

优质大果双季型红树莓新品种沈琳娜的选育

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摘要: 沈琳娜树莓是以 Tulameen 为母本、秋萍为父本杂交选育出的优质大果双季型红树莓新品种。该品种果实圆锥形, 红色, 整齐度好, 果肉糯质细腻, 风味酸甜, 具香气; 平均单果质量 6.0 g, 最大单果质量 13.0 g, 果形指数 1.3; 果实含小核果 130 个。可溶性固形物含量(w, 后同)9.5%, 总酸含量 0.77%, 维生素 C 含量 $1.2 \text{ mg} \cdot \text{g}^{-1}$; 品质上, 优质鲜果率超过 75%。1 年生茎和 2 年生茎均能开花结果, 果实生育期 28~32 d, 在沈阳地区 (123.4°E, 41.8°N) 夏果成熟期 6 月 20 日至 7 月 30 日, 秋果成熟期 8 月 10 日至 10 月 15 日; 每个伞房花序有花 3~7 朵。适宜东北、华北、西北、华中、华东等地区栽培, 定植当年可开花结果, 第 2 年可实现 80% 以上的经济产量, 第 3 年即可丰产, 每 666.7 m² 产量达 1050 kg。

关键词: 树莓; 新品种; 沈琳娜; 优质; 大果

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Breeding report of a new high-quality, large-fruit and two-season bearing red raspberry cultivar Shenlinna

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Abstract: Shenlinna is a new high-quality and two-season bearing red raspberry cultivar with large-fruit. The seedling was derived from a cross between maternal parent Tulameen and paternal parent Qi-uping in 2014 at the raspberry experimental field in Shenyang Agricultural University. Artificial hybridization pollination was done in 2014, and the seeds were sowed in a greenhouse. A total of 512 seedlings were obtained and transplanted in the field in 2015. The cultivar was initially selected in 2016 for its large, uniform, firm and sweet fruit. The fruits had sweet and sour flavor and high quality. Then it was propagated by tissue culture for further investigation. After regional adaptability testing at three sites (including Shenyang, Dalian and Shanghai) over five years from 2019 to 2023, it was finally selected in 2023. The cultivar is a subshrub with thick and tall primocanes, attaining a height of 220 cm. Primocanes are green and with medium dense purple prickles. The length of its fruiting lateral can reach over 1 m. Ternate pinnate leaves are large, with a length of 30 cm, a width of 25 cm and a petiole length of 7 cm. Flower is white with 5 ligulate petals. Fruit uniformity is good. Fruit is red and conical, with firm, thick, waxy and fine flesh. The average fruit weight is 6.0 g, and the maximum fruit weight is 13.0 g. Fruit shape index is 1.3. Each aggregate fruit has 130 drupelets. The contents of soluble solid and total acid are 9.5% and 0.77%, respectively. The solid-acid ratio is 12.3. The content of Vitamin C is $1.2 \text{ mg} \cdot \text{g}^{-1}$ (FW). The content of total anthocyanin is $0.63 \text{ mg} \cdot \text{g}^{-1}$ (FW). The contents of total phenols and flavonoid are 24.8 and $13.8 \text{ mg} \cdot \text{g}^{-1}$ (DW), respectively. The overall quality is excellent. The high quality fresh fruit rate is more than 75%. This cultivar can produce economic yield from floricanes in summer and primocanes in autumn. In Shenyang area, fruits mature from June 20th to July 30th as well as from August 10th to October 15th. Laterals gradually branch out from top to bottom on primocanes,

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but the developmental process of laterals at different height is more consistent on floricanes. For each fruiting lateral, it flowers from the top to the base. The fruit development period is 28 to 32 d. This cultivar can be well cultivated in north, central and east China. It can flower and bear fruit in the current year after planted. 80% of economic yield can be realized in the next year. Bumper and stable yield can be achieved from the 3rd year, with a yield of 1050 kg per 666.7 m². A well-drained sandy soil with a pH value of 5.6 to 7.5 and an irrigation condition are proper for the cultivation of this cultivar. Plenty of base fertilizer or substrate such as coco coir is recommended for soil improvement. Spacing in and between the rows are 30–40 cm × 200 cm. Top application should be applied at the stage of leaf unfolding, bud presenting and fruit swelling. Application amount is 20 kg per 666.7 m² with the N:P:K ratio of 1:2:2. Dripping and infiltrating irrigation system are recommended. Pay attention to drainage in rainy season. In drought season, irrigation should be done every 3 d.

Key words: Raspberry; New cultivar; Shenlinna; High quality; Large fruit

树莓(*Rubus idaeus*)是蔷薇科(Rosaceae)悬钩子属(*Rubus* L.)的多年生落叶灌木,又称悬钩子、托盘等,中国东北及新疆地区称其为马林,中药称其为覆盆子。通常将悬钩子属植物中果实可食的用于园艺栽培生产的种类称为树莓或可食悬钩子^[1]。其果实柔软多汁,色泽鲜艳,味道酸甜,有特殊的香气,含有多种人体必需的营养元素,为各国消费者广泛认可^[2]。近年来,鲜食树莓逐渐受到人们喜爱,树莓观光采摘在中国各地蓬勃发展,产业发展前景广阔。但中国市场上缺乏优质鲜食树莓品种,急需培育优质、大果、高产的树莓新品种,以满足市场需求。

1 选育过程

2014年5月,以加拿大树莓品种Tulameen为母本^[3],以中国自主选育的秋果型树莓品种秋萍为父本杂交^[4],7月初获得杂交果实100余个,取种后于4℃冰箱层积处理,并于冬季在温室内播种育苗。2015年4月将获得的512株杂种苗定植于田间,部分杂种苗于9月结果。2016年夏季,杂种苗陆续开花结果,其中代号为TA-14的单株表现出果个大、整齐度好、硬度高、果肉糯质细腻、甜度高、具香气等特点,入选为优良单株。2016—2019年对该单株进行组培扩繁,2019年开始在沈阳市、大连市、上海市进行区域试验,参照中华人民共和国农业行业标准《植物新品种特异性、一致性和稳定性测试指南 树莓》(NY/T 2520—2013)中所列的测试性状及标准品种^[5],对包括农艺性状及果实经济性状在内的各生物学特性进行连续5 a(年)观测,发现该品种与双亲相比,植株茎粗壮、结果侧枝长、叶片大、果实大、硬度高、甜度高、夏秋均可形成经济产量,多年多点的比较试验表明,

该品种生物学特性表现一致、稳定,综合性状优良。2024年4月获国家林业和草原局颁发的植物新品种权证书(品种权号:20240267),命名为沈琳娜(图1)。



图1 优质大果双季型红树莓新品种沈琳娜

Fig. 1 A new high-quality, large-fruit two-season bearing red raspberry cultivar Shenlinna

2 主要性状

2.1 植物学特征

沈琳娜树莓为半灌木。根系为多年生,植株生长健壮,可萌发根蘖。茎寿命为2年,1年生茎绿色,株高可达220 cm,茎上有刺,刺紫色、短粗。叶片多数为3小叶,顶部小叶先端渐尖尾部圆形,侧生两小叶为阔披针形,叶片长30 cm,宽25 cm,叶柄长7 cm,叶缘锯齿浅。伞房花序,有花3~7朵,花梗长3~5 cm,少刺。花瓣白色,5瓣,舌形,长8 mm。萼片长三角形,长12 mm,先端渐尖,全缘,浅绿色。雄蕊70~90枚,雌蕊110~140枚。

2.2 果实性状

该品种果实红色,圆锥形,平均单果质量6.0 g,

最大单果质量 13.0 g,果实整齐度好、肉质厚、硬度大,其果实硬度与母本 Tulameen 相似。果味酸甜,果肉糯质细腻、具香气,可溶性固形物含量(w ,后同) 9.5%,总酸含量为 0.77%,维生素 C 含量 $1.2\text{ mg}\cdot\text{g}^{-1}$ 。优质鲜果率超过 75%。沈琳娜与亲本主要经济性状比较见表 1。

表 1 沈琳娜与其亲本主要经济性状比较
Table 1 Comparison of main economic characters between Shenlinna and its parents

品种 Cultivar	果实 形状 Fruit shape	果实 颜色 Fruit color	平均 单果质量 Average fruit mass/g	最大 单果质量 Maximum fruit mass/g	w (可溶性 固形物) Soluble solid content/%	w (总酸) Total acid content/%	生长势 Vigor	夏果成熟期 Summer fruit mature period	秋果成熟期 Autumn fruit mature period
沈琳娜 Shenlinna	圆锥形 Cone	红色 Red	6.0	13.0	9.5	0.77	强 Strong	6月20日—7月30日 Jun. 20 to Jul. 30	8月10日—10月15日 Aug. 10 to Oct. 15
Tulameen	圆锥形 Cone	红色 Red	5.4	8.0	9.9	1.88	中 Medium	6月25日—7月25日 Jun. 25 to Jul. 25	
秋萍 Qiuping	圆锥形 Cone	红色 Red	3.6	7.2	8.0	1.24	中 Medium		8月5日—10月5日 Aug. 5 to Oct. 5

2.3 物候期

在沈阳地区,该品种 2 年生茎 4 月中旬萌芽,花期 5 月中旬至 6 月下旬,夏果成熟期为 6 月 20 日至 7 月 30 日;1 年生茎于 5 月上旬萌发长出地面,7 月中旬开始开花,秋果成熟期为 8 月 10 日至 10 月 15 日。

2.4 开花结果习性

该品种 1 年生茎和 2 年生茎均能开花结果,夏秋均可形成经济产量。花和花序着生于茎及侧枝叶片的叶腋处。其 1 年生茎顶端先开花,由上至下逐渐抽生结果侧枝,单个结果侧枝也由顶端自上而下开花。其 2 年生茎开花结果习性类似夏果型树莓,各节位结果侧枝的发育进程相对一致,夏季果实采收期较秋果集中。该品种花后 28~32 d 果实成熟。

2.5 适应性

2019 年开始在沈阳、大连、上海等地定植该品种组培苗,进行区域试验和生产试验,多年多点的观察鉴定表明,沈琳娜树莓表现丰产、优质、大果等优良性状,适应性较强。植株耐寒,但不耐涝,连续多日强降雨会导致涝害,表现为嫩梢和幼叶萎蔫、果实畸形。

3 栽培技术要点

该品种适合在中国东北、华北、西北、华中、华东等地区栽植。适宜种植在通风良好、日照充足、土壤肥沃、排水良好、pH 值范围 5.6~7.5、有灌溉条件的地区。定植前深耕,深度 25~30 cm,施足底肥,通常施用腐熟的有机肥 $1.5\sim2.0\text{ t}\cdot666.7\text{ m}^{-2}$,也可采用椰糠等基质改良土壤。定植行以南北走向为宜,定植株行距 $(30\sim40)\text{ cm}\times200\text{ cm}$ 。在 $10\text{ }^{\circ}\text{C}$ 地温稳定在 $10\text{ }^{\circ}\text{C}$ 以上时采用组培苗定植,单臂篱架,当年秋季

即可结果,第 2 年可实现 80% 的经济产量,第 3 年即可丰产,年平均产量达 $1050\text{ kg}\cdot666.7\text{ m}^{-2}$,以后连续结果 8~10 a。在冬季进行防寒保护的条件下,其 2 年生茎有较高的夏果产量,实现一年二次结果,总产量比单纯秋季结果增加 30% 以上。分别于展叶期、现蕾期、果实膨大期追肥,每次施肥量为 $0.02\text{ t}\cdot666.7\text{ m}^{-2}$,氮磷钾质量比为 1:2:2。灌溉最好采用滴灌或渗灌系统,适时灌溉,保持土壤湿润,但不宜过多,要注意做好雨季排水。

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