

## 苹果早熟新品种‘冀苹3号’的选育

李学营,冯建忠,鄢新民,王献革,郝 婕\*,索相敏\*

(河北省农林科学院石家庄果树研究所,石家庄 050061)

**摘要:**‘冀苹3号’苹果是由‘藤牧1号’的自然实生后代中选育出的早熟新品种。果实近圆形,果形端正,平均单果质量235.7 g;果面光洁,底色黄绿,被鲜红色条纹;果肉乳白色,肉质细腻、多汁,风味酸甜适口,具香气;果肉去皮硬度 $9.87 \text{ kg}\cdot\text{cm}^{-2}$ ,可溶性固形物含量14.02%;综合品质上等。树姿开张,树势中庸。果实成熟期7月下旬,成熟期一致,无采前落果,抗病性和丰产性强,易栽培。

**关键词:** 苹果;新品种;‘冀苹3号’;早熟

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### Breeding of a new early-ripening apple cultivar ‘Jiping 3’

LI Xueying, FENG Jianzhong, YAN Xinmin, WANG Xiange, HAO Jie\*, SUO Xiangmin\*

(Shijiazhuang Pomology Institute, Hebei Academy of Agriculture and Forestry Sciences, Shijiazhuang 050061, Hebei, China)

**Abstract:** New early-ripening cultivar ‘Jiping 3’ is an early-season apple with good appearance. The seeding was selected from the seedling trees of ‘Tengmu 1’ in 2002 at experiment field in Shijiazhuang Pomology Institute, Hebei Academy of Agriculture and Forestry Science. It was initially selected in 2002 for its bright colors and very early ripening character. Through natural hybridization pollination, 256 seedlings were got. After regional adaptability and successively observation over fifteen years from 2002 to 2016, it was finally selected in 2016. The tree is vigorous with semicircular and open tree gesture. Young branches are rufous color. Leaves are bottle-green, flat and apex narrow, sharply serrated. Flower is pink, middle width, 5 petals in every inflorescence. Fruit position is regular and it has good fruit uniformity. Fruit is mainly subrotund, has yellow green peel, bright and clean surface. Its flesh is milk white, crisp, juicy, sour-sweet, and aroma. The average fruit weight is 235.7 g, and fruit shape index is 0.84. The content of soluble solid is 14.02%, hardness is  $9.87 \text{ kg}\cdot\text{cm}^{-2}$ . Quality is excellent. The fruit development period is 95 d and it matures in late July in Shijiazhuang area. The main characteristic is constant maturity, no dropping fruit before picking, strong storage ability, high disease resistance, and the yield can reached  $40\ 000 \text{ kg}\cdot\text{hm}^{-2}$ . It is resistant to drought, apple valsa canker, and apple fruit anthracnose, apple leaf defoliation diseases, etc. The fruit has very long storage period, after storage the fruit aroma is quite strong. Suitable cultivation and introduction area is apple producing areas in Hebei province and other similar climate conditions areas. In different types of soil and climate conditions it can also grow well, and it has high yield potential. Orchard should choose flat and has good moisture and fertilizer ability area; and high quality nursery stock should be chosen to establish orchard, vigorous rootstock and dwarf rootstock are both OK. Spacing in the rows and spacing between rows are  $3.0 \text{ m}\times 4.0 \text{ m}$  with vigorous rootstock and  $2.0 \text{ m}\times 4.0 \text{ m}$  with dwarf rootstock. The suitable interstocks are SH38, M26, etc. The pollinizer is chosen from the main breed commonly used at present, such as ‘Huayan’ ‘Changfu 2’ ‘Tengmu 1’ ‘Gala’ ‘Guohong’ ‘Jishen’ and ‘Hongqiuxiang’, except for ‘NY543’. Appropriate tree structure is long and thin spindle or trunk. In forming period the fixed stem height is 1.2 m or so, pay more attention to prune, after forming period the amount of branches is controlled to 30 or so, aiming at controlling tree size and maintaining tree vigorous.

**Key words:** Apple; New cultivar; ‘Jiping 3’; Early-ripening

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作者简介: 李学营,男,副研究员,从事果树育种研究。Tel:0311-87659934, E-mail: guoshusuofjz@126.com

\*通信作者 Author for correspondence. Tel:0311-87659934, E-mail: suoxiangmin@126.com

目前,我国苹果生产上早中熟品种与晚熟品种结构比过小,且早熟苹果品种以国外引进品种为主,如‘嘎拉’‘藤牧1号’和‘美国8号’等,缺乏具有自主知识产权的优质早熟苹果品种,且现有早熟品种大多存在成熟期不一致、采前落果、采后易变绵等问题<sup>[1-4]</sup>。因此,进行优质早熟苹果新品种的培育,可以丰富我国早熟苹果种质资源,弥补现有早熟苹果品种的缺陷,为种植结构调整奠定基础,从而促进苹果产业的发展。2002年开始,河北省农林科学院石家庄果树研究所开展了早熟品种的选育研究,以‘藤牧1号’苹果为核心亲本进行自然杂交选育,经过连续多年的努力,选育出杂交优系8-2-59。2016年12月通过河北省林木品种审定委员会审定,定名为‘冀苹3号’(图1)。



图1 早熟苹果新品种‘冀苹3号’

Fig. 1 A new early-ripening apple cultivar ‘Jiping 3’

## 1 选育过程

2002年,石家庄果树研究所‘藤牧1号’为母本,进行自然杂交(与‘藤牧1号’同园的品种有‘富士’‘新世界’‘美国8号’),获得实生种子1 250粒。2003年将杂交种子成行单穴点播,当年获得实生苗256株。为缩短童期,2003年采高位成熟芽嫁接于SH中间砧/八棱海棠基础苗上,通过喷布植物激素、扭梢、摘心等栽培促花措施,2006年开始结果,并选出初选系,2007—2009年通过复选鉴定,确定出复选优系,2010—2016年进行区域栽培试验,其中代号8-2-59优系果个大、成熟早、果实成熟一致、无采前落果、综合品质优良<sup>[5]</sup>。

## 2 主要特性

### 2.1 植物学特征

树体半圆形,树姿较开张,树势中庸。1 a年生枝红褐色、生长较顺直,分枝角度较大,新梢平均长42.50 cm,平均粗度0.57 cm,节间平均长度2.15 cm,皮孔中等、较多、灰白色、椭圆形、突起。叶片浓绿,叶面平展、叶尖渐尖,叶柄中等,叶缘锯齿钝,多双刻,裂中等。花朵中等,粉红色,一般每花序5枚花朵,开花较一致。

### 2.2 果实经济性状

果实近圆形,果形指数0.84,平均单果质量235.7 g,果柄较粗、短,果点灰白色,小而稀,果面光洁,底色黄绿,被鲜红色条纹。果肉乳白色,肉质细腻多汁,风味酸甜适口,具香气。果实可溶性固形物含量14.02%,果肉硬度9.87 kg·cm<sup>-2</sup>。果实发育期95 d左右,在河北省石家庄地区7月下旬成熟,果实成熟度一致,无采前落果(表1)。

表1 ‘冀苹3号’与对照品种果实经济性状比较

Table 1 Comparison of fruit economic characters of ‘Jiping 3’ and controls

品种 Cultivar	成熟期 Ripening date	单果质量 Fruit mass/g	果实形状 Fruit shape	果形指数 Shape index	果面颜色 Skin color	$\omega$ (可溶性固形物) Soluble solid content/%	汁液 Juice content	风味 Flavor	肉质 Flesh texture
冀苹3号 Jiping 3	7月下旬 Late July	235.7	近圆形 Nearly round	0.84	底色黄绿,被红色条纹 Yellow-green peel, covered with bright red color	14.02	多 Juicy	酸甜,味浓,具香气 Sour sweet, high flavor and containing aromatic	细、脆 Fine and crisp
藤牧1号 Tengmu 1	7月中旬 Mid July	178.2	长圆形 Long round	0.81	底色黄绿,着色浓红 Yellow-green peel, covered with thick red color	12.00	中 Medium	酸甜,具香气 Sour sweet, high flavor and containing aromatic	细、略绵 Fine and a little soft
嘎拉 Gala	8月中旬 Mid Aug.	147.9	近圆形 Nearly round	0.90	底色黄绿,着色浅红 Yellow-green peel, covered with pale red color	12.97	多 Juicy	酸甜,味浓 Sour sweet, high favor	中细、脆 Medium fine and crisp

### 2.3 生长结果习性

‘冀苹3号’树姿开张,树势中庸,具有较高的萌芽率,正常结果的‘冀苹3号’平均萌芽率为71%,高于其亲本‘藤牧1号’和对照‘嘎拉’。成枝力强,以中短枝结果为主,在生长前期,中果枝占有较大的比例,后期逐渐转为短枝结果,长中短比率为1.0:1.2:4.0。‘冀苹3

号’坐果率较高,花序坐果率为89.7%,花朵坐果率为70.1%。连续结果能力强,果台副梢连续结果率可达44%,而同果园的‘嘎拉’的果台副梢连续结果率为36%。丰产性好,新定植树3 a开始结果,4~5 a生树平均产量达40 000 kg·hm<sup>-2</sup>;高接树嫁接后第2年见果,第3年产量达37 500 kg·hm<sup>-2</sup>。

## 2.4 物候期

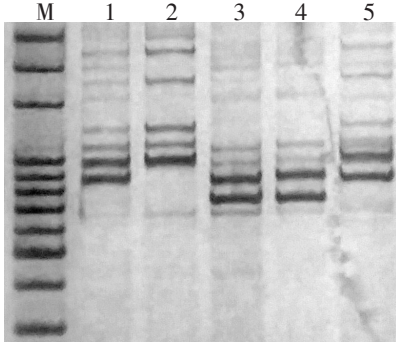
‘冀苹 3 号’在河北省石家庄地区 3 月下旬花芽萌动,4 月 14 日始花,4 月 18—26 日为盛花期,7 月下旬成熟,果实成熟度一致,熟前无落果,果实发育期 95 d 左右,为早熟品种。11 月上旬落叶,营养生长期 240 d 左右。

## 2.5 适应性及抗病性

经多年观察以及区域试栽,‘冀苹 3 号’适应性较强,在不同类型土壤条件和气候条件地区均生长良好。早果丰产,定植后 3 a 结果,4~5 a 可进入丰产,产量达 40 000 kg·hm<sup>-2</sup>。抗轮纹病及炭疽病,生产推广应用前景广阔。

## 3 分子生物学鉴定

选取‘冀苹 3 号’和其他几个苹果品种(包括母本和疑似父本)新生健康幼嫩的叶片,采用 CTAB 大量法提取 DNA,选用 SSR 引物(5'-GCTTTGAATGGATA-CAGGAACC-3' 和 5'-CCTGTCTCATGGCATTGTTG-3'),利用 SSR 分子标记技术对几个苹果品种进行遗传鉴定。结果表明,‘冀苹 3 号’在分子水平上有别于母本和疑似父本品种(图 2),具备成为新品种的遗传基础。



M. Marker;1. 藤牧 1 号;2. 冀苹 3 号;3. 富士;4. 新世界;5. 美国 8 号。  
M. Marker;1. Tengmu 1;2. Jiping 3;3. Fuji;4. Shinsckai;5. NY543.

图 2 苹果‘冀苹 3 号’SSR 指纹分析

Fig. 2 SSR finger-printing map of apple ‘Jiping 3’

## 4 栽培技术要点

### 4.1 适宜栽培区

‘冀苹 3 号’适栽范围包括河北省(包括冀中、南和东部地区,以及西部山区)、北京、河南、云南、山西、辽宁和甘肃等省市,以及相似气候条件地区。

### 4.2 栽植密度与授粉品种

宜选择优质苗木建园,乔化或矮化栽培均可。乔化栽培的株行距为 3.0 m×4.0 m,适宜砧木为八棱海棠,矮化栽培的株行距为 2.0 m×4.0 m,适宜中间砧为 SH<sub>38</sub>、M<sub>26</sub>等。‘冀苹 3 号’授粉品种可选用‘长富 2 号’‘藤牧 1 号’‘嘎拉’‘国红’‘姬神’‘红秋香’等,但不能与‘美国 8 号’搭配。

### 4.3 整形与修剪

‘冀苹 3 号’树形宜采用细长纺锤形或主干分层形。若采用细长纺锤形,成形期定干高度 1.2 m 左右,定干时即去掉剪口下第一个竞争枝芽,当年 5 月中旬对结果枝组开角至 90°或略大,8 月下旬至 9 月上旬对尚未达要求的结果枝组进行第 2 次开角,冬剪时选留 4~6 个结果枝,中心主枝留 60 cm 左右<sup>[6]</sup>。第 2 年至第 3 年结果枝组的角度处理及中心干处理与第 1 年相同。成形后结果枝组的总量控制在 30 个左右。丰产期视情况对结果枝进行更新。

### 4.4 花果管理

疏花时去边花、留中心花,去腋花芽、留顶花芽,去上位花、留下垂花,保证果形端正。果实不需套袋,易着色。

### 4.5 肥水管理

每年果实采收后增施有机肥,一般用量为 40 000 kg·hm<sup>-2</sup>左右,在萌芽、花后、果实膨大及果实采收后结合灌水适当追施氮、磷、钾三元复合肥。

### 4.6 适时采收

‘冀苹 3 号’为早熟品种,成熟期较一致,无采前落果现象。果实被鲜红色条纹,7 月下旬果实成熟采摘。

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