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TITAN' RED RASPBERRY

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Figure 1.

Titan' is a new red raspberry (*Rubus idaeus* L.) cultivar with very large fruit (Fig. 1) and very high yield potential. 'Titan' is expected to be grown primarily in the northeastern United States.

ORIGIN

Titan' was tested as NY 883. It was selected from progeny of a cross between 'Hilton' and NY 598 ('Newburgh' x 'St. Walfried') (Fig. 2). This cross was made in 1963, and the selection was made in 1966. Titan' has undergone field testing for many years at Geneva and

on various commercial farms in the Northeast. While it was an advanced selection Titan' was also included in replicated yield trials conducted by Dr. P. Crandall, Vancouver, Washington.

DESCRIPTION

Titan' has stout green smooth primocanes, with very sparse, small spines. Spines are concentrated at the base of the canes, and are absent on the upper portions of the cane. Spines are green with slightly darkened tips. Fully expanded leaves are large, broad, flat, and dark green. They are born horizontally from the cane. Dormant axillary buds are characteristically large.

Root suckering is light and plant vigor is average. Fruit are highly visible and are typically not hidden from view by foliage. Fruit are very large, and tend to be equal or larger than 'Hilton' in size and weight. Fruit yields can be very exceptional. When bearing a heavy crop, canes require support. The fruit torus is long, pointed, and pink on a long pedicel. The fruit is juicy and has a large cavity, but retains good firmness and coherence. At Geneva fruit ripen over a long season, starting before standard cultivars such as 'Newburgh', and continuing to fruit up to seven days after such

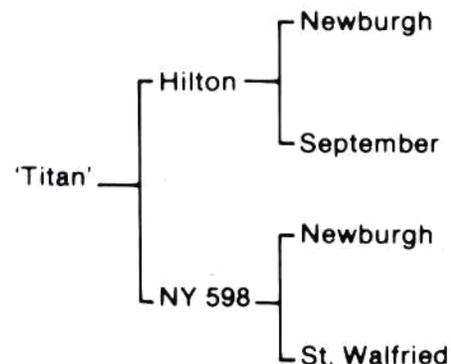


Figure 2.

cultivars are through fruiting. The fruiting season for Titan' at Geneva in 1984 was July 11-July 30.

Titan' is morphologically very similar to its maternal parent, 'Hilton'. It can be distinguished from 'Hilton' by its green rather than purple spines, its larger axillary buds, and its year-old wood which is darker brown and less silvery, and which shows more peeling of the epidermis. It is also distinguishable because 'Hilton' has softer fruit, darker and duller-colored fruit, and more uniformly sized drupelets. Titan' has a milder flavor than 'Hilton' and has fruit which clasp the torus more firmly than 'Hilton'.

PERFORMANCE

After many years of observation in unreplicated plantings at Geneva, it became clear that Titan' warranted wider testing. Therefore, plants were made available to numerous cooperative testers (primarily commercial growers) in the Northeast and other parts of the United States (Table 1).

Table 1. Performance ratings made by cooperative testers at various locations in the Northeastern United States, indicating 'Titan's' general adaptation to this region. These ratings were based on a standardized evaluation form. Cooperators grew 'Titan' for several years and were asked to rate 'Titan' compared to other red raspberry cultivars they were growing, or had grown. 1 = poor, 3 = average, 5 = outstanding. Blanks indicate that the cooperator did not choose to evaluate that character, presumably for lack of sufficient data.

Tester #	Yield	Size	Flavor	Keeping Quality	Hardiness	Overall Rating
1	4	5	5	3	--	4
2	4	5	4	4	3	5
3	4	5	3	--	--	2
4	--	5	4	5	--	5
5	5	5	4	4	3	4
6	4	5	3	3	--	4
7	5	5	3	3	4	4
8	3	4	3	3	3	3
9	5	5	3	4	--	5
10	5	5	3	2	4	3
11	5	5	4	5	1	2
Mean rating:	4.4	4.9	3.5	3.6	3.0	3.7

Titan' was consistently characterized by growers as being very large fruited. At Geneva, Titan' produces fruit which are 4-6 grams in weight. Most of the standard cultivars in the Northeast have fruit weights of 2-3 grams. At Geneva, Titan' tends to have somewhat larger fruit than 'Hilton'; which was previously the largest-fruited, red raspberry in the eastern United States. Titan' has fruit very similar in size to the purple raspberry 'Royalty'.

Titan' was consistently characterized by growers as being very high yielding. In a 1/4 acre unreplicated trial in Massachusetts, a yield equivalent of 6 ton per acre was reported. Similarly, in the first fruiting year of a replicated trial at Geneva, a mean yield of 5.5 MT/ha was recorded, which is a good yield, by New York standards. In contrast, the purple raspberry variety 'Royalty', which is recognized for its high yields, had a mean yield of 4.0 MT/ha. (This difference was statistically significant at the 95 percent level.)

Titan' was developed for the Northeast, and has not been widely tested in the Northwest. However, a replicated trial by Dr. P.C. Crandall, at Vancouver, Washington, supports the fact that Titan' has exceptionally high yield potential and fruit size, and indicates that it can perform well on certain sites in the Northwest (Table 2). In this trial, Titan' yielded more than 7 tons per acre, and was larger fruited and higher yielding than the principal cultivars of that region in all four replicates and in all three years of the trial. Titan's' yield and fruit size were statistically superior to all other cultivars in the trial, including its parent, 'Hilton' (Fig. 3).

Table 2. Mean yields and mean berry weights from trials conducted at Vancouver, WA. Means based upon 3 x 8.3 meter plots, with 4 replicates and 3 years' data. Permission of Dr. P. C. Crandall, Washington State University, SW Washington Research Unit, Vancouver, WA. Means followed by the same letter are not significantly different based on Waller and Duncan's BSD test, K = 100 (Waller and Duncan, 1969).

Cultivar	Mt/hectare	grams/berry
Titan	19.3 a	5.6 a
Hilton	12.2 b	5.0 b
Skeena	10.6 b	5.8 cd
Meeker	10.6 b	3.7 cd
Haida	9.8 b	3.4 d
Willamette	9.5 b	3.8 cd
Chilcoltin	8.7 b	3.9 c

On some sites Titan's' performance has been poor. Such poor performance seemed to correlate with heavy wet soils, and was sometimes characterized as lack of winter hardiness. What has previously appeared to be "winter injury" of Titan' in New York now appears to be primarily associated with various root-rot problems. Titan's' actual degree of hardiness is very similar to that of its parent, 'Hilton'. On well-drained sites Titan' appears to be hardy in most parts of New York, and at Geneva has routinely withstood temperatures of -26 C (-15 F), without serious injury.

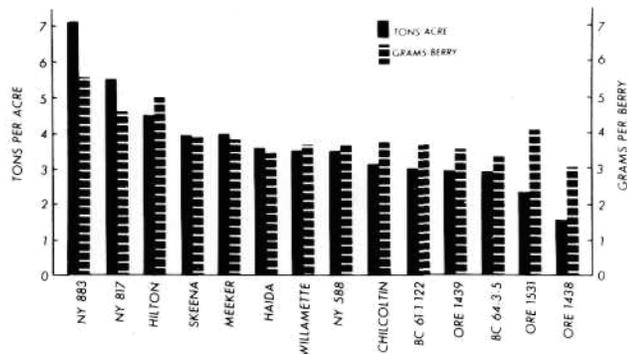


Figure 3.

Titan' is characterized by a mild but pleasant flavor. In 1982 a taste panel compared fresh fruit of 'Titan', 'Heritage', 'Latham', 'Hilton', and 'Newburgh'. Of these five cultivars, 'Titan' ranked first for texture, second for flavor, and third for appearance. In 1984 a taste panel compared freezer jam of Titan', Heritage, Hilton, and Latham. Titan' jam was surpassed by 'Heritage' for overall quality but was superior to 'Hilton' and 'Latham'.

'Titan' suckers sparsely, which may slow conventional propagation. However, reduced suckering can prove to be an important advantage for the fruit grower, due to less inter-cane competition, and less need for cane thinning.

CULTIVAR WEAKNESSES

The large fruit size and high yield potential of 'Titan' warrant its release as a cultivar, but it is not without defects, most of which can be largely corrected by proper management. Titan' appears to be particularly susceptible to crown gall (*Agrobacterium tumefaciens*), and possibly forms of root rot (presumably *Phytophthora* spp.). Titan's' growth and yield potential can be markedly reduced on a wet site, or following a very wet spring or fall, presumably due to root rot. In addition, poor sun exposure and crowding can lead to uneven ripening and reduced flavor in early berries. While the canes and laterals are relatively stout, they are not sufficiently strong to hold up the heavy crops characteristic of this cultivar, resulting in cane and lateral bending and breakage. In addition, the reduced suckering of this cultivar can make conventional nursery production difficult. These problems can largely be corrected by proper culture.

CULTURE

Titan' is currently being propagated in tissue culture. This form of propagation largely precludes problems with conventional propagation and problems with spread of crown gall, and results in a pronounced

increase in vigor in the early years of establishment. Such early vigor may possibly be attributable, in part, to absence of root-rotting inoculum such as *Phytophthora* spp.. Root rot problems can further be avoided by selection of very well-drained sites. The use of the soil fungicide, Ridomil, where legal, may also help control *Phytophthora* spp. (Bristow, 1980).

Good sun exposure is important for the proper ripening of the undersides of Titan's' large fruit. Our preliminary experiments indicate that Titan' responds well to primocane-burning, as described by others (1,2,3), as a means of delaying primocane growth and ensuring good exposure of fruiting canes. However, this practice in the eastern United States remains experimental. While most cultivars in the Northeast are self-supporting, trellising will generally be required for support of 'Titan's' heavy crops. A trellis should easily pay for itself through increased yields, allows more efficient harvest, and should help to produce a more uniform canopy, aiding proper fruit ripening. A simple T-trellis is recommended, with two external wires supporting the row.

AVAILABILITY

Cornell University has obtained a patent on Titan'. Certified virus-free plants of Titan' are available from the New York State Fruit Testing Cooperative Association, Inc. Hedrick Hall, Geneva, New York 14456. Plants are also available from various commercial nurseries in the Northeast. Licenses to sell Titan' plants are free, and may be obtained from the Cornell Research Foundation, East Hill Plaza, Ithaca, New York 14850.

LITERATURE CITED

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