

# ‘Qinyang’ Early-ripening Apple

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*Additional index words.* fruit breeding, fruit quality, Chinese apple

‘Qinyang’, an open-pollinated progeny of ‘Royal Gala’, is a new early-ripening apple cultivar with high fruit quality. Fruit of ‘Qinyang’ are very sweet, crisp, juicy, and attractive. Fruit size is large with average weight of 198 g, shape is globose, and skin color is variable from red stripes to full red over a greenish yellow background. Fruit ripen 2 weeks earlier than ‘Gala’. Leaves and fruits have higher resistance to apple ring moth (*Lithocolletis ringoniella* Mats.), apple leaf spot (*Alternaria mali* Roberts), and apple powdery mildew (*Podosphaera leucotricha*) than ‘Royal Gala’.

## Origin

‘Qinyang’ is derived from an open-pollinated F<sub>1</sub> seedling of ‘Royal Gala’. It is being released as an early-ripening cultivar and a replacement for the local Chinese cultivar of ‘Huaxia’ (Wang and Zhao, 2000) and ‘Royal Gala’ (White, 1991), which are currently grown in the major apple production areas such as the provinces of ‘Shaanxi’, ‘Shandong’, and ‘Hebei’. ‘Qinyang’, tested as ‘12-9-53’, is an open-pollinated progeny of ‘Royal Gala’ made by Northwest A&F University. Molecular analysis is currently underway to determine the male parentage of this cultivar, but at present, this is unknown. In 1989, 1132 seeds were collected from open-pollinated ‘Royal Gala’ fruits and germinated, resulting in 615 seedlings. Four superior seedlings evaluated for fruit quality, productivity, and early ripening date were selected in 1998, from which ‘12-9-53’ was chosen in 1999 after evaluation of trees grown in the apple major production provinces such as Shaanxi, Shanxi, Shandong, Hebei, and Liaoning. ‘12-9-53’ underwent adaptability tests for 3 continuous years in the apple production areas of mid-Shaanxi, Shandong, Hebei, and Shanxi provinces in China (Shu, 1999). After evaluation and approval by the Fruit Cultivar Approval

Committee of Shaanxi Province, ‘12-9-53’ was named ‘Qinyang’ and released in 2005. This article represents the first detailed description of ‘Qinyang’ to be published.

## Description

*Tree.* When grafted on *M. prunifolia* seedling rootstocks with a M.26 interstem, ‘Qinyang’ forms a medium vigorous tree with a conical canopy and an upright-spreading habit, similar to ‘Royal Gala’. This fits into “Type II” according to the classification of apple growth habits into four ideotypes by Lespinnasse (1977). One-year-old shoots are hard, yellowish brown with white (color standards were determined based on the Royal Horticultural Society color guide), mounted, elliptic lenticels. The 2-year-old shoots are dark brown with white, medium-dense, elliptic lenticels. The vegetative buds are triangular, medium in size, and moderately pubescent, whereas flower buds are plump, heart-shaped, and also pubescent. Like ‘Gala’, the majority of early production of this cultivar comes from axillary buds of the long shoots, but spurs are the major source of production from mature trees.

*Leaves.* The leaves are long ovate and greenish; apex is acuminate and cuneate at the base; 11.0 cm long and 6.2 cm wide; margins are complex-dentate (with medium and blunt ends); and both surfaces are flat and glossy.

*Flower.* The flower buds are rose-colored at the full balloon stage becoming pink when fully opened; the corolla diameter averages 3.89 cm; the flowers have an average of 19.2 stamens.

*Fruit.* ‘Qinyang’ has a number of advantages over ‘Royal Gala’: it has a larger fruit size, higher degree of red color (estimated visually), more delicate texture, more flavor, and is less prone to June drop. Its precocity and productivity are similar to those of ‘Royal Gala’ but better than those of ‘Huaxia’. The fruit of this new cultivar ripens very early, is attractive with a pleasant flavor, very sweet, and thus has potential in the marketplace as a high-quality fresh fruit.

Fruit weights range from 165 to 245 g with an average length and width of 6.7 × 7.9 cm. Fruit shape is globose with an average length to diameter ratio of 0.86. Skin color

is variable from red stripes to full red over a greenish yellow ground color (Fig. 1). Lenticels are white, conspicuous, medium size, and medium density. There is little russeting around the stem cavity with radiation ≈1.2 mm. The surface is glossy and bright. The stem is long, averaging 2.79 cm, medium in diameter, and is green but it can be brown when exposed to the sun. Cavity is of moderate width and depth. Basin is non-ribbed, wide but shallow. Calyx is not prominent. Core is mainly closed, medium in size, located in the median position with non-prominently clasping core lines. Carpels are oval and may be cracked but not tufted. Seeds are brown, medium in size, and their tips are obtuse. Flesh is slightly yellowish, crisp, juicy, and medium firm (averaging 81.6 Newtons). Flavor is good, aromatic, sweet, and slightly tart. At harvest, soluble solids concentration (SSC), total sugar concentration (TSC), acidity (expressed as malic acid), and vitamin C concentration (Vc) averaged 12.2%, 11.2%, 0.38 mg·L<sup>-1</sup>, and 72.6 μg·g<sup>-1</sup> fresh weight, respectively (Table 1).

*Storage.* Fruits harvested at maturity can be stored for 15 d without prominent decays at room temperature, which is longer than ‘Huaxia’ but shorter than ‘Royal Gala’. After 5-d and 10-d storage at room temperature, the measured indices of fruit quality (fruit firmness, SSC, TSC, acidity, and Vc), underwent slower changes in ‘Qinyang’ than in ‘Huaxia’ but faster than in ‘Royal Gala’ fruit (Table 1).

*Phenology.* At the South Shaanxi Loss areas (lat. 107°52′ to 110°20′ E; long. 34°15′ to 35°4′ N), budbreak ranges from 20 to 25 Mar.; flowering date is 2 to 4 Apr.; flowering begins mid-April in northern China, 2 or 3 d earlier than ‘Royal Gala’; fruit coloring starts on 15 July; and ripening starts mid-July, which is 2 weeks earlier than ‘Royal Gala’ and 1 week earlier than ‘Huaxia’. Fruit on a single tree exhibit mixed maturity with fruit typically ripening over a 10-d period. The fruit development period is 103 d and leaf fall occurs in mid-November.

*Resistance.* ‘Qinyang’ has demonstrated reasonable field resistance to pests and diseases such as apple ring moth, apple leaf spot, and apple powdery mildew.

*Cultivation.* ‘Qinyang’ trees grow best when cultivated on rich soil with irrigation. The cultivar is compatible with most common



Fig. 1. A fruit of ‘Qinyang’ apple.

Received for publication 13 Oct. 2010. Accepted for publication 25 Jan. 2011.

This work was supported by projects 2006BAD01A1704-8, QN2009013, 2010ZDKG-69, and ncytx-08-01-03.

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Table 1. Attributes of ‘Qinyang’, ‘Huaxia’, and ‘Royal Gala’ fruit at harvest and after 5 or 10 d storage at room temperature (mean data of 3 years 2002–2004, Fuping County, Shaanxi, China).<sup>z</sup>

Cultivar	Time	Firmness (Newtons)	Soluble solids (%)	Total sugars (%)	Acidity (mg·L <sup>-1</sup> malic acid)	Vitamin C (μg·g <sup>-1</sup> )
Qinyang	At harvest	81.6	12.18	11.22	0.38	72.6
	5-d storage	70.3	12.20	11.14	0.30	70.1
	10-d storage	63.3	12.05	11.05	0.22	64.5
	Variance among three storages	<i>F</i> = 267.18 <i>P</i> = 0.0001	<i>F</i> = 1.62 <i>P</i> = 0.372	<i>F</i> = 1.68 <i>P</i> = 0.247	<i>F</i> = 25.54 <i>P</i> = 0.001	<i>F</i> = 96.93 <i>P</i> = 0.0001
Huaxia	At harvest	79.9	11.93	10.08	0.45	48.9
	5-d storage	64.5	12.02	9.96	0.36	45.6
	10-d storage	55.8	11.80	9.85	0.23	42.1
	Variance among three storages	<i>F</i> = 168.05 <i>P</i> = 0.0011	<i>F</i> = 1.27 <i>P</i> = 0.35	<i>F</i> = 5.04 <i>P</i> = 0.033	<i>F</i> = 34.55 <i>P</i> = 0.0008	<i>F</i> = 35.85 <i>P</i> = 0.0003
Royal Gala	At harvest	79.9	12.93	11.08	0.35	58.9
	5-d storage	74.3	13.02	10.96	0.26	55.6
	10-d storage	70.2	12.80	10.85	0.20	52.1
	Variance among three storages	<i>F</i> = 27.22 <i>P</i> = 0.0001	<i>F</i> = 1.05 <i>P</i> = 0.425	<i>F</i> = 4.12 <i>P</i> = 0.049	<i>F</i> = 9.668 <i>P</i> = 0.0103	<i>F</i> = 17.43 <i>P</i> = 0.0023
Qinyang versus Huaxia <sup>y</sup>	5-d storage	**w	NS <sup>v</sup>	NS	NS	**
	10-d storage	**	NS	NS	NS	**
Qinyang versus Royal Gala <sup>x</sup>	5-d storage	**w	NS	NS	**	**
	10-d storage	**	NS	NS	NS	**

<sup>z</sup>All plant materials were grown in the same field with 15 replicate trees per cultivar. Trees were spaced 3.5 × 2.0 m. Samples of eight to 10 fruit per tree (120 to 150 per cultivar) were arbitrarily picked at maturity for evaluation and measurement.

<sup>y</sup>Analysis of variance between Qinyang and Huaxia.

<sup>x</sup>Analysis of variance between Qinyang and Royal Gala.

<sup>w</sup>Significant at *P* < 0.01.

<sup>v</sup>Non-significant.

commercial rootstocks such as ‘M.26’, ‘M.27’, and ‘MM.106’, and suits the tree forms of “tall spindle” or “normal spindle.” ‘Fuji’, ‘Qinguan’, and ‘Huaxia’ can be used as pollinizers for ‘Qinyang’. Young trees are vigorous and are sensitive to heavy pruning (strong vegetative reaction growth); thus, appropriate techniques to develop good tree form should be practiced before fruiting. ‘Qinyang’ forms flower buds profusely and fruit set is relatively high; therefore, thinning is required to avoid

biennial bearing. Standard fertilization and irrigation are required.

#### Availability

An application will be made to protect ‘Qinyang’ nationally in China. Trees and budwood under rules of international Plant Variety Rights are available for research purposes, which can be obtained from the author (Zhao or Gao) at the College of Horticulture, North

west A&F University, Yangling, Shaanxi, China.

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