

猕猴桃新品种平原红的选育

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摘要:平原红是红阳猕猴桃自然授粉的实生后代。果实呈卵圆形,果脐凹陷,果肉黄色,内果皮着辐射状红色,平原地区着色明显优于红阳,夏季高温仍能稳定着色。果顶平或微凸;果皮黄绿色。平均单果质量80.24 g,可溶性固形物含量(w,后同)为20.9%,糖含量14.60%,维生素C含量274.6 mg·100 g⁻¹,酸含量0.41%。果实较耐贮藏,常温下可贮藏1~2个月,低温下可贮藏3个月以上,货架期较长,常温下15~20 d,低温下30~40 d。在六安地区4月12日初花,4月14日盛花,4月19日末花,浆果成熟期9月1日,果实发育期138 d,成熟期比红阳早6 d。嫁接苗第5年每666.7 m²产量超过1000 kg,丰产稳产。适合于大别山区、皖南山区和江淮丘陵地区栽培。

关键词:猕猴桃;新品种;平原红

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Breeding of kiwifruit new cultivar Pingyuanhong

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Abstract: Pingyuanhong kiwifruit is a new cultivar selected from the seedlings of Hongyang kiwifruit. In 2010, the natural pollinated fruits of Hongyang kiwifruit were collected, and the seeds were dried by air at room temperature. After storage at 4 °C for six months, the seeds were sown in the research base of West Anhui Kiwifruit Research Institute in April of 2011. A total of 612 seedlings were obtained. From 2012 to 2014, each of the fruiting plants in the progeny was observed. It was found that the red endocarp of the most strains and Hongyang kiwifruit faded or did not show red again, after experienced continuous high temperature in summer, but the red endocarp coloration of the strain HY520 in the progeny was significantly better than that of Hongyang kiwifruit, which was temporarily named as Pingyuanhong kiwifruit. A regional test was carried out from 2015 to 2019 in Anhui province, and the phenological period, growth and fruiting habits, fruit economic characters and storability of Pingyuanhong were systematically studied in compare with Hongyang kiwifruit. The results showed that Pingyuanhong kiwifruit had oval shape, hollow navel, yellow flesh, and radial red endocarp, which was better than that of Hongyang at the same block in plain areas, although having been experienced continuous high temperature in summer. Fruit apex flat or slightly convex and pericarp yellowish green. The fruit average weight was 80.2 g, soluble solid content was 20.9%, sugar content was 14.6%, vitamin C content was 274.6 mg·100 g⁻¹, and acid content was 0.41%. The fruit can be stored for 1–2 weeks at room temperature and more than 3 months at the temperature of 2–3 °C. The shelf life is longer, 15–20 days at room temperature and 30–40 days at low temperature of 4 °C. In Lu'an area of Anhui, the flowers begin on April 12, peak on April 14, and end on April 19, berry maturity on September 1, fruit development period is about 138 days, harvest period is 6 days earlier than Hongyang kiwifruit. The leaves of

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Pingyuanhong kiwifruit are heart-shaped, with gray white fuzz, pointed or slightly obtuse apex, serrated margins, purplish red young, pale green adult, and prominent veins on the back. The new shoots are light green, 1-year-old branches are gray white, 2-year-old branches are light brown, lenticels are oval and brown. The flowers are small, milky white, with 6-9 petals and calyx. The budding rate was 37.54%, the branch formation rate was 29.36%, and the fruiting branches accounted for 54.78%, which mainly came from the 1st to 10th node of the mother branches, and the fruit set was as high as 89.25% of flowers. The suitable planting density of this variety is 2 m between plants and 4 m between rows, and 'one trunk with two main vines' is adopted. It is necessary to plant enough male pollinizers, and the ratio of male to female trees should be 6-8:1. In case of low temperature, overcast and rainy and other unfavorable weather for pollination during flowering, artificial pollination should be carried out in time, and it is better to raise bees in the orchard at full bloom period to improve the fruit set. The fertilization was mainly organic fertilizer, combined with the suitable amounts of macro-, medium-, and trace-elements. The control of canker and soft rot diseases should be paid attention to in growing season. In the fifth year after planting, the yield of grafted trees was high, stable, and more than 1000 kg per 666.7 m². It is suitable for cultivation in the Dabie Mountain, Southern Anhui Mountain, and Jianghuai Valley areas. In 2020, it was approved by Anhui Forest Variety Approval Committee (Accession No.: Wan S-SV-AC-002-2020).

Key words: Kiwifruit; New cultivar; Pingyuanhong

中国是世界上猕猴桃栽培面积最大的国家,猕猴桃种植面积已超过世界上其他所有猕猴桃生产国种植面积的总和^[1]。我国猕猴桃主栽品种中,有70%以上为绿肉品种,黄肉品种、红心系列品种均不到10%,而国际上猕猴桃生产先进的新西兰黄肉品种约占34%。因此,培育优质的黄肉和红心品种,对于提升我国猕猴桃育种水平、优化品种结构有重要的意义^[2]。红心品种因果肉着辐射状鲜红色,果肉细腻,含糖量高,深受消费者欢迎。而不同海拔条件对红肉猕猴桃果实着色会产生显著影响,在800 m以上高海拔地区栽培果肉可以呈鲜艳的红色,而在200 m左右低海拔地区红色减退甚至完全消失^[3]。安徽位于华东腹地,是猕猴桃的原产地之一,主要分布在大别山区和皖南山区。近年来,主产区金寨县、太湖县引进了红阳、东红和晚红等红肉猕猴桃品种,由于夏季高温和海拔低昼夜温差小等,红阳和晚红品种存在“红肉不红”的现象,东红综合性状表现最好,但夏季连续高温,果肉完全不着色,因此,选育能稳定着色的红肉猕猴桃品种意义重大。

1 选育过程

平原红是红阳的实生第一代优良单株。2010年采集红阳自然(风媒和虫媒)授粉的果实,取种子自然晾干,经层积处理后,于2011年在安徽农业大

学猕猴桃基地——安徽皖西猕猴桃研究所播种,共获得612个实生单株。2012—2014年,以红阳为对照,对结果实生单株进行优选。多数株系与红阳在遇到夏季连续高温,果肉红色消退或不着色,其中HY520着色明显优于红阳,且着色稳定,暂命名为平原红。

2015—2019年进行区域试验,并对平原红的物候期、生长结果习性、果实经济性状、耐贮性等进行了系统研究。平原红具有生长健壮、果肉着色特别好、成熟期早、在平原地区仍能稳定着色的优点(图1),适合于安徽猕猴桃产区栽培。SSR分子鉴定表明,平原红DNA遗传物质与红阳有明显差异(图2),2020年通过了安徽省林木品种审定委员会审定(编号:皖S-SV-AC-002-2020)。

2 主要性状

2.1 植物学特征

平原红生长较红阳旺盛,成枝力强,芽大而饱满,芽苞外露,叶片心形,茸毛灰白色,质地厚实,叶柄淡绿色,叶尖凸尖或微钝,叶缘锯齿状,幼叶紫红色,成年叶淡绿色,叶背叶脉凸明显,叶背被灰白色茸毛。新梢嫩绿色,1年生枝灰白色,2年生枝浅褐色,皮孔椭圆形,棕色。花朵较小,呈乳白色,花瓣、花萼6~9枚。萌芽率37.54%,成枝率29.36%,结果

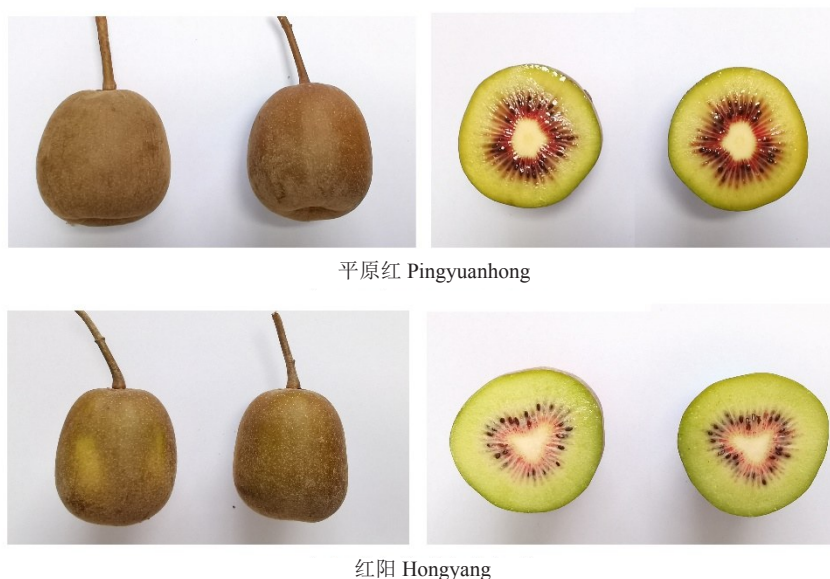
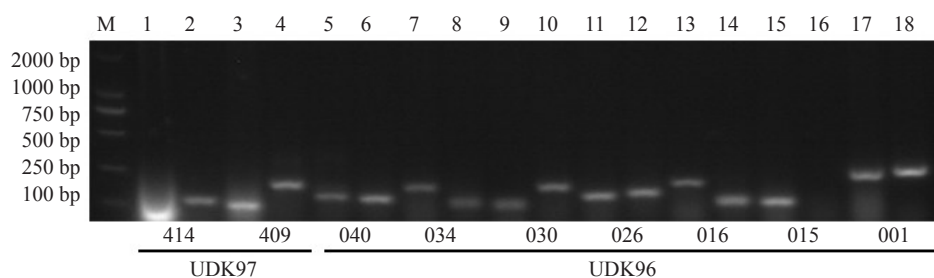


图1 猕猴桃品种平原红和红阳果实外观和横切面

Fig. 1 Fruit appearance and cross section of kiwifruit cultivar Pingyuanhong and Hongyang



M. DNA marker; 奇数泳道为红阳扩增产物; 偶数泳道为平原红扩增产物。9 对引物依次为 UDK97-414、UDK97-409、UDK96-040、UDK96-034、UDK96-030、UDK96-026、UDK96-016、UDK96-015 和 UDK96-001。

M. DNA marker; The odd number lane is Hongyang DNA amplification product; The even lane is the Pingyuanhong DNA amplification product. The nine pairs of primers were UDK97-414, UDK97-409, UDK96-040, UDK96-034, UDK96-030, UDK96-026, UDK96-016, UDK96-015, and UDK96-001 respectively.

图2 猕猴桃品种平原红 SSR 分子鉴定

Fig. 2 SSR molecular identification of kiwifruit cultivar Pingyuanhong

枝率 54.78%，结果枝抽生于结果母枝的第 1~10 节上，坐果率高达 89.25%。

2.2 果实经济性状

平原红果实卵圆形，果脐凹陷，果肉黄色，内果皮着辐射状红色。在夏季连续高温和低海拔地区仍能稳定着色。平均单果质量 80.24 g，可溶性固形物含量 20.9%，糖含量 14.60%，维生素 C 含量 274.6 mg·100 g⁻¹，酸含量 0.41%。果实较耐贮藏，常温下可贮藏 1~2 个月，低温下可贮藏 3 个月以上，货架期较长，常温下 15~20 d，低温下 30~40 d。

2.3 物候期

在安徽六安地区，平原红伤流期为 2 月 7 日，2

月 16 日开始萌芽，3 月 15 日开始展叶，4 月 12 日初花，4 月 14 日盛花，4 月 19 日末花，浆果成熟期 9 月 1 日，比红阳早 6 d。2019 年，5 年生植株平均株产可达 16.1 kg，666.7 m² 产量超过 1000 kg(表 1)。

2.4 适应性及抗逆性

区域试验结果表明，平原红在温暖湿润、夏季阴凉、适宜红肉猕猴桃生长的地区均可种植。平原红树势比红阳旺，但对溃疡病抗性与红阳无显著性差异，均表现为不抗溃疡病，生产上应注意，需增施有机肥，合理配施磷、钾肥，沃土壮根，加强溃疡病的预防工作。平地栽植最好选用水杨桃作为砧木，且避雨或促成栽培。

表 1 2019 年猕猴桃品种平原红的物候期

Table 1 Observation on phenophase of kiwifruit cultivar Pingyuanhong in 2019

品种 Cultivar	伤流期 Bleeding	萌芽期 Germination	始花期 First flowering	盛花期 Full flowering	末花期 Flower withering	成熟期 Fruit ripening
红阳 Hongyang	02-10	02-20	04-12	04-14	04-19	07-09
平原红 Pingyuanhong	02-07	02-16	04-12	04-14	04-16	09-01

3 栽培技术要点

3.1 整形修剪

该品种的生长量与红阳相似,栽植密度以 2 m×4 m 的株行距为宜。采用“一干两主蔓树形”,在主蔓两侧每隔 20~30 cm 留 1 个结果母枝,并固定在架面上。冬季修剪结果母枝,剪留粗度 0.6 cm 左右,单株结果母枝数量在 8~12 个。

3.2 肥水管理

该品种抗旱能力和耐热性一般,园区应配备滴灌和微喷设施,高温干旱季节需及时灌溉,夏季早晚应喷雾 2~4 h。园地务必排水良好,特别是梅雨季应及时排水防涝。幼年树在施足基肥的同时,于每次抽梢前追施 1 次速效肥,并结合叶面喷肥,促进枝梢生长。成年树则着重基肥与壮果肥的施用,注重有机肥与中微量元素合理搭配,有机肥的施入量占全年的 70% 以上。

3.3 授粉

栽植该品种时,需配足授粉树,雌雄株比例不能低于 6~8:1,授粉树为红阳实生雄株,花期若遇低温阴雨等不利于授粉的天气时,应及时进行人工辅助授粉,最好在盛花期能放养蜜蜂,以提高坐果率,使果形圆整。

3.4 病虫害防治

坚持“预防为主,绿色防控”原则,采取农业防治、生物防治、物理防治和化学防治相结合的综合防治方法。做好病虫害预测预报,提高防治效果。重点做好溃疡病和软腐病的防治工作:溃疡病防治应

抓住关键时期科学用药,落叶后和萌芽前喷施石硫合剂,花前和花后、采果前和采果后喷施铜制剂和抗生素类,并注意交替施用;软腐病防治应在幼果期和梅雨季节喷施丙森锌、苯醚甲环唑等化学药剂。

4 开发应用前景

平原红适合于大别山区、皖南山区和江淮丘陵地区栽培。其他温暖湿润、夏季阴凉、适宜红肉猕猴桃生长的地区均可栽植。平原红在低海拔地区和遇到夏季连续高温年份,仍能稳定着色,因此,在平原地区值得推广。

参考文献 References:

- [1] 方金豹,钟彩虹. 新中国果树科学研究 70 年:猕猴桃[J]. 果树学报,2019,36(10): 1352-1359.
FANG Jinbao, ZHONG Caihong. Fruit scientific research in New China in the past 70 years: Kiwifruit[J]. Journal of Fruit Science, 2019, 36(10): 1352-1359.
- [2] 齐秀娟,徐善坤,林苗苗,李玉阔,孙雷明,方金豹. 红肉猕猴桃果实着色机制研究进展[J]. 果树学报,2015,32(6): 1232-1240.
QI Xiujuan, XU Shankun, LIN Miaomiao, LI Yukuo, SUN Leiming, FANG Jinbao. Research advances on fruit coloring mechanism in red-fleshed kiwifruit [J]. Journal of Fruit Science, 2015, 32(6): 1232-1240.
- [3] 罗有良,易春. 红肉猕猴桃实生后代若干性状遗传规律研究[J]. 湖南农业科学,2009(6): 134-136.
LUO Youliang, YI Chun. Inheritance of several traits in the seedling progenies of red-fleshed kiwifruit[J]. Hunan Agricultural Sciences, 2009(6): 134-136.