

优质李新品种‘中李3号’的选育

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摘要:‘中李3号’李是以‘法李’李为母本经自然实生选育而成。该品种生长势强, 树姿半开张, 在河南省新乡市观察, 花芽在3月中旬萌动, 于3月20日左右进入盛花期, 花期约7 d, 树体营养生长持续约220 d; 果实发育期约120 d, 7月下旬成熟; 郑州地区物候期较新乡早5 d左右; 果实呈卵圆形, 平均单果质量约98.2 g, 果皮底色黄绿, 盖色鲜红, 果面有果粉; 果肉黄色, 肉质细腻、松脆, 汁液多, 纤维少, 风味酸甜, 有香气; 果实可溶性固形物含量16.4%, 维生素C含量59.3 mg·kg⁻¹, 可溶性糖含量10.21%, 还原糖含量3.28%, 总酸含量1.09%; 该品种5 a(年)生树的株产超过31.6 kg, 丰产能力较强, 在河南及周边李树适生区均可栽植。

关键词:李; 新品种; ‘中李3号’; 优质; 高糖; 风味芳香

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‘Zhongli No. 3’, a new high-quality plum cultivar

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Abstract: ‘Zhongli No.3’, a high quality plum cultivar, was newly selected from 98 natural-bred offsprings of ‘Fali’. ‘Fali’ was discovered in Yunnan province with its outstanding fruit quality, and was introduced into Zhengzhou Fruit Research Institute in 1996. ‘Zhongli No.3’ plum was approved by the Approval Committee for Improved Varieties of Forest Tree of Henan Province in December, 2019. The fruit shape of ‘Zhongli No.3’ plum is oval with attract appearance and the average fruit weight is 98.2 g, and the maximum fruit weight is 150.0 g. The fruit is nearly symmetry, the apex is light round bulge, the suture is shallow, and the cavity is medium deep and narrow. The fruit ground color of is yellowish green and it turns to be bright red at full ripening stage. The peel of ‘Zhongli No.3’ plum fruit is medium thick and covered with skin powder, and the flesh is yellow in color, crisp and delicate in texture, with a low fiber content. The fruit is with very rich in juice, with balanced sugar/acid ratio and intense fruity aroma. The fruit soluble solids content is 16.4%, the total soluble sugar content is 10.21%, the reducing sugar content is 3.28%, the total acid content is 1.09%, and the vitamin C content is 5.93 mg·100 g⁻¹. The fruit can be stored at room temperature for about 15-20 days. The tree habit is spreading and tree vigor is strong. The color of perennial branch is dark grey, and one year branch is reddish brown. The habit of one year branch is titled and it is smooth with no pubescence. The internode length is 2.0 cm, and the lenticel is dense and small, grey white in color and elliptical in shape. The flower is with five petals and is white color, with one pistil and 32-41 stamens. The leaf is deep green in color and long oblong in shape, the leaf apices is acute and the base is cuneiform. The length and width of leaf is 12.2 cm and 6.4 cm, respectively. When observing in Xinxiang city, Henan province, ‘Zhongli No.3’ plum started germinating in early-March. The early blossom date is in mid-March, the full blossom date is in late

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March, and the flowering period is approximately 7 days. The leaf bud starts germinating in late March and expands in early April. Tree defoliation starts in mid-November, and the tree vegetative growth period lasts about 220 days. The fruit development period is about 120 days. The ripening date is late July in Xinxiang, which is about 5 days late than that in Zhengzhou. Fruits of 'Zhongli No.3' plum are mainly bore on bouquet spurs and short fruiting branches. Fruiting starts at the second year and high yield period usually comes at the fourth year after grafting, and the average yield of a five-year tree reaches up to 31.0 kg. 'Zhongli No.3' plum is a new early-ripening cultivar which exhibits strong suitability to undesirable circumstances, and is highly and stably productive for high quality fruits. It is suitable to be cultivated in Henan province and the surrounding provinces and cities.

Key words: *Prunus salicina* L.; New cultivar; 'Zhongli No. 3'; Good quality; High sugar content; Aromatic flavor

李原产我国,遗传多样性丰富,经济价值高,富含多种维生素及氨基酸,有促进消化、降压止咳、清肝利解毒、美容养颜等多种功效,深受国内外消费者喜爱^[1]。目前,世界李栽培中,主要以欧洲李(*Prunus domestica* L.)和中国李(*Prunus salicina* L.)两个种为主,欧洲李主要用于加工,中国李则以鲜食为主。中国李种质资源经过长时期的交流、驯化及遗传改良等,不同栽培区域形成了其品种特色,如欧美品种群果实偏酸,适宜欧美口味需求,丰产、稳产性不佳,但果实耐贮藏性较好,国内品种群以小农生产方式为主,丰产性好,果实糖度较高,但果肉偏软,不耐贮藏^[2]。我们课题组的育种目标是在保留国内李品种群高糖、丰产等优良特性的前提下,对果实肉质性状进行改良,以获得优质耐贮中国李新品种^[3]。

1 选育经过

'中李3号'是以'法李'为母本经自然实生选育而成。'法李'原产云南通海,中国农业科学院郑州果树研究所小杂果课题组于1996年资源考察时,采集'法李'一年生枝条作为接穗,于1997年春季选用毛桃砧木,嫁接3株,保存于郑州试验基地。

母本'法李'果实圆形,平均单果质量43.9 g,缝合线浅,片肉不对称,果皮底色绿黄,盖色紫红,纤维多,汁液多,味酸甜,香气浓,离核,可溶性固形物含量12.5%,总糖6.05%,总酸1.03%,果实7月上旬成熟,常温下果实可贮放7 d左右,树势强,树体适应性较强,抗寒、抗旱,耐瘠薄(图1)。

3株'法李'母树嫁接苗于2000年开始开花结果,2005年采集母树上所有自然实生果实种子共316粒,翌年春天播种,共获实生苗98株,进行常规



图1 '中李3号'(上)与其母本'法李'(下)果实外观对比

Fig. 1 The comparison between fruit appearances of 'Zhongli No.3' (up) and 'Fali' (down)

田间管理。2009年实生苗开始开花结果,参照《李种质资源描述规范和数据标准》^[4]对果实的经济性状、丰产性能、结果习性、抗性等多方面进行观察、鉴定,其中编号为F-1的单株综合性状表现优良:果实圆形,果顶尖,果皮光亮,底色黄绿,盖色鲜红,果实可溶性固形物含量16.4%,汁液丰富,纤维少,酸甜可口,具芳香味,口感好,风味极佳,在郑州地区七月下旬成熟,并于2010—2013年连续3 a(年)高接复选,F-1单株表型稳定,遂定为优良单株。

2013年繁育F-1优系的嫁接苗1 000余株,当年定植郑州试验地20株。2014年开始,分别在河南省偃师市、濮阳市、开封市、南阳市等地建立试验点,各点

栽植苗木150~200株,对优系F-1进行区域试验。2015年在中国农业科学院郑州果树所新乡实验基地李杏园定植80株,进行继续观察试验。经过连续多年对果实经济性状、丰产性能、生长结果习性、抗性等多方面观察,发现其综合性状表现稳定。2018年定名为‘中李3号’,2019年7月通过河南省林木良种审定委员会审定(编号:豫S-SV-PS-011-2019)(图2)。



图2 李优质新品种‘中李3号’

Fig. 2 Fruit of the superior plum cultivar ‘Zhongli No. 3’

表1 ‘中李3号’与对照品种‘法李’果实经济性状比较

Table 1 Comparison of economic characters of fruits between ‘Zhongli No.3’ and ‘Fali’

品种 Cultivar	成熟期 Ripening date	单果质量 Average fruit weight/g	果色 Peel color	肉质 Fruit texture	w(可溶性固形物) Soluble solid content/%	w(可溶性糖) Soluble sugar content/%
中李3号 Zhongli No.3	7月下旬 Late Jul.	98.2	鲜红 Bright red	细腻 Delicate and crisp	16.4	10.21
法李 Fali	7月上旬 Early Jul.	43.9	紫红 Purple red	硬脆 Delicate	12.5	6.05

色为黄绿色,大部分着鲜红色;果面有果粉,果点白色、中大,果皮中厚;果肉呈黄色,肉质细腻、松脆,汁液多,纤维较少,果实风味为酸甜,有淡香气;完熟果实可溶性固形物含量16.4%,可溶性糖含量10.21%,还原糖含量3.28%,可滴定酸含量1.09%,维生素C含量为59.3 mg·kg⁻¹;果核小,呈倒卵圆形,黏核,核面较粗糙,鲜核平均质量为1.70 g;果核纵径、横径及侧径分别为2.40 cm、1.72 cm及0.91 cm;果实可食率均在97%以上,常温下(25℃)果肉硬度、脆度可保持15~20 d。

2.2 植物学特征

‘中李3号’树体生长势强,树姿较直立,树冠多呈自然开心形;树皮及多年生枝呈暗灰色,多年生枝表面分布浅灰色纵向条纹;一年生枝以斜生为主,呈红

2 主要性状

2.1 果实的经济性状

如表1所示,果实呈卵圆形,平均单果质量为98.2 g,最大单果质量可达150.0 g;果实纵径、横径、侧径分别为5.28 cm、5.95 cm和5.23 cm;果顶形状尖,缝合线浅,较对称,梗洼深度中等,较窄;果皮底

褐色,表面光滑、无茸毛,节间平均长度2.0 cm;皮孔数量较多,灰白色,较小,呈椭圆形;叶片呈长椭圆形,深绿色,先端短突尖,基部楔形,叶片叶缘具钝锯齿,叶脉黄绿色,叶片平均长度12.2 cm,平均宽度6.4 cm,平均厚度0.15 mm;叶柄呈绿色,平均长度1.40 cm;花朵具5片白色花瓣、1枚雌蕊及35枚左右雄蕊。

2.3 生长结果特性

‘中李3号’树势强健,在新乡试验基地内调查,5 a生树平均高度3.0 m,平均冠幅2.6 m,平均干周45.1 cm;平均新梢长38.5 cm,平均枝条直径为0.84 cm;果实发育期约120 d,于7月下旬成熟,主要为短果枝和花束状果枝结果;1 a生嫁接苗定植第2年开始坐果,定植3年后陆续进入盛果期,5 a生树株产可达31.6 kg(表2)。

表2 ‘中李3号’与对照品种‘法李’产量比较
Table 2 Comparison of fruit yield between ‘Zhongli No.3’ and ‘Fali’

kg

品种 Cultivar	3年生 3-year old tree		4年生 4-year old tree		5年生 5-year old tree	
	平均株产 Average yield per tree	每666.7 m ² 产量 Yield per 666.7 m ²	平均株产 Average yield per tree	每666.7 m ² 产量 Yield per 666.7 m ²	平均株产 Average yield per tree	每666.7 m ² 产量 Yield per 666.7 m ²
中李3号 Zhongli No.3	10.6	877.8	22.8	1 892.4	31.6	2 622.8
法李 Fali	6.1	506.3	13.5	1 120.5	23.1	1 917.3

注:每666.7 m²定植83株,产量按2 m×4 m株行距进行测算。

Note: The yield per 666.7 m² was calculated with 83 trees in a density of 2 m×4 m.

2.4 物候期

新乡试验基地观察发现,3月中旬花芽萌动,3月20日左右进入盛花期,花期7 d左右;叶芽3月下旬萌动,展叶期在4月上旬,11月中旬开始落叶,树体营养生长约220 d;果实发育期约120 d,7月下旬成熟;郑州地区物候期整体比新乡地区早5 d左右。

2.5 适生性与抗性

‘中李3号’适应性较强,区域试验过程中,在南阳、濮阳、开封等地区的壤土、沙土等不同类型土质上均表型良好,但是耐涝性差,建园时应注意排水防涝;该品种抗病虫害能力较强,部分果园仅需注意早春萌芽前对蚜虫的预防;该品种在河南及周边地区李树适生区均可推广栽培。

3 栽培技术要点

选择排水良好、土质疏松的地块(若在山地、丘陵则选择背风向阳的南坡)建园,按照既定株行距,在冬季土壤封冻前或翌年春天土壤解冻后定植,选用芽眼饱满、无病虫害、根系发达的优质苗木,定植后立刻浇足水,秋季栽苗需封高垄以防止冻害,春季栽苗需要覆盖地膜,以保水保墒,提高树苗成活率^[3]。

‘中李3号’为异花授粉,需配置‘李王’等品种作授粉树,比例以4~8:1为宜。根据栽培模式和密度,可采用自由纺锤形、主干疏散分层形、“Y”字形、自然开心形等树形进行整形修剪。

在蕾期和花期,根据园地管理水平及立地条件确定留花量,进行疏花;在花后30 d左右进行疏果,疏去伤果、畸形果和过密拥挤的果实。

基肥于9—10月份施入,以有机肥为主,初结果树每666.7 m²施基肥约2 000 kg,盛果期树每666.7 m²约2 500 kg;追肥在花前施入,大树每株施尿素1 kg,

小树施0.1~0.2 kg,果实膨大期每株追施氮磷钾复合肥0.25~0.5 kg,在生长期土壤干旱和施肥后应及时浇水^[3]。

对于病虫害,应预防为主,防治结合,加强果园管理,合理整形修剪,保持园内通风透光性,同时加强水肥管理,保证营养供给,强健树势,提高树体抗病能力,若采用药物防治,则应选择高效低毒农药和生物制剂。

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