‘TAM Dulcito’, a New, Multiple Virus-resistant Sweet Jalapeño Pepper

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The Texas Agricultural Experiment Station (TAES) at Weslaco announces the release of ‘TAM Dulcito’, a multiple virus-resistant, nonpungent pepper (Capsicum annuum L.). The project to breed virus-resistant peppers at the TAES began in 1971. Several cultivars of virus-resistant jalapeños have been released over the last 20 years (Villalon et al., 1992, 1994). The production of hot and sweet peppers in Texas has fluctuated from 1200 to 7000 ha over the last 30 years. Currently, close to 2500 ha are cultivated statewide (Smith and Anciso, 1960; Greenleaf, 1986; Zitter and Cook, 1973), ‘Avelar’, PI 264281, and AC 2207 (Cook, 1960; Greenleaf, 1986; Zitter and Cook, 1973), as well as several jalapeno lines. Field selections were conducted for 15 generations. Progeny of the initial virus-resistant F2 single plant selection were placed in an isolation block and selected based on fruit quality and yield, bulking superior plants. This process was repeated and superior selections were bulked for two more generations. This uniform F11 line was then subjected to four generations of selfing in the greenhouse and bulking the plants to increase seed. At each generation, seedlings were mechanically inoculated in succession with Texas isolates of TEV and PepMoV before transplanting to the field to verify resistance (Villalon, 1981). Susceptible control varieties were included to ensure viral pathogenicity. The final selection was at the F15 generation and possessed uniform plant and fruit traits.

Description

‘TAM Dulcito’ is adapted to the high temperatures and virus disease pressures of south Texas. The concentrated set of large, crack-free fruit on compact (36 to 42 cm) plants makes it ideally suited to once over harvests and high-density plantings. Comparisons for field performance, yield, and fruit quality were conducted under commercial and experimental field conditions in 1999 and 2000 at the TAES center at Weslaco (silty, clay loam soil type) and also in a commercial field in Edinburg, TX (sandy soil). Typical commercial production practices such as establishment from transplants, on drip-irrigated raised beds, and chemical pest control were followed. Fruit size and yield data were based on a randomized complete block design with four replications containing eight plants each. Thirty fruit per plot from healthy plants were used to calculate averages for quality traits.

In the fall season, ‘TAM Dulcito’ had significantly larger fruit and thicker flesh than ‘Mitla’ and similar yield per plant. In the spring season, fruit size and yield were significantly greater than ‘Grande’ (Table 1; Fig. 2). In both seasons, ‘TAM Dulcito’ matured 6 d before ‘Mitla’ at Weslaco. In the Fall 2000 season, yields and fruit quality were compared among ‘TAM Dulcito’ and the commercial cultivars ‘Mitla’, ‘Grande’, and ‘Tula’ as well as two TAES releases, ‘TAM Mild Jalapeño 1’ and ‘TAM Mild Jalapeño 2’ (Table 2). Yields of ‘TAM Dulcito’ (635 g/plant) were significantly greater than those of the popular cultivars ‘Grande’ (444 g/plant) and ‘Mitla’ (502 g/plant). Fruit of ‘TAM Dulcito’ were smaller than those of ‘Tula’ but equal in size to ‘Grande’ fruit. In addition, ‘TAM Dulcito’ fruit produced very little anthocyanin compared with fruit of ‘Grande’ and ‘Mitla’ (data not shown). This purple–black pigment is undesirable for jalapeño peppers and reduces the value of the crop. Total capsaicinoid concentrations of mature fruits from ‘TAM Dulcito’ plants grown in Uvalde and College Station in Spring 2001 were measured by high-performance liquid chromatography (Hoffman et al., 1983). Fruits from a hot jalapeño cultivar ‘Grande’, grown in College Station, were also analyzed for comparison. Total capsaicin, on a dry weight basis, was converted to Scoville Heat Units (SHU) following the method of Collins et al. (1995). ‘TAM Dulcito’ fruit from both locations had no detectable levels of capsaicin. By comparison, the hot jalapeño ‘Grande’ had a capsaicin concentration of 1332 mg·kg⁻¹ (19,980 SHU).

In separate experiments, seedlings of both ‘TAM Dulcito’ and a susceptible control, ‘Mitla’, inoculated with local isolates of TEV, PVY, or PepMoV, were transplanted to 10-L pots in the greenhouse and into field plots (TEV and PepMoV) to observe effects on plant growth and fruit quality. In both greenhouse and field experiments, TEV-inoculated plants of ‘Mitla’ had small, misshapen fruit, and chlorotic leaves, whereas inoculated plants of ‘TAM Dulcito’ had normal fruit and no chlorosis. None of the plants appeared to be reduced in height. PepMoV-inoculated plants of ‘Mitla’ exhibited severe leaf distortion, plant stunting, and reduced yield with misshapen fruit. None of the fruit from inoculated ‘Mitla’ plants were of commercial quality. ‘TAM Dulcito’ plants inoculated with PepMoV exhibited...
mild chlorosis on older leaves but no distortion or misshapen fruit. No symptoms were observed on ‘TAM Dulcito’ or ‘Mitla’ after inoculation with PVY in the greenhouse. Enzyme-linked immunosorbent assay tests were conducted on leaf samples from inoculated greenhouse plants of both ‘TAM Dulcito’ and ‘Mitla’ to determine the presence of TEV, PepMoV, and PVY. Leaves from ‘Mitla’ tested positive for TEV and PepMoV with absorbance readings of 1.70 and 2.21, respectively, but negative for PVY (0.02). Leaves from ‘TAM Dulcito’ tested negative for TEV (0.04) and PVY (0.02) and weakly positive for PepMoV (0.44). Leaves of a susceptible control, ‘Capistrano’ bell pepper, tested positive for TEV (4.00) and PepMoV (2.37).

The large, nonpungent fruit of ‘TAM Dulcito’ makes it well suited for many processed products. These would include mild salsas and rings for markets, which prefer less pungent foods, or in cases in which synthetic capsaicin is added to create distinct but uniform heat levels. The multiple virus resistance and adaptation to high temperatures will be valuable attributes in regions where these stresses exist. ‘TAM Dulcito’ could be a useful parent to develop other virus-resistant jalapeno cultivars with varying degrees of pungency or other attributes. The seed of this open-pollinated cultivar will be much less expensive than comparable hybrid cultivars as a result of the lower production costs.

**Availability**

Breeder’s seed will be maintained by the Texas Agricultural Experiment Station at Weslaco. Application for plant variety protection is being filed for ‘TAM Dulcito’. This variety may be licensed through the Texas Agricultural Experiment Station for commercial seed production.

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