

ICS 65.020.20

B 05

Technical Standard of International Seabuckthorn Association

团 体 标 准

T/ISA008-2022

果实丰产型沙棘品种评价规范 (Code for evaluation of high-yield seabuckthorn varieties)

Issued on December 29, 2022

Effective on January 29, 2023

Issued by: International Seabuckthorn Association

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前言

本规范按照 GB/T 1.1—2020《标准化工作导则 第一部分：标准结构和编写》的规则起草。

本规范由国际沙棘协会（ISA）归口。

本规范起草单位：黑龙江省农业科学院乡村振兴科技研究所、水利部沙棘开发管理中心（水利部水土保持植物开发管理中心）、中国林业科学研究院沙漠林业实验中心、黑龙江省八面通林业局有限公司、大连民族大学、辽宁省旱地农林研究所、山西省林业和草原科学研究院、黄河水利委员会西峰水土保持科学试验站、黄河水利委员会天水水土保持科学试验站、青海省农林科学院青藏高原野生植物资源研究所、澜湄水资源合作中心、高原圣果沙棘制品有限公司、吉林吉隆东北沙棘产业公司等。

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Introduction

This code is based on the rules of GB/T 1.1-2020 "Standardization Work Guide Part I: Standard Structure and Preparation"

This code is **issued** by the International Seabuckthorn Association (ISA).

The drafting units of this code are: Rural Revitalization Science and Technology Institute of Heilongjiang Academy of Agricultural Sciences, Sea Buckthorn Development and Management Center of Ministry of Water Resources(Center for Plant Development and Management of Soil and Water Conservation, Ministry of Water Resources), Experimental Center of Desert Forestry, Chinese Academy of Forestry, Heilongjiang Bamiantong Forestry Bureau Co., LTD., Dalian Minzu University, Liaoning Dryland Agriculture and Forestry Research Institute, Shanxi Academy of Forestry and Grassland Science, Xifeng Soil and Water Conservation Scientific Experimental Station of Yellow River Water Conservancy Commission, Tianshui Soil and Water Conservation Scientific Experimental Station of Yellow River Water Conservancy Commission, Qinghai Institute of Tibetan Plateau Wild Plant Resources, Provincial Academy of Agriculture and Forestry Sciences, Lancang-Mekong Water Resources Cooperation Center, CONSECO Sea Buckthorn Products Co., LTD, Jilin Jilong Northeast Sea Buckthorn Industry Co., LTD.

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1 范围

本规范规定了果实丰产型沙棘品种评价的术语定义、类别和性状，技术要求、鉴定方法和评价。

本规范适用于中国沙棘、大果沙棘和杂交沙棘的品种或品系。

1 Range

This code specifies the definitions of terms, categories and traits, technical requirements and identification methods for the evaluation of high yield fruit seabuckthorn varieties..

This code applies to the varieties or strains of *Chinese Seabuckthorn (Hippophae rhamnoides ssp sinensis)*, *large fruit seabuckthorn (Hippophae rhamnoides ssp.mongolica)* and *hybrid seabuckthorn*..

2 规范性引用文件

下列文件对于本规范的应用是必不可少的。凡是注日期的引用文件，仅所注日期的版本适用本规范。凡是未注日期的引用文件，其最新版本（包括所有修改单）适用于本规范。

GB/T 12295 水果、蔬菜制品可溶性固形物含量的测定-折射仪法

2 Normative references

The following documents are essential for the application of this specification. For dated references, this specification applies only to the dated version. For undated references, the most recent version (including all amendment orders) applies to this Specification.

GB/T 12295 Fruit and vegetable products -- determination of soluble solid content -- Refractometer method.

3 术语和定义

丰产型沙棘品种 (high-yield seabuckthorn varieties)

特指果实丰产型，具有优良的形态特征和生物学特性，较高的果实产量及优异的品质。每年抽生一定数量的枝条、叶片和饱满花芽，树冠茂盛，树形合理，果实单株产量 1kg 以上，稳产年限 5-8a，适宜特定区域推广种植的优良无性系。

3 Terms and definitions

High yield seabuckthorn varieties: refers to the excellent clones of fruit-bearing type with good morphological and biological characteristics, high fruit yield and excellent quality, producing a certain number of branches, leaves and full flower buds every year, the crown of the tree is lush, the tree shape is reasonable, and the fruit yield per plant is more than 1kg, stable yield for 5-8a, suitable for planting in specific regions.

4 类别

依据沙棘品种选育主要群体及过程，将丰产型沙棘品种评价资源分为中国沙棘、大果沙棘和杂交沙棘三类，并分别评价。

中国沙棘：为沙棘 (*Hippophae rhamnoides*) 种下一个亚种 (*Hippophae rhamnoides* ssp. *sinensis*) 的优良品种或品系无性系。

大果沙棘：为蒙古沙棘 (*Hippophae rhamnoides* ssp. *mongolica*) 等亚种中选育出的优良品种无性系。

杂交沙棘：为中国沙棘、蒙古沙棘等亚种间杂交的优良品种或品系无性系。

4 Categories

According to the main population and breeding process of Seabuckthorn, the evaluation resources of high yield seabuckthorn varieties were divided into Chinese Seabuckthorn (*Hippophae rhamnoides* ssp. *sinensis*), large fruit seabuckthorn (*Hippophae rhamnoides* ssp. *mongolica*) and hybrid seabuckthorn.

Chinese Seabuckthorn variety: is a good variety or strain clone selected from *Hippophae rhamnoides* ssp. *sinensis*.

Large fruit seabuckthorn variety: is an excellent clone from *Hippophae rhamnoides* ssp. *mongolica*.

Hybrid seabuckthorn variety: is an excellent hybrid variety or strain clone bred by *Hippophae rhamnoides* ssp. *sinensis* with *Hippophae rhamnoides* ssp. *mongolica*.

5 性状

5.1 丰产性状

主要是果实产量，其次是与其关联度较高的百果重、果实密度和树势。

5.2 品质性状

主要包括果实硬度、果实风味、果实可溶性固形物含量和出汁率。

丰产性状和品质性状均为评价必须描述性状，性状代号由性状类别加两位顺序号组成。

描述性状的代码应是有序的。如数量性状从低到高、从小到大、从少到多排列。

每个描述性状应有一个基本的定义或说明。两类性状均有评价标准和等级划分。

5 Traits

There are two principal traits:

5.1 Yield traits

It was mainly fruit yield, followed by 100 fruit weight, fruit density and tree vigour which were highly correlated with it.

5.2 Quality traits

It mainly includes fruit hardness, fruit flavor, soluble solid content and fruit juice yield. Both yield characters and quality characters are required to be described for evaluation. The character code consists of character category plus two serial numbers.

Both yield traits and quality traits must be described in evaluation, and the character code consists of character category plus two serial numbers.

Codes describing traits should be ordered. For example, quantitative traits are arranged from low to high, from small to large, from few to many.

Each described trait should have a basic definition or description. There were evaluation criteria and grade division for both traits.

6 技术要求和方法

6.1 评价测试材料

6.1.1 试验地点的气候等生态条件应能满足测试材料的正常生长发育及性状的正常表达。

6.1.2 评价测试材料栽培面积以积 5 亩以上，具有连续 3 年的株产量测定值及平均值。

6.1.3 评价测试材料是通过无性繁殖的树龄至少 5a 的植株，数量不少于 10 株，且应满足抗旱、抗寒性强，无病虫害等要求。

6 Technical requirements and methods

6.1 Evaluate test materials

6.1.1 The climate and other ecological conditions of the test site should be able to meet the normal growth and development of test materials and the normal expression of characteristics.

6.1.2 Evaluation test materials shall cover more than 5 mu, with three consecutive years of plant yield measured value and average value.

6.1.3 The evaluation test materials shall be plants at least 5a in age through clonal propagation, and the number shall be no less than 10 plants, which shall meet the requirements of drought resistance, cold resistance, no pest and other requirements.

6.2 测试方法

6.2.1 测试周期和时间

在符合测试条件（进入盛果期）下，至少测试沙棘一个生长周期，即从萌动期至落叶期。

6.2.2 测试地点

测试沙棘材料应位于符合条件要求的生产基地。

6.2.3 测试条件

测试应该在测试材料相关特征能够完全表达的条件下进行，树龄应不小于 5a。

6.2.4 丰产性状的测试方法

丰产性状数据的采集应在树体正常生长情况下，在相应生育期（结实期）内，现场人工测定统计评价。

6.2.5 品质性状的测试方法

沙棘品质性状只针对果实硬度、果实风味、果实可溶性固形物含量和出汁率，利用速测仪器结合人工判断进行现场测试评价。

6.2 Test method

6.2.1 Test period and duration

Under the test conditions (at fully fruiting stage), at least one growth cycle of seabuckthorn

was tested, that is, from budding to deciduous stage.

6.2.2 Test location

Test sea-buckthorn materials should be located in the production base that meets the requirements.

6.2.3 Test conditions

The test should be carried out under the condition that the relevant characteristics of the test material can be fully expressed, and the age of the tree should not be less than 5a.

6.2.4 Test methods for yield traits

The data of high yield traits should be collected artificially in the field during the corresponding growth period (fruiting period) under the condition of normal growth of trees measurement statistical evaluation.

6.2.5 Test methods for quality traits

The quality characters of Seabuckthorn were determined by quick instrument measurement only for fruit hardness, fruit flavor, fruit soluble solids content and juice yield combined with manual judgment for field test evaluation.

7 丰产性状现场测定

7.1 百果重

对于满足正常田间管理的树体，在果实成熟期，选取 3-5 个样株，每株树手工摘取 500 个左右的果实，利用“四分法”从中随机抽取 100 个成熟鲜果（含果柄），称重，3-5 个样株平均值，即为百粒鲜果重，简称百果重，单位 g。

7.2 果实密度

选取 3-5 个样株，剪取有代表性结果枝中部枝段，量取果枝长度 10cm，调查果实数量，3-5 个样株取其平均值，即为果实密度，单位个/10cm。

7.3 果实产量

在正常管理条件下，选择定植株行距 2m×3m、树龄不小于 5a 的沙棘 3-5 株，在果实成熟期人工采摘果实，测量单株果实产量，取 3-5 个样株平均值，作为果实产量，单位 kg/株。

7.4 树势

在年末停止生长后，调查造林保存率，观测 10 个植株的株高、冠幅、地径和新梢生长量，采用综合指数法（见附录 A），结合树龄综合评价确定树势。

7. Field determination of yield traits

7.1 One hundred fruit weight

For trees that meet normal field management, 3-5 sample plants are selected at fruit maturity stage, and 500 are picked from each tree by hand. About 100 fresh ripe fruits (including fruit stalks) were randomly selected by "quartering method" and weighed with 3-5 samples plant average, namely, 100 fresh fruit weight(as 100 fruit weight), unit g.

7.2 Fruit density

3-5 sample plants were selected, and the middle branches of representative fruiting branches

were clipped. The length of fruit branches was measured by 10cm, and the number of fruits was investigated. The average value of 3-5 sample plants was taken, namely, the fruit density (unit per 10cm).

7.3 Fruit yield

Under normal management conditions, 3-5 seabuckthorn plants with row spacing 2m×3m and tree age no less than 5a were selected to produce fruit. Fruits were picked manually at ripening stage, and the fruit yield per plant was measured. The average value of 3-5 sample plants was taken as the fruit yield (unit: kg/ plant).

7.4 Tree vigour

After the growth stopped at the end of the year, the plant survival rate was investigated, and the plant height, crown width, ground diameter and young branch growth of 10 plants were observed. The comprehensive index method (see Appendix A) was used to determine the tree vigour combined with the comprehensive evaluation of tree age.

8 品质性状现场测定

8.1 果实硬度

选取 3-5 个样株，每株随机摘取成熟果实 50 个左右，从中抽取 10 个果实，采用果实硬度计测定果皮硬度（测定方法依照说明执行），计算其平均值，单位 kg/cm²。

8.2 果实风味

果实风味包括呈味性和呈香性两类物质，鉴于现场评价的时空特点，重点对糖酸比进行测定。选取 3-5 个样株，每株随机抽取成熟鲜果实样本 30 粒以上，采用水果糖酸度计测定糖酸比（测定方法依照说明执行），同时由不少于 5 人现场品尝，综合判定果实的风味。

8.3 可溶性固形物含量

选取 3-5 个样株，每株随机抽取 20 个成熟果实，挤压果实，将榨出的汁液滴到手持折光仪上，记录实测数据，计算可溶性固形物含量平均值，单位%。

8.4 果实出汁率

选取 3-5 个样株，每株随机抽取成熟果实样本 500g，榨汁过滤，计算榨取果汁占样本的百分比，3-5 株数据平均计算出汁率，单位%。

8. Field determination of quality characters

8.1 Fruit hardness

3-5 sample plants were selected, and about 50 mature fruits were randomly picked from each plant, from which 10 fruits were selected and the fruits were hard. Meter To determine the hardness of peel (according to the instructions), calculate the mean value, unit kg/cm.

8.2 Fruit flavor

Fruit flavor includes flavorability and aroma. In view of the temporal and spatial characteristics of field evaluation, the comparison of sugar and acid was emphasized. 3-5 sample plants were selected, and more than 30 ripe fresh fruit samples were randomly selected from each plant, and measured by fruit fructose acidity meter. To determine the ratio of sugar to acid (the determination method shall be carried out according to the instructions). At the same time, no less

than 5 people shall taste the fruit on site to comprehensively determine the flavor of the fruit.

8.3 Soluble solid content

Select 3-5 sample plants, randomly select 20 ripe fruits from each plant, squeeze the fruits, and drop the juice into the hand fold. On the optical instrument, the measured data were recorded and the average soluble solid content (unit: %) was calculated.

8.4 Fruit juice yield

3-5 sample plants were selected, and 500g ripe fruit samples were randomly extracted from each plant. Juice was extracted and filtered to calculate the proportion of juice extracted in the sample. The juice rate is calculated according to the average plant number. The unit is %.

9.1 丰产型沙棘品种评价方法

9.1.1 按照各性状描述、标准进行选育群体资源类别的评价,确定相应的评价代码(附表1)。

代号由3位数字组成,第一位数字1代表丰产性状,2代表品质性状,第二、三两位数字01、02等代表每类性状的序号。所有指标均为正向性指标,二级指标按数值从低到高划分为低、中、高3类,代码依次为1、2、3。

9.1.2 对丰产性状、品质性状先行分组,统计每组分值。在符合评价代码标准条件下,方可进一步打分评价,采用100分制。依据丰产性状、品质性状在丰产型沙棘品种评价中的地位 and 重要程度,分别给予丰产性状65%、品质性状35%的权重,即丰产性状得分65分,品质性状得分35分,总分100分。

9.1.3 丰产性状二级指标中,百果重、果实密度、果实产量和树势分别赋分5分、10分、35分、15分,共计65分。

9.1.4 品质性状二级指标中,果实硬度、风味、果实可溶性固形物含量和出汁率分别赋分5分、5分、15分、10分,共计35分。

9.1.5 参评沙棘品种的总分值,系对各二级指标通过计算而得(附表2)。

各二级指标的具体分值,通过下述公式计算而来:

$$Y = \begin{cases} \frac{x-b_1}{b_2-b_1} \times A & b_1 < x \leq b_2 \\ A & b_2 < x \end{cases}$$

式中:

Y 为各个二级指标的评价分值;

x 为各个二级指标的现场测定值;

b_1 、 b_2 为各二级指标所属数据范围的下限和上限值;

A 为各二级指标的最大赋分值。

中国沙棘、大果沙棘和杂交沙棘的 b_1 、 b_2 值,系多年来国内有关试验研究的综合结果。

将丰产、品质两类指标的各二级指标分值相加，得被评价沙棘品种的总分值。

9. Evaluation of high-yield seabuckthorn varieties

9.1 Evaluation methods

9.1.1 Evaluate the resource categories of breeding populations according to the description and standards of various traits, and determine the corresponding evaluation code (as in Table 1).

The code is composed of three digits. The first digit 1 represents the yield trait, and 2 represents the quality trait, while the second and third digit 01,02 represents the serial number of each character. All indicators are positive, and associated characters are graded to high, mediate and low with codes as 1, 2, and 3 respectively.

9.1.2 As the principla characters, high-yield traits and quality traits were grouped first, and the scores of each group were counted. Under the conditions of meeting the evaluation code standard, the evaluation can be further scored and evaluated, using the 100-point system. According to the status and importance of yield traits and quality traits in the evaluation of high-yield Seabuckthorn varieties, the weights of yield traits 65% and quality traits 35% were given, that is, yield traits scored 65 points, quality traits scored 35 points, and the total score was 100 points.

9.1.3 In the associated characters of yield traits, 100 berry weight, fruit density, fruit yield and tree vigour were respectively assigned 5 points, 10 points,35 points, 15 points respectively, and 65 points in total.

9.1.4 Among the associated characters of quality traits, fruit hardness, flavor, fruit soluble solid content and juice yield were scored 5 points, 5 points, 15 points and 10 points respectively, totaling 35 points.

9.1.5 The total score value of evaluated seabuckthorn varieties was obtained by calculating the associated characters (as in Table 2).

The specific score value of each associated characters is calculated by the following formula:

$$Y = \begin{cases} \frac{x-b_1}{b_2-b_1} \times A & b_1 < x \leq b_2 \\ A & b_2 < x \end{cases}$$

Where:

Y is the evaluation score of each associated characters;

x is the field measured value of each associated characters;

b1 and b2 are the lower limit and upper limit of the data range belonging to each associated characters;

A is the maximum value assigned to each associated characters.

The b1 and b2 values of Chinese Seabuckthorn(*Hippophae rhamnoides ssp sinensis*) and large fruit seabuckthorn(*Hippophae rhamnoides ssp.mongolica*) and hybrid seabuckthorn were the comprehensive results of relevant domestic experiments over the years. The total score of the evaluated Seabuckthorn varieties was obtained by adding the scores of the two associated indexes of each of yield and quality.

9.2 标准品种确立

参评沙棘能否评定为丰产型沙棘品种，决定于对照的标准沙棘，本规范以现有工业原料林中，中国沙棘、大果沙棘、杂交沙棘的总体平均株作为标准沙棘。

9.2 Determination of standard varieties

Whether sea-buckthorn can be evaluated as a high-yield variety depends on the standard sea-buckthorn of the control. This specification is based on existing industrial raw materials. In practice, the average plants of *Chinese Seabuckthorn*(*Hippophae rhamnoides ssp sinensis*) and *large fruit seabuckthorn*(*Hippophae rhamnoides ssp.mongolica*) and hybrid seabuckthorn were used as the standard sea-buckthorn.

9.3 丰产型沙棘品种认定

依照标准沙棘的评价分值（附表 3），达到以下分值的评价测试材料可认定为丰产型沙棘品种。

评价分值 ≥ 75 分 （中国沙棘）丰产型沙棘品种

评价分值 ≥ 85 分 （大果沙棘）丰产型沙棘品种

评价分值 ≥ 80 分 （杂交沙棘）丰产型沙棘品种

9.3 Identification of high-yield Seabuckthorn varieties

According to the evaluation scores of the standard seabuckthorn (as in Table 3), any candidate material reaching the following scores can be identified as a high-yield variety of different types.

Evaluation score ≥ 75 points, for Chinese Seabuckthorn(*Hippophae rhamnoides ssp sinensis*) type

Evaluation score ≥ 85 points, for large fruit seabuckthorn(*Hippophae rhamnoides ssp.mongolica*) type

Evaluation score ≥ 80 points, for hybrid seabuckthorn type

附表1 丰产型沙棘性状、标准及代码表

Table 1: Characters, standard and code of high yield seabuckthorn varieties

| 序号 Serial number | 代号 Designation | 性状及单位 Traits and unit | 标准 Standard | 代码及评价 Code and grade |
|---------------------|-------------------|--|----------------|-------------------------|
| 1 | 101 | 百果重 100 fruit weight (g) | 10-30 | 1: 低 |
| | | | 30-50 | 2: 中 |
| | | | >50 | 3: 高 |
| 2 | 102 | 果实密度 Fruit density (个 pcs/10cm) | 40-60 | 1: 低 |
| | | | 60-80 | 2: 中 |
| | | | >80 | 3: 高 |
| 3 | 103 | 果实产量 Fruit yield (kg/株 tree) | 1-3 | 1: 低 |
| | | | 3-5 | 2: 中 |
| | | | >5 | 3: 高 |
| 4 | 104 | 树势 Tree vigour (E值) | 0.4-0.6 | 1: 低 |
| | | | 0.6-0.8 | 2: 中 |
| | | | >0.8 | 3: 高 |
| 5 | 201 | 果实硬度 Fruit hardness (kg/cm ²) | 2.5-3.0 | 1: 低 |
| | | | 3.0-3.5 | 2: 中 |
| | | | >3.5 | 3: 高 |
| 6 | 202 | 果实风味 (糖酸比) Fruit flavor (sugar-acid ratio) | 0.6-0.8 | 1: 低 |
| | | | 0.8-1.0 | 2: 中 |
| | | | >1.0 | 3: 高 |
| 7 | 203 | 可溶性固形物含量 Soluble solid content (%) | 6-8 | 1: 低 |
| | | | 8-10 | 2: 中 |
| | | | >10 | 3: 高 |
| 8 | 204 | 果实出汁率 Fruit juice yield (%) | 60-70 | 1: 低 |
| | | | 70-80 | 2: 中 |
| | | | >80 | 3: 高 |

附表2 丰产型沙棘评价分值计算表

Table 2: Basic evaluation score of high yield seabuckthorn varieties

| 组别 Principal characters (PC) | 关联性状 Associated characters(AC) | 代码及标准 Codes and standards | | | 评价分值计算 Evaluation score calculation | | | | |
|---------------------------------------|---|------------------------------|---------|------|--|-----|-----|---|---|
| | | 1 | 2 | 3 | A | b1 | b2 | x | Y |
| 产量性状 Yield traits (YT)(65%) | 百果重 100 Fruit weight (5 分 points) | 10-30 | 30-50 | >50 | 5 | 10 | 50 | | |
| | 果实密度 Fruit density (10 分 points) | 40-60 | 60-80 | >80 | 10 | 40 | 80 | | |
| | 果实产量 Fruit yield (35 分 points) | 1-3 | 3-5 | >5 | 35 | 1 | 5 | | |
| | 树势 Tree vigour (15 分 points) | 0.4-0.6 | 0.6-0.8 | >0.8 | 15 | 0.4 | 0.8 | | |
| | 小计 Subtotal (65 分 points) | | | | 65 | | | | |
| 品质性状 Quality traits (QT)(35%) | 果实硬度 Fruit hardness (5 分 points) | 2.5-3.0 | 3.0-3.5 | >3.5 | 5 | 2.5 | 3.5 | | |
| | 果实风味 Fruit flavor (5 分 points) | 0.6-0.8 | 0.8-1.0 | >1.0 | 5 | 0.6 | 1 | | |
| | 可溶性固形物 Soluble solid content (15 分 points) | 6-8 | 8-10 | >10 | 15 | 6 | 10 | | |
| | 果实出汁率 Fruit juice yield (10 分 points) | 60-70 | 70-80 | >80 | 10 | 60 | 80 | | |
| | 小计 Sub-total (35 分 points) | | | | 35 | | | | |
| 总分 In total | 100 分(100 points) | | | | 100 | | | | |

附表 3 标准沙棘评价分值表

Table 3: Evaluation score of standard seabuckthorn varieties

| 组别 PC | 关联性状 AC | 代码及标准 Codes and standards | | | 标准沙棘 Standard sea buckthorn varieties | | | 中国沙棘 CS | | 大果沙棘 LS | | 杂交沙棘 HS | |
|---------------------|-------------------------------------|------------------------------|---------|------|--|------------|------------|------------|-------------|------------|-------------|------------|-------------|
| | | 1 | 2 | 3 | 中国沙棘 CS | 大果沙棘 LS | 杂交沙棘 HS | 代码 code | 分值 score | 代码 code | 分值 score | 代码 code | 分值 score |
| 产量性状 YT (65%) | 百果重 100 FW (g) (5分 points) | 10-30 | 30-50 | >50 | 20 | 55 | 30 | 1 | 1.25 | 3 | 5.00 | 2 | 2.50 |
| | 果实密度 FD (10分 points) | 40-60 | 60-80 | >80 | 70 | 70 | 65 | 2 | 7.50 | 2 | 7.50 | 2 | 6.25 |
| | 果实产量 FY (35分 points) | 1-3 | 3-5 | >5 | 4.1 | 6.0 | 4.5 | 2 | 27.12 | 3 | 35.00 | 2 | 30.62 |
| | 树势 TV (15分 points) | 0.4-0.6 | 0.6-0.8 | >0.8 | 0.9 | 0.7 | 0.8 | 3 | 15.00 | 2 | 11.25 | 3 | 15.00 |
| | 小计 Sub-total (65分 points) | | | | | | | | 50.87 | | 58.75 | | 54.37 |
| 品质性状 QT (35%) | 果实硬度 FH (5分 points) | 2.5-3.0 | 3.0-3.5 | >3.5 | 3.2 | 3.7 | 3.4 | 2 | 3.50 | 3 | 5.00 | 2 | 4.50 |
| | 果实风味 FF (5分 points) | 0.6-0.8 | 0.8-1.0 | >1.0 | 0.7 | 1.2 | 0.9 | 1 | 1.25 | 3 | 5.00 | 2 | 3.75 |
| | 可溶性固 形物 SSC (15分 points) | 6-8 | 8-10 | >10 | 12 | 7.7 | 8.5 | 3 | 15.00 | 1 | 6.38 | 2 | 9.38 |
| | 果实出汁 率 FJY (10 分 points) | 60-70 | 70-80 | >80 | 70 | 82 | 76 | 2 | 5.00 | 3 | 10.00 | 2 | 8.00 |
| | 小计 Sub-total | | | | | | | | 24.75 | | 26.38 | | 25.63 |

| | | | | | | | | | | | | | |
|--|------------------|--|--|--|--|--|--|--|-------|--|-------|--|-------|
| | (35 分 points) | | | | | | | | | | | | |
| 总分 In total | 100 分 points | | | | | | | | 75.62 | | 85.13 | | 80.00 |
| 评价标准分值 Evaluation standard score (≥) | | | | | | | | | 75 | | 85 | | 80 |

The note:

PC represents Principal characters, AC as Associated characters, YF as Yield traits, QT as Quality traits

CS represents Chinese Seabuckthorn(*Hippophae rhamnoides ssp sinensis*), LS as large fruit seabuckthorn(*Hippophae rhamnoides ssp.mongolica*) and HS as hybrid sea-buckthorn.

100 FW represented 100 fruit weight, FD as Fruit density, FY as Fruit yield, TV as Tree vigour, FH as Fruit hardness, FF as Fruit flavor, SSC as Soluble solid content, FJY as Fruit juice yield.

附录 A (资料性附录)

沙棘品种树势强弱评价-综合指数法

一般来讲,沙棘造林保存率本身就是一个综合性指标,适应性与否,应该基本上可由保存率决定;但考虑到沙棘生长发育状况,是一个影响以后生态经济功能的重要指标,所以将树高、地径、冠幅和新稍长也一并作为衡量指标,与保存率一起对沙棘树势进行综合评价。隶属函数构建公式如下所示,以综合指数 E 来表示树势。

保存率指数: $ES=S_i/S_{max}$

株高指数: $EH=H_i/H_{max}$

地径指数: $ED=D_i/D_{max}$

冠幅指数: $EC=C_i/C_{max}$

新稍长指数: $EL=L_i/L_{max}$

综合指数: $E= [ES + (EH+ED+EC+EL) /4] /2$

上面几个函数中, S、H、D、C、L 分别代表保存率、树高、地径、冠幅、新稍长; i 代表某一沙棘品种; max 代表保存率、树高、地径、冠幅、新稍长中的最大值。

根据以上隶属函数,计算沙棘品种的综合指数 E 值。根据综合指数 E 值,确定品种的树势强弱

Appendix A (Informative Appendix)

Evaluation of tree **vigour** of Seabuckthorn cultivars - Comprehensive index method

Generally speaking, the preservation rate of sea-buckthorn afforestation itself is a comprehensive index, and the adaptability should be basically determined by the survival rate. However, considering that the growth and development status of sea buckthorn is an important index affecting the ecological and economic functions in the future, tree height, ground diameter, crown width and new branch length are also taken as measurement indicators, and the survival rate is used to comprehensively evaluate the tree **vigour** of sea buckthorn. The membership function construction formula is shown below, and the tree **vigour** is represented by the comprehensive index E.

Survival index: $ES=S_i/S_{max}$

Height index: $EH=H_i/H_{max}$

Ground diameter index: $ED=D_i/D_{max}$

Crown index: $EC=C_i/C_{max}$

New branch length index: $EL=L_i/L_{max}$

Comprehensive index: $E= [ES + (EH+ED+EC+EL) /4] /2$

In the above functions, S, H, D, C and L represent survival rate, tree height, ground diameter,

crown width and new branch length respectively. i represents a seabuckthorn variety; \max represents the maximum value of survival rate, tree height, ground diameter, crown width, and new branch length.

According to the above membership function, the comprehensive index E value of seabuckthorn varieties was calculated. According to the comprehensive index E value, the tree [vigour](#) of the varieties was determined.