

# 优质黄果百香果新品种雅蜜的选育

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**摘要:**雅蜜是从黄金百香果自交后代中选育的优质鲜食百香果新品种。该品种果实近圆形,果大,平均单果质量95.79 g;成熟时果皮黄色,表面有星状白色果点;果肉黄色至橙黄色,多汁,风味酸甜,香气浓郁,不易脱囊,可食率50.87%。可溶性固体含量( $w$ ,后同)18.50%,总糖含量12.7 g·100 g<sup>-1</sup>,总酸含量16.97 g·kg<sup>-1</sup>,维生素C含量14.1 mg·100 g<sup>-1</sup>,氨基酸总量18.0 g·kg<sup>-1</sup>。该品种果实生长期60~100 d,在福建种植区果实收获时间集中在7月中下旬至9月上旬和10月上旬至11月中下旬;植株生长势强,易成花,自交亲和,每666.7 m<sup>2</sup>平均产量1 240.0 kg,丰产稳产。较抗炭疽病和病毒病,较耐高温。适应范围广,适宜于在福建、广西、云南等黄果百香果产区种植。

**关键词:**百香果;新品种;雅蜜;大果;优质

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## A new high-quality yellow passion fruit cultivar Yami

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**Abstract:** The new fresh edible passion fruit (*Passiflora edulis* f. *flavicarpa*) cultivar, Yami was selected from selfing progeny of Huangjin cultivar. The parent (named H3) was selected from 48 passion fruit plants of Huangjin cultivar introduced from Taiwan, with traits of larger fruit size, higher content of soluble solids and more flowers in summer compared with the other plants. The selfing was made in the summer of 2013 and 262 health seedlings were obtained and transplanted into the field in 2014. After preliminary screening, a total of eight promising seedlings were selected in 2014, one superior plant (named 05) with high average single fruit weight, high edible rate, high soluble solid contents, rich aroma, delicious flavor and high yield was finally selected after 2 years (2015—2016) of observations. The grafted trees of the superior plant showed stable genetic traits in the multisite trials from 2017 to 2021. It was evaluated by experts' on-site evaluation on 29 August, 2022 and it was named Yami. It was certified as a provincial cultivar on 26 December, 2023 in Fujian province. The vines were cylindrical shaped and colored green. The leaves were papery and green and had three shapes: unlobed, two-lobed, palmately three-lobed leave. The flowers were hermaphroditic and include three bracts, five sepals, five petals, five stamens, three floral column and one ovary. The shape of fruit was nearly round and the average weight of single fruit was 95.79 g. Ripe Yami fruit had yellow skin and with white spots. The pulp was yellow to orange yellow, juicy, with sour and sweet taste and strong aroma. The pulp was not easily detached from the funicle. The edible rate was 50.87%, the soluble solid content was 18.50%, the total sugar content was 12.7 g·100 g<sup>-1</sup>, the total acid content was 16.97 g·kg<sup>-1</sup>, the vitamin C content was 14.1 mg·100 g<sup>-1</sup>, and the total amino acids content was 18.0 g·kg<sup>-1</sup>. The fruit growth duration of Yami was 60–100 d, and the harvest time was mainly concentrated from mid-late July to early September, and

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early October to mid-late November in Fujian planting areas. Yami had strong growth vigor and was highly self-compatible, and was not only resistant to anthracnose and viruses, but also highly tolerant to high temperature than its parent. It had the advantage of relatively high and stable yield and wide adaptability. It would be suitable for planting in yellow passion fruit producing regions such as Fujian, Guangxi, Yunnan and other areas. The one-year cropping pattern was applicable to the regions with winter frost. High ridge cultivation was effective for preventing base rot disease. The planting density was would be 3 m × (1.0–2.0) m.

**Key words:** Passion fruit; New cultivar; Yami; Big fruit; High quality

百香果为西番莲科(*Passifloraceae*)西番莲属(*Passiflora* Linn.)多年生藤本常绿果树,原产于安地列斯群岛。百香果果实香气浓郁,风味独特,富含黄酮、萜烯等100多种生物活性物质<sup>[1-2]</sup>,具镇静、抗氧化等保健功效,并且百香果种植周期短见效快,受到消费者及种植者的喜爱。近十年,中国百香果产业发展迅速,在广西、福建、海南、云南等地区广泛种植<sup>[3-5]</sup>。福建气候温暖湿润,热量资源丰富,百香果适种区较广,龙岩、漳州、泉州、福州、宁德等地均有种植,龙岩和漳州为主要产区。福建作为中国百香果主产区之一,近十年来主栽品种经历了明显的变化,产业发展初期主栽品种为紫果百香果(*P. edulis*),如台农一号<sup>[6]</sup>、紫香、满天星等,紫果百香果香气浓郁,风味偏酸,鲜食加工兼用;此后黄果百香果(*P. edulis* f. *flavicarpa*)因果实酸味较紫果百香果淡,市场接受度更高,迅速取代紫果百香果成为市场宠儿,代表品种有黄金、福建百香果3号<sup>[7]</sup>、钦蜜9号<sup>[8]</sup>等;目前,为满足市场需求的多样化和差异化,新品种不断被选育出来,如金都3号<sup>[9]</sup>和蜜语<sup>[10]</sup>等,为百香果产业品种结构的优化奠定了基础。针对福建气候条件,在追求甜味口感的同时,稳产、优质、多用途、耐储运新品种的选育对促进百香果品种结构优化和良种化商品化生产也具有积极意义。基于此,福建省农业科学院果树研究所和漳州市果粒多农业科技有限公司以大果、优质、丰产稳产为育种目标,开展了百香果新品种选育工作,经多年努力育成新品种雅蜜,该品种具大果、优质、抗性强、丰产稳产、适应性广等特点。

## 1 选育过程

2012年台湾嘉义人石满宝将台湾民间选育的品种黄金百香果引入福建漳州百花村。同年,对定植于漳州市南靖县靖城大道西侧福建省农业科学院果

树研究所漳州育种基地内的48株黄金进行跟踪观测,筛选出植株健壮且平均单果质量和可溶性固形物含量高的单株3株并越冬栽培。2013年夏,以夏季花量多的H3单株为亲本进行自交,获得314粒种子,11月播种后育成健壮杂种实生苗262株。2014年4月上旬移大苗定植于该育种基地,并进行田间观测,以花期早、单果质量大和风味甜为主要指标,初步选出较早挂果、风味较甜的F<sub>1</sub>优株8株,编为01~08。2015—2016年连续2 a(年)对8个优株进行跟踪观测,结果显示,05优株相较于其他单株综合性状更优,具有大果、香气浓、高可溶性固形物含量、高可食率、高固酸比、风味酸甜、株产较高等特点。2016年秋季,以金霸为砧木,以05优株的半木质化茎段为接穗,繁育嫁接苗,2017年开始陆续在福建省漳州市芗城区、南靖县、武平县、长汀县等地进行无性子代的遗传稳定性观测。经过5 a观测,表明该优株的无性子代遗传性状稳定一致,表现为果大、风味酸甜、香气浓、品质佳、丰产稳产。2022年8月定名为雅蜜,2023年通过了福建省非主要农作物品种认定,认定编号:闽认果2023001。

## 2 特征特性

### 2.1 植物学特征

雅蜜藤形状圆柱形,藤颜色绿色。叶片纸质,绿色,不裂、2裂和掌状3裂交替出现,叶缘锯齿状,叶柄2个蜜腺邻近叶基(图1)。花为两性花,具自交亲和性,具苞片3枚、萼片5枚、花瓣5枚、雄蕊5枚、花柱3枚、子房1个。花苞片具锯齿,平均长25.01 mm;花萼片绿色,平均长34.37 mm,宽11.61 mm;花瓣平均长32.16 mm,宽6.29 mm,正面主色浅绿色;花冠喉斑点状环纹的色彩强度中等;外副花冠花丝颜色具白、紫两种,副花冠花丝上具紫色环纹,环纹平均宽度11.10 mm,丝状副花冠平均直径61.12 mm,副

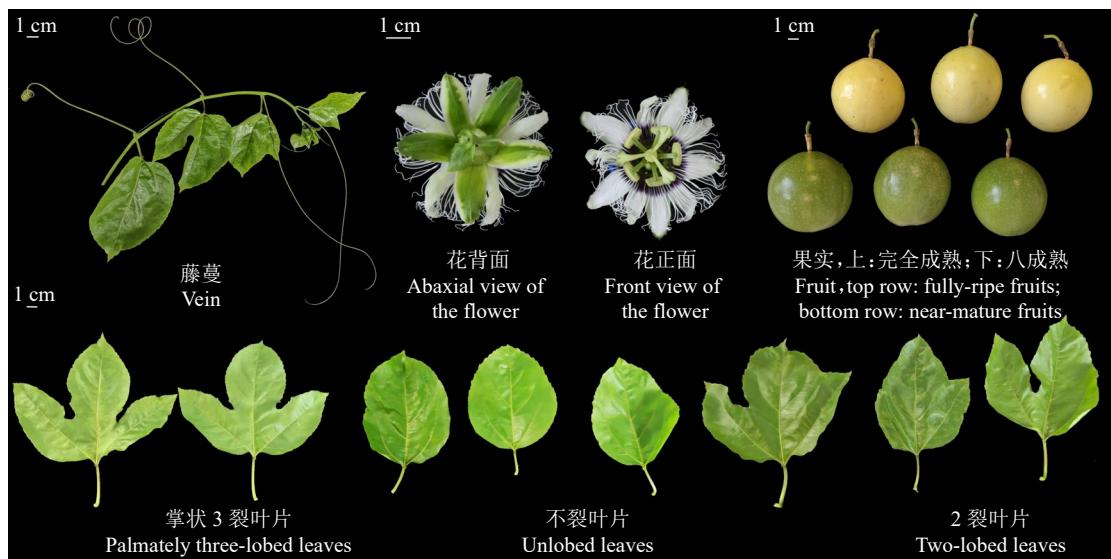


图1 百香果新品种雅蜜藤蔓、花、果实及叶片  
Fig. 1 Vine, flowers, fruits and leaves of Yami passion fruit

花冠花丝平均长度 23.90 mm, 花丝平均数量为 160 枚; 花柄平均长 31.44 mm。

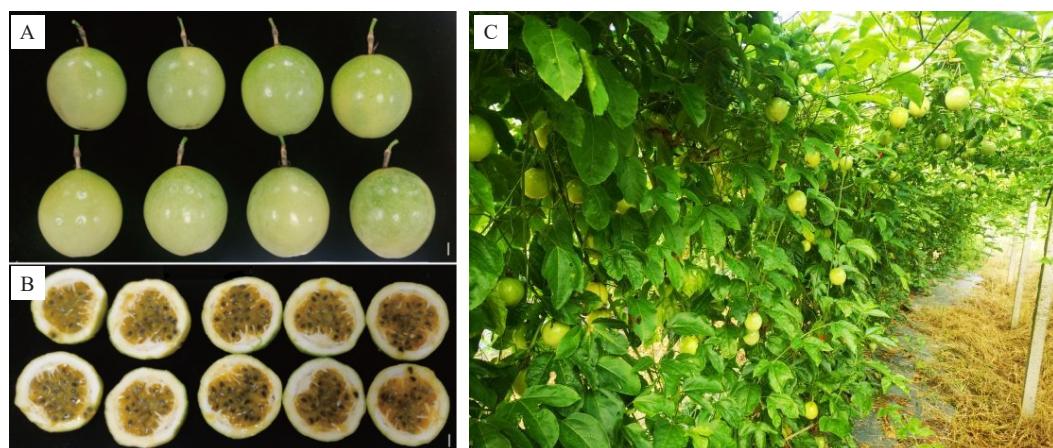
## 2.2 果实经济性状

雅蜜果实近圆形, 果实平均纵径 71.48 mm, 横径 67.7 mm, 果形指数 1.05, 单果质量 95.79 g。果皮上有星状白色果点, 果皮成熟后为黄色(图2-A), 果皮平均厚 0.45 cm。果实成熟后果肉黄色至橙黄色(图2-B), 平均可溶性固形物含量( $w$ , 后同)18.50%, 总糖含量  $12.7 \text{ g} \cdot 100 \text{ g}^{-1}$ , 总酸含量  $16.97 \text{ g} \cdot \text{kg}^{-1}$ , 维生素 C 含量  $14.1 \text{ mg} \cdot 100 \text{ g}^{-1}$ , 氨基酸总量  $18.0 \text{ g} \cdot \text{kg}^{-1}$ , 可食率 50.87%(表1), 果实香气浓郁, 风味佳, 品质优。种子为卵状三角形, 黑褐色, 平均长宽为 5.60 mm ×

3.66 mm。该品种保留了亲本黄金果大和香气浓的性状, 但总酸含量明显下降, 口感较黄金更甜, 风味酸甜可口, 不易脱囊; 相较于钦蜜 9 号, 该品种香味较浓, 且秋冬季果与夏季果大小无明显差异。

## 2.3 品种分子鉴定结果

利用笔者已开发的西番莲 SSR 分子标记<sup>[1]</sup>对雅蜜和黄金百香果进行 SSR 分子鉴定, 随机抽取 4 对引物(表2)开展测试, PCR 产物利用 LabChip GX Touch 24 核酸分析(PerkinElmer)进行电泳检测。结果如图3所示, 利用 4 对引物扩增出的 2 个品种的特异性条带分布于 100~300 bp, 雅蜜与黄金的多数条带较为一致, 表明雅蜜为黄金的自交后代。



A. 果实外观; B. 果实横剖面; C. 结果树。  
A. Fruit appearance; B. Transverse section of fruit; C. Yami plant during the fruiting stage.

图2 百香果新品种雅蜜  
Fig. 2 A new passion fruit cultivar Yami

表 1 雅蜜与主栽品种的性状比较

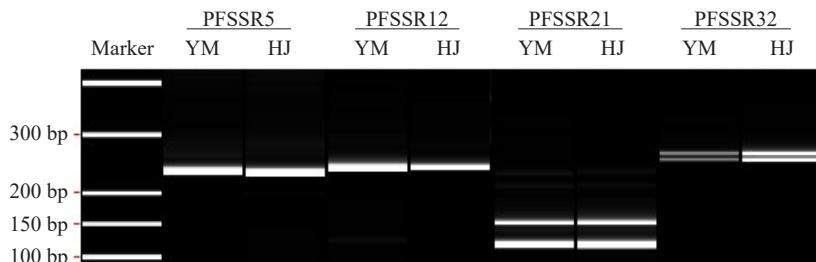
Table 1 Comparison of main economic characters between Yami and main cultivar

品种 Cultivar	平均单果 质量 Average fruit mass/g	果形 Fruit shape	w(可溶性 固形物) Soluble solids content/%	w(总糖) Total sugar content/ (g·100 g <sup>-1</sup> )	w(总酸) Total acid content/ (g·kg <sup>-1</sup> )	w(维生素C) Vitamin C content/ (mg·100 g <sup>-1</sup> )	w(总氨基酸) Total amino acids content/ (g·kg <sup>-1</sup> )	可食率 Edible rate/%	风味 Flavor
雅蜜 Yami	95.79±3.15	近圆形 Oblate	18.50±0.67	12.7±0.7	16.97±0.82	14.1±1.6	18.0±1.2	50.87±1.46	甜微酸,香味浓 Sweet, slightly sour, strong france
黄金 Huangjin	91.44±2.52	近圆形 Oblate	17.85±1.30	8.9±1.2	28.10±0.81	23.0±1.4	17.1±1.1	48.83±1.75	甜酸,香味浓 Sweet and sour, strong france
钦蜜9号 Qinmi 9	83.21±1.36	近圆形 Oblate	19.69±1.28	12.0±1.6	15.12±1.45	23.2±1.4	16.4±2.3	45.28±1.92	清甜,香味淡 Sweet, light france

表 2 西番莲 SSR 引物序列

Table 2 SSR primer sequences of passion fruit

引物编号 Primer No.	正向序列(5'→3') Forward primer sequence(5'→3')		反向序列(5'→3') Reverse primer sequence(5'→3')	
PFSSR5	AACCCCTTCCTCGTGCTAAT		GTCAGGCCTACAACCCATA	
PFSSR12	GTGAGGACAGAGAGCGATCC		GCACTGATGCAAGGTTCTGA	
PFSSR21	GGTTGCAACGATGGAGTTTT		GCTAGGATTGATGGGTCA	
PFSSR32	CTACAGACTCTCCGTTCCCG		GCAGACAGGACAATCAAGCA	



Marker. DNA 标准物; YM. 雅蜜; HJ. 黄金; PFSSR5、12、21、32. 西番莲 SSR 分子标记引物编号。

Marker. DNA standard; YM. Yami; HJ. Huangjin; PFSSR5, 12, 21, 32: Passion fruit SSR primer 5, 12, 21, 32.

图 3 雅蜜(YM)和黄金(HJ)的 SSR 电泳图

Fig. 3 SSR electrophoresis maps of Yami and Huangjin passion fruit

## 2.4 生长结果习性

雅蜜植株生长势强。在20~30 °C下生长迅速,二级蔓和三级蔓为主要结果蔓,具有自交亲和性,成花坐果性好,每年开花结果集中于两批次,持续结果期长。在福建漳州芗城、南靖、龙岩武平、岩前镇、长汀、福州长乐等示范基地进行多年多点试验,三年区试试验每666.7 m<sup>2</sup>平均年产量为1 240.0 kg,两年丰产性试验每666.7 m<sup>2</sup>年产量为1 194.2 kg,多年多点每666.7 m<sup>2</sup>平均年产量为1 218.7 kg,丰产、稳产性好。

## 2.5 物候期

在福建栽培区,3月底大苗定植后,4月中下旬

花芽萌动,花期主要集中在5月—7月上旬和8月上旬—10月,果实收获时间集中在7月中下旬—9月上旬和10月上旬—11月中下旬,夏季果实发育期较短,为60~70 d,秋冬季果实发育期长,为80~100 d。

## 2.6 嫁接亲和性及抗逆性

在嫁接适宜期,雅蜜与生产上常用砧木(如金霸)小苗嫁接,成活率均高于90%,嫁接后嫁接口愈合良好,生长结果正常,嫁接亲和性强。经田间病害调查,该品种对炭疽病、病毒病抗性强;经田间观测,该品种较耐高温,在高温下停滞开花挂果时间较亲本黄金短,耐高温性强于亲本黄金。

### 3 栽培技术要点

#### 3.1 适宜区域

适宜在福建龙岩和漳州、广西北流、贵州从江和榕江等生态环境条件类似地区栽培。在百香果适宜种植地区,选择年均温高于18℃、最冷月平均气温不低于10℃、冬季基本无霜冻、水源丰富、阳光充足的平地或山地建园。山地宜选坡度<20°,不在风口处、冷空气易堆积或易积水等处建园。土壤以肥沃、酸碱度适中(pH值5.5~7.5)、排水良好的壤砂土或改良后的红黄壤土为佳。

#### 3.2 园地建设

根据自然条件、生产规模和经营模式等情况,建设生产道路、排灌系统、种植棚架等。棚架可采用平棚式、篱笆式、T形棚等,架高1.8~2.0 m较适宜,材料可选水泥柱、石柱、竹竿、木杆、铁丝、铝钢线、镀锌线等。果园需挖设排水沟及排洪沟,果园平整后起高畦,高约30 cm,畦上可布设滴灌设施并覆盖防草膜。

#### 3.3 定植技术

全年均可定植,福建栽培区以3—4月定植最佳,种植时间应选阴天或雨后晴天进行。根据园地情况及棚架类型确定种植密度,行距约3.0 m,株距1.0~2.0 m,每666.7 m<sup>2</sup>种植110~230株。定植前2~3个月完成全园翻犁,并挖长、宽、深均为50 cm的定植穴,每穴施入有机肥约10 kg,以及1 kg的钙镁磷肥。垒出高出地面20 cm的墩台,以便定植时挖穴种植。定植后灌溉充足的定根水。

#### 3.4 整枝修剪

定植后初期要及时抹除砧木上萌发的腋芽,根据需要抹除主蔓上新萌的腋芽。单主蔓种植时,抹除所有主蔓上新萌腋芽,保障顶芽营养以促主蔓迅速上架,待主蔓长40~50 cm时,用细绳或支架做好牵引,主蔓上架后及时摘心,留3~4个侧枝作为一级蔓朝不同方向延展,侧枝长至1.0~1.5 m摘心,促发二级蔓和三级蔓以待结果。多主蔓种植时,保留主蔓上新萌腋芽1~2个,形成2~3个主蔓,同样待蔓长40~50 cm时,根据布局将各主蔓牵引至棚架适宜位置,后续管理同单主蔓,注意要保留所有主蔓上萌发的全部花芽,以待结果。因该品种生长势强,生长量大,在种植过程中要及时疏除过密枝条,如开花坐果期疏除无花果枝条,采果后短截侧蔓,疏除病虫枝、

瘦弱枝等,垂地枝条距地面20~30 cm处修剪等。

#### 3.5 肥水管理

苗期多施氮肥以促植株生长,可在定植10 d后开始结合灌溉约每7 d株施浓度(w,后同)0.3%~0.5%的高氮复合肥水溶液1次,肥量可依据植株大小酌情增加。藤蔓上架后可在距植株两侧40 cm处各开约20 cm深的施肥沟追施磷钾肥,株施入复合肥0.25 kg,硫酸钾0.20 kg,后及时覆土。花期及幼果期可通过叶片喷施0.3%磷酸二氢钾和0.2%硼砂水溶液以利于保花保果。果实迅速膨大期,以钾肥为主,配以其他中微量肥,并需注意良好的水分供应。果实成熟期应适当控水。

#### 3.6 病虫害防治

病害主要有茎基腐病、病毒病、疫病、炭疽病等,茎基腐病可通过选用抗性砧木和高畦种植来防控;病毒病可通过选用健康苗木,建网室栽培,防控蓟马、蚜虫等传媒媒介来防控;疫病和炭疽病可选用70%甲基硫菌灵1000倍液、75%百菌清可湿性粉剂800倍液、50%多菌灵可湿性粉剂800倍液等药剂进行防控。虫害主要有蓟马、果蝇、蚜虫等。蓟马可用黄色粘虫板诱杀成虫,用70%吡虫啉3000~4500倍液在卵盛孵期、低龄若虫期和虫害始发期喷施;果蝇可通过实蝇诱捕球、诱捕器和带有性诱剂的黄板诱捕成虫,用5%阿维菌素1500倍液或10%高效氯氟氰菊酯3000倍液喷洒果园地面防控幼虫;蚜虫可喷雾40%毒死蜱800倍液或90%敌百虫800倍液来防控。

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