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中华猕猴桃早中熟新品种‘赣金 2 号’的选育

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摘要：‘赣金 2 号’是从江西省野生中华猕猴桃(*Actinidia chinensis*)自然变异群体中选育而成的早中熟新品种。果实广椭圆形，果面茸毛较易脱落，果喙微钝凸。一个花序中的侧花在开花时会自动脱落，仅主花能正常坐果，果实平均单果重 93.60 g，最大单果重 127.80 g。果肉髓射线明显，呈黄绿色。果实可溶性固形物含量为 19.20%，干物质含量为 18.77%，可滴定酸含量为 0.98%，抗坏血酸含量为 1.88 mg/g。在江西省宜春市，盛花期为 4 月中旬，果实成熟期为 9 月中下旬。植株生长势旺盛，具有较强的耐热、抗旱性，果实大小均匀一致，综合性状优良。盛果期产量为 22.56 t·hm^{-2}。

关键词：中华猕猴桃；单花结果型；品种；早中熟

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A new early-mid-mature kiwifruit cultivar ‘Ganjin 2’

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Abstract: Kiwifruit belongs to the family Actinidiaceae and the genus *Actinidia*. It is a perennial deciduous vine fruit crop. Among them, *A. chinensis* is currently the most widely cultivated species. However, cultivars of *A. chinensis* primarily harvest at late August to early September (the early-maturing type) or late October to early November (late-maturing type). The concentration of harvest periods and the short product supply window limit the effective development of *A. chinensis* germplasm resources. Additionally, the inflorescences are mainly panicles, which require manual thinning of flowers and fruits to promote normal fruit development, significantly increasing labor costs. Therefore, medium maturity and single-flower fruiting traits are important breeding objectives for *A. chinensis*. Our research team conducted a detailed survey and germplasm collection of wild kiwifruit resources in the major mountainous areas of Jiangxi Province. In Yihuang County, Fuzhou City, Jiangxi Province, at an altitude of 548 m, we discovered a single plant with medium maturity and single-flower fruiting, designated ‘YH-2’. After grafting and identification, we systematically observed and evaluated its biological characteristics, key fruit traits, and genetic stability. Results from three consecutive years of trials showed that the ‘YH-2’ exhibited stable medium maturity and single-flower fruiting traits. In Fengxin County (at an altitude of 75 m), the flowering period begins in mid-April, and the physiological maturity of the fruit is reached in late September, with the fruit development period spanning 155-160 days. The fruit is broadly elliptical, with a single-flower fruiting rate exceeding 95%. The fruit has a length of 4.30 cm, a diameter of 4.25 cm, and a fruit shape index of 1.01. The fruit has a slightly blunt, convex beak, and the pedicel length is 4.30 cm. The average

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fruit weight is 93.60 g, with the largest fruit reaching 127.80 g. The fruit skin is brown, covered with a moderate amount of short yellowish fuzz, while the flesh is yellow-green with distinct pith rays. The fruit is of excellent quality, with soluble solid content (SSC) reaching 19.20%, dry matter (DM) at 18.77%, titratable acid (TA) at 0.98%, and ascorbic acid (AsA) at 1.88 mg/g. The fruit has good storage potential and can be stored at room temperature for 30-45 days. The one-year-old branches are brownish-yellow, with an average internode length of 4.41 cm and a diameter of 0.95 cm. The fruit-bearing shoots are brown, with an average internode length of 2.36 cm and a diameter of 0.81 cm. Both the upper and lower surfaces of the young leaves and petioles are anthocyanin-colored, with pointed leaf tips and a gradually narrowing base. The mature leaves are broadly ovate with flat or slightly concave tips, measuring 9.86 cm in length and 12.19 cm in width, with petioles of 6.11 cm. The flowers are solitary or in cymose inflorescences, with 1-3 flowers per inflorescence. The petals are white, with 5-7 petals per flower. The fruiting rate is high (91.5%), and the plant exhibits strong continuous fruiting ability, with normal vegetative branches becoming fruiting shoots for the following year. The fruit set rate exceeds 95%, and flower and fruit drop are minimal. The first flowers bloom in mid-April, with peak bloom occurring in late April, lasting 5-8 days. The fruit matures in late September, making it a medium-maturing yellow-fleshed kiwifruit. The yield during the full fruit-bearing period is 22.56 $t \cdot hm^{-2}$. The breed of *A. chinensis* is of great significance for adjusting the fruit shelf life and can effectively reduce the labor costs associated with summer pruning.

Keywords: *Actinidia chinensis*; single-flower fruiting type; cultivar; early-mid-mature

猕猴桃(*Actinidia*)是原产于我国且极具特色的浆果，因其果实富含维生素 C、膳食纤维及多种矿物质元素，深受消费者喜爱。其中，中华猕猴桃(*A*. var *chinensis*)是猕猴桃属栽培较为广泛的一个种，绝大部分品种为早熟(8 月下旬-9 月上旬)、晚熟(10 月中下旬-11 月上旬)品种，中熟(9 月中旬-10 月上旬)品种较少，导致果实采收期过于集中、果品供应期偏短，这将严重制约中华猕猴桃种质资源的高效开发[1-3]。同时中华猕猴桃多以伞房花序为主，需要进行人工的疏花、疏果以促进果实的正常生长发育，极大增加了劳动成本。因此，中熟、单花结果是中华猕猴桃品种选育的重要目标性状。江西省具有丰富的野生猕猴桃种质资源，自主选育的‘金丰’、‘魁蜜’等品种已成为国内外主要的骨干亲本，这均为选育一个极具特色的早中熟中华猕猴桃品种奠定了良好基础。

1 选育过程

江西农业大学猕猴桃科研团队从 2008 年开始对江西省野生猕猴桃种质资源进行搜集和保存，其中在黄县（江西省抚州市）海拔 548 m 处发现了编号为‘YH-2’的单株，该单株结果时为单花结果类型，且成熟期较早。从母树采集接穗，进行异位高接（砧木为美味猕猴桃‘米良 1 号’）。2010 年，在江西省奉新县山维猕猴桃科技开发有限公司资源圃进行了为期 3 年的性状观测，包括倍性、遗传稳定性、植物学特性、果实品质等进行了观测与分析。2014-2017 年，采集其接穗在赣南、赣中均进行高接换种，以中华猕猴桃‘金艳’[4]为对照，进行品比试验。多年的品比试验结果表明，该优株倍性、单花结果特性等植物学特性稳定遗传，果实均匀一致，成熟期在 9 月中下旬（奉新地区）。2019 年，该优株被定名为‘赣金 2 号’，并于 2023 年 9 月获得国家农业农村部植物新品种权（CNA20201000528）。

2 主要特征特性

2.1 倍性鉴定

采集‘金果’（二倍体）、‘金艳’（四倍体）、‘金魁’（六倍体）以及‘赣金 2 号’的嫩叶进行

倍性检测。测定结果表明，‘赣金 2 号’与‘金艳’一样均为稳定的四倍体植株（图 1）。

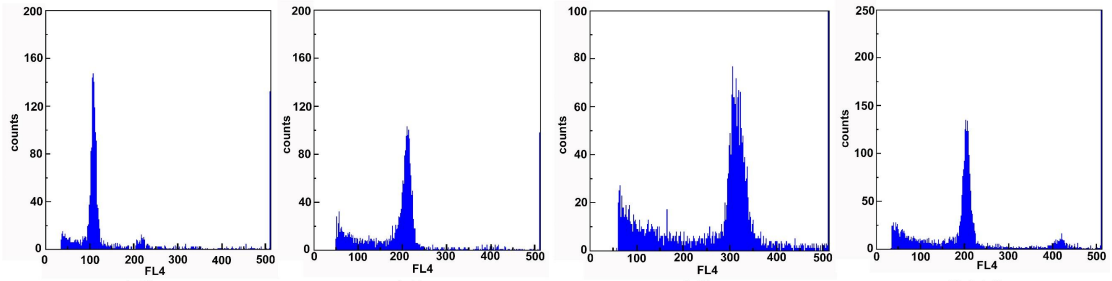

图 1 倍性检测结果

Fig1. The result of ploidy tested

2.2 植物学特征

新稍表面有短茸毛；一年生枝呈黄褐色，平均节间长 4.41 cm，直径 0.95 cm，皮孔呈多长梭形，数量较多，黄色；结果母枝褐色，平均节间长 2.36 cm，直径 0.81 cm。幼叶叶片和叶柄正面均有花青素着色，幼叶尖端渐尖，基部相接；成叶超广卵形，叶尖平或微凹，叶长 9.86 cm，叶宽 12.19 cm，叶柄长 6.11 cm，正面深绿色无茸毛，叶脉明显；花单生或伞房花序，每花序 1-3 朵花，花瓣为白色，5-7 片（表 1）。

表 1 ‘赣金 2 号’和‘金艳’的植物学性状特性比较

Table 1 Comparison of fruit characteristics of ‘Ganjin 2’ and ‘Jinyan’

	物候期 Phenological periods			叶 Leaf			花 Flower		
品种 Cultivar	伤流期 Branches bleeding	花期 Time of flowering	果实成熟期 Fruit maturing	叶片形状 Shape	成叶长/cm Length/cm	成叶宽/cm Width/cm	花序类型 Inflorescence type	颜色 Colour of petals	朵/花序 Flower/inflorescence
赣金 2 号 Ganjin 2	2.25-26	4.21-26	9.21-24	超广卵形 Super broad ovate	9.86±0.34	12.19±0.38	单生或伞房花序 Single or corymb	白色 white	1-3
金艳 Jinyan	2.24-26	4.24-29	10.28-11.2	超广卵形 Super broad ovate	13.89±0.45	14.02±0.22	伞房花序 Corymb	白色 white	3

	一年生枝 Annual branch			果实 Fruit					
品种 Cultivar	粗度/cm Thickness /cm	节间长度/cm Internode length /cm	正面颜色 Front color	果实形状 Shape	果喙端形状 Fruit bottom	平均单果重/g Average weight/g	果形指数 Fruit shape index	中果皮颜色 Color of the pericarp	果柄长/cm Stalk length/cm
赣金 2 号 Ganjin 2	0.95±0.05	4.41±0.32	褐色 Brown	广椭圆形 Broad oval	微顿凸 Convex	93.60±3.56	1.01±0.15	黄绿色 Green yellow	4.30±0.41
金艳 Jinyan	0.92±0.08	3.86±0.24	褐色 Brown	长圆柱形 Long cylinder	浅凹 Hollow	105.62±2.84	1.20±0.21	黄色 Gold	2.87±0.32

2.3 果实经济性状

果实广椭圆形（图 2），单花序结果率达 95%以上；果实纵径 4.30 cm，横径 4.25 cm，果形指数 1.01；果喙微顿凸，果柄长 4.30 cm；平均单果重 93.60 g，最大单果重 127.80 g；果皮褐色，均匀被有中等偏少的黄色短茸毛，萼片有宿存；果肉黄绿色，髓射线明显，肉质细腻，味甜，有香气，风味浓郁，品质上等；果实可溶性固形物含量(SSC)达 19.20%，干物质(DM)为 18.77%，可滴定酸(TA)为 0.98%，抗坏血酸含量(AsA)为 1.88 mg/g（表 2），果实耐贮藏，常温下可贮藏 30-45 d。

图 2 中华猕猴桃新品种‘赣金 2 号’

Fig. 2 A novel *A. eriantha* cultivar ‘Ganjin 2’

表 2 ‘赣金 2 号’和‘金艳’的果实特性比较

Table 2 Comparison of fruit characteristics of ‘Ganjin 2’ and ‘Jinyan’

品种 Cultivar	抗坏血酸 FW Ascorbic acid content/（mg·g^{-1}）FW	可溶性固形物 Soluble solids content/%	干物质 Dry matter/%	总酸 Total acids content/%
赣金 2 号 Ganjin 2	1.88±0.21	19.20±0.51	18.77±0.41	0.98±0.05
金艳 Jinyan	0.63±0.12	15.38±0.32	13.86±0.22	1.19±0.04

2.4 生长结果习性与物候期

坐果率高达 95%以上，落花落果少。在江西省奉新地区，初花期在 4 月中旬，盛花期在 4 月下旬，花期为 5-8 d，‘奉雄 2 号’可以作为配套的授粉雄株；果实发育期 155～160 d，果实成熟期在 9 月中下旬，为早中熟猕猴桃品种。连续结果能力强，结枝率高（91.5%），正常生长的营养枝均可成为翌年的结果母枝（表 1）。盛果期产量为 22.56 t·hm^{-2}。

2.5 DNA 指纹图谱鉴定

利用 4 对 SSR 分子标记，对‘赣金 2 号’与已报道的中华猕猴桃品种 ‘金艳’、‘金果’及‘庐山香’等进行鉴定，并构建分子身份证。结果表明，‘赣金 2 号’与已报道的中华猕猴桃品种在 DNA 水平上存在显著性差异（表 3）。

表 3 基于 SSR 分子标记的分子身份证

Table 3 Molecular ID cards based on SSR molecular markers

品种（系）Cultivars	UDK96-035	FOR-13	EST-Ad42	UDK96-040
赣金 2 号 ‘Ganjin 2’	1100010	100111111	0000111100	0000000010101010
金艳 ‘Jinyan’	1001010	111001100	0000101000	0000011111011010

金果 ‘Jinguo’	0000001	000000000	0000100000	0000000011101010
庐山香 ‘Lushanxiang’	0000000	000000100	0000101000	0000010111101100
武植 3 号 ‘Wuzhi 3’	1010010	011000100	1000111100	0000011000111000
早 鲜 ‘Zaoxian’	1001010	010010101	0011111001	0110000001100101
魁 蜜 ‘Kuimi’	0000000	000000000	0000111000	0000000000000000
翠 玉 ‘Cuiyu’	0010000	110001100	1001110100	1000011111110000
华 优 ‘Huayou’	1001110	110001100	0011110011	0000011111000000
金 桃 ‘Jintao’	1000010	001100101	0000010100	0000001100001000

3 栽培技术要点

适宜在江西、福建及维度相似的省份种植，无霜期要求在 150 d 以上，≥10℃的积温达 1800℃以上。宜采用架式为水平大棚架，株行距 3-3.5 m×4-5 m，树形为单干双主蔓多侧蔓式。进入盛果期的果园需要每年施 2-3 次肥，春施 N 肥和复合肥分别用于壮芽、壮果，秋施基肥以有机肥为主。花期需要及时疏除弱花、晚开花；由于其侧花坐果后会自动凋落，侧花可以不疏；‘奉雄 2 号’可以作为配套的授粉雄株；坐果后及时疏除小果、畸形果、病虫果。当果实可溶性固形物含量达 7.5%时（9 月中下旬）及时采收，去除地热后放入冷库贮藏。冬剪时，芽饱满且枝条粗壮的结果母蔓留 7-8 个有效芽，枝条稍微纤弱的结果母蔓则留 5-6 个有效芽，太弱的结果母蔓直接疏除。

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