

苹果晚熟新品种华优甜娃的选育

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摘要: 华优甜娃是以寒富作母本、华红作父本进行杂交选育出的晚熟苹果新品种。果实近圆形, 平均单果质量 197 g, 果形端正, 果形指数 0.86。果面光滑, 无果棱、果粉。果皮底色黄绿色, 着色为红色, 果皮较薄。果心小。果肉淡黄色, 肉质细腻, 酥脆, 汁液多, 品质极佳。果实去皮硬度为 $8.8 \text{ kg} \cdot \text{cm}^{-2}$, 可溶性固形物含量 (w , 后同) 为 18.0%, 可滴定酸含量为 0.26%, 维生素 C 含量为 $148.3 \text{ mg} \cdot \text{kg}^{-1}$ 。有较强的适应性, 适宜在寒富和金冠种植区栽植。在辽宁兴城地区, 果实 10 月下旬成熟, 全生育期为 165 d 左右, 11 月中旬树木落叶, 营养生长期为 210 d。有良好的丰产性, 5 年生树平均株产 35.7 kg, 666.7 m^2 产量为 1992 kg。

关键词: 苹果; 新品种; 华优甜娃; 晚熟

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Breeding report of a new late-ripening apple cultivar Huayoutianwa

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Abstract: Huayoutianwa is a late-ripening apple cultivar derived from the cross between Hanfu (female parent) and Huahong (male parent). In the spring of 2003, we completed the hybridization work in the Research Institute of Pomology, Chinese Academy of Agricultural Sciences, and obtained the hybrid seeds in the autumn, which were sown in the spring of 2004. In 2015, the plant coded as 03-57 was found to have strong tree vigor and beautiful fruit shape. Besides, fruits of 03-57 were tasted strongly sweet and crunchy. In 2016, the strain 03-57 was determined as an excellent variety. The regional cultivation experiments were undertaken at Xingcheng city and Lianshan city of Liaoning province over five years from 2016 to 2020. The results were great and no obvious diseases and pests were observed. It was registered by the Ministry of Agriculture and Rural Affairs in 2021, and officially named as Huayoutianwa. The tree of Huayoutianwa is easily ramified with open canopy. The color of tree trunk is gray-brown. The number of lenticels and length of internode of one-year-old shoot are medium. And the color of one-year-old shoot is reddish brown. The leaves are medium-green, 9.86 cm long, 6.44 cm wide and margin-biserrated, with leaf blade outwards in relation to shoot with weak pubescence. Each cluster has five flowers on average. The flower is dark pink. The average diameter of flower is 4.5 cm. The arrangement of petals is overlapping. Huayoutianwa is a late-maturing variety. In Xingcheng, Liaoning, the fruit mature period is late October. The fruit of Huayoutianwa is nearly round. The average fruit weight is 197 g. The fruit shape index (L/D) is 0.86. The fruit length of stalk is 2.1 cm. The fruit russetting around stalk is large. And the fruit area of russetting on cheeks is medium. The fruit color is yellow green. The fruit is covered with red color, and the surface is smooth with no fruit wax and fruit edges. The fruit flesh is light yellow and juicy. Fruit hardness is $8.8 \text{ kg} \cdot \text{cm}^{-2}$. The fruit flesh texture is hard and crisp. The soluble solids content is 18.0%, the soluble sugar content is 10.9%, and the titratable acid

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content is 0.26%. The fruit flavor is very sweet. The vitamin C content is $148.3 \text{ mg} \cdot \text{kg}^{-1}$. Huayoutianwa tree has high yield, strong vigor, easy branching ability, strong adaptability, and the good ability of initiating flower buds. And it has strong continuous bearing ability. After top grafting on the mature tree, the trees of Huayoutianwa will bear fruits and bring about stable yield three years later. In the fifth year, the average yield of Huayoutianwa plant can reach 35.7 kg, and the yield can achieve 1992 kg per 666.7 m^2 . This variety is suitable for cultivation in planting area of Hanfu and Golden Delicious. The spacing of planting density is $3 \text{ m} \times 4 \text{ m}$. Fertilization should be done three times during a growth season, in spring, June and autumn, respectively. The pruning is suitable in summer. About pruning, we should pull branches and avoid heavy cutting back as much as possible. The best time to eat Huayoutianwa fruit is at late October, so the harvesting period should be postponed appropriately.

Key words: Apple; New cultivar; Huayoutianwa; Late-ripening

苹果 (*Malus pumila* Mill.) 是中国重要的水果,也是主要的消费果品^[1]。中国苹果的种植面积和产量均居世界首位,但苹果品种过度单一,富士系品种的栽植面积占中国苹果栽植总面积的60%以上,中国苹果市场中红富士占比为70%左右^[2-3]。单一的苹果品种严重削弱了消费者的购买欲望,极大地阻碍了中国苹果产业的发展。目前,培育综合性状优良、轻简化管理的品种,已成为中国苹果育种的重点工作。

1 选育经过

2003年春季,中国农业科学院果树研究所以寒富为母本、华红为父本进行杂交,当年秋季获得杂交种子,2004年春季播种。2015年发现编号为03-57的植株树势健壮且稳定,连续结果能力强;果形端正,果肉甘甜松脆,口感极佳,通过进一步调查,在2016年将其确定为优系,当年在辽宁省葫芦岛市连山区和兴城市等地进行区域性栽培试验。试验结果表明,该品种综合性状优良,无明显病虫害。2021年,正式命名为华优甜娃,并通过农业农村部登记备案[登记编号为GPD苹果(2021)210070](图1)。

2 主要性状

2.1 植物学特征

华优甜娃树型为分枝型,姿态开张,主干呈灰褐色。一年生枝红褐色,茸毛密,皮孔数量和节间长度均为中等。叶片绿色,叶片姿态为水平,叶片长和宽分别为9.86 cm和6.44 cm,叶尖渐尖,叶缘有钝锯齿;叶面向上抱合,披稀疏茸毛。每个花序5朵花,花蕾深粉红色。花冠直径为4.5 cm。花瓣长圆形、



图1 苹果晚熟新品种华优甜娃

Fig. 1 A new late ripening apple cultivar Huayoutianwa

叠生。

2.2 果实经济性状

华优甜娃果实为近圆形,果形端正,平均单果质量为197 g,果形指数为0.86。果梗长度为2.1 cm,中等粗度;梗洼深度中等,锈多。果面较为光洁,无果棱、果粉,果锈中多。果皮底色黄绿色,部分着红色,果点大小中等,果皮薄,果心小。果肉淡黄色,甘甜松脆,汁液多,口感极佳,品质上等。果实去皮硬度为 $8.8 \text{ kg} \cdot \text{cm}^{-2}$,可溶性固形物含量(w ,后同)为18.0%,可滴定酸含量为0.26%,维生素C含量为 $148.3 \text{ mg} \cdot \text{kg}^{-1}$ 。属晚熟品种,在辽宁兴城地区,果实成熟期为10月下旬(表1)。

表 1 华优甜娃果实经济性状

Table 1 The Huayoutianwa economic characteristics

品种 Cultivar	单果质量 single fruit mass/g	果形指数 Fruit shape index	硬度 Hardness/ (kg·cm ⁻²)	w(可溶性固形物) Soluble solid content/%	w(可溶性糖) Soluble sugar content/%	w(总酸) Total acid content/(g·kg ⁻¹)	w(维生素C) Vitamin C content/(mg·kg ⁻¹)	成熟期 Maturation date
华优甜娃 Huayoutianwa	197	0.86	8.80	18.0	10.9	2.61	148.3	10月下旬 Later October
寒富 Hanfu	267	0.87	6.92	13.9	10.6	3.87	32.8	9月下旬 Later September
金冠 Jinguan	221	0.89	7.28	14.5	11.3	4.28	39.7	10月上旬 Early October

2.3 生长结果习性

华优甜娃树势强。5年生植株高3.7 m,东西冠径和南北冠径分别为2.2 m和2.3 m,主干直径约为6.7 cm。枝条长势较旺,一年生枝长为81 cm,节间长度为2.62 cm,粗度为0.67 cm。形成花芽能力强,以中短果枝结果为主,连续结果能力强,丰产性强,大树高接换头后第3年可开花结果并形成稳定产量,5年生树平均株产35.7 kg,666.7 m²产量为

1992 kg。2016年在辽宁省葫芦岛市连山区锦郊乡,大树高接华优甜娃。高接第3年(2018年)开始形成稳定产量,单株平均产量为17.3 kg,每666.7 m²产量为972 kg;高接第4年单株平均产量为29.6 kg,每666.7 m²产量为1657 kg;高接第5年单株平均产量可达35.7 kg,每666.7 m²产量为1992 kg。华优甜娃产量高于金冠,前期产量高于寒富,后期产量与寒富相当(表2)。但是华优甜娃果实品质要优于寒富和

表 2 2018—2020 年华优甜娃单株产量及每 666.7 m² 产量Table 2 Yield per plant and yield per 666.7 m² of Huayoutianwa during 2018 to 2020

kg

品种 Cultivar	2018		2019		2020		平均 Average	
	单株产量 Yield per plant	每 666.7m ² 产量 Yield per 666.7 m ²	单株产量 Yield per plant	每 666.7m ² 产量 Yield per 666.7 m ²	单株产量 Yield per plant	每 666.7m ² 产量 Yield per 666.7 m ²	单株产量 Yield per plant	每 666.7m ² 产量 Yield per 666.7 m ²
华优甜娃 Huayoutianwa	17.3	972.0	29.6	1 657.0	35.7	1 992.0	27.5	1 540.3
寒富 Hanfu	13.8	777.5	26.4	1 480.2	44.3	2 480.8	28.2	1 579.5
金冠 Jinguan	12.2	683.2	21.2	1 188.1	34.5	1 932.0	22.6	1 267.8

注:2016 年为高接后第 1 年。

Note: The first year of top grafting is 2016.

金冠(表 1)。

2.4 物候期

在辽宁省兴城市,华优甜娃萌芽期为4月上旬,初花期为5月3日前后,5月8日左右为盛花期。果实10月下旬成熟,果实发育期165 d左右。11月中旬树体开始落叶,营养生长期210 d左右。

2.5 抗逆性

华优甜娃在辽宁葫芦岛、绥中和兴城等地区区域性试验中未发现冻害现象。果实对轮纹病抗性较强,抗轮纹病能力优于富士、寒富,为中抗品种。抗炭疽病能力与富士、寒富相似,均属中感品种。

3 栽培技术要点

(1)华优甜娃适应性强,适合在北方寒富、金冠栽植区种植。适宜在辽宁、河北、内蒙古、山西、陕西等大多数北方省份以及云南地区推广。尽可能选择地势平坦,或坡度较缓,背风向阳,透气性良好的沙壤土地建园。选择生长健壮的华优甜娃苗木进行栽植,种植前要注意施足有机肥,种植后要浇足水。以山定子或其他乔化砧木在平原或坡度较缓的山地行株距为4 m×3 m,在平原地区利用矮化砧木进行密植,行株距可为4 m×2 m。行间可生草,植株之间可进行清耕或铺设黑色地膜。

(2)保证供应树体充足的养分。秋施基肥以有机肥为主,并且要在秋梢停长之后进行。此外,春季和7月份前后要进行补充施肥。春季施肥以农家肥为主,7月份前后施肥以复合肥为主。

(3)树势较强,要加强夏季修剪,防止旺长,及时清除徒长枝,尤其是内膛影响光照的直立枝条。生长季多进行拉枝,尽可能避免短截,轻剪缓放枝条,缓和树势,提早结果。由于结果率高,夏季修剪可配合疏果同时进行。果实最佳食用时间为10月末,可适当晚采以提升品质。

(4)在栽培过程中要注意对果实炭疽病的防治。可在树体发芽前喷石硫合剂1次,在果实套袋前喷施3遍药,可使用80%的代森锰锌800倍液或50%的多菌灵600倍液。同时种植过程中要注重对果园肥水的管理,以增强树势。合理密植,注重修剪,保证果园的通风透光,降低果园湿度。及时清除果园中的病果、干枯枝和病虫枝。

(5)该品种丰产性较好,在生产过程中要特别注意疏花疏果,保证果实品质。可在花蕾期到盛花期结束前进行疏花工作,谢花后45 d内结束疏果工作,一般情况下留中心花和中心果。果实摘袋后要注意及时摘叶、转果以及铺设反光膜,保证果实着色均匀。

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