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早熟砂梨新品种金早晶的选育

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摘 要:金早晶是由圆黄×翠冠杂交选育出的早熟砂梨新品种。果实圆形,果皮褐色,果面光滑,果肉白色,肉质疏松,风味甜;平均单果质量340 g,可溶性固形物含量(*w*,后同)12.4%,维生素C含量1.53 mg·100 g^{-1},果肉硬度5.6 kg·cm^{-2}。果实发育期约110 d。在武汉地区,果实成熟期为7月中下旬。该品种抗梨黑斑病。耐贮藏,货架期20 d。适宜在湖北武汉、枝江、潜江及相似生态区栽培,定植第3年开花结果,丰产。

关键词:砂梨;新品种;金早晶;早熟;褐皮

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Breeding report of a new early ripening sand pear cultivar Jinzaojing

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Abstract: The fruit surface of green-skinned sand pear varieties is highly susceptible to russeting, which compromises the fruit's appearance and market quality. As a result, the development of russet/brown-skinned cultivars that can be grown without bagging has become a major goal in current sand pear breeding. Jinzaojing is an early-season sand pear and derived from a cross between Wonhwang and Cuiguan in 2013 at Institute of Fruit and Tea, Hubei Academy of Agriculture Sciences. The seeds underwent sand stratification in December and were sown in January 2014, resulting in 130 seedlings. Fruiting commenced in 2017. Following continuous observation over multiple years, the plant in the first row, thirteenth position, was initially selected in 2017 for its early ripening time, attractive appearance, and excellent quality. After regional adaptability testing at three sites (including Wuhan, Zhijiang and Qianjiang in Hubei province) over four years from 2019 to 2023, it was finally selected in 2023. It was designated as SY1-13 and officially named Jinzaojing in 2023. The cultivar was registered by the Ministry of Agriculture and Rural Affairs in March 2025, with the certificate number GPD Pear (2025) 420002. This species is a tall arboreal plant, reaching up to 5 m in height. It exhibits vigorous growth, with a densely branched crown and an overall upright habit. The current-year branches display a yellow-brown coloration and bear sparse lenticels. The leaves are ovate in shape, acuminate at the apex, measuring approximately 9.7 cm in length and 6.5 cm in width, with sharply serrated margins. The flowers have a diameter of about 3.3 cm. Color of unopened flower is white, and anthers are pink. The fruit is predominantly round in shape, featuring a russet-colored peel. Its flesh is white, crisp, rich juice, fine texture without aroma. The average fruit weight 340 g, fruit shape index 0.97, persistent sepals. The content of total soluble solids is 12.40%, soluble sugar content 7.5%, the content of total acid is 0.11%, vita-

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min C 1.53 mg·100 g^{-1}, flesh hardness 5.60 kg·cm^{-2}. The fruit exhibits excellent quality, with a development period of approximately 110 days. Under the climatic conditions of the Wuhan region, it typically reaches maturity in mid-July. The number of flowers per inflorescence is 6−7. Capability of continuously fruiting is strong. It is resistant to pear black spot. The fruit possesses an extended storage capacity, maintaining quality for approximately six months under cold storage conditions and remaining marketable for more than 20 days at ambient shelf conditions. Suitable cultivation area is Hubei province and similar areas in the Yangtze river basin. Jinzaojing exhibits moderate branching capability, and a bud break rate of 81.5%. The average fruit cluster set is 3.5 fruits. The trees initiate fruit production in the third growing season following planting and achieve full fruiting capacity by the fifth year. During the full production period, the yield exceeds 2100 kg per 666.7 m^2. It shows no significant alternate bearing phenomenon. It is self-incompatible, requiring the reasonable allocation of compatible pollinizer varieties. For orchard establishment, it is advisable to select level terrain with neutral sandy soil that demonstrates good moisture retention and nutrient-holding capacity. A planting spacing of 3 meters between trees within rows and 4 meters between rows is recommended. Cuiguan, Sucui 1, Housui are the most suitable pollination cultivars, and the configuration of pollinizer is 3∶1.

Key words: *Pyrus pyrifolia*; New cultivar; Jinzaojing; Early ripening; Russet skin

中国是全球梨生产第一大国，梨果产量占世界梨产量的2/3以上。根据梨属植物起源演化路径，可分为亚洲梨和欧洲梨种群。砂梨（*Pyrus pyrifolia* Nakai）即为亚洲梨的主要栽培种，起源于我国长江流域及以南地区，是我国、日本和韩国梨的主要栽培种。

果皮颜色是植物分类学的重要形态特征，也是影响梨果实外观品质的重要性状[1-2]。根据梨果皮有无木栓层覆盖，果皮颜色可分为褐色和绿色。褐皮型品种成熟果实表皮被木栓层全面覆盖，在保护果实抵御外部胁迫方面具有重要的生物学意义。不同地区消费者对砂梨果皮颜色具有一定偏爱，如褐皮型砂梨深受日本和韩国消费者青睐，丰水、秋月、秋荣、新高、圆黄等日本、韩国育成品种目前仍是东亚地区砂梨主栽品种；而中国消费者则多偏爱绿皮，育成的砂梨品种以黄绿皮为主。

长江流域是我国砂梨种植的核心区域，其中早熟梨的生产具有明显优势。以翠冠、翠玉、苏翠1号等为代表的绿色果皮早熟梨，在我国砂梨品种结构优化中地位显著[1]。然而，在南方高温多湿气候下，绿皮梨果皮表面极易产生锈斑，对果实外观影响较大。因此，生产中必须采用果实套袋，增加了大量人工成本。近年来，育种目标逐渐转向选育早熟、褐色果皮、无需套袋的砂梨品种。目前，部分早熟褐皮砂梨品种选育已有报道，如早生新水、新玉、沪晶梨67号、沪晶梨18号等[3-7]。

1 选育过程

2013年，湖北省农业科学院果树茶叶研究所选用圆黄作为母本，翠冠作父本开展人工杂交。翌年1月播种，获得130株实生苗。2017年，部分植株陆续挂果，经连续3年筛选，编号为SY1-13的植株（第1行第13株）综合表现突出，其成熟期早、果皮褐色、果个较大、可溶性固形物含量高，被确定为优良单株。2019—2023年，连续5 a（年）在江夏、枝江、潜江等多个试点进行区域试验，对其植物学特征、生长结果习性、果实品质、抗性及适应能力等性状开展系统调查与分析。结果表明，该品系性状表现稳定，果实大、果形端正、风味甘甜，整体品质优良（图1）。2025年4月，该品种通过农业农村部非主要农作物品种登记，正式命名为金早晶，登记编号：GDP梨（2025）420002。采用SSR分子标记对金早晶进行系谱分析，结果确认其为圆黄与翠冠的杂交后代（图2，表1）。

2 主要特性

依据国家标准GB/T 19557.30—2018《植物品种特异性、一致性和稳定性测试指南 梨》[8]和《梨种质资源描述规范和数据标准》[9]开展金早晶的植物学特征、果实经济性状、生长结果习性等性状鉴定评

图1 砂梨新品种金早晶

Fig. 1 A new sand pear cultivar Jinzaojing

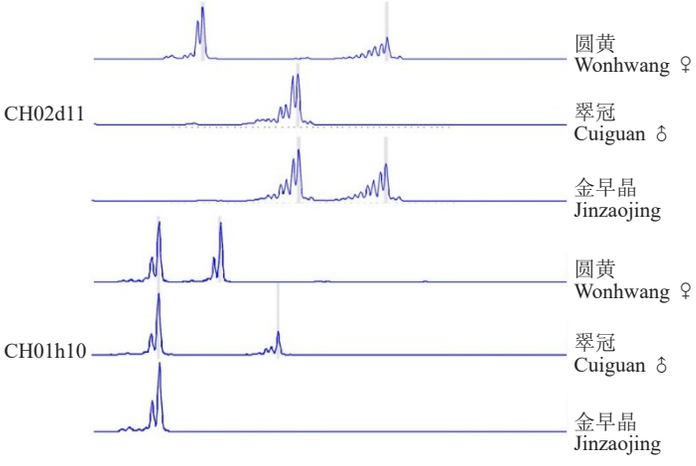

图2 基于SSR标记的金早晶系谱分析

Fig. 2 Parentage analysis of Jinzaojing by SSR markers

表1 金早晶及其亲本的SSR指纹图谱

Table 1 SSR genotypes of Jinzaojing and its parents

SSR locus	圆黄 Wonhwang	翠冠 Cuiguan	金早晶 Jinzaojing
NH013a	199/217	205/217	199/205
BGT23b	190/190	186/222	190/222
CH03g07	253/259	245/253	245/253
NH011b	180/180	180/182	180/180
CH04e03	182/186	188/221	182/221
CH04e05	202/204	204/210	202/204
CH01h10	92/102	92/112	92/92
CH05c07	127/133	115/127	127/127
CH03d02	175/179	177/179	177/179
CH01f02	160/174	166/176	166/174
CH01d08	281/295	281/281	281/295
NH007b	148/148	148/148	148/148
NH015a	135/135	99/135	135/135
CH02d11	99/129	115/115	115/129
EMPc117	103/103	91/103	91/103
TsuENH089	168/168	168/168	168/168
TsuENH080-354	350/350	353/370	350/370

价。

2.1 植物学特征

在武汉地区，该品种表现为树姿半开张。1年生枝节间平均长度4.3 cm、枝条阳面呈黄褐色、皮孔密度中等。叶芽顶端锐尖，相对枝的着生姿势为斜生。花芽长度为短到中等，花瓣相对位置为无序，花瓣卵圆形，柱头略低于花药。叶长9.7 cm、叶宽6.5 cm，长宽比适中；叶缘锐锯齿状，叶基圆形，叶尖渐尖；叶片纵向轴弯曲程度弱，叶柄长度中等、无托叶。

2.2 果实经济性状

果实较大，平均单果质量340 g；果实圆形，纵径9.9 cm，横径10.2 cm，果形指数0.97。果皮底色不可见，果皮盖色为褐色、程度中等；果肉质地细腻、脆，汁液多。果梗长度适中，梗洼浅，萼片宿存，果心小。果肉硬度5.6 kg·cm^{-2}，可溶性固形物含量（w，后

同）12.4%，可溶性糖含量7.5%，可滴定酸含量0.11%，维生素C含量1.5 mg·100 g^{-1}（表2）。果实较耐贮藏，常温下货架期约20 d。

2.3　生长结果习性

树势强健，成枝力中等，萌芽率81.5%。每花序平均坐果3.5个。栽植后第3年始果，第5年进入盛果期。盛果期每666.7 m^{2}产量可达2100 kg，大小年结果现象不明显。自交不亲和，需配置授粉树。

表2　金早晶与翠冠果实经济性状

Table 2　Main economic characteristics of Jinzaojing and Cuiguan

品种 Cultivar	成熟期 Maturity period	果实形状 Fruit shape	果皮颜色 Peel color	果肉质地 Fresh texture	风味 Flavor	平均单果质量 Average single fruit mass/g	果肉硬度 Hardness/（kg·cm^{-2}）	w（可溶性固形物）Soluble solids content/%
金早晶 Jinzaojing	7月中旬 Mid-July	圆形 Round	褐色 Russet	细、脆 Fine, crisp	甜 Sweet	340	5.6	12.4
翠冠 Cuiguan	7月中旬 Mid-July	圆形 Round	绿色 Green	细、脆 Fine, crisp	甜 Sweet	295	4.5	12.7

2.4　物候期

在湖北省武汉市，金早晶在3月上旬花芽萌动，3月中下旬盛花，7月中下旬果实成熟，11月中旬落叶，果实生育期约110 d。

2.5　适应性与抗逆性

金早晶适应性广，在武汉、潜江及枝江等多地多年栽培表现良好。金早晶抗梨黑斑病，人工接种梨黑斑病病菌7 d后，平均病情指数为20.4。

3　栽培技术要点

3.1　建园及栽培模式

选择坡度较缓、土层深厚肥沃、排水良好的地块建园，一般按照株距2~3 m、行距4 m进行栽植。推荐倒伞形或细长纺锤形树形。该品种生长势较强，修剪时宜以轻剪为主，减少短截，结合刻芽、拉枝、摘心及扭梢等技术措施，以加快树冠成形并促进早结果。为提高授粉质量，建议搭配丰水、翠玉、翠冠等品种作为授粉树，主栽品种与授粉品种的配置比以（2~3）∶1为宜，且授粉品种选择2个以上。

3.2　花果管理

若园内未配置授粉树，可采用人工辅助授粉以提高坐果率。落花后2~3周开始疏果，按照每20 cm枝段保留1个果的标准，优先选留着生位置较低、果形端正、无损伤和病虫害的幼果，可采用免套袋的栽培模式。采收时间应依据果实生育期、成熟度以及销售计划综合确定，做到分期、适时采摘。

3.3　病虫害防控

金早晶在生长期间病害主要包括梨锈病、黑斑病与轮纹病等；虫害方面则以梨木虱及梨小食心虫为常见。在防治策略上，应以农业防治与物理防治为根本措施，同时加大生物防治技术的示范与推广应用力度，并根据病虫害发生规律与经济阈值科学选用化学药剂，实现精准防控。需注重全园综合管理，保护叶片与果实，避免秋季出现树体二次生长或返花现象。

4　应用前景

南方砂梨产区的主栽品种翠冠因果锈问题，在生产中常需要进行二次套袋。金早晶梨成熟期与翠冠相近，无需套袋，可大幅降低生产成本，因而作为翠冠的补充或者替代品种进行栽培。

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