进理解的交流平台。

D. Nasanjargal
President, MNAFB

Chair of the Board
理事会主席

Board members
理事会成员

Ch. Avdai
Academician

P. Uchral
Member of the Governing Council, ISA

M. Bayanjargal
Senior specialist, MoFALI

G. Chimed-Ochir
Dean/Director, School of Transport Management, MUST, PhD

Kh. Tsevelmaa
Director, Economic Institute of the NUM, PhD, Professor at the Department of Economics, NUM

D. Khandsuren
Professor, MULS, PhD

Board members
理事会成员

D. Enebish
Member of the Board
(МБОХХ), PhD

B. Battumur
Head of Sector, Institute for
Plant & Agriculture, PhD

Z. Tsetsegzuvd
Director of Strategy,
Planning & Innovation,
Uvs Khuns JSC

Ch. Khurelbaatar
Director, Eden LLC

O. Misheel
Director, Eco-Erdene LLC

Ts. Sukhbaatar
Director, Bayamb ü rd
Nogoon T*ö*g*ö*l LLC

6.Introduction of important activities, key events, successful stories and advanced persons together with good photos in your country in the year of 2024 and 2025.

In 2024, Mongolia celebrated the **70th Anniversary of the Scientific Establishment of the Fruit and Berry Sector. On this occasion, our Association under**took numerous activities to review achievements and challenges in the sector, define future directions for development, and promote the expansion of Seabuckthorn exports through the application of Good Agricultural Practices (GAP). At the same time, we actively contributed to international cooperation by discussing pressing issues of sea buckthorn cultivation and seeking viable solutions.

1.National Training and Discussion on GAP

- On **16 April 2024,** in collaboration with the School of Agroecology at the Mongolian University of Life Sciences (MULS), we organized a training and discussion event titled *"Implementation of Good Agricultural Practices (GAP) in Fruit and Berry Cultivation."*

- **Over 70 participants** attended, including representatives from state authorities of Ulaanbaatar and 8 provinces, professors and researchers from MULS, members of the MNAFB, branch leaders, partner organizations, and growers. The event provided a valuable platform for sharing knowledge, experiences, and solutions to improve economic efficiency and food safety in fruit and berry production.

2.Participation in the European Regional Meeting of ISA

- On **27–28 August 2024,** in Pruszków, Poland, our Vice President Mr. P. Uchral represented Mongolia at the 6th European Sea Buckthorn Meeting & Seminar organized by ISA.
oHe was elected as a member of the ISA Executive Board during this event.

六、2024 年蒙古国的重要活动、关键事件、成功故事和先进人物介绍

2024 年，蒙古国庆祝了水果和浆果产业科学成立 70 周年。在这次会议上，本协会开展了许多活动，总结该部门的成就和挑战，确定未来的发展方向，并通过应用良好农业规范（GAP）促进沙棘出口的扩大。同时，我们积极促进国际合作，就讨论沙棘种植的紧迫问题展开讨论并寻求可行的解决方案。

（一）全国 GAP 培训与讨论

2024 年 4 月 16 日，本协会与蒙古生命科学大学（MULS）农业生态学院合作，举办了题为“水果和浆果栽培良好农业规范（GAP）的实施”的培训和讨论活动。超过 70 名参与者出席，其中包括乌兰巴托市和 8 个省的代表、MULS 的教授和研究人员、MNAFB 成员、分支机构领导、合作组织和种植户。本次活动为分享知识、经验和解决方案提供了一个宝贵的平台，以提高水果和浆果生产的经济效率和食品安全。

（二）参加国际沙棘协会 ISA 欧洲区域会议

2024 年 8 月 27 日至 28 日，协会副主席 P.Uchral 先生在波兰普鲁什科（Pruszków）代表蒙古出席了由 ISA 组织的第六届欧洲沙棘会议和研讨会。在此次活动中，他被选为 ISA 执行董事会成员。

3.International Scientific Conference “AsiaBerry-2024”

- On **30 October 2024,** we successfully hosted the international conference “Development of Seabuckthorn and other Horticultural Markets in the Asia Region

- The conference brought together **36 foreign delegates from Germany, Nepal, Pakistan, Russia, China, Kazakhstan, Kyrgyzstan, and Latvia, alongside over 120 Mongolian participants** from government agencies, academia, and industry.

- More than **30 scientific presentations** were delivered, covering regional ecosystem development, economic opportunities, industry progress, challenges, and collaborative experiences.

4.Public Outreach and Media Coverage

- All major events and activities were widely disseminated through the Association’s website (www.chatsargana.mn), official Facebook page, and partner platforms such as www.agronews.mn, as well as other media outlets.

5.Standardization and Intellectual Property Initiatives

- A working group was established to develop and align the Sea Buckthorn Oil Standard with the Codex Alimentarius (CAC) framework, with the aim of easing trade barriers and enhancing market demand.

- We submitted an official proposal to designate “Mongolian Sea Buckthorn Oil” with Geographical Indication (GI) status through the Mongolian National Chamber of Commerce and Industry (MNCCI). The request was conveyed to the Korean Intellectual Property Office (KIPO) under their *“One Village – One Brand” and R&D Projects.*

（三）“AsiaBerry-2024”国际科学会议

2024 年 10 月 30 日，我们成功举办了“亚洲地区沙棘和其他园艺市场发展”国际科学会议。来自德国、尼泊尔、巴基斯坦、俄罗斯、中国、哈萨克斯坦、吉尔吉斯斯坦和拉脱维亚的 36 名外国代表以及来自政府机构、学术界和工业界的 120 多名蒙古代表参加了此次会议。

会议期间共发表了 30 多场科学演讲，涵盖了区域生态系统发展、经济机遇、行业进步、挑战和合作经验。

（四）公众宣传和媒体报道

协会所有重大活动和活动都通过协会网站（www.chatsargana.mn）、官方 Facebook 页面、合作伙伴平台（如 www.agronews.mn）以及其他媒体渠道广泛传播。

（五）标准化和知识产权倡议

成立了专项工作组，以制定沙棘油标准并推动其与食品法典（CAC）框架接轨，旨在缓解贸易壁垒并提高市场需求。

我们提交了一份官方提案，申请授予蒙古国家工商会（MNCCI）“蒙古沙棘油”地理标志（GI）身份认证。该申请通过韩国知识产权局（KIPO）的“一村一品牌”和研发项目提交。

在 KIPO 对蒙古的实地考察期间，我们安排了

- During KIPO's site visit to Mongolia, we arranged meetings with growers (Bayamburd Green Grove), processors (Huba Haya, Eden Co.), and researchers to present the production chain and discuss collaborative opportunities.

6.Cluster Development and International Networking

- The Sea Buckthorn Cluster, supported by the EU-funded ITDM Project, actively participated in EU Day events and organized product exhibitions.

- As part of this project, we co-hosted the First National Forum on Export Clusters in Non-Mining Sectors.

- Our cluster leaders and members, Ms. Kh. Tsevelmaa, Ms. Z. Tsetsegtsuvd, and Ms. E. Uranchimeg—successfully completed the "Global Cluster Leadership Training" program and were certified as Cluster Advisors.

7.Strengthening Bilateral Cooperation with the Republic of Korea

- The President of the Korea Fruit Association was formally invited to Mongolia, where a joint meeting was held with officials from the Ministry of Food, Agriculture and Light Industry of Mongolia.

- As a result, a Memorandum of Understanding (MoU) was signed between the two Fruit Associations, as well as between the Korea Fruit Association and the Mongolian University of Life Sciences, establishing a foundation for future cooperation.

8.Participation in the ISA 2025 Conference, Ordos, Inner Mongolia, China

- On 01–05 September 2025, the Mongolian Seabuckthorn Cluster actively participated in the ISA 2025 Conference held in Ordos, Inner Mongolia, China. The Mongolian delegation comprised over

与种植户（Bayamburd Green Grove）、加工者（Huba Haya，Eden Co.）和研究人员的会议，介绍生产链并讨论合作机会。

（六）集群发展与国际联网

在其他沙棘产业集群在欧盟资助的 ITDM 项目支持下，积极参加欧盟日活动并组织产品展览。美洲国家组织作为该项目的一部分，我们共同主办了第一届非采矿部门出口集群国家论坛。

集群领导者和成员 –Ms. Kh.Tsevelmaa、Z.Tsetsegtsuvd 女士和 E.Uranchimeg 女士成功完成了"全球集群领导力培训"计划课程，并获得集群顾问认证。

（七）加强与韩国的双边合作

韩国水果协会主席被正式邀请访问蒙古国，并与蒙古国粮食、农业和轻工业部官员举行了联席会议。

因此，两个水果协会之间以及韩国水果协会和蒙古生命科学大学之间签署了谅解备忘录（MoU），为未来的合作奠定了基础。

（八）参加在中国内蒙古鄂尔多斯举办的 2025 年第十届国际沙棘大会

2025 年 9 月 1–5 日，由 10 多名专家教授、研究员、企业家、种植者及蒙古沙棘协会理事

ten participants, including seabuckthorn-related professors and researchers, board members of the Mongolian National Association for Food and Berries (MNAFB), as well as representatives from processing factories and growers.

- Two formal presentations were delivered on behalf of the Mongolian Seabuckthorn Cluster: Dr. Tsevelmaa Khyargas presented on the topic: *"Fruit and Berry Cluster Configuration and Coordination in Mongolia",* highlighting the strategic development and integration of sea buckthorn stakeholders in the country. Ms. Tsetsegsuvd Zagir delivered a presentation titled *"Exploring Geographical Indication: The Seabuckthorn Access Case",* focusing on the potential of geographical indication (GI) as a tool for enhancing the value and market identity of Mongolian seabuckthorn products.

- This conference provided a valuable platform for knowledge exchange, networking, and strengthening international collaboration in the development of seabuckthorn-based industries.
Forum and "World Food Day" conference in Rome, Italy

9.Participation in the "Seeds to Foods Exhibition", "Hand in Hand" Investment Forum and "World Food Day" conference in Rome, Italy

- On 9-13 October 2025, the Mongolian Seabuckthorn Cluster successfully participated in the "Seeds to Foods" Exhibition in Rome, Italy, showcasing a wide range of high-quality Mongolian seabuckthorn products. The exhibition attracted more than 20,000 attendees from 193 countries, providing a unique opportunity to promote Mongolia's seabuckthorn industry to a global audience.

- On 14-17 October 2025, Ms. Z. Tsetsegsuvd, a board member of the Mongolian Seabuckthorn Cluster, delivered a presentation titled *"Mongolian Seabuckthorn Cluster Initiative"* during the Hand in Hand Investment Forum. The presentation

组成的蒙古国代表团出席大会，两位专家作了专题学术报告。本次会议为蒙古国沙棘知识交流、加强国际沙棘产业合作提供重要平台。

（九）参加在意大利罗马举办的"世界粮食日"大会暨"种子到食品"展览、"手牵手"投资论坛

2025 年 10 月 9–13 日， 盟国国代表团参加在意大利罗马举办的"种子到食品"展览，成功展示蒙古系列沙棘产品。本次展览吸引力来自 193 个国家的 20000 多名参观者，也向蒙古展示沙棘产品提供很好机遇。

10 月 14–17 日，蒙古国沙棘协会理事 Ms. Z. Tsetsegsuvd 在"手牵手"投资论坛作了学术交流。该讲座吸引了来自蒙古农业食品与轻

generated significant interest among key stakeholders, including Representatives from the Ministry of Food, Agriculture and Light Industry (MOFALI) of Mongolia, officials from the Mongolian Embassy in Italy, experts from the FAO Investment Department, Private sector participants interested in investment opportunities in Mongolia's sea buckthorn industry. The event marked an important step in enhancing international cooperation, attracting investment, and expanding the global visibility of Mongolian sea buckthorn products.

工部代表、蒙古驻意大利大使馆官员、联合国粮农组织投资部专家，以及蒙古国沙棘产业投资私人业主的浓厚兴趣，该活动预示着蒙古国沙棘国际合作、吸引投资、产品走向世界迈进了重要一步。

Conclusion

结论

The year 2024 was marked by significant progress for the Mongolian fruit and berry sector, with a strong focus on knowledge sharing, standardization, international collaboration, and cluster-based development. The Mongolian National Association of Fruits and Berries remains committed to enhancing the global recognition and market potential of Mongolian sea buckthorn and fruit products, while actively contributing to the objectives of the International Seabuckthorn Association.

2024 年，蒙古水果和浆果行业取得了重大进展，重点推进知识共享、标准化、国际合作和产业集群化发展。蒙古国家水果和浆果协会仍然致力于提升蒙古沙棘和水果产品的全球认知度和市场潜力，同时积极推动实现国际沙棘协会发展目标。


Монголын чацаргана
кластер
Mongolian Seabuckthorn
Cluster
UVSKHUNS


Hug Haya is natural gift to You.


ЕВРОПЫН ӨДӨРЛӨГ 2024
35
ЕВРОПЫН


ISA 2025
沙棘创新与生态、营养、健康


SEABUCK
Tsetsegsuvd Zagi
Board member, "
Board member, "
Director of Strate
tsetsegsuvd@uvs
2025.09.02
Ordos, Inner Mon


SEEDS
FOODS
ASIA AND
THE PACIFIC


E-ITDM


Draft Project paper of Promote New Work
Project
Seabuckthorn Dis
tee on

7.The policies, documents related to seabuckthorn, and research papers in the year 2024 in your country.

7.1 Research outputs (МЖЖҮХ, 2024)

The research team of the Mongolian National Association of Fruit and Berries (МЖЖҮХ) surveyed the area, age structure, and regeneration of natural seabuckthorn. Field measurements with GPS were processed and mapped using ArcGIS 10.3 and ERDAS IMAGINE 10.3, employing supervised classification, to produce distribution/area/location maps. (See Figure 1 and Appendix 12.)

七、蒙古国 2024 年有关沙棘的政策、文件和相关研究论文

（一）研究成果（МЖЖҮХ，2024）

蒙古国家水果和浆果协会（МЖЖҮХ）的研究小组对天然沙棘的面积、年龄结构和再生情况展开调查。通过 GPS 进行现场测量，使用 ArcGIS 10.3、ERDAS IMAGINE 10.3 和监督分类进行数据处理和绘制分布图、面积图、位置图。（见图 1 和附录 12。）

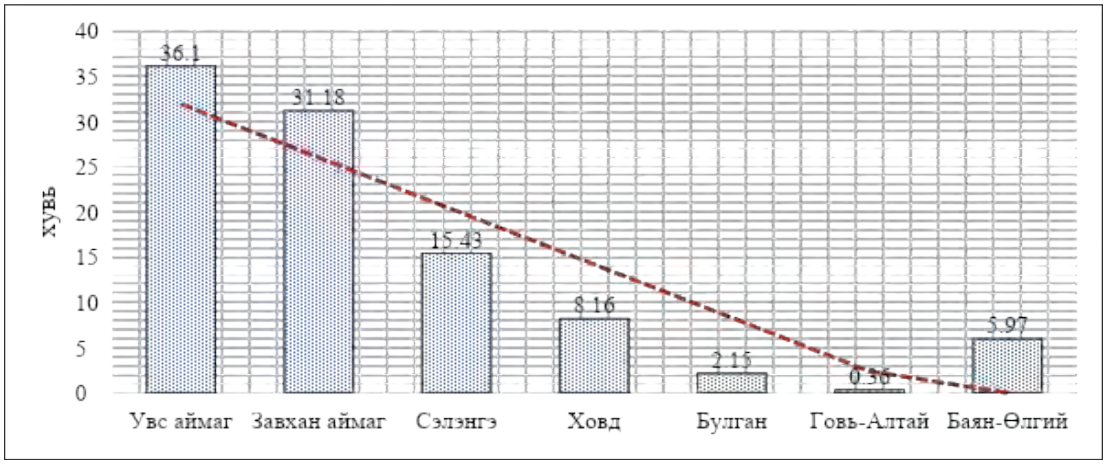


Figure 1. Distribution of natural seabuckthorn, by percentage
图 1 天然沙棘的分布（按百分比）

Total natural area: 14,357.7 ha, widely distributed along Mongolia's river basins. Shares by aimag: Uvs 5,183.7 ha (36.10%), Zavkhan 4,575.9 ha (31.18%), Selenge 2,216.0 ha (15.43%), Khovd 1,171.8 ha (8.16%), Bayan-Ölgii 857.5 ha (5.97%), Bulgan 309.5 ha (2.15%), Govi-Altai 53.3 ha (0.36%).

自然分布总面积：14357.7 公顷，广泛分布于蒙古的河流流域。各省的份额：Uvs 5183.7 公顷（36.10%），扎夫汗 4575.9 公顷（31.18%），Selenge 2216.0 公顷（15.43%），Khovd1171.8 公顷（8.16%），Bayan-Ölgii857.5 公顷（5.97%），Bulgan309.5 公顷（2.15%），Govi-Altai 53.3 公顷（0.36%）。

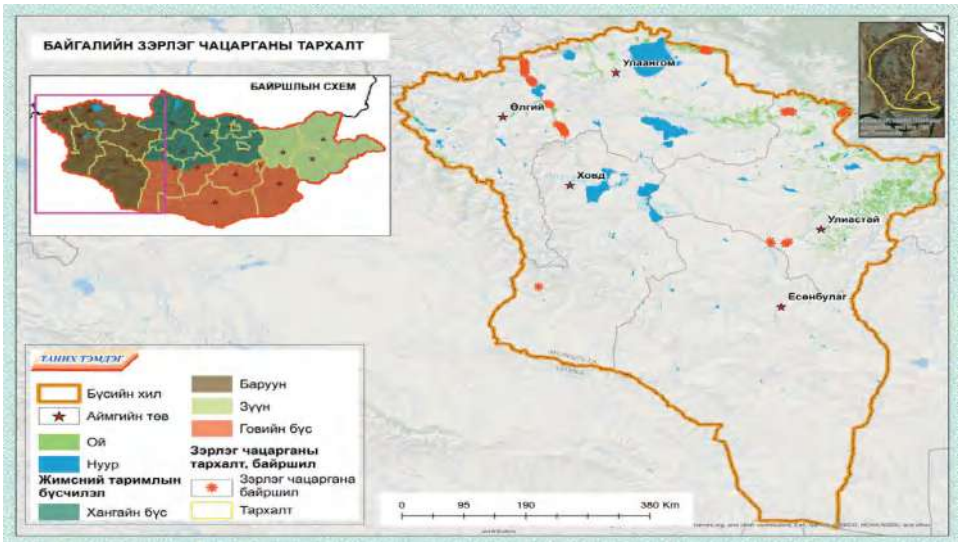


Figure 2. Distribution of natural seabuckthorn, 2024
图 2. 2024 年天然沙棘分布

According to the study results, 50–86.7% of all natural seabuckthorn shrubs are under 10 years old, while 13–50% are 10–18 years old. This indicates a pattern in which new young shoots are forming and regenerating from the root collar, roots, and rhizomes, with increasing capacity for renewal. The potential fruit-bearing stage for fruit and berry plants is considered to be ages 7–25 (Figure 3).

根据研究结果显示，天然沙棘灌木中有 50–86.7% 在 10 年生以下，而 13–50% 介于 10–18 年生之间。这表明新的嫩芽正在通过根颈，根和根茎形成和再生，并且更新能力不断增强。7–25 年生是其果实形成的黄金期（图 3）。

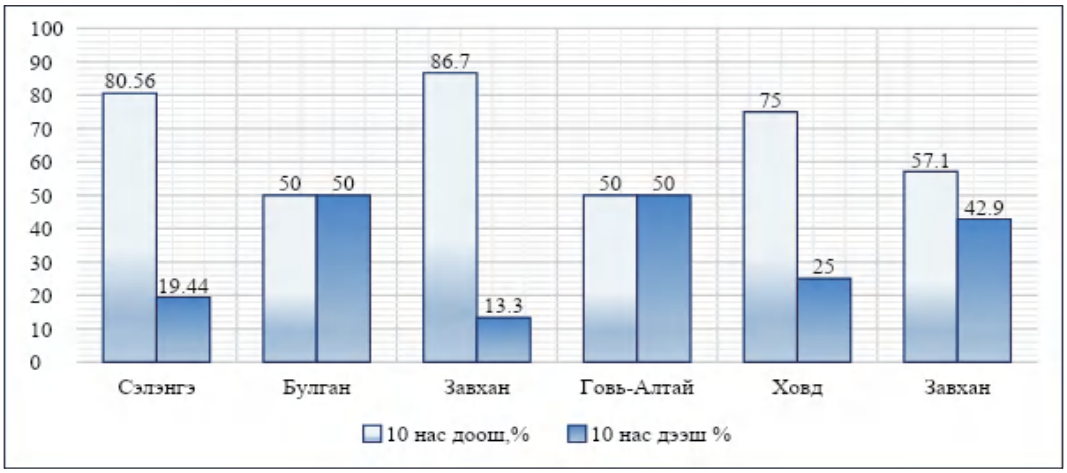


Figure 3. Age structure of natural seabuckthorn, by aimag (province)
图 3. 各省天然沙棘的年龄结构

7.2. Policy Documents

- Mongolia National Export Strategy 2024–2028. Superfood Export Strategy: Seabuckthorn and Pine Nuts — part of the National Export Strategy for prioritized non-mining sectors.

- An evaluation study of the “Fruit and Berries” National Programme was conducted. Based on inputs from MoFALI, aimag Departments of Food, Agriculture and Light Industry, soum agricultural units, MULS, research organizations, professional associations, and international project organizations, evaluation indicators were developed for 40 targets grouped into four categories; each indicator was assessed and the results were consolidated.

7.3. Project:

- “Morphological and Nutritional Diversity Among Natural Berry Plants: Implications for Conservation and Foraging” Project, 2022-2024, Project leader: Ass. Professor Dr D.Khandsuren, MULS. School of Agroecology.

7.4. Papers: 2023

- D. Khandsuren; B. Dorjderem. Impact of Environmental Factors on the Morphological Traits of Natural Seabuckthorn (Hippophae rhamnoides L.).

- Dorjderem Balchin; Ninj Badam; Jamiyansuren Sandagdorj; Khandsuren Damba. Primary assessment of the genetic diversity for seabuckthorn (Hippophae rhamnoides L.) in Mongolia.

（二）政策文件

《2024–2028 年蒙古国家出口战略》超级食品出口战略：沙棘和松仁——作为国家出口战略优先发展中非采矿产业领域的一部分。

针对“水果和浆果”国家计划进行了评估研究。根据莫法利省、省食品、农业和轻工业部门、区级农业单位、MUL、研究组织、专业协会和国际项目组织的反馈意见，为 40 个目标制定了评估指标，指标涵盖四大类，各项指标均经过评估并汇总结果。

（三）研究项目

- “天然浆果植物的形态与营养多样性：对保护与觅食的影响”项目，2022–2024 年，项目负责人：MULS. 农业生态学院副教授 D.Khandsuren 博士。

（四）论文：2023

- D.Khandsuren；B.Dorjderem。环境因素对沙棘（Hippophae rhamnoides L.）形态特征的影响。

- Dorjderem Balchin; Ninj Badam; Jamiyansuren Sandagdorj; Khandsuren Damba.。沙棘（Hippophae rhamnoides L.）遗传多样性的初步评估。

8.References

八、参考文献

[1] D. Nasanjargal and Sh. Batsukh, “State agency participation in implementing the ‘Seabuckthorn’ program and future objectives,” 2012.

[2] G. Dorjderem, “Variety trials of blackcurrant,” Scientific Works of Plant and Crop Research, vol. 3, pp. 111–117, 1966.

[3] Ö. Tömördash, “From the archival materials of the Fruit and Berry Experimental Station of Bulgan soum, Khovd aimag,” report, Bulgan soum, Khovd aimag, 1972.

[4] Ts. Ayuush, “Results of experimental work on fruit agrotechnics and forest nursery,” UB, vol. 3, pp. 26–35, 1966.

[5] Bat-Ochir, “Results of studying methods for propagating seabuckthorn,” Works of the Plant & Agricultural Experimental Research Station, Ulaangom, vol. 2, pp. 100–107, 1994.

[6] G. Bayaraa, “Results of studying the distribution of the seabuckthorn root system,” Works of the Plant & Agricultural Experimental Research Station, Ulaangom, vol. 2, no. [Ulaangom], pp. 108–111, 1994.

[7] Ts. Alimdaryaa, “Results of studying the agro-biological characteristics of apple (Malus domestica L. Borkh) cultivars in Mongolia’s central cropping zone,” abstract of dissertation for the Doctor of Agricultural Education degree, MULS, UB, 2002.

[8] D. Bulgamaa, “Comparative study of blackcurrant (Ribes nigrum L.) cultivars,” dissertation, MULS, UB, 2003.

[9] G. Altangoo, Ö. Juuperelmaa, and B. Batbold, “Scientific research report,” Darkhan; Ulaangom, 2006.

[10] B. Batbold, “Results of domesticating stone fruits,” Ulaangom, 2004.

[11] A. Ts and N. B, “Technological renewal in fruit horticulture and solutions,” UGTEShK, vol. 2, no. [Darkhan], pp. 30–33, 2004.

[12] Sh. L, “Methods for growing planting material and increasing the output of apple seedlings under forest-steppe conditions in Mongolia,” dissertation, MULS, UB, 2001. [orig. Russian title]

[13] Ch. Oyuuntsetseg, “Comparative study of blackcurrant cultivars in the Altai zone,” dissertation, MULS, UB, 2006.

[14] N. Tserentogtokh, “Results of studying agrotechnical methods for domesticating the ‘khar chisentsar’ of the Gobi,” dissertation, MULS, UB, 2005.

[15] Khandsuren Damba, “Biological and horticultural peculiarities of acclimatized cherry (Prunus fruticosa Pall. [ex Maxim.]) in the Altai region of Mongolia,” Mongolian Agricultural University, 2010.

[16] N. Saikhantsestseg, “Trial results of plum cultivars in the Western region,” dissertation, MULS, UB, 2015.
[17] L. Pagam, Forms of seabuckthorn in the forest-steppe zone, Shaamar Scientific Works, vol. 3, UB, 1974.

[18] Ts. Tsendeehuu, “Dynamics and localization of certain substances in various organs of seabuckthorn,” author’s abstract of dissertation for Candidate of Biological Sciences, NUM, UB, 1978.

[19] D. Nasanjargal, Ö. Juuperelmaa, et al., Distribution and resources of Mongolia’s natural seabuckthorn, vol. 1, [no further details given].

[20] Ts. Tsendeehuu and Kh. Otgonbileg, Possibilities for rehabilitating seabuckthorn thickets and reducing desertification, vol. 1, UB, 2003.

[21] I. Tuvshintogtokh, Geobotany, UB, 2005.

[22] Ts. Tsendeehuu et al., Plant Physiology, Khuriin Shim, vol. 2, UB, 2008.

[23] Kh. Buyan-Orshikh, Geobotany: methods of geobotanical research, UB, 2005.

[24] Sh. A. P., Introduction to Geobotany, MSU edition, Moscow, [year not specified].

[25] D. Oyungerel, U. Juuperelmaa, D. Nasanjargal, G. Altangoo, and S. Battumur, “Distribution and genetic resource of Mongolian natural wild seabuckthorn (Hippophae rh.),” Mongolian Journal of Agricultural Sciences, vol. 13, no. 2, pp. 55–59, Jun. 2015, doi: 10.5564/mjas.v13i2.516.

[26] Kh. Mirzabek, “Study of distribution and resources in Bayan-Ölgii aimag,”

5. Country Report of Seabuckthorn

波兰沙棘发展报告

Drafted by:

Prof. Dr. Stanislaw (Stan) Pluta, Prof. Eligio Malusa and Prof. Malgorzata Tartanus
National Institute of Horticultural Research,Konstytucji 3 Maja 1/3，96-100 Skierniewice, Poland
e-mail: Stanislaw.Pluta@inhort.pl
www.inhort.pl

撰稿人：

Prof. Dr. Stanislaw (Stan) Pluta, Prof. Eligio Malusa and Prof. Malgorzata Tartanus
单位：波兰国家园艺研究所
地址：Konstytucji 3 Maja 1/3，96-100 Skierniewice, Poland
邮箱： Stanislaw.Pluta@inhort.pl
网站：www.inhort.pl

Country Report of Seabuckthorn Development Year 2024 in Poland

波兰 2024 年沙棘发展国家报告

1. The national-wide seabuckthorn resources of plantations and berry yield.

1.1. The total area of seabuckthorn resources up to the year of 2024 including the natural stands and the artificial plantations, and the increased areas in the year of 2024.

The sea buckthorn (*Hippophaë rhamnoides* L) – "Rokitnik zwyczajny" (in Polish) has been known for long time, but it belongs to the rare (minor) cultivated crop in our country. So, there is no official statistic data and estimated acreage of commercial plantations was about 150 ha in 2024. The natural plantings are in city/town parks, National parks and on the dunes of the Baltic Sea coast.

Sea buckthorn cultivation in Poland is developing slowly, but systematically. Although no large new plantations are being established, many people grow sea buckthorn in their gardens or on amateur scale.

1.2. The harvested and the estimated amounts of total production of seabuckthorn berries in your country in the year of 2024.

Sea buckthorn fruit production was approximately 500 metric tons (MT) harvested in 2024, as an increase of 12,5% compered year to year of 2023 (400 MT). The higher fruit harvested was influenced by favorable weather conditions during vegetation, fruit developing, ripening and harvesting in 2024.
The main barriers to develop of sea buckthorn production in Poland are limited nursery plant

一、全国沙棘人工林资源和浆果产量。

（一）截至 2024 年的沙棘资源总面积，包括天然林和人工林，以及当年新增的面积。

沙棘（*Hippophaërhamnoides* L）–"Rokitnik zwyczajny"（波兰语）早已为人所知，但它属于我国少量栽培的作物。因此缺乏官方统计数据，2024 年商业种植园的估计面积约为 150 公顷。自然分布于城市或城镇公园、国家公园和波罗的海沿岸的沙丘上。

波兰的沙棘种植发展缓慢，但有条不紊。虽然没有新建大型的种植园，但有许多人在自家花园里或业余规模种植沙棘。

（二）2024 年波兰沙棘浆果的收获量和预估总产量。

2024 年，沙棘果实产量约为 500 公吨（MT），与 2023 年（400 公吨）相比，增长了 12.5%。产量增加主要得益于植被、果实发育、成熟和收获期间的有利天气条件影响了收获的果实数量。波兰发展沙棘生产的主要障碍是新

material of new released and valuable cultivars for planting as well as especially the lack of mechanized harvesting of these fruits.

型的优质种植品种苗圃植物资源有限，尤其是缺乏机械化采收手段。

1.3. A brief introduction of main seabuckthorn plantations in your country.

（三）简要介绍波兰主要的沙棘种植园。

Polish fruit growers have been more interested in recent years in both the increasing cultivation of sea buckthorn and consumption of different products due to fruit and leaf nutraceutical properties and health benefits for people. Most sea buckthorn plantations are rather small (1-5 ha) managed according to organic fruit production (ECO) and integrated production (IP). The biggest plantation (about 40 ha) belongs to the Family Horticultural Farm located in the North-east Poland (Fot. 1-3).

近年来，波兰果农对沙棘的种植和各类产品的消费越来越感兴趣，因为沙棘的果实和叶子具有营养价值，对人们的健康有益。大多数沙棘种植园都很小（1–5 公顷），采用有机水果生产（ECO）和综合生产（IP）进行管理。最大的种植园（约 40 公顷）属于位于波兰东北部的家庭园艺农场（Fot.1–3）。

Fot. 1–3 Seabuckthorn plantation with trees in full yielding and just before fruit ripening and harvesting.
图 1–3 种植园中的果树正处于丰产期，果实即将迎来成熟和收获季。

The total cultivated acreage of the Family Farm is over 500 ha. Among sea buckthorn, also blackcurrants (Ribes nigrum L.) are commercially cultivated (320 ha), red currants (Ribes rubrum L.) on 10 ha, aronia (Aronia melanocarpa L) on 160 ha and rosa hip (Rosa sp.) on 3 ha. This Family Farm is modern and well equipped with tractors (different powers) and cooperating machines, including 5 different harvesters for fruit collecting of currants, aronia and rosa hip, but not for sea buckthorn.

2. The genetic resources of seabuckthorn in your country

2.1 Introduction of natural seabuckthorn species and subspecies of Hippophae.

The main and commonly known and used is *Hippophaë rhamnoides* L, from which the most cultivars of sea buckthorn are derived (originated) in applied breeding programs.

ording to the literature few European subspecies of the genus Hippophae occur naturally, in botanical gardens, and in collections (genetic resources). These include:

- subsp. fluviatilis (Soest) Rivas Mart., – narrow leaves – 3 to 6 mm wide, rusty hairs present on the undersides of the leaves; looser shrubs – elongated branches, less branched, and less thorny than in subsp. rhamnoides;

- subsp. carpatica Rousi, – leaves 5 to 10 mm wide, rusty hairs present on the undersides of the leaves; straight shoots, more or less spherical fruits;

- subsp. caucasia Rousi, – large, upright shrub or tree reaching up to 10 m in height; thorns not numerous, usually unbranched, shoots not silvery white; lanceolate leaves – widest at the base, tapering upwards; silvery-white underneath; rusty hairs sparse; elliptical fruits;

家庭农场的总耕地面积超过 500 公顷。在沙棘中，也有商业种植的黑醋栗（Ribes nigr um L.）（320 公顷），10 公顷种植的红醋栗（Ribes rubrum L.），160 公顷种植的野樱莓（aronia melanocarpa L.）和 3 公顷种植的玫瑰果（rosa sp.）。这个家庭农场是现代化的，配备了拖拉机（不同功率）和协作机器，包括 5 台不同的收割机，用于采集醋栗、野樱莓亚和玫瑰果，但不适用于采集沙棘。

二、波兰沙棘遗传资源

（一）当地沙棘属自然种和亚种介绍

最常见的和应用最广泛的沙棘属的沙棘，在应用育种计划中，大多数栽培品种都是从沙棘中衍生出来的。根据文献，*Hippophae* 属在欧洲自然分布的亚种很少，通常出现在植物园和收藏机构（遗传资源）中。具体包括：

- 溪生沙棘亚种，– 狭窄的叶子 – 叶子背面有 3 至 6 毫米宽的锈色绒毛；灌木形态较松散——细长的树枝，分枝较少，比海滨沙棘亚种少刺；

- 喀尔巴阡山沙棘亚种，叶子宽 5 至 10 毫米，叶子背面有锈色绒毛；直立枝条，果实呈球形或近球形；

- 高加索沙棘亚种，一种高达 10 米的大型直立灌木或乔木；刺不多，通常不分枝，嫩枝不银白色；披针形的叶子——基部最宽，向上逐渐变细；叶子背面呈银白色；锈色绒毛稀疏；椭圆形果实；

2.2. Names of newly bred seabuckthorn varieties and introduced cultivars from other countries and their performance including morphological/ biochemical features.

In Poland no new cultivars were released because the active breeding program of sea buckthorn, which was conducted in the former Institute of Pomology and Floriculture in Skierniewice, Poland was closed about 15 years ago due to lack of financial support from the Ministry of Agriculture and Rural Development.

Recently, new Latvian cultivars: 'Mary' and 'Tatjana' have been planted and grown commercially on some plantations in our country.
Cultivar 'Mary' is primarily known for its use in juice blends and food preparations, while 'Tatjana' is valued for its high oil content, making it ideal for oil extraction for nutraceuticals and cosmetics.

'Mary'

- Origin: Latvian cultivar.
- Primary Use: juices and food/drink preparations where a strong, pleasant, but slightly more acidic and astringent taste is desired.
- Fruits: they are juicy and rich in juice, with little oil content
- Ripening/harvesting: late July to early September.

'Tatjana'

- Origin: Latvian cultivar.
- Primary Use: commercial and nutraceutical oil extraction due to its high oil content.
- Fruits: they are suitable for juice, but its high oil content makes it the preferred choice for oil production.
- Ripening/harvesting: Late July to early September.

（二）新培育的沙棘品种和从国外引进的品种的名称及其表现，包括形态 / 生化特征。

由于波兰缺乏农业和农村发展部的财政支持，大约 15 年前，波兰 Skierniewice 前果树和花卉研究所进行的沙棘育种计划已经停止，因此未推出新栽培品种。

最近，新的拉脱维亚品种“Mary”和“Tatjana”已在波兰部分种植园实现商业化种植。品种“Mary”主要以其在混合果汁和食品制备中的用途而闻名，而“Tatjana”因其高含油量而备受青睐，使其成为营养保健品和化妆品油提取的理想原料。

1.“Mary”品种，产地：拉脱维亚。

- 主要用途：制作果汁和食品饮料制剂，口感浓郁，风味宜人但略带酸涩的味道。
- 果实：果汁丰富，含油量少
- 最佳成熟和收获季节：7 月下旬至 9 月初。

2.“Tatjana”品种，产地：拉脱维亚。

- 主要用途：由于其高含油量，可用于商业和营养油提取。
- 果实：它们虽然适合榨汁，但其高含油量使其成为产油的首选。
- 最佳成熟和收获季节：7 月下旬至 9 月初。

Characteristics of both cultivars:

Plants of cultivars ‘Mary’ and ‘Tatjana’ are robust shrubs/trees that have adapted well to various climates and are resistant to fungal and bacterial pathogens.

3. Enterprises and processing

3.1. In the year of 2024, the number of seabuckthorn enterprises, the gross output and the total value of seabuckthorn products in your country.

There are only small processing plants of the sea buckthorn fruits in Poland. It is difficult to provide the gross output and the total value of sea buckthorn products in our country.

The big processing and freezing industries (mainly foreign capital) has not been interested in sea buckthorn fruits because of low fruit production (volume) offered by our growers.

3.2. A brief introduction of main enterprises and their main products of seabuckthorn.
Sea buckthorn fruits are used in:

1.Food processing - the most popular are juices/ nectars, soft drinks, jams, tea and dried fruits (Fot. 4).

两个品种的特点：

品种“Mary”和“Tatjana”的植物是健壮的灌木或树木，能耐受各种气候条件，对真菌和细菌病原体具有抗性。

三、企业与加工

（一）2024 年，波兰沙棘企业数量、沙棘产品总产量和总价值。

波兰只有少量的沙棘果加工厂，难以提供我国沙棘产品的总产量和总价值。

由于我们的种植者提供的水果产量（数量）低，大型加工和冷冻行业（主要是外资）对沙棘果缺乏兴趣。

（二）沙棘主要企业及其核心产品简介。
沙棘果实应用领域包括：

1. 食品加工 – 最受欢迎的产品是果汁和蜜饯、软饮、果酱、茶和干果（图 4）。

Fot. 4. Examples of food products (juices and jam) from sea buckthorn fruits manufactured and available in Poland.
图 4. 波兰生产的沙棘果食品（果汁和果酱）示例。

2.Pharmacy - functional products, supplements and drugs, including oils from fruit flesh and seeds (OMEGA) (Fot. 5).

2. 药品 – 功能性产品、补剂和药物，包括果肉和种子油（含 omega-3 脂肪酸）（图 5）。

Fot. 5. Seabuckthorn functional products, including OMEGA 7 and oils from fruit flesh and seeds.
图 5. 沙棘功能性产品，包括欧米茄 7 和果肉和种子油。

3.Cosmetic - creams, lotions, shampoos and lipsticks (Fot. 6)

3. 化妆品 – 面霜、乳液、洗发水和唇膏（图 6）

Fot. 6. Creams and lotion from seabuckthorn fruits.
图 6. 沙棘果面霜和乳液。

One of the small Family Processing Plant located in the North-east Poland and producing different sea buckthorn products including soft drinks, juices, syrup shot, oleson, jam, fruit and seed oil (fot. 7-8).

位于波兰东北部的一家小型家庭加工厂，生产各种沙棘产品，包括软饮料、果汁、糖浆丸、oleson、果酱、水果和种子油（图 7–8）。

Fot. 7. Exhibition of different seabuckthorn products during the promotion action organized in late August 2024 in Poland (Company I).
图 7.2024 年 8 月下旬在波兰组织的促销活动中展出的各种沙棘产品（公司 I）。

Fot. 8. Selected seabuckthorn products presented during the promotion action in Poland (Company I).
图 8. 在波兰促销活动期间展出的高附加值沙棘产品（公司 I）。

nother small Business Enterprise produces different and valuable pure sea buckthorn and/or mixed with other fruits (Fot. 9-10)

另一家小型企业生产不同且有价值的纯沙棘和 / 或与其他水果混合的沙棘（图 9–10）

Fot. 9. Exhibition of different seabuckthorn food products during the promotion action organized in late August 2024 in Poland (Company II).
图 9.2024 年 8 月下旬在波兰组织的促销活动中展出了不同的沙棘食品（公司 II）。

Fot. 10. Juices, syrup, jelly and candies produced from seabuckthorn fruits (Company II).
图 10. 由沙棘果制成的果汁、糖浆、果冻和糖果（公司 II）。

A small group of domestic fruit producers and processors producing excellent products are struggling with the uncontrolled import of sea buckthorn fruit, especially ready-made juices, even in barrels, the quality of which is very questionable, which is often confirmed by consumers.

Polish producers and processors are not competitive compared to imported products, especially from the East, where sea buckthorn fruits are harvested every year with the onset of frost, and they are not able to compete in terms of costs with goods coming from the above-mentioned directions.

Sea buckthorn, and especially its fruits, are becoming more and more popular, which is largely due to the promotional activities that we have been carrying out for several years by scientists and producers of these fruits and processors processing Polish fruit.

4. Scientific research

4.1 The status of seabuckthorn scientific institution in your country in terms of the number of institutes and their scientists, and their research field.

There is not special sea buckthorn institutions in Poland, which are only involved in the research, manufacturing, marketing planting, public management in Poland.

4.2. A brief introduction of main research institutes/ universities and enterprises, the main research programs and updated achievements on seabuckthorn.

In Poland there are few scientists from the Research Institute and Universities of Life Sciences working on different sea buckthorn topics.

Research on sea buckthorn (*H. rhamnoides*) is mainly carried out at the National Institute of Horticultural Research (InHort) in Skierniewice, Poland.

虽然一小部分国内水果生产商和加工商生产出优质产品，却因沙棘果实不受控制的进口而举步维艰，尤其是现成的果汁，即使是桶装果汁，也往往被消费者反馈称产品存在严重的质量问题。

与进口产品相比，波兰的生产商和加工商没有竞争力，尤其是来自东部的产品，那里每年都会在霜冻开始时采收沙棘果实，他们无法在成本方面与来自上述方向的商品竞争。

沙棘，尤其是其果实，变得越来越受欢迎，这在很大程度上是由于科研人员和这些水果的生产商以及加工波兰水果的加工商多年来持续开展的促销活动。

四、科学研究

（一）波兰沙棘科研机构的现状，包括研究所及其科研人员规模和研究领域。

波兰没有专门的沙棘机构，相关工作波兰的研究、制造、种植推广和公共管理的人员承担。

（二）主要研究机构 / 大学和企业简介，沙棘的主要研究项目和最新成果。

在波兰，研究所和生命科学大学的科学家很少从事不同的沙棘研究。

沙棘（*H.rhamnoides*）的研究主要在波兰斯基尔涅维奇的国家园艺研究所（InHort）进行。

Studies on the protection of sea buckthorn against diseases and pests has been carried out over several years at the InHort as part of research on organic farming funded by the Ministry of Agriculture and Rural Development. These studies have been carried out in collaboration with farmers located in the major production areas (North and East part of Poland).

Due to the still limited land area of the crop, the harmful and beneficial fauna occurring in Polish plantations is little known. Monitoring studies were therefore undertaken to determine the threats to sea buckthorn. As a result, it was shown that the greatest pest threat, especially in organic plantations, is the sea buckthorn fruit fly (*Rhagoletis batava*). The sea buckthorn gall mite (*Aceria hippophaena*), the sea buckthorn aphid (*Capitophorus hippophaes*), and the sea buckthorn lice (*Cacopsylla hippophaes*) may also occur. Fungal and bacterial pathogens were isolated from various parts of the plant (shoots, flowers, fruit) in studies assessing their presence. Among fungi were isolated Botrytis cinerea and Alternaria infectoria, which are polyphagous and have a wide host-plant range, as well as *Hymenopleella hippophaeicola* which is already known to be a pathogen of sea buckthorn and can infect both shoots and leaves.

Several projects have carried out research on the reduction of sea buckthorn fruit fly populations. Yellow sticky traps can be used to monitor the presence of the fly with good results. On the other hand, traps with an attractant developed for Ceratitis capitata, as well as a 4% solution of ammonium phosphate fertilizer, were highly effective in mass trapping of sea buckthorn fruit fly adults. A reduction of fruit damage (efficacy 40-50%) of this pest was also observed after treatments with cinnamon, clove and oregano oils.

In Poland there are also some research programs carried out by other Life Sciences (Agricultural) Universities mentioned above. Studies have mainly concerned the determination of bioactive

InHort 多年来一直在进行关于保护沙棘免受病虫害的研究，这些研究是农业和农村发展部资助的有机农业研究项目的一部分。这些研究是与主要产区（波兰北部和东部）的农民合作进行的。

由于沙棘种植面积仍然有限，波兰种植园中出现的有害和有益动物群分布尚不明确。因此开展了监测研究以确定沙棘面临的威胁。结果表明，在有机种植园中最大的害虫威胁是沙棘果蝇（*Rhagoletis batava*）、沙棘瘿螨（*Aceria hippophaena*）、沙棘蚜虫（*Capitophorus hippophaes*）和沙棘虱（*Cacopsylla hippophae*）也可能发生。在评估真菌和细菌病原体存在性的研究中，研究人员从植物的不同部位（芽、花、果实）分离出它们。其中分离出的真菌包括灰霉病菌和侵染链格孢菌，它们是多食性的，寄主植物范围广，以及已知是沙棘病原体的沙棘干缩病菌 *Hymenopleella hippophaeicola*，可以感染沙棘的嫩枝和叶片。

多个项目对控制沙棘果蝇种群数量进行了研究。黄色粘蝇板在监测苍蝇的存在方面效果良好。另一方面，为防治地中海实蝇 Ceratitis capitata 开发的引诱剂陷阱以及 4% 的磷酸铵肥料溶液在大规模诱捕沙棘果蝇成虫方面非常有效。用肉桂油、丁香油和牛至油处理后，这种害虫的果实损伤也减少了（功效为 40–50%）。

在波兰，其他生命科学（农业）大学也开展了相关研究项目。研究主要涉及各种沙棘品种果

compounds in the fruits of various sea buckthorn cultivars and their health-promoting properties, as well as the formulation of new, innovative products and dietary supplements.

实中生物活性化合物的测定及其保健特性，以及新型创新产品和膳食补充剂的配方。

5. Human resources

五、人力资源

5.1. The total personnel involved in seabuckthorn research, manufacturing, marketing planting, public management, etc. in your country.

（一）波兰从事沙棘研究、生产、种植推广、公共管理等工作的人员总数。

The National Institute of Horticultural Research (InHort) in Skierniewice, Poland has two groups of research dealing with sea buckthorn: first dedicated to cultivar assessment and technology of cultivation advised to growers (lead by Prof. Dr. Stanisław Pluta) and second dealing with plant protection (lead by Prof. Eligio Malusà and Assoc. Prof. Małgorzata Tartanus).

波兰 Skierniewice 的国家园艺研究所（InHort）有两组研究沙棘的研究：第一组专注于品种评估和为种植者提供栽培技术建议（由 Stanisław Pluta 教授领导），第二组致力于植物保护（由 Eligio Malusà 教授和 Małgorzata Tartanus 副教授领导）。

In addition, the few scientists from Universities of Life Sciences in Lublin (South-east Poland) and in Olsztyn (North-east Poland) have been dealing on different topics, including the sea buckthorn beneficial bioactive compounds and their influence on human health as well as processing of fruits and leaves of this crop.

此外，来自 Lublin（波兰东南部）和 Olsztyn（波兰东北部）生命科学大学的少数科学家持续开展了多项研究，包括沙棘有益的生物活性化合物及其对人类健康的影响，以及该作物的果实和叶子的加工技术。

5.2. The members of National Seabuckthorn Association if provided, including institutional and individual members.

（二）国家沙棘协会成员（如有），包括机构和个人成员。

In autumn 2024 the group of 8-10 sea buckthorn growers and processors decided to established the National Association of Sea buckthorn Growers and Processors (in Polish: “Krajowe Stowarzyszenie Plantatorów i Przetworców Rokitnika” - „Rokitnik Polski”). The Association's Statute, Board and necessary documents were officially prepared and reviewed by a lawyer and then submitted to the Court for the registration of this Sea buckthorn Association for the first time in Poland.

2024 年秋季，由 8–10 名沙棘种植者和加工商组成的小组决定成立全国沙棘种植者和加工业协会（波兰语：“Krajowe Stowarzyszenie Plantatorów i Przetworców Rokitnika”–“Rokitnik Polski”）。协会章程、董事会和必要的文件由律师正式起草和审查，然后提交法院，首次在波兰注册该沙棘协会。

The list of Members of this Association and Board will be provided in the next ISA Report for 2025.

5.3. A brief introduction of successful institutional members of seabuckthorn Association if provided.

Not any, institutional members of the Polish Sea buckthorn Association is provided.

6. Introduction of important activities, key events, successful stories and advanced persons together with good photos in Poland in the year of 2024.

In 2024 an important event again (like in 2023) was connected with the promotion of sea buckthorn in Poland, as a part of a wider campaign of fruit and vegetables. Berry fruits, like strawberry, raspberry, blackcurrants, aronia, blueberry, including also sea buckthorn were promoted as "Polish superfruits". For example several promotional actions were organized in 2024:

1)National Sports Day - September 15th 2024, with an offer for berry processors;

The Polish Fruits & Vegetable and the Polish Chamber of Organic Food, associating producers, distributors, processors and stores with classical and organic food of different fruits and products (including sea buckthorn) were presented in the zone. Their stand was hosted culinary workshops with a popular educator - Sylwia Majcher - as well as a competition with prizes, and dietary consultations.

2)Berry Fest was organized for its third edition on October 3, 2024.

Nearly 40 different food products, wines and liqueurs made from white, red and black currants, haskap berries, strawberries, which were not available before, as well as aronia, gooseberries, raspberries, dogwood and sea buckthorn were presented during this event.

该协会和董事会的成员名单将收录于 2025 年 ISA 年度报告中。

（三）沙棘协会成功机构成员简介

暂无波兰沙棘协会的任何机构成员的资料。

六、介绍 2024 年波兰的重要活动、重大事件、成功案例和先进人物

2024 年，波兰再次举办了一场重要活动（延续 2023 年的模式），通过推广沙棘等一系列浆果类食物，作为更广泛的水果和蔬菜运动的一部分。草莓、覆盆子、黑醋栗、野樱梅、蓝莓等浆果，包括沙棘，都被宣传为“波兰超级浆果”。例如，2024 年组织了多次促销活动：

（一）2024 年 9 月 15 日，国家体育日，推出浆果加工商特别优惠；

波兰水果和蔬菜协会以及波兰有机食品商会在该区展出了不同水果和产品（包括沙棘）的经典和有机食品，汇集了生产商、分销商、加工商及零售商。他们的展位上举办了由著名教育家 Sylvia Majcher 主持的烹饪研讨会，以及一场有奖竞赛和饮食咨询。

（二）第三届浆果节于 2024 年 10 月 3 日举办。

在本次活动中，展示了近 40 种由白、红、黑醋栗、蓝靛果、草莓制成的食品、葡萄酒和利口酒，这些产品之前从未亮相，同时展出的还有野樱莓、醋栗、覆盆子、山茱萸和沙棘等特色浆果。

3)Berry Innovation 2024 - a review of berry innovations October 22nd, 3rd edition

It was the next edition of this event, which brought together innovators in the fruit berry industry to share their experiences and identify potential paths for development. The Berry Innovation 2024 focused on opportunities to increase margins from fruit production and develop new markets. The meeting was held as part of the "Time for Polish Superfruits" project, in which sea buckthorn was also included.

4)Golden Innovations competition with a preserves' promotion – 8th November 2024

It was the largest consumer competition in Poland, aimed at recognizing innovative products emerging in the market in a given year. The winners were determined by consumers who selected the most attractive solutions in an online survey. Berry preserves were increasingly among the winners. In addition to the Polish "Superfruits" category, awards were once again presented in the Organic and Eco categories, and, for the first time, in the Alcohol category. In addition, processors took advantage of another opportunity to promote the berry industry.

Generally saying, fruits and vegetables were also promoted as the basis of everyday diet nutrition "*half the battle*".

7. The policies, documents related with sea buckthorn and research papers in the year of 2021-2023 in Poland.

（三）第三届浆果创新大会于 2024 年 10 月 22 日举办

这次活动汇集了浆果行业的创新者，通过分享他们的经验，共同探索潜在的发展路径。会议专注于提升水果生产利润空间和开拓新兴市场两大议题。作为“波兰超级浆果时代”项目的重要组成部分，沙棘也包括在内。

（四）黄金创新竞赛与保护区推广——2024 年 11 月 8 日

这是波兰最大的消费者竞赛活动，旨在表彰年度市场上出现的创新产品。获奖名单由消费者在线调查中选出最具吸引力的解决方案。这其中浆果蜜饯屡获殊荣。除了波兰的“超级水果”类别的奖项外，还再次颁发了有机和环保类别的奖项，并首次颁发了酒精类别的奖项。此外，加工商也借此机会大力推进浆果产业的发展，同时强调水果和蔬菜为日常饮食营养基础的“半壁江山”。

七、波兰 2021–2023 年与沙棘有关的政策、文件和研究论文。

Research papers 研究论文

1.Tartanus M., Malusà E., Podedworny G., Pluta S., 2023. Development of integrated approach for mass trapping of Rhagoletis Batava in organic Seabuckthorn orchards. 9th International Sea Buckthorn Association Conference ISA – 2023. 22-25 May 2023. Thessaloniki, Greece; Book of Abstracts: 21

2.Tartanus M., Malusà E., Furmańczyk E.M. and Danelski W. 2021 Monitoring fruit fly populations in cherry, Japanese rose and sea buckthorn in organic orchards in Poland. In: B. Tanović, P.C. Nicot, V. Dolzhenko & D. Marčić (Eds.) Understanding pests and their control agents as the basis for integrated plant protection, Proceedings of the VIII Congress on Plant Protection (November 25-29, 2019, Zlatibor, Serbia). IOBC-WPRS, Plant Protection Society of Serbia and IOBC-EPRS, Darmstadt, Germany, pp. 67-73

Technical papers 技术文件

3.Podedworny G., Tartanus M., Malusà E., 2023. Substancje podstawowe w ochronie roślin jagodowych (Basic substances for the protection of berry crops). Jagodnik 6(84): 70-75. (in Polish)

4.Malusà E., Tartanus M., 2022. Innowacje nie tylko w ochronie roślin jagodowych (innovations not only for the protection of berry fruits). TMJ 6: 63-64. (in Polish)

5.Tartanus M., Malusà E., 2022. Preparaty biologiczne w walce ze szkodnikami (Biological formulations for the control of pests). Jagodnik 6 (76): 85 87. (in Polish)

6.Tartanus M., Malusà E., 2022. Nasionnice szkodnikami nie tylko czereśni (Fruit flies, pests not only for cherry fruits). Jagodnik 5(75):83-85. (in Polish)

6.Constitution of ISA

国际沙棘协会章程

Constitution of International Seabuckthorn Association
(Adopted at the Second Representative Assembly of ISA on October 15, 2019)
国际沙棘协会章程

Chapter I General Provisions

Article 1 The name of the Association is "International Seabuckthorn Association", and its English abbreviation is ISA.

Article 2 The Association is an academic and industry-based international non-governmental and non-profit organization that is voluntarily formed by enterprises, institutions, individuals and other organizations which are active in the research and development of seabuckthorn around the world.

Article 3 The purpose of the Association is to give full play to the role of seabuckthorn in facilitating environmental protection, economic development and human health, promote exchanges and global cooperation in seabuckthorn cultivation, scientific research, production, economy and trade, personnel, information, etc., and provide international communication service of seabuckthorn to the Association's members and all sectors of the society.

Article 4 The Association subject to the operational guidance and supervision of its competent authority of the Ministry of Water Resources of the People's Republic of China (MWR) and its registration and administration authority of the Ministry of Civil Affairs of the People's Republic of China.
The Association abides by the Constitution, laws, regulations and policies of the state, and complies with the ethical trends of the society.

Article 5 The address of the Association is 1, Fuxing Road, Haidian District, Beijing.

第一章 总 则

第一条 本协会的名称为"国际沙棘协会"，英文译名为International Seabuckthorn Association，英文缩写：ISA。

第二条 本协会是由全球积极开展沙棘研究与开发的企事业单位、个人和其他组织自愿结成的、学术性和行业性的国际非政府、非营利组织。

第三条 本协会的宗旨是全面发挥沙棘在促进环境保护、经济发展及人类健康等方面的作用，推进中国与世界各国在沙棘种植、科研、生产、经贸以及人员和信息等方面的交流与合作，为会员和社会各界提供沙棘领域的国际交流服务。

第四条 本协会接受业务主管机关水利部与登记管理机关民政部的业务指导和监督管理。本协会遵守宪法、法律、法规和国家政策，遵守社会道德风尚。

第五条 本协会的地址：北京市海淀区复兴路甲1号。

Chapter II Scope of Association Affairs

Article 6 Under the principles of mutual respect, equality, mutual benefit and common development, the Association carries out the following activities:
(1) Give play to the self-discipline role of the seabuckthorn industry, formulate industry regulations, standardize industry behaviors, and promote the development of the industry;
(2) Investigate and research the developmental dynamics and trends of seabuckthorn at home and abroad, and provide consulting services for the construction and development of seabuckthorn;
(3) Undertake international exchange and cooperation projects entrusted or funded by government agencies and other organizations;
(4) Build international seabuckthorn information network and database, and promote international exchanges and cooperation of seabuckthorn;
(5) In accordance with relevant provisions, edit and publish professional publications, and expand the popularity and publicity of seabuckthorn knowledge;
(6) Organize and host exchange activities such as seabuckthorn academic seminars at home and abroad;
(7) Carry out personnel training and exchange visits in the field of seabuckthorn.

Chapter III Membership

Article 7 ISA members are divided into unit members and individual members.

Article 8 To apply to join the Association, you must comply with the following conditions:
(1) Support the Constitution of the Association;
(2) Have the willingness to join the Association;
(3) Enterprises, institutions, individuals and other organizations have the willingness to actively carry out international exchanges and cooperation of seabuckthorn;
(4) Have a major impact in the field of seabuckthorn business.

第二章 业务范围

第六条 本协会在相互尊重、平等互利、共同发展的原则下，履行以下职责，开展以下各项业务：
（一） 发挥沙棘行业自律作用，制定行业规章，规范行业行为，推动行业发展；
（二） 调查研究国内外沙棘发展动态和趋势，提供沙棘建设与开发咨询服务；
（三） 承办政府机构等组织委托或资助的国际交流与合作项目；
（四） 建设国际沙棘信息网络和资料库，促进国际沙棘交流与合作；
（五） 按照有关规定，编辑出版专业刊物，加大沙棘知识的普及和宣传力度；
（六） 组织举办国内外沙棘学术研讨会等交流活动；
（七） 开展沙棘领域的人才培训和交流考察。

第三章 会员

第七条 国际沙棘协会的会员分为单位会员和个人会员。

第八条 申请加入协会的会员，必须具备下列条件：
（一）拥护协会的章程；
（二）有加入协会的意愿；
（三）愿意积极开展沙棘国际交流与合作的企事业单位、个人和其他组织；
（四）在沙棘业务领域有较大的影响。

Article 9 The procedures for members to join the Association are:
(1) Submit an application for membership;
(2) Approved by the ISA Board through discussion;
(3) Pay dues according to the standards of membership dues;
(4) Membership certificate is issued by the ISA Board or an authorized body of the Board.

Article 10 Members have the following rights:
(1) The Association's right to vote, right to stand in election and voting right;
(2) Participate in activities of the Association;
(3) Have priority in obtaining services of the Association;
(4) The rights to criticize and supervise the work of the Association;
(5) Join the Association voluntarily and withdraw freely.

Article 11 Members shall perform the following duties:
(1) Execute resolutions of the Association;
(2) Maintain the legitimate rights and interests of the Association;
(3) Accomplish the work assigned by the Association;
(4) Pay the membership dues as required;
(5) Reflect situations and provide relevant information to the Association.

Article 12 The member who would like to withdraw shall notify the Association in writing and return the membership card. If a member does not pay membership dues or does not participate in activities of the Association for one year, it is regarded as withdrawing voluntarily.

Article 13 If a member seriously violates the Constitution of the Association, it shall be adopted to remove by vote of the ISA Board.

Chapter IV Generation and Removal of Organizations and Principal Heads of Offices

Article 14 The highest authority of the Association is the Representative Assembly.

第九条 会员入会的程序是：

（一）提交入会申请书；
（二）经理事会讨论通过；
（三）按会费标准缴纳会费；
（四）由理事会或理事会授权机构发给会员证。

第十条 会员享有下列权利：
（一）协会的选举权、被选举权和表决权；
（二）参加协会的活动；
（三）获得协会服务的优先权；
（四）对协会工作的批评建议权和监督权；
（五）入会自愿、退会自由。

第十一条 会员履行下列义务：
（一）执行协会的决议；
（二）维护协会合法权益；
（三）完成协会交办的工作；
（四）按规定交纳会费；
（五）向协会反映情况，提供有关资料。

第十二条 会员退会应书面通知协会，并交回会员证。会员如果 1 年不缴纳会费或不参加协会活动的，视为自动退会。

第十三条 会员如有严重违反本章程的行为，经理事会表决通过，予以除名。

第四章 组织机构和负责人产生、罢免

第十四条 协会的最高权力机构是会员代表大会。

Article 15 The functions and powers of the Representative Assembly are:
(1) Formulate and revise the Constitution;
(2) Elect and dismiss members of the ISA Board;
(3) Review the work report and financial report of the ISA Board;
(4) Formulate and revise the standard of membership fees;
(5) Make decisions on termination matters;
(6) Make decisions on other major matters.

Article 16 The Representative Assembly must be attended by more than two-thirds of the member representatives. The resolutions must be adopted by vote of more than half of the attended member representatives.

Article 17 A term of the Representative Assembly is five years. Under special circumstances that a term needs to be ended in advance or postponed, it shall be adopted by vote of the ISA Board, and submitted to the competent authority for review and the registration and administration authority for approval. However, the maximum extension of a term shall not exceed one year.

Article 18 The ISA Board is the executive body of the Representative Assembly. The Board leads the Association to carry out the daily work during intervals between meetings and is responsible to the Representative Assembly.

Article 19 The functions and powers of the ISA Board are:
(1) Execute resolutions of the Representative Assembly;
(2) Elect and dismiss the chairman, vice chairman and secretary general;
(3) Prepare and host the Representative Assembly;
(4) Report work and financial status to the Representative Assembly;
(5) Make decisions on the absorption or removal of members;
(6) Decide to establish administrative offices, branches, representative offices and entities;
(7) Make decisions on the employment of the Deputy secretary general and principal heads of offices;
(8) Lead organs of the Association to conduct work;

第十五条 会员代表大会的职权是：
（一）制定和修改章程；
（二）选举和罢免理事；
（三）审议理事会的工作报告和财务报告；
（四）制定和修改会费标准；
（五）决定终止事宜；
（六）决定其他重大事宜。

第十六条 会员代表大会须有 2/3 以上的会员代表出席方能召开，其决议须经到会会员代表半数以上表决通过方能生效。

第十七条 会员代表大会 5 年一届。因特殊情况需提前或延期换届的，须由理事会表决通过，报业务主管单位审查并经社团登记管理机关批准同意。但延期换届最长不超过 1 年。

第十八条 理事会是会员代表大会的执行机构，在闭会期间领导协会开展日常工作，对会员代表大会负责。

第十九条 理事会的职权是：
（一）执行会员代表大会的决议；
（二）选举和罢免主席、副主席、秘书长；
（三）筹备召开会员代表大会；
（四）向会员代表大会报告工作和财务状况；
（五）决定会员的吸收或除名；
（六）决定设立办事机构、分支机构、代表机构和实体机构；
（七）决定副秘书长、各机构主要负责人的聘任；
（八）领导协会各机构开展工作；

(9) Develop the internal management system;
(10) Make decisions on other major matters authorized by the Representative Assembly.

Article 20 the meeting of the ISA Board must be attended by more than two-thirds of the Board members. The resolutions must be adopted by vote of more than half of the attended members.

Article 21 the meeting of the ISA Board must be held at least once a year. In special circumstances, it may be held in the form of communication.

Article 22 The chairman, vice chairman and secretary general of the Association must meet the following conditions:
(1) Have a major impact in the operational area of the Association;
(2) In principle, the chairman, vice chairman and secretary general shall not be more than 70 years of age, and the secretary general shall be full-time;
(3) Shall be healthy and able to work properly;
(4) Not subject to criminal punishment such as deprivation of political rights;
(5) Have full capacity for civil conduct.

Article 23 If the chairman, vice chairman or secretary general of the Association exceeds the maximum age restriction of appointment, the post shall be held after being adopted by vote of the ISA Board, and submitted to the competent authority for review and the registration and administration authority for approval.

Article 24 A term of the chairman, vice chairman or secretary general of the Association is five years, and shall not exceed two terms at maximum in principle. Under special circumstances that a term needs to be ended in advance or postponed, the post shall be held after being adopted by vote of more than two-thirds of the member representatives of the Representative Assembly, and submitted to the competent authority for review and the registration and administration authority for approval.

（九）制定内部管理制度；
（十）决定经会员代表大会授权的其他重大事项。

第二十条 理事会须有 2/3 以上理事出席方能召开，其决议须经到会理事半数以上表决通过方能生效。

第二十一条 理事会每年至少召开一次会议；情况特殊的，也可采用通讯形式召开。

第二十二条 协会主席、副主席、秘书长必须具备下列条件：
（一）在协会业务领域内有较大影响；
（二）主席、副主席、秘书长最高任职年龄不超过 70 周岁，秘书长为专职；
（三）身体健康，能坚持正常工作；
（四）未受过剥夺政治权利等刑事处罚的；
（五）具有完全民事行为能力。

第二十三条 协会主席、副主席、秘书长如超过最高任职年龄的，须经理事会表决通过，报业务主管单位审查并社团登记管理机关批准同意后，方可任职。

第二十四条 协会主席、副主席、秘书长每届任期 5 年，一般不应超过 2 届。因特殊情况需延长任期的，须经会员代表大会 2/3 以上会员代表表决通过，报业务主管单位审查并经社团登记管理机关批准同意后方可任职。

Article 25 The secretary general is the legal representative of the Association. The legal representative of the Association shall not serve as legal representative of other groups.

Article 26 The chairman of the Association exercises the following functions and
(1) Convene and preside over the ISA Board;
(2) Check the implementation of resolutions of the Representative Assembly and the ISA Board;
(3) Preside over and study major matters of the Association;
(4) May nominate the list of candidates for vice chairman and secretary general, but the appointment is decided by the ISA Board.
(5) May delegate vice chairman or secretary general to exercise functions and powers of the chairman;

Article 27 The secretariat permanently located in Beijing, China, is the legally registered body of ISA and execute the following functions under the guidance of related authorities of Chinese government.
(1) Conduct routine activities following the work-plan;
(2) Execute the decision of the Board;
(3) Manage the asset of Association;
(4) Assist the Board and Chairman to implement related activities;
(5) Draft rules or regulation for decision of the Board and then put into implementation;
(6) Absorb and manage members authorized by the Board.

Article 27 The secretary general of the Association exercises the following functions and powers:
(1) Sign relevant important documents on behalf of the Association;
(2) Presided over administrative offices to carry out the daily work, and organize the implementation of annual work plan;
(3) Coordinate the work of branches, representative offices and entities;
(4) Nominate deputy secretary general and principal heads of administrative offices, branches, representative offices and entities, and submit to the ISA Board for decision;

第二十五条 协会秘书长为协会的法定代表人。本协会法定代表人不兼任其他团体的法定代表人。

第二十六条 协会主席行使下列职权：
（一）召集和主持理事会；
（二）检查会员代表大会、理事会决议的落实情况；
（三）主持研究协会的重大工作事宜；
（四）可提名副主席、秘书长候选名单，由理事会决定任命；
（五）可委托副主席或秘书长行使其职权；

第二十七条 秘书处是协会的法定办事机构，常设在中国北京，履行以下职责：
（一）在中国政府有关部门的指导下制定实施年度计划，开展日常工作；
（二）负责执行理事会的决定；
（三）管理协会的资产；
（四）协助理事会及主席履行具体职能；
（五）起草制定协会有关规章制度并提请理事会批准后执行；
（六）经理事会授权，代行理事会有关吸收新会员、管理会员的职权。

第二十七条 协会秘书长行使下列职权：
（一） 代表协会签署有关重要文件；
（二） 主持办事机构开展日常工作，组织实施年度工作计划；
（三） 协调各分支机构、代表机构、 实体机构开展工作；
（四）提名副秘书长以及各办事机构、分支机构、代表机构和实体机构主要负责人，交理事会决定；

(5) Make decisions on the employment of full-time staff for administrative offices, representative offices and entities;
(6) Deal with other daily affairs.

Chapter Five Principles of Asset Management and Use

Article 28 Financial sources of the Association:
(1) Membership fees;
(2) Donations;
(3) Government grants;
(4) Income from activities or services within the verified operational scope of the Association;
(5) Interest;
(6) Other legal income.

Article 29 The Association collects membership dues in accordance with relevant state regulations.

Article 30 The funds of the Association must be used in the operational scope and career development in accordance with the Constitution of the Association, and shall not be distributed among the members.

Article 31 The Association shall establish a strict financial management system to ensure that accounting materials are legal, real, accurate and complete.

Article 32 The Association shall be staffed with accounting personnel with professional qualifications. The accountant shall not serve as cashier. Accounting personnel must conduct accounting and implement accounting supervision. When transferring or leaving the post, accounting personnel must accomplish handover procedures with take-over personnel.

Article 33 The asset management of the Association must implement the financial management system as stipulated by the state and accept the supervision of the Representative Assembly and the financial authority. When assets source from state grants, social donations or social funding, it must be

（五）决定办事机构、代表机构、实体机构专职工作人员的聘用；
（六）处理其他日常事务。

第五章 资产管理、使用原则

第二十八条 协会经费来源：
（一）会费；
（二）捐赠；
（三）政府资助；
（四）在核准的业务范围内开展活动或服务的收入；
（五）利息；
（六）其他合法收入。

第二十九条 协会按照国家有关规定收取会员会费。

第三十条 协会经费必须用于本章程规定的业务范围和事业的发展，不得在会员中分配。

第三十一条 协会建立严格的财务管理制度，保证会计资料合法、真实、准确、完整。

第三十二条 协会配备具有专业资格的会计人员。会计不得兼任出纳。会计人员必须进行会计核算，实行会计监督。会计人员调动工作或离职时，必须与接管人员办清交接手续。

第三十三条 协会的资产管理必须执行国家规定的财务管理制度，接受会员代表大会和财政部门的监督。资产来源属于国家拨款或者社会捐

supervised by the audit institution, and the relevant information shall be disclosed to the public in appropriate manners.

赠、资助的，必须接受审计机关的监督，并将有关情况以适当方式向社会公布。

Article 34 Before the change of a term or replacing the legal representative, the Association must accept financial audit organized by the registration and administration authority and the competent authority.

第三十四条 协会换届或更换法定代表人之前必须接受社团登记管理机关和业务主管单位组织的财务审计。

Article 35 No unit or individual shall invade and occupy, privately divide or misappropriate assets of the Association.

第三十五条 协会的资产，任何单位、个人不得侵占、私分和挪用。

Article 36 The salaries, insurance and welfare benefits for the full-time staff of the Association shall be implemented in accordance with relevant state provisions on public institutions.

第三十六条 协会专职工作人员的工资和保险、福利待遇，参照国家对事业单位的有关规定执行。

Chapter Six Procedures for Revisions of the Constitution

第六章 章程的修改程序

Article 37 The revisions to the Constitution of the Association shall be submitted to the Representative Assembly for discussion after being adopted by vote of the ISA Board.

第三十七条 对协会章程的修改，须经理事会表决通过后报会员代表大会审议。

Article 38 Before it comes into force, the revised Constitution of the Association shall be reviewed and approved by the competent authority and verified by the registration and administration authority within 15 days after being passed by the Representative Assembly.

第三十八条 协会修改的章程，须在会员代表大会通过后 15 日内，经业务主管单位审查同意，并报社团登记管理机关核准后生效。

Chapter Seven Termination Procedures and Assets Treatment after Termination

第七章 终止程序及终止后的财产处理

Article 39 If the Association completes its purpose, dismisses voluntarily or needs to apply for the cancellation due to reasons such as separation or merger, the ISA Board shall propose a termination motion.

第三十九条 协会完成宗旨或自行解散或由于分立、合并等原因需要注销的，由理事会提出终止动议。

Article 40 The termination motion shall be adopted by vote of the Representative Assembly and submitted to the competent authority for review and approval.

第四十条 协会终止动议须经会员代表大会表决通过，并报业务主管单位审查同意。

Article 41 Before the termination, the Association shall establish a liquidation organization under the guidance of the competent authority and relevant authorities to settle claims and debts and deal with the aftermath. During the liquidation, activities other than liquidation shall not be carried out.

第四十一条 协会终止前，须在业务主管单位及有关机关指导下成立清算组织，清理债权债务，处理善后事宜。清算期间，不开展清算以外的活动。

Article 42 After the registration and administration authority finishes procedures for the cancellation of registration, the Association shall be terminated.

第四十二条 协会经社团登记管理机关办理注销登记手续后即为终止。

Article 43 After the termination of the Association, the remaining assets shall be used for the development of undertakings related to the purpose of the Association in accordance with relevant state provisions under the supervision of the registration and administration authority and the competent authority.

第四十三条 协会终止后的剩余财产，在业务主管单位和社团登记管理机关的监督下，按照国家有关规定，用于发展与协会宗旨相关的事业。

Chapter Eight Supplementary Provisions

第八章 附则

Article 44 The Constitution of the Association was adopted by vote at the Second Representative Assembly held on October 15, 2019.

第四十四条 本章程经 2019 年 10 月 15 日在德国召开的第二届会员代表大会审议通过。

Article 45 The ISA Board reserves the right of interpretation of the Constitution.

第四十五条 本章程的解释权属协会的理事会。

Article 46 The Constitution shall come into force on the date of verification by the registration and administration authority.

第四十六条 本章程自社团登记管理机关核准之日起生效。

国际沙棘协会（中国）企业委员会会长单位 —— 高原圣果沙棘制品有限公司

Conseco Seabuckthorn Co., Ltd. was founded in 1998 under China National Administration Center for Seabuckthorn Development. The headquarters is in Beijing, and seabuckthorn resources processing base are in Ordos.

高原圣果沙棘制品有限公司创建于 1998 年，是水利部沙棘开发管理中心为推动沙棘事业投资创办的国家级沙棘产业示范企业。公司总部在北京，在内蒙古鄂尔多斯建有沙棘资源基地及原料加工基地。

Conseco has its own improved seedling breeding base, raw material processing base and marketing system. Conseco has six health products with batch numbers, such as seabuckthorn flavonoids soft capsule, seabuckthorn oil soft capsule and Qingyan capsule, which are of excellent quality and high technical content among the similar health products and are well received by the majority of consumers.

公司拥有自己的良种苗木繁育基地、原料加工基地以及市场销售体系。并且拥有沙棘黄酮软胶囊、沙棘油软胶囊、清妍胶囊等六款保健品批号产品，在同类保健品中品质优良，技术含量高，受到广大消费者的好评。

Conseco has passed the health registry of food exporting, the international certificate of ISO9001, HACCP and Kosher, and the certificate of organic food in EU, United States and Japan. The processes including picking, sorting, processing, packing, storage and transportation are strictly followed these international standards. Conseco produced series of seabuckthorn products which be sold all over China and other countries in the world.

公司先后通过了国家的食品出口卫生注册、ISO9001 质量管理体系国际认证、HACCP 食品安全体系国际认证、Kosher 认证、欧盟、美国及日本的有机食品认证。产品加工过程从采果地认证－采果－分选－加工－包装－保鲜－储运等，各项工序严格遵照国际标准进行。开发生产系列沙棘产品，业务遍及中国和世界很多地区。

In 2019, Conseco was awarded the “President unit of the International seabuckthorn Association”. In 2021, Conseco was honored and became an excellent member of the International Sea-buckthorn Association.

2019 年，高原圣果沙棘制品有限公司被授予“国际沙棘协会企业委员会会长单位”。2021 年，高原圣果沙棘制品有限公司荣获“国际沙棘协会优秀会员企业”称号。

国际沙棘协会（中国）企业委员会副会长单位 —— 北京宝得瑞健康产业有限公司

Beijing Powdery Health Industry Co., Ltd. has been operating for more than 20 years，It has a high reputation in the ingredient industry of functional food. The company focuses on the industrial chain model from the base to the products. Controllable raw materials, excellent technology, product stability are the foundation of the company. The company has one-stop capability of the choice of product direction, product research and development, industrialization. Currently The products mainly include fruit and vegetable powders, plant extracts, functional high-end health oils, powdered oils, functional liquid drinks and solid drinks etc. More than 20 invention patents have been authorised. With the development of the company, we have set up independent legal entities in Jingmen City, Hubei Province and Zhangjiakou City, Hebei Province in order to realize the main raw materials from our own planting bases.

北京宝得瑞健康产业有限公司运营 20 多年，在功能食品原料行业具有很高的知名度。公司专注从基地到原料的产业链模式，原料可控、工艺优良、产品稳定是公司的立身之本，公司耕耘果蔬粉、植物提取物、功能性高端保健油脂、粉末油脂、功能性液体饮料、功效性固体饮料等，从产品方向选择到产品研发、产业化一条龙实现。公司拥有 20 项发明专利，伴随着公司的发展，公司在湖北荆门市和河北张家口市成立了独立法人公司，实现主原料基地化生产。

- Powdery (Hebei) Health Industry Co., Ltd. mainly focuses on sea buckthorn business. The company has 40,000 hm2 of Hippophae rhamnoides subsp. sinensis, of which 7333 hm2 have been certified as organic. Sea buckthorn products cover the whole range, including sea buckthorn puree, sea buckthorn clear juice, sea buckthorn concentrated juice, sea buckthorn seed oil, sea buckthorn fruit oil, sea buckthorn juice powder, sea buckthorn seed oil powder, sea buckthorn fruit oil powder, sea buckthorn peel powder, sea buckthorn leaf powder. The company is a national high-tech enterprise, which has powder product production line, CO2 supercritical production line, sea buckthorn juice production line, glass bottle oral liquid production line, softgel production line, tablet candy production line, etc and has 11 sea-buckthorn related invention patents covering the whole process of products.

宝得瑞（河北）健康产业有限公司主要围绕沙棘业务展开，公司拥有中国沙棘资源 60 万亩，其中 11 万亩进行了有机认证；沙棘产品覆盖全，包括沙棘汁、沙棘清汁、沙棘浓缩汁、沙棘籽油、沙棘果油、沙棘果汁粉、沙棘籽油粉、沙棘果油粉、沙棘果皮粉、沙棘叶粉等；公司有粉状产品生产线、CO_2 超临界生产线、沙棘果汁生产线、玻璃瓶装口服液生产线、软胶囊生产线、压片糖果生产线等；公司沙棘相关发明专利 11 项，覆盖产品的全过程，是国家级高新技术企业。

国际沙棘协会（中国）企业委员会副会长单位 —— 河北神兴沙棘研究院

Hebei Shenxing Seabuckthorn Research Institute, founded in 2000, located in Shijiazhuang, capital of Hebei Province, which is a technology-based private enterprise dedicated itself in the application of advanced technology for research, development, and industrialization of seabuckthorn products, complemented by related technical services.

As the vice chairman of the Enterprise Committee（China）of the ISA, the company actively participates in the work of the association, and has successively become the sponsor of the eighth and ninth International Seabuckthorn Association conferences in 2018 and 2023 respectively.

With over two decades of experience, the institute has accumulated extensive expertise in beverages, health food, and pharmaceuticals. It possesses a range of core technologies, including supercritical CO_2 extraction, macroporous resin adsorption, and membrane separation techniques.

Under the institute's technical guidance, Shenxing seabuckthorn industry cluster has obtained 26 drug approvals and 8 health food registration licences, the dosage forms include soft capsule, tablet, oral liquid, raw materials cover seabuckthorn fruit oil, seabuckthorn seed oil, flavonoids, fruit powder, OPC, pulp, concentrate juice, etc. Additionally, there is 1 certificate of invention patent for Seabuckthorn Wine and over 40 kinds of scientific research reserve projects related to seabuckthorn, abundant achievements in scientific research have been made.

河北神兴沙棘研究院，坐落于河北省省会石家庄市。公司成立于 2000 年，是一家科技型民营企业。公司目前经营业务为：运用高新技术，从事沙棘系列产品的研究、开发及产业化，同时开展有关的技术服务。公司从组建之初，就坚持以“实施名牌战略，发展沙棘事业”为使命，以“奉献生态效益、造福人类健康”为目的，以高新技术为先导，创立中国沙棘保健品新体系，开创沙棘新药新体系。

2014 年以来，公司与河北医科大学药学院签订了共建实验室协议。2017 年，公司与山西省林业和草原科学研究院签订战略合作协议。2019 年，公司被授予“国际沙棘协会（中国）企业委员会副会长单位”。同年，国家林业和草原局沙棘工程技术研究中心功能食品研发中心在河北神兴沙棘研究院挂牌成立。2018 年与 2023 年，公司连续成为第八届、第九届国际沙棘协会大会赞助单位。

经过二十年的发展，公司在饮料、保健食品、药品等研究领域积累了丰富的经验，拥有了一系列核心技术：超临界 $C0_2$ 萃取技术、大孔树脂吸附技术、膜分离技术。

在研究院的技术支持下，神兴沙棘产业集群先后取得 26 个药品批号（其中国家一类新药 1 个，国家二类新药 1 个，国家 6 类新药 2 个），沙棘系列保健食品批号 8 个（产品型态丰富，涉及软胶囊、片剂、口服液，原料涵盖沙棘果油、沙棘籽油、黄酮、果粉、花青素、原浆、浓缩汁等），酒品专利 1 个，并拥有 40 多个沙棘科研储备项目，相关课题先后通过河北省重大科技攻关项目、自然科学基金及多个石家庄市级科研项目鉴定，取得了丰硕的学术成果。

国际沙棘协会（中国）企业委员会副会长单位 —— 吕梁野山坡食品有限责任公司

There are dozens of product categories which include seabuckthorn raw material,seabuckthorncon, Seabuckthorn beverage, seabuckthorn con, seabuckthorn seed, seabuckthorn fruit, seabuckthorn seed oil, seabuckthorn fruit oil, seabuck-thorn frozen dry fruit,seabuckthorn fruit dry skin, seabuckthorn dry fruit and seabuckthorn bis-cuit which are sold to places all over the country. The market share of terminal products main-tains 90% in north China. Seabuckthorn juicedrink, tinned seabuckthorn, seabuckthorn seed, seabuckthorn fruit,seabuckthorn seed oil,seabuckthorn fruit oil, dried seabuckthorn, dried sea-buckthorn skin and seabuckthorn dry fruit areexported to countries such as Japan, Korea and Germany. The sales ratio of products reaches 100%. The company buys more than 10,000 tons of seabuckthorn from farmers each year in theway of subscription agreement,which raises the income of more than 5,000 farming families with an average family income over 16,000 Yuan. Accordingly, the economic income of famers in mountain area is improved and the develop-ment of rural economy is promoted.

BUSINESS CATEGORY

seabuckthorn beverage
seabuckthorn fruit oil
seabuckthorn dry fruit
seabuckthorn seed oil
seabuckthorn seed
seabuckthorn raw fruit
seabuckthorn oil capsule
abuckthorn fruit dry skin
seabuckthorn forzen dry fruit
seabuckthorn biscuit
seabuckthorn tea
seabuckthorn chewable tablets

主要产品有沙棘原料、沙棘口服液、沙棘饮料、沙棘罐头、沙棘籽、沙棘果肉、沙棘籽油、沙棘果油、沙棘干果、沙棘干果皮、沙棘果皮粉、沙棘饼干等几十个品种，产品销售网络遍布全国各地。终端产品在华北地区保持 90% 的市场覆盖率。沙棘原果汁、沙棘罐头、沙棘籽、沙棘果肉、沙棘籽油、沙棘果油、沙棘干果、沙棘干果皮、沙棘果皮粉等出口日本、韩国、德国等国家。产品销售率达到 100%。公司每年以收购协议方式向农民收购沙棘 10000 吨以上，直接带动山区 5000 多名农民采收户，户均收入可达 16000 元以上。改善了山区农民的经济收入，促进了农村经济产业化的发展。

经营类目

沙棘汁饮料 沙棘果油 沙棘干果 沙棘籽油 沙棘籽 沙棘原浆 沙棘油胶囊沙棘干果皮 沙棘果皮粉沙棘饼干 沙棘茶叶 沙棘咀嚼片。

国际沙棘协会（中国）企业委员会副会长单位 —— 陕西海天制药有限公司

Shaanxi Haitian Pharmaceutical Co. , Ltd. is a high-tech enterprise integrating R & D, production and sales of medicine, Hippophae rhamnoides series health food, health care products and female beauty care products. It was established in 2001, headquartered in Xixian new area, Shaanxi Province, the existing drug production base of three, two seabuckthorn processing plants and 40,000 mu of seabuckthorn Chinese medicine planting base, more than 10 Chinese medicine formulation production lines, can produce more than 90 million boxes of Chinese medicine; The production line can process 6,000 tons of Chinese medicinal materials annually, and the equipment imported from Germany can produce more than 100 tons of sea buckthorn seed oil Supercritical fluid extraction year.

The company has more than 100 drug numbers, and its main products are Siji antivirus mixture (capsule) , Mozhen capsule, compound seabuckthorn seed oil suppository, seabuckthorn dry emulsion, Baihe Gujin oral liquid and Xindakang tablets, etc. , among them, there are 5 exclusive varieties, 4 patented varieties, 2 exclusive dosage forms, and 6 traditional Chinese medicine varieties with Hippophae rhamnoides as the main raw material. It is also the enterprise with the largest number of hippophae rhamnoides as raw material in China, the annual demand of Hippophae rhamnoides is about 7000 tons.

The company has more than 4200 employees, of which more than 3000 full-time sales team, covering more than 30 regions in the country's 236 offices. Enterprises adhering to the“People-oriented, science and technology-oriented, loyal service to human health cause” purpose, adhere to the integrity of business, according to tax, corporate responsibility, it has won more than 100 honours at various levels in China, the provinces and the municipalities.

陕西海天制药有限公司是一家集药品、沙棘系列健康食品、保健产品和女性美容护理用品研发、生产和销售于一体的高新技术企业，2001 年成立，总部位于陕西省西咸新区，现有药品生产基地三处、两个沙棘加工厂和 4 万亩沙棘中药材种植基地， 10 余条中药剂型生产线，可年产中药成药 9000 多万盒；全自动化控制提取生产线可年处理各类中药材 6000 吨，德国原装进口的二氧化碳超临界萃取生产设备可年产沙棘籽油百余吨。

企业拥有药品文号 100 多个，主要产品有四季抗病毒合剂（胶囊）、蛾贞胶丸、复方沙棘籽油栓、沙棘干乳剂、百合固金口服液和心达康片等，其中独家品种 5 个，专利品种 4 个，独家剂型品种 2 个，以沙棘为主要原料的中药品种 6 个，也是国内拥有沙棘为原料药品文号最多的企业，年沙棘需求量约 7000 余吨。

企业拥有员工已超过 4200 多人，其中 3000 多人的专职销售团队，遍布于全国 30 多个地区的 236 个办事处。企业秉承“以人为本、以科技为先导，忠实服务于人类健康事业”的宗旨，坚持诚信经营、依法纳税，履行企业责任，已荣获中、省、市各级荣誉 100 多项。

国际沙棘协会（中国）企业委员会副会长单位 ——吉林吉隆东北沙棘产业有限责任公司

Jilin jilong DongBei Seabuckthorn Industry Co.,LTD was established in 2017, based in Da'an City Jilin Province,the company develop seabuckthorn and Chinese herbal medicine compound planting and processing in salt-alkali sand, such as ecological fragile zone. The company's mission is to promote the development of Chinese herbal medicine industry of Sea-buckthorn, and to achieve the purpose of rural revitalization and prosperity of the people through integration of the three industries", that is, the close combination of ecological green economy and health industry.

With a total investment of 450 million yuan, the project includes planting 20 thousand mu of eco-economic forest of sea-buckthorn and 15 thousand mu of Chinese medicinal materials such as rhizome attrium, building processing and production bases of sea-buckthorn and Chinese medicinal materials, and promoting rural employment. After completion of the project, the annual output value is expected to be 300 million yuan, and provide employment for more than 1,000 people.

Company build a research platform for Chinese medicinal materials planting has been rated as provincial leading enterprise of forestry industrialization,Jilin Provincial Demonstration Base of high-quality and Authentic Medicinal materials Science and Technology,Baicheng Demonstration Base of Chinese Medicinal Materials Planting,etc. The company is now the construction unit of Jilin Provincial Engineering and Technology Research Center,and the vice president unit of National Sea-buckthorn Entrepreneurs Association.

The sea-buckthorn multiple-producing factory was basically completed and went into service in 2023, 1000 tons of fruit will be harvested and produced to raw pulp beverage,oil and other products afterward.

吉林吉隆东北沙棘产业有限责任公司成立于 2017 年，公司致力于以大安市为基地，在盐碱风沙等生态脆弱地带，发展大果沙棘和中药材复合种植与加工，通过生态绿色经济和大健康产业，实现“三产融合”全产业链紧密结合，促进沙棘中药材产业的发展，达到乡村振兴产业富民的目的。

项目规划总投资 4.5 亿元，种植大果沙棘生态经济林 2 万亩和苍术板蓝根等 1.5 万亩，建设占地 5 万平方米的综合加工生产基地，带动农户种植大果沙棘和中药材 5 万亩，项目建成后预计年产值 3 亿元，提供就业 1000 余人。

公司在吉林省各级领导支持下被评为省级林业产业化龙头企业、吉林省农民工等人员返乡创业基地、吉林省优质道地药材科技示范基地、白城市农业产业化龙头企业、白城市中药材种植示范基地等，担任吉林省林业草原沙棘工程技术研究中心的建设单位，全国沙棘企业家协会副会长单位。

2023 年沙棘综合加工厂基本建成投入使用，采收沙棘果实 1000 吨，生产的沙棘原浆、沙棘饮料、沙棘油等产品投放市场。

国际沙棘协会（中国）企业委员会副会长单位 —— 上海容邦企业集团有限公司

Shanghai Rongbang Enterprise Group, founded in 2006, is an environmentally friendly healthy food enterprise focusing on the development and production of organic agriculture and seabuckthorn industry products. The company has nearly 500 employees, with 21 offline stores operating and tens of thousands of products sold. The company adopts the service mode of combining online self-run small programs + live broadcast + online and offline physical stores to provide intimate services for more than 10 million customers.

In terms of organic products, there are five farms, namely Zhouzhuang Farm, Taizhou Farm, Nanzhang Farm, Hainan Farm and Nanxiang Farm, without using chemical pesticides, fertilizers, hormones and genetically modified in the production process. Shangshanyuan always adheres to building high standard and high quality organic agriculture, and has been identified as the provincial key leading enterprise of agricultural industrialization in Jiangsu Province, the municipal leading enterprise of agricultural industrialization in Taizhou City, and the director unit of Shanghai Organic Special Committee.

In the field of seabuckthorn products, food source pay attention to product research and development and innovation, to user demand as the guidance, constantly optimize the products, with strong technical strength and advanced equipment, and advanced talent service team, seabuckthorn, successfully developed a series of products, such as seed oil, Seabuckthorn probiotics, Seabuckthorn and thistle, original pulp, etc., and consumers love and trust, has won the international association of excellent member enterprises, the international association, vice President of the unit.

上海容邦企业集团成立于 2006 年，是一家以有机农业和沙棘产业产品研发生产为主的环保型健康食品企业。公司在职员工近 500 人，目前已有 21 家线下门店正在营业，所售产品有上万种，公司采用线上自营小程序 + 直播 + 实体门店线上线下相结合的服务模式，为用户提供贴心服务。

在有机产品方面，拥有周庄农场、泰州农场、南漳农场、海南农场以及南翔农场共五大农场，在生产过程中不使用化学农药、化肥、激素、转基因。上膳源始终坚持打造高标准、高品质有机农业，先后被认定为江苏省农业产业化省级重点龙头企业、泰州市农业产业化市级龙头企业、上海有机专委会主任单位。

在沙棘产品领域，上膳源注重产品的研发与创新，以用户需求为导向，不断优化产品，凭借强大的技术实力和先进的设备，以及高精尖人才服务团队，成功开发出一系列沙棘产品，如沙棘籽油、沙棘益生菌、沙棘水飞蓟、沙棘原浆等，深受广大消费者的喜爱和信赖，先后荣获国际沙棘协会优秀会员企业、国际沙棘协会副会长单位。

国际沙棘协会（中国）企业委员会副会长单位 —— 内蒙古宇航人高技术产业有限责任公司

Inner Mongolia Yuhangren Company founded in 1995 and has been committed to the comprehensive utilization of seabuckthorn industry at the beginning of the founding,Creating a full industry chain operation model for seabuckthorn. From seedling cultivation, scientific research and development, production and processing to sales services, we adhere to full production quality control in every link. Yuhangren seabuckthorn career with its huge ecological benefit, social benefit and economic benefit, get the attention and recognition from the Inner Mongolia Autonomous Region and Hohhot government for many years.

As a leading enterprise in the comprehensive utilization of the whole industry chain of sea buckthorn, Yuhangren Company insists on producing various products with high standards and high quality requirements, and applies high-tech methods such as supercritical fluid technology, biological engineering technology,macroporous resin adsorption, molecular wall breaking and enzyme addition, and osmotic membrane ultrafiltration to the development of seabuckthorn,and exploit more than 200 high-quality products for market including the pharmaceutical, functional food, personal care products, health food fields etc.Among them, we have successfully applied for two seabuckthorn drugs, nine seabuckthorn health foods, and hundreds of products from three well-known brands of seabuckthorn cosmetics.The products have been passed the world's most authoritative inspection institutions detection and obtained NOP, EEC (European Union organic food), JAS (organic food for organic agricultural products in Japan), Chinese organic food certificates. Products are exported to nearly 30 countries and regions.

内蒙古宇航人公司成立于1995年，自成立之初就致力于沙棘产业综合开发利用，打造沙棘全产业链运营模式，从育苗种植、科研开发、生产加工到销售服务，坚持每一个环节的生产质量全控制。并以其巨大的生态效益、社会效益、经济效益，多年来得到内蒙古自治区和呼和浩特市政府的高度关注和认可。

作为沙棘综合利用全产业链的龙头企业，宇航人坚持以高标准高品质要求生产各类产品，将超临界流体技术、生物工程技术、大孔树脂吸附、分子破壁加酶、渗透膜超滤等高新技术手段应用于沙棘开发，相继在医药、功能食品、沙棘饮品、保健食品、个人护理品等领域研发并上市了近200多个优质产品，其中成功申请2个准字号沙棘药品、9个沙棘保健食品批文及3大品牌上百个沙棘化妆品。产品通过了世界最权威检验机构检测，获得美国FDA、美国有机食品（NOP）、欧盟有机食品、日本有机农产品（JAS）认证，产品出口到近30个国家和地区。

国际沙棘协会（中国）企业委员会副会长单位 ——新疆景华天宝科技发展有限公司

Xinjiang Jinghua Tianbao Technology Development Co., Ltd. was established in 2019 and is a comprehensive technology enterprise focusing on the systematic development of sea buckthorn resources and research on sea buckthorn–based health products. The company has long been deeply engaged in the construction of the sea buckthorn industrial chain, taking quality management and technological innovation as its core development directions, and is committed to promoting the standardized, professional, and sustainable development of the sea buckthorn industry.

As a Vice Chairman Unit of the International Sea Buckthorn Association, Xinjiang Jinghua Tianbao actively participates in international exchanges and cooperation within the sea buckthorn industry. The company continuously explores and practices in areas such as the transformation of sea buckthorn resource value, product quality standards, and industrial collaboration, striving to play a positive role for Chinese sea buckthorn enterprises within the international industrial system.

In the professional field, the industrial practices and development achievements of Xinjiang Jinghua Tianbao have received continuous attention and recognition from the International Sea Buckthorn Association system. The company's principal and brand founder has been included in the Sea Buckthorn Expert Database of the International Sea Buckthorn Association and has been awarded the title of "Outstanding Sea Buckthorn Entrepreneur" by the China Enterprise Committee of the International Sea Buckthorn Association; meanwhile, the company itself has been honored as an "Outstanding Sea Buckthorn Enterprise," reflecting its professional value in industry standard development and industrial practice.

新疆景华天宝科技发展有限公司成立于 2019 年，是一家专注于沙棘资源系统化开发与沙棘大健康产品研究的综合型科技企业。公司长期深耕沙棘产业链建设，以品质管理与科技创新为核心发展方向，致力于推动沙棘产业的规范化、专业化与可持续发展。

作为国际沙棘协会副会长单位，新疆景华天宝积极参与国际沙棘产业交流与协作，在沙棘资源价值转化、产品质量标准及产业协同发展等方面持续探索实践，努力发挥中国沙棘企业在国际产业体系中的积极作用。

在专业领域内，新疆景华天宝的产业实践与发展成果获得了国际沙棘协会体系的持续关注与认可。公司负责人及品牌主理人入选国际沙棘协会沙棘专家数据库，并荣获国际沙棘协会中国企业委员会颁发的“优秀沙棘企业家”称号；公司同时获评“优秀沙棘企业”，体现了其在行业规范建设与产业实践方面的专业价值。

国际沙棘协会（中国）企业委员会副会长单位 —— 新疆康元生物技术集团股份有限公司

Xinjiang Kangyuan Biotechnology Group Co., LTD., founded in June 2009, has a registered capital of 61.2 million yuan and total assets of 180 million yuan. Registered in Xinjiang Habahe Industrial Park, it is a joint-stock enterprise integrating the cultivation, research and development, deep processing and sales of small berries with big fruit sea-buckthorn as the main. It has a senior management team composed of famous experts from investment bank, forest fruit, sea buckthorn and other industries. The group has become a national high-tech enterprise, a leading enterprise in Xinjiang's key agricultural industrialization, a leading enterprise in Xinjiang's key poverty alleviation, a small giant enterprise in Xinjiang, and one of hundreds of companies to be listed in Xinjiang's key cultivation. It is a model to highlight the "ecological, social and economic" benefits and practice the "Clear waters and green mountains are as valuable as mountains of gold and silver."

The Group's own demonstration planting base of sea-buckthorn has obtained the organic certification of China, the European Union and the United States and the record of export base of Xinjiang Inspection and Quarantine Bureau. It has also passed the certification of HACCP, ISO22000 food safety management and ISO9001:2015 quality management system.

The company is the world's first manufacturer of vacuum freezing and low-temperature drying technology, and has launched the concept and series products of sea-buckthorn whole fruit powder, sea-buckthorn fruit pulp powder, sea-buckthorn mixed functional fruit powder, Wolfberry whole fruit powder, sea-buckthorn original pulp, sea-buckthorn juice, sea-buckthorn milk beverage and sea-buckthorn whole fruit oil, creating a unique sea-buckthorn big fruit industry chain.

新疆康元生物技术集团股份有限公司，始建于 2009 年 6 月，集团注册资金 6120 万元，总资产 1.8 亿元。注册地为新疆哈巴河工业园区，是集以大果沙棘为主的小浆果种植、研发、深加工、销售为一体的股份制企业，拥有来自于投行、林果、沙棘等业内著名专家组成的高层管理团队。集团现已成为国家级高新技术企业、新疆重点农业产业化龙头企业、新疆重点扶贫龙头企业、新疆专精特新小巨人企业，新疆重点培育百家拟上市公司之一。是彰显“生态、社会、经济”效益和践行“绿水青山也是金山银山”的典范。

集团自有的大果沙棘示范种植基地，获得了中国、欧盟、美国有机认证和新疆检验检疫局的出口基地备案，也通过了 HACCP、ISO22000 食品安全管理、ISO9001：2015 质量管理体系认证。

全球首创真空冷冻、低温干燥技术，首发沙棘全果粉、沙棘果浆粉、沙棘复配功能果粉、枸杞全果粉、沙棘原浆、沙棘原汁、沙棘乳饮料、沙棘全果油概念及系列产品，打造独一无二的大果沙棘产业链。

国际沙棘协会（中国）企业委员会副会长单位 ——新疆中科沙棘科技有限公司

Xinjiang Zhongke Seabuckthorn Technology Co., Ltd. was established in Aheqi County, Kizilsu Kirghiz Autonomous Prefecture, Xinjiang in December 2018. It is a food production enterprise integrating seabuckthorn storage and preservation, production and processing, product R&D, and operation and sales. Covering an area of 71 mu (approximately 47,333 square meters) with a workshop construction area of 11,622 square meters, the company is equipped with a 4,000-ton fresh-keeping and frozen storage warehouse.

The enterprise has jointly established the "Xinjiang Seabuckthorn Intensive Processing Engineering Technology Research Center" with Xinjiang Agricultural University, and carried out technical cooperation with universities and research institutes such as Jiangnan University and Xinjiang Agricultural University to research and develop functional high-value-added products and build the "Jixianfeng" brand. At present, it has developed and produced more than 30 specifications of seabuckthorn products in 5 series, including seabuckthorn compound juice drinks, organic seabuckthorn original pulp, organic seabuckthorn whole fruit powder, organic seabuckthorn oil, seabuckthorn extract gel candies, and seabuckthorn leaf tea. The series of products were selected as "Taste Xinjiang" High-Quality Products in 2023, passed the certification of the regional public brand "Xinjiang Quality" in 2024, and were included in "Xinjiang Premium Products" in 2025. The enterprise has obtained 4 invention patents, 9 utility model patents, 3 appearance design patents, and 10 work registration certificates, participated in the formulation of 1 group standard, and formulated more than 10 enterprise standards. Currently, it is applying for 3 invention patents and has obtained the Intellectual Property Compliance Management System Certification.

新疆中科沙棘科技有限公司于 2018 年 12 月在新疆克州阿合奇县成立，是集沙棘存储保鲜、生产加工、产品研发、经营销售为一体的食品生产企业。占地面积 71 亩，厂房建筑面积 11622 平方米，配套建设 4000 吨保鲜冷冻贮藏库。

企业联合新疆农业大学成立“新疆沙棘精深加工工程技术研究中心”，并与江南大学、新疆农业大学等高校院所进行技术合作，研究开发功能性高附加值产品，并打造“棘鲜丰”品牌。现已开发生产出 5 大系列 30 余种规格的沙棘产品，有沙棘复合果汁饮料、有机沙棘原浆、有机沙棘全果粉、有机沙棘油、沙棘提取物凝胶糖果、沙棘叶茶等，系列产品入选 2023 年“品味新疆”好产品，2024 年通过“新疆品质”区域公共品牌认证，入选 2025 年“新疆优品”。企业现已取得 4 项发明专利，9 项实用新型专利，3 项外观设计专利，10 项作品登记证书，参与制定团体标准 1 项，制定企业标准 10 余项，目前正在申请发明专利 3 项，获得知识产权合规管理体系认证。

国际沙棘协会（中国）企业委员会副会长单位 ——布尔津县松源林果生物科技有限公司

Xinjiang Songyuan Lingguo Biotechnology Co., Ltd. is a modern agricultural enterprise integrating seabuckthorn planting, R&D, processing and sales. Adhering to the development philosophy of "policy guidance, market-driven, capable leadership, and scientific and technological cooperation", it has deeply cultivated characteristic ecological agriculture through the "Company + Cooperative + Family Farm" model. Since its founder Jin Huilin contracted thousands of mu of Gobi desert to start seabuckthorn cultivation in 2012, the enterprise has transformed the once barren land into an industrial highland with considerable annual output value and remarkable ecological benefits after more than ten years of hard work.

The company currently has a 30,000-mu seabuckthorn planting base, with an expected annual output of 6,000 to 7,000 tons of fresh seabuckthorn fruits in 2025. It has built 5 standardized production workshops, 2 breeding farms and 8 cold storage facilities, and completed the seabuckthorn tea production line.

Industrial development has driven more than 1,000 surrounding farmer households to participate in seabuckthorn planting, with an average annual income increase of 23,000 yuan per household. From 2012 to 2025, the cumulative labor transfer funds distributed reached approximately 78 million yuan, injecting strong momentum into the rural revitalization of Burqin County. With outstanding contributions, founder Jin Huilin has successively won many honors such as the First Prize in the Autonomous Region Innovation and Entrepreneurship Competition and "Advanced Individual in Rural Revitalization of the Autonomous Region". He was certified as a Senior Agricultural Technical Instructor (Agronomist) in 2024 and appointed as a Corporate Science and Technology Commissioner of Burqin County in 2025.

新疆松源林果生物科技有限公司是一家集沙棘种植、研发、加工、销售于一体的现代化农业企业，秉持“政策引导、市场驱动、能人带动、科技合作”的发展理念，以“公司 + 合作社 + 家庭农场”模式深耕特色生态农业。自 2012 年创始人靳慧林承包千亩戈壁荒漠开启沙棘种植之路以来，企业历经十余年奋斗，已将昔日不毛之地打造成年产值可观、生态效益显著的产业高地。

公司现拥有沙棘种植基地 3 万亩，2025 年预计年产沙棘鲜果 6000–7000 吨，建有 5 座标准化生产车间、2 个养殖基地和 8 座冷库，完成沙棘茶生产线建设。

产业发展带动周边1000余农户参与沙棘种植，户均年增收 2.3 万元，2012 至 2025 年累计发放劳务转移资金约 7800 万元，为布尔津县乡村振兴注入强劲动力。创始人靳慧林凭借突出贡献，先后荣获自治区创新创业大赛一等奖、“自治区乡村振兴先进个人”等多项荣誉，2024 年获评高级农业技术指导师（农艺师），2025 年受聘为布尔津县企业科技特派员。

国际沙棘协会（中国）企业委员会副会长单位 ——北京汇源食品饮料有限公司

In 2010, Huiyuan Group actively responded to national policies by establishing a sea buckthorn industry in Burqin, Xinjiang. The group set up Burqin Huiyuan Biotechnology Co., Ltd., which is part of Huiyuan Group's agricultural projects. This initiative aimed to support Burqin County's efforts to become a national-level ecological county and forest city.

After the company was established, it focused on several key areas:

1.High-Quality Seed Cultivation: Developing superior sea buckthorn varieties.

2.Desertification Control: Establishing a 50,000-acre standardized ecological demonstration plantation to combat desertification and improve ecological conditions.

3.Comprehensive Processing: Developing a 100,000-ton sea buckthorn fruit comprehensive processing facility.

Huiyuan's sea buckthorn initiative leverages agricultural resources and integrates tourism functions to build a green ecological park. This park is dedicated to ecological development and combines planting, breeding, tourism, leisure, scientific education, and regional culture. The goal is to create a highly integrated industry chain that merges primary, secondary, and tertiary industries. After over a decade of dedicated effort, Huiyuan's sea buckthorn industry has garnered significant attention and recognition:

2010 年，汇源集团积极响应国家政策，在新疆阿勒泰地区布尔津县布局沙棘产业，投身布尔津县国家级生态县和森林城市创建，并设立布尔津汇源生物科技有限公司（隶属于汇源集团的农业项目）。

公司成立后，重点开展沙棘良种繁育、5 万亩标准化荒漠化草场生态示范治理种植园建设、10 万吨沙棘果综合加工利用、沙棘系列产品开发生产等项目。持续提升沙棘深加工能力，已开发出沙棘原浆、沙棘复合果汁、沙棘饮料、沙棘茶、沙棘籽油、沙棘果油凝胶糖果、沙棘冻干粉等 10 余种沙棘产品。

经过 10 余年深耕，汇源沙棘产业受到社会各界的关注与认可，荣获“2021 年度企业社会责任峰会绿色榜样”“2022 年新疆阿勒泰地区重点龙头企业”等荣誉，并成为国际沙棘协会（中国）企业委员会副会长单位。2023 年 9 月，还成功承办“国际沙棘协会（中国）企业委员会 2023 年年会暨全国沙棘学术交流会”。

国际沙棘协会（中国）企业委员会副会长单位 ——阿勒泰太阳石健康产业发展有限公司

Established in 2013, Sunstone Group has focused on the in-depth development of the Xinjiang sea buckthorn industry, comprehensively integrating upstream and downstream resources across the entire industrial chain. From sea buckthorn cultivation and raw material procurement, production and processing to product sales, Sunstone has built a complete and highly efficient closed-loop industrial ecosystem. As a Vice Chairman unit of the Enterprise Committee of the International Sea Buckthorn Association (China), the company actively collaborates closely with the National Sea Buckthorn Development Center of the Ministry of Water Resources. Leveraging the complementary resources and strengths of both parties, Sunstone injects strong momentum into the vigorous development of the sea buckthorn industry, while actively responding to national policies by promoting rural revitalization and advancing ecological restoration through industrial development.

Sunstone Sea Buckthorn highly values scientific research and innovation, possessing numerous patented technologies. These include research on refining equipment and methods for sea buckthorn oil, as well as the development of pulp separation devices for sea buckthorn fruit processing. The company has mastered advanced technologies such as physical deacidification, molecular distillation, and specialty membrane technologies. In addition, it owns a portfolio of patents covering novel product formulations and processing techniques, continuously strengthening its core technological barriers. Driven by scientific research as a powerful engine, Sunstone integrates lean manufacturing principles throughout the entire production process and combines them with an industrial tourism model, creating a modern group enterprise that integrates industry, academia, and research.

太阳石集团于 2013 年正式成立，自创立伊始便将目光聚焦于新疆沙棘产业的深度开发、全面整合产业链上下游资源，从沙棘种植、原料采购、生产加工到产品销售，形成了一个完整、高效的产业闭环。作为国际沙棘协会（中国）企业委员会的副会长单位，公司积极与国家水利部沙棘开发中心展开紧密携手合作，凭借双方的资源与优势，共同为沙棘产业的蓬勃发展注入强大动力，同时积极响应国家政策，致力于通过沙棘产业推动乡村振兴战略的实施以及生态治理工作的有效开展。

太阳石沙棘高度重视科研创新，拥有多项专利技术。如沙棘油的精炼设备及方法的研究、沙棘果加工用瓤子分离装置的研发等；掌握“物理脱酸”、“分子蒸馏技术”、“特种膜技术”等先进工艺技术；还拥有多款新型产品配方和工艺专利，不断健全核心技术壁垒，以科研为强大驱动引擎，将精益制造理念贯穿于生产全过程，并结合工业旅游的新模式，打造出一个现代化产学研为一体的集团企业。

国际沙棘协会（中国）企业委员会副会长单位 —— 青海康普生物科技股份有限公司

General Health Group, established in May 2002, It is engaged in organic cultivation, intensive processing and product development of characteristic plant resources of Qinghai-Tibet Plateau, especially sea buckthorn and wolfberry, We have focused on human nutrition and health business for over 20years, and have been identified by the government of National High-tech Enterprise,National Innovation-oriented Enterprise,NationalSRDI(specialized,refinement,differential,innovation)Little Giant Enterprise,National Key Leading Forestry Enterprise,National Key Leading Enterprise in Agriculture Industrialization,National Model Agro - processing Enterprise, National Green Factory.

康普集团创立于 2002 年 5 月，从事青藏高原特色植物资源尤其是沙棘、枸杞的有机种植、精深加工和产品研发，专注于人类营养健康事业二十年的国家级高新技术企业、国家级创新型企业、国家级专精特新小巨人企业、国家林业重点龙头企业、农业产业化国家重点龙头企业、全国农产品加工示范基地、国家级绿色工厂。

We have taken the lead in setting up the first leading academician workstation in the industry. Our R&D Center, established the cooperation of manufacturing and science between the enterprise and more than 20 top scientific research institutions, has been identified of National and Local Joint Engineering Laboratory.

率先成立行业首家院士工作站，研发中心被认定“国家地方联合工程实验室”，与国内 20 多所顶级科研院校建立了产学研合作关系。

We have got certificate of ACCP,ISO9001,ISO14001, ISO45001.We have got Chinese,EU, USDA,AND JAS Organic certification.We have got the CMA qualification certification.Full-chain traceability management system has been ensured.High quality material has been ensured and provided by our organic plantation.Reliable products have been ensured and provided by our industry-leading manufacturing technique.

企业通过 HACCP/ISO9001/ISO14001/ISO45001 认证；中国、欧盟、美国、日本有机认证；CMA 资质认证；保证全链可追溯管理。有机基地确保优质原料，行业领先的生产工艺平台为您提供放心产品。

国际沙棘协会（中国）企业委员会副会长单位 ——山西待见生物科技有限公司

Shanxi Daijian Biotechnology Co., Ltd. is located in Chengtou Village, Xiying Town, Jiaocheng County, Shanxi Province, a time-honored county with a history spanning thousands of years. The factory covers a total area of 20,000 square meters. Since its establishment, the company has upheld the original aspiration of "Providing Quality Products Around You" and dedicated itself to the development and utilization of sea buckthorn resources. It is a large-scale full-industry-chain enterprise integrating the harvesting, R&D, production and sales of sea buckthorn.

On the production front, the company is equipped with 8 advanced professional production lines, covering the entire production process of sea buckthorn fresh fruit pressing, 10,000-ton-level PET bottle filling, glass bottle filling, oral liquid filling, spouted aluminum foil bag filling, and sea buckthorn oil filling, which can efficiently meet the large-scale production needs of multi-specification and multi-category products. At present, the company has built a diversified product matrix, including sea buckthorn juice, organic sea buckthorn juice, sea buckthorn puree, sea buckthorn seed oil, sea buckthorn fruit oil, as well as sea buckthorn goat milk tablets, sea buckthorn fruit cake, concentrated sea buckthorn paste and other series of products, fully catering to the personalized needs of different consumption scenarios, sales channels and user groups. To strengthen the quality defense line, the company has successively obtained a number of authoritative certifications and qualifications, including Organic Product Certification, ISO22000 Food Safety Management System Certification, HACCP System Certification, U.S. NOP Organic Certification, EU Organic Certification, U.S. FDA Certification, and Export Enterprise Filing, safeguarding product quality with stringent standards.

山西待见生物科技有限公司坐落于千年古县山西省交城县西营镇城头村，厂区占地面积达 20000 平方米。自创立之初，公司便秉持“做你身边好产品”的初心，深耕沙棘资源开发与利用领域，是一家集沙棘采摘、研发、生产、销售于一体的全产业链大型企业。

在生产端方面，公司配备 8 条先进的专业化生产线，涵盖沙棘鲜果压榨、万吨级 PET 瓶灌装、玻璃瓶灌装、口服液灌装、吸嘴铝箔袋灌装、沙棘油灌装等全品类生产环节，可高效满足多规格、多品类产品的规模化生产需求。目前，公司已构建起多元化的产品矩阵，包括沙棘果汁、有机沙棘果汁、沙棘原浆、沙棘籽油、沙棘果油以及沙棘羊奶片、沙棘果糕、沙棘膏等系列产品，全面覆盖不同消费场景、销售渠道与用户群体的个性化需求。为筑牢品质防线，公司先后斩获有机产品认证、ISO22000 食品安全管理体系认证、HACCP 体系认证，以及美国 NOP、欧盟 EU 有机认证、美国 FDA 认证、出口企业备案等多项权威资质，以严苛标准守护产品品质。