

## 蓝莓新品种致远的选育

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**摘要:** 蓝莓新品种致远是由蓝雨 (Bluerain) 的播种实生苗中筛选得到的南高丛蓝莓。果粒中, 平均单果大小为 1.66 cm (纵径) × 1.79 cm (横径), 最大单果质量 2.99 g, 平均单果质量 2.59 g, 果实扁圆形, 果粉厚且质地均匀, 颜色亮蓝, 果蒂痕小而干, 果实硬度达到 4.09 kg cm<sup>-2</sup>, 可溶性固形物含量为 10.68%, 酸度适中。在辽宁大连的自然条件下, 成熟期为 6 月下旬, 属于早熟品种。该品种对土壤的适应性好, 在南方主要土壤上能够良好生长。该品种果粒中, 风味好, 产量较高, 适宜鲜食市场。

**关键词:** 蓝莓; 品种; 育种

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## Breeding of a new blueberry Cultivar Farsight

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**Abstract:** The new blueberry variety, designated Farsight, is a southern highbush blueberry that was selected from sown seedlings of Bluerain. In spring 2011, 282 seedlings were grown at Dalian Senmao Modern Agriculture Co., Ltd., and in spring 2012, the seedlings were transferred to Zhuanghe Experimental Station for field trials. The performance and characteristics of the seedlings were determined for mature fruit when they first fruited at the end of 2015. Based on plant morphology, flowering and fruiting characteristics, fruit yield, and fruit quality, superior offspring were selected and numbered SMN-035. After tasted and identified, SMN-035 showed excellent performance, with vigorous plant growth, medium fruit size, light blue color, thick fruit wax, moderate acidity, small and dry picking scar, and high productivity. It is an excellent cultivar for fresh food. A comprehensive evaluation of traits including plant morphology, fruit characteristics, and production was conducted over three years of continuous fieldwork from July 2017 to July 2019, demonstrating consistent and stable performance. In July 2020, the State Forestry and Grassland Administration granted this selection the Plant Cultivar Protection Certificate and designated it Farsight. This variety has an open type tree body, 5-year-old plants, tree height up to 1.2 m, the base part of the branching ability is very strong; its leaf blade is elliptical, the average area of 8.65cm<sup>2</sup>. The leaf margins are serrated, the colour is dark green, the back of the leaf is not tomentose, the leaf buds sprout earlier, the inflorescences are shorter, the

corolla is altar-shaped with ridges, the anthocyanin colour intensity is medium. The fruits of the new fruit shoots were in clusters, the fruits were closely attached to the spike, the fruits were oblate in shape, the average size of each fruit was 1.66 cm × 1.79 cm, the maximum recorded weight was 2.99 g, with an average weight of 2.59 g, the soluble solids content of Brix% reached 10.68, the fruits have good storage characteristics. The variety has a medium size fruit, light blue in colour (101-B), thick wax, good flavour and a small and dry plucking scar. The plant is vigorous and very productive, making it an excellent variety for fresh consumption. Under natural conditions in Dalian, Liaoning, the plant reaches maturity at the end of June, thus categorising it as an early-season variety. It is well-suited to cultivation in the region situated to the south of the Yangtze River or at high altitudes. It requires a loose, fertile, deep, well-drained and moist but not easily waterlogged soil with a loamy-sandy or loamy texture. The pH value should be within the range of 4.4 to 5.5, and the organic matter content should exceed 3.0%. To ensure adequate growth, the planting area should receive at least 600 hours of chilling. Rows should be laid out in a north-south direction and, in hilly areas, along the contour lines. For fertilisation and water management, the whole park should be covered with straw, rice straw, wood chips, pine needles, etc. The thickness of the mulch should not be less than 10 cm, which can achieve the effect of water retention, increase soil organic matter and improve soil properties. Using black mulch to cover the underside of the canopy can inhibit weed growth. Seedlings should be 2 or 3 years old, over 40 cm tall, with a diameter of at least 0.4 cm at the base of the main stem, and should be potted or bare-root seedlings. It is very adaptable to soils and grows well in predominantly southern soils. It is recommended that the soil be treated with fully decomposed organic fertiliser prior to the planting of seedlings.

**Key words:** Blueberry; Cultivar; Breeding

蓝莓是杜鹃花科 (Ericaceae) 越橘属 (*Vaccinium* L.) 的一种高价值浆果和常绿灌木, 蓝莓果实为两极略扁的近圆形, 是一种呼吸跃变型水果<sup>[1-2]</sup>。因丰富的营养价值和健康益处而闻名, 其含有大量的花青苷、熊果苷、黄酮类以及其他抗氧化成分, 具有抗氧化、预防和减缓衰老等作用, 深受消费者的欢迎<sup>[3]</sup>。蓝莓还被认为能够提高视觉敏锐度, 增强免疫系统功能, 改善记忆力, 其抗癌特性也受到了科研人员的关注。随着蓝莓产业的蓬勃发展, 市场和消费者对蓝莓新品种的需求持续演变, 对口感 (风味、硬度)、外观 (果实大小、果粉) 及贮藏性提出了更高的要求<sup>[4]</sup>。基于品种多样化的需求, 已培育出森茂系列、寨选系列及辽蓝 513 等优良新品种<sup>[5]</sup>。目前, 南高丛蓝莓培育数量稳步攀升, 其具有需冷量低、果实品质佳、成熟期早、可实现反季栽培等突出优势<sup>[6]</sup>, 因此, 培育出适应当地环境、果实品质优良且产量高的南高丛蓝莓新品种, 对于加快蓝莓产业发展至关重要。

## 1 选育过程

2010年7月，在大连森茂现代农业有限公司收集了蓝雨的种子，2011年春，种子播种后培养出282株实生苗，并于2012年春季被移至庄河试验基地。2015年6月下旬，果实成熟时筛选出优良子代SMN-035，命名为致远，经过品尝和各项指标测试，该品种果实呈扁圆形，亮蓝色，果粉极厚，风味好，果蒂痕小而干，产量高，是作为鲜食的极好品种。2017年6月，通过对优良品系及其无性繁殖后代性状的综合评估，其植株的形态、开花结果情况、果实产量和品质等综合性状表现一致，且特异性状稳定。2020年7月获得国家林业和草原局植物新品种权证书，命名为致远（图1），品种权编号为20200069。



图1 蓝莓新品种致远

Fig. 1 A New Blueberry Cultivar Farsight

## 2 主要性状

### 2.1 植物学特征

本品种是南高丛蓝莓，树体开张型，5年生植株，树高可达1.2 m，基部分生枝能力极强；叶片为椭圆形，平均面积8.65 cm<sup>2</sup>，叶边缘锯齿状，颜色深绿，新生果实簇状排列于枝上，叶背无绒毛，叶芽萌发早，花序短，花冠坛形，具棱脊，花青苷显色强度中等。

### 2.2 物候期

在辽宁大连，该品种通常在4月开始萌芽，5月为盛花期，花期20 d，果实自然成熟于6月下旬，属早熟品种，采摘期约35 d，果实生长发育约60 d。

### 2.3 植株适应性

致远经田间试验及连续观测自然特性显示其对土壤的适应性较强，在南方主要土壤上能够良好生长。

### 2.4 果实主要性状

果实密集生长于穗上，为扁圆形，平均单果的大小为1.66 cm×1.79 cm，最大果质量为2.99 g，平均单果质量为2.59 g，可溶性固形物含量达到10.68%，果实具有良好的贮藏特性。该品种果粒中，亮蓝色（101-B），果粉厚，果实酸度适中，风味好，果蒂痕小而干，产量高，适宜鲜食市场（表1）。

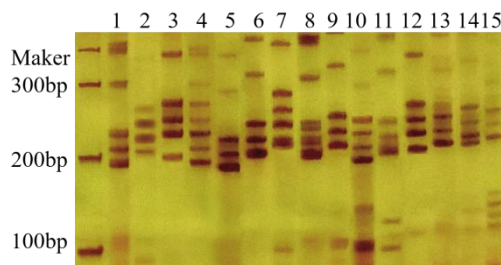
## 3 分子鉴定

本研究使用自主开发的 SSR 核心引物 SSR1690, 对 13 个主推蓝莓品种及选择的母本蓝雨和子代致远进行鉴定。在这 15 种蓝莓品种中, 引物 SSR1690 的扩增效果如图 2 所示。通过 PCR 扩增和聚丙烯酰胺凝胶电泳检测, 可鉴别和区分致远、母本和业内优势品种。

表 1 致远与蓝雨的果实品质特征

Table 1 Fruit quality attributes of Farsight and Bluerain

品种 Cultivar	果实形状 Fruit shape	果实硬度 Fruit hardness/ (kg·cm <sup>-2</sup> )	果皮颜色 Skin color	成熟期 Maturation period	平均单果质量 Average single fruit weight/g	w(可溶性固形物) Soluble solid content/%	w(酸) Acid content/%
致远 Farsight	扁圆形 Oblateness	4.09	亮蓝色 Light blue	6月下旬 Late June	2.59	10.68	0.44
蓝雨 Bluerain	扁圆形 Oblateness	4.00	亮蓝色 Light blue	6月中下旬 Mid-late June	0.55	15.40	0.53



1. 蓝雨; 2. 致远; 3. 钱德勒; 4. 黑珍珠; 5. 珠宝; 6. 鲁贝尔; 7. 久比利; 8. 彭德尔; 9. 奥尼尔; 10. 汉纳; 11. 晨号; 12. 柳叶; 13. 夏普蓝; 14. 蓝考; 15. 开普菲尔。

1. Bluerain; 2. Farsight; 3. Chandler; 4. Black pearl; 5. Jewel; 6. Rubel; 7. Jubilee; 8. Pender; 9. O'Neal; 10. Hannah; 11. Reveille; 12.

Willow; 13. Sharpblue; 14. Rancocas; 15. CapeFear.

图 2 引物对 15 个蓝莓品种的扩增结果

Fig. 2 Amplification results of 15 blueberry varieties with primer pairs

## 4 栽培技术要点

### 4.1 种植要求

致远适合在长江南部地区或高原地区种植, 土壤应疏松湿润但避免积水, 防止烂根, 透气良好, 且富含有机质。保持适度的灌溉是保持土壤松软的关键。若栽培区域土壤不适宜种植, 需进行改良, 改良方法包括添加酸性物质如硫酸铵、硫酸钾等来降低土壤 pH 值, 或者添加有机物如农家肥、腐熟堆肥等来提高土壤有机质含量。

### 4.2 建园定植

秋季到早春萌动前定植是最好的时机。使用的苗木应为 2 年或 3 年生, 植株高度超过 40 cm 的钵苗或裸根苗。种植之前, 需结合压绿肥深翻土壤, 耕深 30 cm 左右。垄宜南北朝向, 丘陵地区应沿等高线布局垄, 既便于排水, 又能减少水土流失的发生。建议的株行距为 1.5 m×2.0 m。

### 4.3 肥水管理

用沙子、木屑、稻壳、花生壳、松鳞，等覆盖园区，可以防止土壤板结，达到保水、改善土壤性质的效果。利用黑色地膜覆盖树冠底部，能抑制杂草生长。布置滴管时应嵌入地膜下。移苗前应充分施用腐熟的有机肥。

### 4.4 病虫害防治

蓝莓常见的病害可以分为两种类型。一是生理性叶面问题，如缺氮、磷、钾、铁、镁症，植株不干枯，但叶片失绿，发黄。通常是土壤问题，如土壤不透气，或者 pH 值过高，可以通过调整土壤酸度以及适量灌溉来改善这种情况。二是病理性叶面问题，如灰霉病、炭疽病、枝枯病等，可在春季萌芽前将受影响的个别植株枝条修剪除去。蓝莓遭遇虫害时，建议尽可能以生物农药进行防治，如发现虫害，及时进行机械捕杀；对于鸟类威胁，铺设鸟网是最佳选择。

### 4.5 整形修剪

定植后，应立刻进行定干处理，控制高度为 0.2~0.3 m。树木成长过程中，应培养 8~10 个主干枝，采用多主干和自然形态。重视夏季修剪和冬季修剪，在夏季果实收获后，应结合使用短截和疏除的修剪技术。冬季修剪最好在白露季节进行，以促进花芽生长。

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