'Sweet Round' and 'Sweet Long': Two Pepino Cultivars for Mediterranean Climates

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The pepino (*Solanum muricatum* Aiton), a juicy fruit native to the Andes, is of increasing interest in the exotic fruit markets in Europe, North America, and Japan (National Research Council, 1989; Nuez and Ruiz, 1996). In Japan, the pepino has had great success and its demand is growing. Despite the interest in this vegetatively propagated herbaceous plant as a possible new crop for many mild-temperate frost-free areas, most of the attempts to cultivate it in Mediterranean climates have been unsuccessful. A main factor considered as responsible for this failure has been the lack of exploitation of the huge genetic diversity available in the species (Prohens et al., 1996a).

As a result of a plant breeding program aimed at introducing the pepino crop in Spain, we have developed two cultivars ('Sweet Round' and 'Sweet Long') adapted to protected cultivation in Mediterranean climates. The introduction of commercial cultivars grown in Ecuador, Chile, Colombia, Peru, New Zealand, and the Canary Islands was discarded in the initial steps of the program due to their low fruit set, deficient organoleptic attributes, or both.

'Sweet Round' and 'Sweet Long' are highly productive. Their fruit are attractive, eye-catching, intensely scented, have a high soluble solids concentration and ascorbic acid content, and excellent flavor and texture. At present, 'Sweet Round' and 'Sweet Long' are being commercially cultivated in the Spanish Mediterranean, and their fruit are being exported to several European countries.

Origin

'Sweet Round' and 'Sweet Long' originated in 1990 from a selection of pepino plants raised from seed of diverse origins. The variability for agronomic and fruit quality characters among plants from these origins, and among plants from the same origin, was high (Ruiz and Nuez, 1991; Ruiz et al., 1992). Clones having a good productivity and fruit

quality were initially selected. Subsequent cycles of selection, along with trials under commercial conditions at several localities of the Spanish Mediterranean, led to the final selection of 'Sweet Round' and 'Sweet Long'. The parentage of 'Sweet Round' and 'Sweet Long' can be traced, respectively, to seed coming from northern and central Chile. 'Sweet Round' was initially designated as A/2 and 'Sweet Long' as CH/1. Because both cultivars maintain a high degree of heterozygosity, plants from seed do not breed true and, therefore, they must be vegetatively propagated.

Description

The vine of both cultivars is semi-erect in habit. When not trained, it can become 1 m across and reach a height of 50–80 cm. Propagation is performed by small stem cuttings, which can be easily rooted in vermiculite or peat, or by micropropagation (tissue culture) techniques. Leaves are simple, lanceolate, 16 × 5 cm in 'Sweet Round' and 12 × 4 cm in 'Sweet Long'. Flowers are 2 cm in diameter,

nonshowy, with white petals marked with purple stripes. Pollen is highly fertile and mechanical vibration of the inflorescences increases fruit set. Bloom is abundant, with 10–15 flowers per inflorescence of which up to four may set. Auxin applications to improve fruit set are only recommended in conditions of low light and minimum temperatures below, or around, 3–5 °C (Ruiz et al., 1996).

'Sweet Round' and 'Sweet Long' are specially suited to the autumn–winter growing cycle under protected cultivation in Mediterranean climates. In this cycle, planting is set at the end of summer, fruit set takes place in autumn, and ripening in winter–spring. These conditions avoid temperatures above 30 °C, which may impair fruit set and negatively affect fruit quality. To avoid the contact of the fruit with the soil and to control vegetative growth, which may compete with fruit set, the vine must be trained with vertical strings in a 2–3 leader system (Fig. 1) or trellised between double horizontal wires in a hedge-like manner (Fig. 2). Common yields under commercial production are 30 t·ha⁻¹ for 'Sweet Round' and 40 t·ha⁻¹ for 'Sweet Long', although yields up to 67.5 t·ha⁻¹ for 'Sweet Round' and 79.2 t·ha⁻¹ for 'Sweet Long' have been reported (Ruiz et al., 1994). Both cultivars show a good tolerance to salinity. Soilless culture, using water with an electric conductivity (EC) of 8 dS·m⁻¹, decreased yield only by 30% and improved the soluble solids concentration (SSC) by 2% when compared to a control irrigated with water having an EC of 3 dS·m⁻¹.

The fruit of 'Sweet Round' and 'Sweet Long', respectively, weigh 215 and 170 g in average. 'Sweet Round' is almost spherical in shape, with a mean height : diameter (h : d) ratio of 1.19, while 'Sweet Long' is elongated

Fig. 1. 'Sweet Round' pepino trained with vertical wires.

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Fig. 2. 'Sweet Long' pepino trellised in a hedge-like manner.

Fig. 3. Fruit of 'Sweet Round' (left) and 'Sweet Long' pepino (right).

having an h : d ratio of 2.67 (Martínez et al., 1995). When ripe, the fruit of both cultivars has a shiny, golden-yellow, purplish-striped skin. Purple stripes can cover between 10% and 40% of the fruit surface, and are more intense in the part most exposed to the sun. The fruit flesh is yellow (Fig. 3), juicy, scented, without the unpleasant aftertaste characteristic of many pepino cultivars, and has the high quality needed for a dessert fruit. When grown

in an autumn–winter growing cycle, with air maxima usually below 25 °C, 'Sweet Round' and 'Sweet Long' have (mean values), respectively, a SSC of 10.4% and 10.6%, a titratable acidity (TA; expressed as citric acid) of 0.26 and 0.27 g/100 g, and an ascorbic acid concentration (AA) of 26 and 28 mg/100 g. However, if grown in a spring–summer growing cycle, when temperatures during ripening often reach 30 °C and more, mean values, respectively, for

'Sweet Round' and 'Sweet Long', are 7.4% and 6.8% for SSC, 0.11 and 0.14 g/100 g for TA, and 41 and 38 mg/100 g for AA. The lower values for the SSC and TA obtained in the spring–summer cycle considerably reduce the organoleptic fruit quality when compared to those grown in the autumn–winter cycle; therefore, the latter is recommended.

Time elapsed from fruit set to ripening is ≈ 90 d for 'Sweet Round' and 85 d for 'Sweet Long' in a winter-growing cycle, and 65 and 60 d, respectively, in a spring–summer cycle. Applications of 2-chloroethylphosphonic acid (ethephon) at 500–1000 mg·L⁻¹ to the fruit can advance ripening by 2 weeks without affecting fruit quality (Prohens et al., 1996b). Harvesting should be when between one-half and three-quarters of the fruit surface shows the yellow pigmentation characteristic of maturation. At this stage, the fruit may be kept at 5–10 °C for up to 4 weeks. Fruit harvested in a more advanced stage are very sensitive to handling.

Availability

'Sweet Round' and 'Sweet Long' have been released as public cultivars. There are no restrictions on their propagation. A limited quantity of propagation material may be obtained from F.N., Dept. de Biotecnología, Área de Genética, Universidad Politécnica de Valencia, Camino de Vera 14, 46022 Valencia, Spain (email: fnuez@btc.upv.es).

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