

# 苹果新品种金玉的选育

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**摘要:**金玉苹果是由华美×Hongro 常规杂交选育出的早熟迷你苹果新品种。果实圆柱形或长圆锥形, 果皮金黄色, 果面光滑, 有蜡质, 果肉黄白色, 肉质松脆, 风味酸甜, 有香气; 平均单果质量 110 g, 最大单果质量 130 g, 果形指数 0.98; 每果实平均含种子 7 粒。金玉果实可溶性固形物含量(w, 后同)14.9%, 可滴定酸含量 0.12%, 硬度 8.5 kg·cm<sup>-2</sup>, 维生素 C 含量 4.4 mg·100 g<sup>-1</sup>; 品质中上。果实生育期 100 d, 在郑州地区 7 月上中旬成熟; 花序花朵数 5~6 朵, 萌芽率较高, 成枝力稍弱。抗逆性、抗病性较强。货架期 10~15 d, 可冷藏 2 个月。适合在淮河以北苹果适生区免套袋栽培, 第 2 年开花结果, 三年量产, 四年丰产。

**关键词:** 苹果; 新品种; 金玉; 早熟; 迷你型

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## Breeding report of a new apple cultivar Jinyu

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**Abstract:** Jinyu is an early-season, table apple variety with excellent appearance. The variety was derived from a cross between Huamei and Hongro in 2006 in the experimental field. It was initially selected in 2010 for its early ripening time and good quality. After five years of consistent observations, it was finally selected in 2016. The regional adaptability test started in 2017 at five sites (including Zhengzhou, Xinxiang, Sanmenxia, Shangqiu, and Gongyi), the authorization was received from the Ministry of Agriculture and Rural Affairs for the protection of new plant varieties in 2019; and it was approved by the Henan Forest Species Certification Committee in 2023. The young trees of Jinyu were vigorous, with strong, fast-growing branches with slight short internodes. The leaves were 10.13 cm in length and 6.34 cm in width, medium green, and had acuminate (pointed) tips. The early flowering date was early April, full blooming date was from April 4 to 13. The fruit began to lose its astringency and acidity in mid-June, turned color from green to yellow in early July. The leaf fall occurred in early November, with a vegetative growth period of 250–260 days. The fruit was cylindrical or long conical, with a regular shape. It had an average longitudinal diameter of 5.4 cm and a transverse diameter of 5.5 cm. The fruit size was small, weighing approximately 110 g on an average. The flesh was yellowish-white, fine, and crispy, with a peel firmness of 8.5 kg·cm<sup>-2</sup>. The solid content was 14.4%, titratable acid content 0.12%, and the quality was high. The fruits ripened in mid-to-late July in Zhengzhou, approximately two weeks earlier than Gala and its parent varieties. The flavor was similar to that of Gala. The axillary flower buds were easily formed on the young trees. To reduce the competition between these buds and overall tree growth, it was important to remove excess axillary buds during the early stage. Thinning flowers

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and fruits was crucial to ensure optimal fruit size. Typically, no more than two fruits were allowed per inflorescence. The distance would be 10–15 cm between the fruit clusters. The plants exhibited minimal occurrence of severe leaf diseases such as apple *Alternaria mali* roberts and powdery mildew. The fruit could be stored for 10–15 days at room temperature, and the cold storage life was 2 months. Jinyu was highly adaptable and had a wide planting range with dwarfing, semi-dwarfing, and standard rootstocks.

**Key words:** Apple; New cultivar; Jinyu; Early maturing; Mini apple

苹果是中国落叶果树中的第一大树种,种植面积占中国落叶果树的一半以上,是中国大宗果品之一<sup>[1]</sup>。但长期以来,中国苹果主栽品种结构单一,以晚熟品种富士为代表的居多,早中熟苹果品种占比较少;并且国外育成品种在中国栽培较多,国内育成品种占少数<sup>[2]</sup>。近年来,不少地区先后出现晚熟品种滞销现象,而早熟品种的市场表现良好,效益较高。中国先后育出的华美、华玉、华硕、秦阳、瑞阳、鲁丽等优良品种,已逐渐成为新发展果园早中熟品种的首选<sup>[3]</sup>。但这些品种仍有不足之处,如外观大多为红色,皆为大果型,尚不能满足消费者对苹果品种多样化的需求。为了适应苹果生产中品种结构调整的需求,中国农业科学院郑州果树研究所苹果育种团队一直致力于早中熟优良品种的培育。先后以嘎拉、藤木一号、美八、华硕、华美、Hongro等为亲本进行杂交,目标是培育有特色、易结果、好管理、能抗病的早中熟优良品种。金玉就是从华美×Hongro杂交组合中获得的迷你型早熟黄金果。该品种成串结果,果面呈金黄色,脆甜,香味浓,可实现免套袋栽培,也迎合了水果市场趋向小型化的需求,具有较高的食用价值和经济价值。

## 1 选育经过

该品种源于华美×Hongro杂交组合。在2006年的花期提前采集中国农业科学院郑州果树研究所苹果资源圃内父本Hongro的花粉,晾干备用,于母本华美的初花期花蕾去雄、授粉并套袋,15 d后去袋,8月中旬果实成熟后采收杂交果随即采集种子,共获得570粒种子,将种子清洗杀菌保藏,并于当年冬季层积处理。2007年春播种杂交实生苗386株,2008年即有少量单株成花,但未能结果,经过圃内对实生苗生长性状的预选,2009年砍伐淘汰了一批结果晚、长势偏野生的实生苗,剩余213株继续培养。2010年,213株杂交苗中的136株开花结果,代号为HK-132的单株是最早结果的15个单株之一,成熟早,果

个小而均匀,外观洁净,果面呈金黄色,而且肉质细腻、风味酸甜,有香味,品质优良,定为初选优系。随后连续5 a(年)观察,该单株的上述特性表现稳定,2016年确定为决选优系。2017年后陆续在河南郑州、新乡、三门峡、商丘、巩义等地高接、定植开展区试。经过连续多年对其高接树及试验基地果树的结果习性、丰产性能、果实经济性状等系统观察,确定该品系具有亲本Hongro的优良品质和结果性状,口感脆甜,有香味,成熟期比父母本早14 d左右,果面呈金黄色、小果型,极具特色。2018年定名金玉(图1),2019年获得农业农村部植物新品种保护权;2023年通过河南省林木品种审定委员会审定(审定编号:豫S-SV-MP-007-2023)。

## 2 主要性状

### 2.1 果实经济性状

果实圆柱形或长圆锥形、整齐端正,平均纵径5.4 cm,横径5.5 cm;果个中小,平均单果质量110 g。果皮表面金黄色,果面平滑,蜡质多,有光泽;无锈,果粉少;果点小,密度中,灰白色,突出。果梗长度中,平均长2.5 cm,中粗;梗洼深度中,中广,少锈。萼片宿存,反卷,闭合;萼洼中,缓、中深。果肉黄白色;肉质细,松脆,果实硬度 $8.5 \text{ kg} \cdot \text{cm}^{-2}$ ;汁液中多,可溶性固形物含量( $w$ ,后同)14.4%,可滴定酸含量0.12%,维生素C含量 $4.4 \text{ mg} \cdot 100 \text{ g}^{-1}$ ,风味酸甜适口,有芳香;品质上等。果实在普通室温下可贮藏10~15 d。同一地区同一栽培管理条件下的金玉及其亲本华美、Hongro及嘎拉的果实综合性状如表1所示。

金玉果实风味浓郁,极丰产,郑州地区7月中下旬成熟,比嘎拉及其亲本早2周左右,风味与嘎拉相似。可在早熟品种藤木一号收获后、嘎拉成熟前的空档上市。

### 2.2 植物学特征

金玉幼树树势旺盛,枝条健壮、生长较快,节间



图1 苹果新品种金玉的果实和花朵表型

Fig. 1 Fruits and flowers of new apple cultivar Jinyu

表1 金玉与亲本及同类品种果实经济性状比较

Table 1 Comparison of economic characters among Jinyu, its parents and Gala

品种 Cultivar	成熟期 Maturity period	单果质量 Single fruit mass/g	外观、色泽 Fruit appearance and color	风味、品质 Fruit flavor and quality	w(可溶性 固形物) Soluble solids content/%	结果性状 和贮藏性 Habit of fruiting and storability
金玉 Jinyu	7月中 下旬 Mid to late July	115	圆柱形,高桩,底色黄,果面金黄色,干净,平滑,果点明显。 Cylindrical shape, high pile, yellow background, golden fruit surface, clean, smooth, obvious fruit points.	肉质细,松脆,汁液中多;风味酸甜适口,有芳香。 The flesh is fine, crisp and juicy; The flavor is sweet and sour.	14.4	易结果,小型果,果实大小均匀,无采前落果,采后可贮10~15 d。 Easy to bear, small fruit, uniform fruit size, no pre-harvest drop, can store 10~15 days after harvest.
华美 Huamei	8月上旬 Early August	186	圆锥形,底色黄绿、阳面着片状红色,果点中密。 Cone-shaped, yellow-green background, flaky red on the sunny side, medium dense fruit points.	肉质松脆,汁液多,风味酸甜、味稍淡。 The flesh is crisp, juicy, sour and sweet flavor, slightly light taste.	13.4	成熟期不一致,采前有轻微落果、采后5~7 d果实沙化。 The ripening stage was inconsistent, with slight drop of fruit before harvest and sandy fruit 5~7 days after harvest.
Hongro	8月初 Early August	170	圆锥形或短圆锥形,底色黄、着色橘红或红,果点中、疏。 Conical or short conical, yellow, orange or red, medium and sparse.	果肉黄白、松脆,稍硬,汁液中,风味甘甜,无酸味。 Flesh yellowish white, crisp, slightly hard, juice, sweet flavor, no acid.	14.0	易结果,果实大小不一,易感糖蜜病,采后可贮10~15天不沙化。 Easy to bear fruit, fruit sizes vary, susceptible to molasses disease, can be stored 10~15 days after harvest without desertification.
嘎拉 Gala	8月中旬 Middle August	165	圆锥形,底色绿黄、阳面着橙红色,果点中密。 Conical, green yellow on the ground, orange red on the sunny side, fruit point.	肉质细、松脆,汁液多,风味酸甜、味浓。 The meat is fine, crisp, juicy, sour and sweet, and rich in flavor.	12.7	成熟期不一致,采前有轻微落果、采后可贮7~15天。 The ripening stage was inconsistent, with slight drop of fruit before harvest and sandy fruit 7~15 days after harvest.

稍短;1年生枝萌芽率较高,当年易形成二次分枝,成形快。花蕾颜色深粉红色,花瓣分离呈卵形,花期早;叶片姿态水平,平展内卷,叶缘钝锯齿,长度10.13 cm,宽度6.34 cm,绿色,叶尖渐尖。

### 2.3 物候期

金玉与其亲本Hongro花期基本相同,郑州地区3月7日—10日芽萌动;4月初开花,4月4日—13日为盛花期,花期9~10 d;果实6月中旬开始脱涩脱

酸、7月初开始由绿色转黄色,7月中下旬成熟,果实发育期100~110 d,成熟期比父母本早2周左右;11月上旬落叶,营养生长期250~260 d。

### 2.4 生长结果特性

金玉幼树以中、长果枝和腋花芽结果为主,随树龄增大逐渐以短果枝和中果枝结果为主,有一定的腋花芽结果能力。金玉坐果率极高,易结果丰产,生理落果轻,在授粉树配置合理的果园,如花期无自然



灾害,无需人工授粉。金玉结果性状好,早果丰产,嫁接第2年即有少量挂果,第3年每666.7 m<sup>2</sup>产量可达800 kg,第4年进入丰产期,每666.7 m<sup>2</sup>产量超过2000 kg。

### 2.5 抗逆性

金玉自选为优株以来,已在生产上试栽多年。根据各地引种试栽的情况,植株表现生长健旺,枝叶繁茂,很少发现有严重的苹果斑点落叶病、白粉病等叶部病害的发生;由于果实在7月底已成熟采收,避开了苹果的炭疽病、轮纹病等发病时期;与华美、美八、Hongro 和嘎拉等其他主栽品种相比,无特别严重的虫害蔓延发生。

## 3 栽培技术要点

### 3.1 繁育与定植

该品种应通过嫁接繁殖保持其稳定性。M26矮化中间砧定植密度为株行距(1.5~2.0)m×(3.5~4.0)m, M9矮化自根砧定植密度为株行距(1.2~1.5)m×(3.0~3.5)m,以设施扶干栽培、采用细长纺锤形整形;山地土壤贫瘠地区可采用海棠等实生砧或者半矮化砧栽培,定植密度为株行距(2.5~3.5)m×(4.0~5.0)m,采用自由纺锤形整形。

### 3.2 授粉品种配置

金玉品种的S基因型为S2S3,与金冠的S基因型一致,相互授粉效果不佳;与生产上的主栽品种富士、美八、华硕、嘎拉、锦秀红、华玉、藤木一号、华星、华美、Hongro 等品种S基因型都不相同<sup>[4]</sup>,可互为授粉树,授粉后坐果率高。

### 3.3 幼树期管理

定植当年视苗木强弱定干,壮苗高定干、弱苗低定干;萌芽后及时抹除与主干相竞争的枝芽,培养相对强壮的主干;苗木当年萌发的所有枝条除选定用作中心干的枝保持直立生长外,其他枝条尽早开角和拉枝控制生长势;栽后第1年冬剪时仅对中心干进行短截,主干上当年萌发的侧生枝条过旺的疏除,其余一律缓放,促其成花结果。

若采用M26、M9等矮化砧苗木,应注意幼树期扶干。土壤贫瘠的山地或丘陵地区可选用MM106半矮化砧木嫁接苗木栽植。

### 3.4 花果管理

金玉幼树极易形成腋花芽,幼树期注意疏除过多的腋花芽,减少因腋花芽结果而产生的与树体生

长之间的竞争。

金玉坐果率高,为保证果个,应注意疏花疏果,一般单花序留果不超过2个,留果花序间距10~15 cm。

### 3.5 肥水管理

新植果园在定植时要穴施足够的有机肥,以后每年都要秋施一定量的有机肥,并注意在果实膨大期及时补充营养。

### 3.6 病虫害防治

根据各地病虫害发生规律,在整个生长关键时期,重点防治果树腐烂病、轮纹病、早期落叶病和红蜘蛛。

## 4 综合评价

金玉适应性强,种植范围广,适合矮化、半矮化、乔化不同砧木类型栽培;成熟早、果面金黄、汁多、味甜,是苹果市场上不可多得的早熟迷你型黄金果。

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