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'Tulameen' Red Raspberry

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'Tulameen' has become one of the leading fresh market red raspberry cultivars in the world. Some history helps to describe the cultivar and why it has become so important. 'Tulameen' is from the 1980 cross of 'Nootka' x 'Glen Prosen' made in the breeding program at Agriculture and Agri-Food Canada's Pacific Agriculture Research Center (PARC) in British Columbia (BC) (1). 'Nootka', an earlier release from the program, is noted for its high levels of soluble solids which are well balanced with acid levels; it did not have wide acceptance mainly because of its relatively low yields. 'Glen Prosen' is an exceptionally firm, large-fruited cultivar from the Scottish Crop Research Institute's program. It owes its firmness to genes obtained from the eastern North America native black raspberry, *Rubus occidentalis* L. These genes had been brought into raspberry breeding programs through the pioneering work done at Horticulture Research International, located in East Malling, England. Because of its firmness, 'Glen Prosen' has been grown in Britain for fresh market use, particularly that involving transport to distant markets.

'Tulameen' is the first floricane-fruiting red raspberry cultivar released in North America that had the black raspberry cultivar 'Cumberland' in its ancestry (1). Derivatives of 'Cumberland', which is either a selection of *R. occidentalis* or else is one generation removed from it, have been used extensively in breeding programs in the United Kingdom (UK). Some fruit traits of 'Tulameen', apparently derived from the black raspberry, are late ripening and firm fruit.

'Tulameen' was initially selected in the seedling stage for resistance to the common strain of the aphid vector (*Amphorophora agathonica* Hottes of the raspberry mosaic virus complex (1). The selected seedling was placed into the field in 1982 and tested as BC 80-28-53. As early as 1984, it was recognized for outstanding qualities including large, relatively firm fruit with glossy medium red color. Fruit was well displayed and easily removed from the receptacle. The color was more attractive than that of either parent. Flavor was especially appealing. Harvest began in late June and lasted for approximately six weeks, up to two weeks longer than that of most other cultivars. Such a long season is considered an especially desirable trait for fresh market cultivars. The plant was vigorous but did not produce excessive primocanes, though sufficient for propagation purposes. It was decided to "fast track" the selection. Propagation of pathogen-free nuclear stock for production of certified plants began immediately. By 1987 there were plants in growers' trials and in a replicated yield trial at the PARC's field substation near Abbotsford.

'Tulameen' was named in 1989, a year before the Plant Royalty Act came into effect in Canada. Thus, unlike the situation with cultivars named since then, it was easy to distribute plants to raspberry production regions throughout the world. During the 1990s, favorable performance information was received from the UK, various western European countries, such as Spain, Portugal, France, Belgium and the Netherlands, southeastern Australia, and Chile. It was particularly interesting to learn that the cultivar was being sold by its actual name in Belgium. This is a situation akin to that used in marketing some other fruits, for example 'Gala', 'Fuji' or 'Cox's

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Orange Pippin' apples or 'Bartlett' pears. Now 'Tulameen' is marketed under its name in the UK and Western Europe.

'Tulameen' seems particularly suited to production under protected structures, including plastic tunnels and greenhouses, allowing for top quality out-of-season fruit. At Cornell University in New York, 20 cultivars were evaluated for greenhouse production during the winter and early spring months (4). 'Tulameen' was the best all-around performer by far. Fruit was top-ranked for flavor, essential for anyone paying premium prices. Although it was not the highest yielder, it was near the top. It was outstanding for appearance and large size as well as flavor. Now 'Tulameen' is being grown "out-of-season" in commercial greenhouses in New York and other parts of eastern North America.

'Tulameen' canes have relatively low chilling requirements so that it is easy to force them to leaf out and then flower when moved into protected structures. The low-chilling requirements are also an advantage when plants are field grown in Mediterranean-type climates such as Spain, Portugal and the Santiago area of Chile. Field-produced fruit in these regions is exported to more temperate regions where field ripening occurs later in the season or trans-hemispheric in the case of Chile.

It has now become profitable for propagators to produce 'Tulameen' canes at higher altitudes or in colder climates to ensure that there is adequate chilling, even if it is relatively low compared to many other cultivars. These are termed 'long canes'. Canes can also be cold-stored at low temperatures to meet the requirements.

To ensure good fruit set on greenhouse-grown 'Tulameen', bumble bees are used as pollinators. After fruiting, the plants growing in pots can be moved outside or placed into cold storage until sufficient chilling is received for another season in the greenhouse.

Recently 'Tulameen' has become a staple in UK supermarkets. Other cultivars, such as 'Glen Ample', may be more productive, but 'Tulameen' is preferred because of its superb appearance and flavor. 'Tulameen' is perceived as having a particularly early and subsequently prolonged season since the first fruits are imported from Spain prior to the main season crop produced in local UK fields. Now there is pressure on UK growers to further extend the season during which fresh 'Tulameen' fruits are available. Canes that have been pre-chilled can be used for "out-of-season" production in greenhouses rather than relying on primocane (fall) fruiting cultivars, such as 'Autumn Bliss' and 'Joan Squire', grown in the field. The primocane cultivars invariably lack that distinctive raspberry flavor. At the same time, the quality of greenhouse produced 'Tulameen' is superior to any fruit imported from the southern hemisphere through the fall and winter months.

'Tulameen' is not without its faults. Its low chilling requirements mean that plants break dormancy early and are vulnerable to winter damage when grown outdoors in many production regions, such as northeastern North America, the Scandinavian countries, Poland and other central or eastern European countries. Damage usually does not occur in the typical winter of the Pacific Northwest production region. In North America, the UK, and Western Europe plants are relatively susceptible to root rot, caused by *Phytophthora fragariae* var. *rubi* Wilcox & Duncan. Raised beds with polyethylene covering help to reduce incidences of the disease. In Australia plants have some resistance (3). It is likely that the *Phytophthora* causal organism is a different species or race(s). 'Tulameen' is relatively susceptible to cane diseases, but they can usually be controlled by good management, including the avoidance of excessive nitrogen, and by cultural practices that improve air movement. It is susceptible to raspberry bushy dwarf virus which is spread by pollen (2). Nevertheless, there is little evidence of infection. 'Tulameen' is susceptible to a resistance-breaking strain of the aphid vector of the raspberry mosaic virus complex (1). Neither the aphid nor the virus has been observed in the field. In the

greenhouse, plants are susceptible to two spotted spider mite (*Tetranychus urticae* Koch) and as susceptible to powdery mildew, (*Sphaerotheca macularis (Fr.)* Jackewski) as are some other cultivars (Pritts, personal communication).

'Tulameen' has been remarkably successful. Recently it has been used extensively in breeding programs located in various raspberry-producing regions. We anticipate at least some of its progenies will produce cultivars that will be widely grown. In the meantime, it is likely that there will be more plantings of 'Tulameen' in most raspberry production regions throughout the world as the demand for high quality fruit throughout the year increases.

At the 2002 Meeting of the Canadian Society for Horticultural Science, 'Tulameen' received the Outstanding Cultivar Award. This is considered particularly appropriate since the meeting was held in conjunction with the International Horticultural Congress and 'Tulameen' has gained international recognition.

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Nominations must be submitted by 1 May 2003.