‘Gem’ Pear

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‘Gem’ is a new cultivar that combines excellent appearance, fruit quality, and long storage potential with precocious and high yields. It can be eaten without ripening as a result of a crisp, juicy texture as well as ripened to a soft texture. ‘Gem’ was jointly released by the U.S. Department of Agriculture, Oregon State University, Michigan State University, and Clemson University in 2013.

Origin

The cross from which ‘Gem’ was selected, ‘Sheldon’ × US62563-004 (Fig. 1), was planned and performed by T. van der Zwet and R.C. Blake in 1970 (Fig. 1). The original source of fire blight resistance is ‘Seckel’. The original seedling tree was grown in the orchard of the USDA, ARS, Henry A. Wallace Beltsville Agricultural Research Center, Beltsville, MD, and selected in 1981 by R.L. Bell. Clonal trees on ‘Bartlett’ seedling rootstock were evaluated in a second test trial at the Appalachian Fruit Research Station (AFRS) for a general level of production, fruit quality, and fire blight resistance. Co-operator trials for evaluation of production and fruit quality under a range of environmental conditions were performed at the Mid-Columbia Agricultural Research and Extension Center (MCAREC) of Oregon State University in Hood River, OR, the Mount Vernon Northwestern Washington Research and Extension Center of Washington State University in Mount Vernon, WA, where evaluation of pear scab (Venturia pirina Aderh.) and powdery mildew (Podosphaera leucotricha (Ellis & Everh.) E. S. Salmon) was performed, the Southwest Michigan Research and Extension Center (SWMREC) of Michigan State University in Benton Harbor, MI, and the Northwest Michigan Horticulture Research Center (NWMHRC) of Michigan State University in Traverse City, MI, and the Musser Fruit Farm of Clemson University in Clemson, SC (Reighard et al., 2005).

Description

Fruit traits. The fruit of ‘Gem’ (Fig. 2) are obovate-acute-pyriform to globose-acute-pyriform in shape (Zielinski, 1955), corresponding to scores 3.4 and 5.4, respectively, of the International Board of Plant Genetics Resources pear descriptor list (Thibault et al., 1983). Fruit from unthinned trees at AFRS were moderate in size with fruit length and width averaging 76.5 mm and 70.9 mm, respectively. The stems are of uniform diameter or rarely slightly clubbed at the base, upright or occasionally oblique, averaging 29.2 mm in length and 3.4 mm in diameter (Table 1). The cavity is acute and 1 to 2 mm in depth; the basin is wide (17 to 25 mm) and shallow (2 to 6 mm). The calyx is convergent and the tube is urn-shaped. The undercolor is yellow–green, predominantly 114A of the Royal Horticultural Society (RHS) Color Chart (Fourth Edition, RHS, London, U.K.), and the sun-exposed side of fruit is frequently covered with orange–red (34A or 34B) or red (42A) blush. At AFRS, the percentage of fruit surface covered by blush averaged 20% (Table 1); in the high-light environment of Hood River, fruit exposed to sunlight developed red to orange–red pigmentation over 25% to 50% of the surface. The skin is smooth and waxy with a glossy finish with some tendency to marking as a result of abrasion. Skin is moderate in thickness with no bitterness or astringency. Rust was small and sparse at AFRS, primarily appearing as prominent lenticel russet, appearing as only small lenticel russet at Mount Vernon, and absent at MCAREC. Lenticels are round, conspicuous but small, dark tan in color, and of moderate density (Table 1). Overall appearance scores were similar to ‘Bartlett’ and ‘Beurre´ Anjou’.

The flesh is creamy white in color. Mean core diameter is 16 mm, and the cells are closed. The carpels are mucronate, and the seed is acuminate in shape. Grit content is light and less than ‘Bartlett’ and ‘Beurre´ Anjou’; grit size was small, of uniform size distribution, and located primarily in the flesh and under the skin with little prominent grit around the core.

At AFRS, optimum maturity was estimated at 17 to 30 d after ‘Bartlett’. At AFRS the mean maturity date for ‘Gem’ was 8 Sept., whereas mean ‘Bartlett’ maturity occurred on 18 Aug. At MCAREC, harvest maturity occurred with ‘Bartlett’ to 19 d after ‘Bartlett’, depending on the year, with a mean of 8 d after ‘Bartlett’ (128 d after full bloom) (Table 2). Fruit firmness at this maturity was estimated to be ≈53.4 N (5 kgf) at MCAREC. Fruit maturity of ‘Gem’ at Clemson was estimated to be 27 d before ‘Bartlett’ with mean firmness of 58.8 N (6.0 kgf) and 75.5 N (7.7 kgf), respectively (Reighard et al., 2005).

Texture is moderately fine, similar to ‘Bartlett’ and ‘Beurre´ Anjou’. Juiciness is moderate, also similar to ‘Beurre´ Anjou’. At AFRS, fruit harvested from –2 to +7 °C in relation to ‘Bartlett’ and stored at –1 °C for up to 16 weeks and did not ripen when exposed to 20 °C for 7 d; fruit harvested 14 to 24 d after ‘Bartlett’ ripened normally to a soft, fine-grained, melting, juicy texture at 20 °C after 11 weeks of cold storage; fruit harvested from 29 to 35 d after ‘Bartlett’ ripened after 6 weeks of cold storage. Fruit evaluated at harvest 14 to 35 d after Bartlett at AFRS and up to 36 d after ‘Bartlett’ at MCAREC.
was firm, crisp, and juicy. The fruit maintained its crisp, juicy texture when evaluated immediately on removal from cold storage for a period of up to 5 months. At MCAREC, when fruit was harvested at the earliest maturity (15 d after ‘Bartlett’ at a firmness of 53 N), between 30 and 60 d of cold storage (–1 °C air) was necessary to ripen to a soft texture (Table 3); however, delaying harvest timing by 1 to 3 weeks shortened the chill requirement to less than 30 d (Table 3). Fruit were capable of storage up to 5 months in regular air without loss of ripening capacity at Hood River. Internal breakdown and premature ripening have not been observed. Flavor is mildly sweet with a light aroma, intermediate between ‘Bartlett’ and ‘Beurre’ Anjou’. In 1-year trials at Gerbers, Fremont, MI, the Brix, acidity, texture, and consistency of ‘Gem’ were considered promising for baby MI, the Brix, acidity, texture, and consistency of ‘Anjou’. In 1-year trials at Gerbers, Fremont, MI, the Brix, acidity, texture, and consistency of ‘Gem’ were considered promising for baby MI, the Brix, acidity, texture, and consistency of ‘Anjou’. In 1-year trials at Gerbers, Fremont, MI, the Brix, acidity, texture, and consistency of ‘Gem’ were considered promising for baby MI, the Brix, acidity, texture, and consistency of ‘Anjou’.

**Flavor and insect resistance.** ‘Gem’ was observed at AFRS to be moderately susceptible to epiphytic fire blight with a mean score of 4.5 (van der Zwert et al., 1970), but significantly less susceptible than ‘Bartlett’ with a mean score of 2.5 (Table 5). No natural infection was observed at SWMREC or NWMHRC during a period of 8 years, including an epidemic year during 2000 at SWMREC when adjacent ‘Bartlett’, ‘Bosc’, and ‘Anjou’ trees were heavily blighted. Response to artificial inoculation of actively growing shoots, however, indicated a high level of resistance in shoots. Fewer shoots became infected, and the amount of necrosis, as indicated by both lesion length and percent lesion length, was significantly less for ‘Gem’. Lesion length for ‘Gem’ was 15% of that for ‘Bartlett’. The more susceptible response resulting from natural infection may be the result of susceptibility to blossom infection and subsequent lesion development in the subterminal older branches.

Data collected at the Mount Vernon Northwestern Washington Research and Extension Center of Washington State University indicated that ‘Gem’ is susceptible to powdery mildew [**Podosphaera leucotricha** (Ellis & Everh.) E. S. Salmon] with mean and maximum percentages of leaves infected of 2.5% and 30%, respectively, and to pear scab (**Venturia pirina** Aderh.), with a mean infection of 3.33% of leaves and a maximum of 10% of leaves. Observations at AFRS indicated that it is also susceptible to Fabraea leaf and fruit spot [**Diplodcarpon mespili** (Sorauer) Sutton]. ‘Gem’ is also susceptible to pear psylla (**Cacopsylla pyricola** (Sorauer) Sutton). The susceptibility of ‘Gem’ and ‘Beurre’ Anjou’ were evaluated using artificial inoculations for resistance to three common postharvest fruit rot diseases, gray mold (**Botrytis cinerea** (De Bary) Whetzel), blue mold (**Penicillium expansum** Link), and Mucor mold (**Mucor pinformis** Scop.). The incidence of infection