

优质丰产番木瓜新品种紫晖的选育

魏岳荣, 杨 护, 周陈平, 邝瑞彬, 黄炳雄, 杨 敏*

(广东省农业科学院果树研究所·农业农村部南亚热带果树生物学与遗传资源利用重点实验室·
广东省热带亚热带果树研究重点实验室, 广州 510640)

摘 要:紫晖是由泰国红×GZ201301301 杂交选育出的优质、丰产番木瓜新品种。该品种植株生长旺盛,冠幅 290 cm,茎干高 195 cm,茎干粗 45 cm,叶片长 90 cm,叶片宽 93 cm,叶柄呈深紫色,长 102 cm。花序主轴呈深紫色,平均长约 7.5 cm,花数量多。果实长椭圆形,果肩有紫色印圈,果皮橙黄色,果面光滑,果肉橙红色,厚约 3.3 cm,口感嫩滑清甜。平均单果质量 1 142.7 g,平均纵径 21.4 cm,横径 10.8 cm,纵横径比为 1.98。可溶性固形物含量(w,后同)11.5%,总糖含量 10%,总酸含量 0.21%,维生素 C 含量 1.01 mg·g⁻¹,粗纤维含量 0.6%,品质优良。在珠江三角洲地区,组培苗春季定植至始花时间约 63 d,定植至始采时间约 180 d,最低结果部位离地约 34.5 cm,连续坐果能力强,节位坐果率为 92.2%;丰产性强,当年平均单株产量 64.4 kg,每 666.7 m²产量 7728 kg。适应性良好,但感环斑花叶病毒病。常温条件下保鲜贮藏期为 7 d。适宜在广东省番木瓜产区及类似生态区栽培,宜采用轮作或选择新区种植。

关键词:番木瓜;新品种;紫晖;优质;丰产

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Breeding of a new papaya cultivar Zihui with good quality and high yield

WEI Yuerong, YANG Hu, ZHOU Chenping, KUANG Ruibin, HUANG Bingxiong, YANG Min*

(Institute of Fruit Tree Research, Guangdong Academy of Agricultural Sciences/Key Laboratory of South Subtropical Fruit Biology and Genetic Resource Utilization, Ministry of Agriculture and Rural Affairs/Guangdong Province Key Laboratory of Tropical and Subtropical Fruit Tree Research, Guangzhou 510640, Guangdong, China)

Abstract: Zihui is a new top-quality and high-yield papaya cultivar, which was selected from the first hybrid with Taiguohong as the female parent and the small-fruit Hawaiian type GZ201301301 as the male parent in 2021. Through artificial pollination in 2016, 358 hybrid seeds and 296 seedlings were got. It was initially selected in 2017 for its fast growth rate, strong growth vigor, low fruit-bearing position, strong continuous fruit-bearing capacity, smooth peel, good fruit shape, high yield and good quality. The clone seedlings were obtained by grafting and tissue culture with its lateral buds after the stem was cut off. After variety test and regional adaptability test at 3 sites (including Guangzhou, Foshan and Zhanjiang) over 3 years from 2018 to 2020, it was finally selected in 2020, and certificated by the Crop Varieties Certification Committee of Guangdong Province in 2021. The plant grows vigorously, showing as 290 cm in crown width, 195 cm in plant height from ground to apical meristem, 45 cm in stem circumference, 90 cm in leaf length, 93 cm in leaf width and 102 cm in dark purple petiole. The inflorescence has multi-flower properties, and the main axis of the inflorescence is dark purple, with an average length of about 7.5 cm. The corolla is purple, and the length is about 3.4 cm. Fruit shape is oblong oval, with an obvious purple circular mark on the fruit base. The average single fruit weight is 1 142.7 g, with an average longitudinal diameter of 21.4 cm, a transverse diameter of 10.8 cm, and the ratio of 1.98. The peel is smooth and orange yellow after ripening. The flesh is of good quality, with orange-red color,

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作者简介:魏岳荣,男,研究员,主要从事果树育种和栽培技术研究工作。Tel: 020-38765468, E-mail: weid18@163.com

*通信作者 Author for correspondence. Tel: 020-38765468, E-mail: minyang_0123@126.com

3.3 cm in thickness, and the taste is tender, smooth and sweet. The contents of soluble solid, total sugar, total acid, vitamin C, and crude fiber are 11.5%, 10%, 0.21%, 1.01 mg·g⁻¹ and 0.6%, respectively. When the tissue culture seedlings were planted in the Pearl River Delta Region in spring, the period from planting to first flowering was about 63 d, and the first fruit insertion height, defined as the distance from the ground to peduncle of the first fruit at harvest time, was about 34.5 cm. The period from planting to first harvesting, defined as the earliest fruit reaching color break stage, was about 180 d. This cultivar had strong ability of continuous fruit setting and high yield performance. Fruit setting rate at node position was 92.2%. In the year of planting, 61.8 fruits were harvested per plant, including 56.4 commercial fruits, and the commercial fruit rate was 91.3%. The average yield per plant was 64.4 kg in the year of planting, and the yield was 115.92 t·hm⁻² in the case of planting 1800 plants. The cultivar had strong adaptability to the environment, but it was susceptible to papaya ring-spot virus disease. The storage period of fruit at room temperature was 7 days. It was suitable for cultivation in papaya production areas in Guangdong province and additional similar ecological areas. It is suggested to adopt rotation or plant in the new field. The orchards should be established in new fields with PRSV free, good drainage and irrigation, fertile and loose soil, and more than 500 m distance from other papaya orchards. The healthy tissue culture seedlings with 6–8 functional leaves and well-developed roots should be selected to plant to ensure the consistency of seed and plant characteristics. Spacing in the rows and between rows are (1.8–2.0) m×(2.5–2.6) m. This cultivar has the characteristics of short and strong plant and low minimum fruit-bearing height, so it is not suitable to be planted by pulling slope. It is suggested that water and fertilizer integration and plastic film covering technology should be used for high efficiency management of fertilizer and water and grass control. In the process of management, side buds should be removed in time, and flowers and fruits should be thinned out to reserve 1–2 normal fruits at each node according to the actual needs of production and management level. The control of ring spot virus disease, root rot disease, red spider and aphid is the key of prevention of diseases and insect pests.

Key words: Papaya; New cultivar; Zihui; Good quality; High yield

番木瓜 (*Carica papaya* L.) 隶属于番木瓜科 (Caricaceae) 番木瓜属 (*Carica*), 是热带、亚热带地区最重要的果树作物之一^[1], 果实富含维生素和矿物质, 钠、脂肪和卡路里含量低, 无淀粉^[2], 以其营养和药用价值闻名于世^[3], 被世界卫生组织列为最有营养价值的十大水果之首^[4]。

番木瓜为多年生草本果树, 通常在定植后第2年进入丰产期, 但毁灭性病害番木瓜环斑花叶病毒病 (PRSV) 往往导致定植后第2年开始大幅减产甚至绝收^[5], 成为制约番木瓜产业发展的主要瓶颈。由于番木瓜属种质资源具有遗传背景狭窄、种内抗性资源缺乏、属间不亲和的特性, 通过常规杂交育种难以改善番木瓜的抗逆性^[2,6]。因此, 培育丰产优质番木瓜新品种, 研发优质高效配套栽培技术, 实现当年定植、当年丰收的目的, 成为当前番木瓜常规育种和产业发展的重点方向。

1 选育经过

2016年7月以泰国红两性株为母本、小果型夏威夷

类 GZ201301301 两性株为父本, 通过常规杂交方式得到杂交种子 358 粒, 12 月播种后培育获得 F₁ 代健康种苗 296 株。2017 年 2 月定植于白云区钟落潭镇育种基地, 4 月底始花挂果。经筛选和综合评价, 获得植株生长速度快、生长势强、挂果早、结果部位低、连续结果能力强、果皮光滑、果形好、产量高、品质优良的两性株优系 GZ16-2。为避免该优系感染环斑花叶病毒病, 并尽快获得无性系种苗, 缩短育种周期, 于 2017 年 12 月采取搭建独立简易温室的方式对优系单株进行保护, 覆盖塑料薄膜和防虫网。将该优系于离地 1 m 处截干, 低温期辅助加热, 促进侧芽萌发, 保证侧芽在低温期的正常生长。所获得的侧芽部分被用于嫁接以获得嫁接苗, 部分被用于种苗的组织培养快繁以获得组培苗, 分别于 2018 年 3 月和 9 月定植在广州市天河区和白云区试验基地, 进行品种比较试验。2019—2020 年, 于广州市、佛山市、湛江市等地开展多年多点试验。经综合评价, GZ16-2 遗传性状稳定, 具有适应性强、生长势旺盛、结果早、结果部位低、连续坐果能力强、早熟、商品性状优良、商品果率高和

丰产优质等特点。2021年8月通过广东省农作物品种审定委员会品种评定(评定编号:粤评果20210009),定名为紫暉番木瓜(图1)。



图1 优质丰产番木瓜新品种紫暉
Fig.1 A new papaya cultivar Zihui with good quality and high yield

2 主要性状

2.1 植物学特征

植株壮旺,冠幅约290 cm,株高260 cm。茎干呈圆柱形,灰紫色,内中空,茎干高195 cm,粗45 cm。叶片大,叶长90 cm,宽93 cm,呈掌状缺刻状,缺刻深度中,无旗叶,颜色浓绿,叶脉清晰且呈浅紫色,叶片较厚而有光泽。叶柄粗大,呈深紫色,叶柄长约102 cm,粗11 cm。始花节位数19.3节,花序主轴呈紫色,平均长约7.5 cm,花数量多,花冠紫色,花瓣黄色,花冠长度约3.4 cm。

2.2 主要经济学特性

结果部位低,最低结果高度34.5 cm,连续坐果能力强,节位坐果率为92.2%,定植当年单株收获果实数量61.8个,其中商品果56.4个,商品果率为91.3%。果实一致性高,呈椭圆形,平均纵径21.4 cm,横径10.8 cm,纵横径比为1.98,平均单果质量1 142.7 g,当年平均单株产量64.4 kg,按666.7 m²种植120株折算,每666.7 m²产量为7728 kg(表1)。成熟果实果皮表面光滑,橙黄色,果肩有紫色印圈,果顶

表1 紫暉番木瓜与对照品种结果性状及丰产性比较

Table 1 Comparison of characters on fruit setting and yield between Zihui and the control cultivar

| 品种 Cultivar | 始花节位数 Number of initial flower node | 最低结果高度 The lowest fruiting height/ cm | 节位 坐果率 Fruit setting rate/% | 单株结 果数 Fruits Number per plant | 单株商品果数 Commercial fruits Number per plant | 商品果率 Commercial fruit rate/% | 平均单 果质量 Average fruit weight/g | 单株 产量 Plant yield/kg | 666.7 m ² 产量 Yield per 666.7 m ² /kg |
|-------------------|--|--|--------------------------------------|---|--|------------------------------------|---|-------------------------------|--|
| 紫暉 Zihui | 19.3 | 34.5 | 92.2 | 61.8 | 56.4 | 91.3 | 1 142.7 | 64.4 | 7728 |
| 泰国红 Taiguohong | 20.9 | 48.3 | 89.9 | 53.0 | 46.0 | 86.7 | 1 359.5 | 62.5 | 7512 |

圆形。平均果肉厚3.3 cm,橙红色,口感嫩滑清甜,品质优良,可溶性固形物含量(w,后同)11.5%,总糖含量10.0%,总酸含量0.21%,维生素C含量1.01 mg·g⁻¹,粗纤维含量0.6%。

2.3 生物学特性

组培苗在春植的栽培模式下,3月初定植,4月底至5月初现蕾,定植至始花时间约63 d,9月中下旬开始采收,定植至始采时间约180 d,10—11月为采收盛期,当年可有效采收至12月中下旬。

2.4 适应性和抗性

多年多点区域性试验结果表明,紫暉番木瓜根系发达,对各地栽培环境适应性良好,但感环斑花叶病毒病(PRSV)。

3 栽培技术要点

3.1 适栽区域

适宜在广东省番木瓜产区及类似生态区栽培,宜采用轮作或选择新区种植。

3.2 选地与整地

选择远离三废污染、不带PRSV病源且与其他番木瓜果园距离500 m以上的新地,要求地块排灌良好、土壤肥沃、土层深厚、土质疏松。按种植规格整地,施足腐熟有机肥,一般每株5~10 kg,挖好排灌沟,使地下水位保持在离地面50 cm以下。

3.3 种苗选择

选用种源纯正、无病虫害、具有6~8枚功能叶且

根系发达的健壮组培苗,确保种性和株性一致。

3.4 定植

根据不同管理水平可采用株行距(1.8~2.0)m×(2.5~2.6)m进行定植,建议每666.7 m²种植130~150株。该品种具有植株较矮壮、最低结果高度低的特点,为避免成熟期果实接触地面而导致烂果,定植及后续管理过程中不宜采用拉斜种植方法。定植后淋透定根水,注意不露根、不积水。

3.5 科学肥水管理

规模种植时建议采用水肥一体化技术进行高效肥水管理,施肥原则:主攻促生肥、催花肥和壮果肥。促生肥:定植后10~15 d抽生出新叶开始薄施,可用0.15%~0.2%的尿素淋施,每7~10 d施1次;当叶色转为浓绿时,以速效氮肥为主,加适量钾肥,每10~15 d施肥1次,由薄施到多施,浓度由稀至浓。催花肥:现蕾前后(定植后45~50 d)及时施重肥,供花芽形成,仍以氮肥为主,适当增施磷、钾肥。每株施尿素50 g、复合肥25 g、钾肥25 g,每20 d施1次。另外,应每株施3~5 g硼砂3~5次,每30 d施1次,防瘤肿病发生。壮果肥:盛花坐果期增施重肥,有机肥与无机肥结合施用,增施磷钾肥,少施氮肥。6—10月期间每月施重肥1次,每次每株施复合肥100 g、氯化钾100 g。在成熟前2个月开始增施有机肥,如沤熟的花生麸,加适量磷肥,以提高果实品质。水分管理原则:保持土壤润湿,旱灌涝排,防止积水烂根。

3.6 除草管理

番木瓜对除草剂较为敏感,需定期人工除草,建议采用地膜或地布覆盖防草管理。

3.7 树体和果实管理

开花坐果前及时摘除侧芽,台风季节加固支撑防风。若受风害等外力影响导致植株歪斜或倒伏时,应扶正并用木桩支撑,适当培土,避免露根和果实接触地面。

该品种具有连续结果能力强、花数量较多的特点,应根据生产实际需要和管理水平,在盛花期和坐果期及时疏花疏果,每个节位以保留1~2个正常果为宜。高温干旱等异常气温导致的畸形花和畸形果应尽早疏除。

3.8 病虫害防控

重点防控环斑花叶病毒病、茎腐病、霜霉病、白粉病、炭疽病、红蜘蛛和蚜虫危害。其中,番木瓜环斑型花叶病毒病是生产上最主要的限制因素,目前尚无有效药物防治,宜采取以栽培为主的综合防控措施:建园时远离病源,采取轮作制度栽培模式,选择不带病毒种苗,栽培管理上增强植株抵抗力,及时预防和灭杀蚜虫,防止传播和扩散。有条件的种植户可采用网室栽培。

3.9 果实采收与护理

果皮出现三划黄时即可采收,应小心轻放,可采用海绵等软材料包装,防止机械伤。

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