

United States Patent [19]

Lamb et al.

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[54] **APPLE CULTIVAR NY 58533-1**

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[52] U.S. Cl. **Plt./34**

[58] Field of Search **Plt./34**

Primary Examiner—Robert E. Bagwill

[57] ABSTRACT

A new and distinct apple cultivar, named 'Freedom' which is exceptional for its resistance to apple scab incited by *Venturia inaequalis*, cedar apple rust incited by *Gymnosporangium juniperi virginianae*, apple powdery mildew incited by *Podosphaera leucotricha*, and fire blight incited by *Erwinia amylovora*, for its high yields of large fruits and for its good quality.

4 Drawing Figures

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SUMMARY

This invention is a new and distinct cultivar of the apple which is exceptional for its resistance to apple scab incited by *Venturia inaequalis*, cedar apple rust incited by *Gymnosporangium juniperi virginianae*, apple powdery mildew incited by *Podosphaera leucotricha*, and fire blight incited by *Erwinia amylovora*, for its high yields of large fruits and for its good quality.

ORIGIN

This new cultivar was developed under project 451 Breeding Disease Resistant Apple Cultivars, of the Dept. of Pomology and Viticulture and the Dept. of Plant Pathology of the New York State Agricultural Experiment Station, Geneva, N.Y. It was selected from a cross made in 1958 of NY 18491 (Macoun×Antonovka) pollinated by NY 49821-46 (Golden Delicious×Ill 26829-2-2). It was selected for further trial, and first propagated in 1965. It has been extensively tested since that time under the number NY 58533-1. It will be named Freedom.

BRIEF DESCRIPTION OF PHOTOGRAPHS

FIG. 1 is 'Freedom'/EM9 in its 8th leaf, approximately 7 feet tall.

FIG. 2 is the fruit of 'Freedom' showing stem end, calyx end, side view, cross and longitudinal sections.

FIG. 3 is the fruit of 'Freedom' on the tree.

FIG. 4 is the fruit of 'Freedom' on the tree.

DESCRIPTION

'NY 58533-1' has been extensively tested in the greenhouse and in the orchard for resistance to the major apple diseases. It is highly resistant to apple scab, when inoculated in the greenhouse, showing only small, non-sporulating, necrotic spots on the inoculated leaves. In the orchard no symptoms of apple scab have ever been found on this cultivar. In greenhouse tests of cedar 35 apple rust resistance, NY 58533-1 showed pycnia of this disease after inoculation but we have only seen rust symptoms once on this cultivar in the field. For fire blight following inoculation in the greenhouse NY 58533-1 was given a score of 2 which is a resistant rating. In the orchard on the USDA scale from 1 to 10 "8" is the worst fire blight infection that has been observed. This means that there is some entry into 2 year old

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wood and that not more than 4-6% of the tree was infected.

We do not have a good greenhouse technique for evaluating resistance to mildew in apples. However, 5 NY 58533-1 has been evaluated for resistance in unsprayed orchards for many years. Lesions of mildew can be found on the leaves in most years but the occurrence of infected terminals on which the disease usually overwinters is quite rare.

10 The level of resistance to these 4 major diseases is such that this variety can be grown without any protective sprays in this area. It is not resistant to insects and must be sprayed with insecticides to protect it from insect pests.

15 The habit of growth of NY 58533-1 is vigorous and spreading. See FIG. 1. It is precocious and very productive. The shoots are a deep red in color, nearly glabrous at the base and tomentose toward the tip. The lenticels are prominent, scattered, grey in color and oval in shape 20 with the long axis parallel to the shoot. Most of the buds on one year old shoots will break in the spring to form spurs. These spurs will remain productive for 2-3 years.

The leaves of this variety are large, 102×63 mm and 25 leathery in texture. The shape of the leaf is elliptic, the apex is acuminate, the base is obtuse, and the margins are coarsely serrate. The upper leaf surface is glabrous and dark green in color and the lower surface is tomentose and greyish green. The shoots are reddish in color nearly glabrous at the base and tomentose toward the tip.

30 'NY 58533-1' blooms on the average May 15 or about 3 days after McIntosh. It has fertile pollen and is a precocious and productive variety.

The fruit of NY 58533-1 (FIGS. 2, 3, 4) is large, 69 mm long, and 85 mm in the largest cross-sectional diameter, and oblate in shape. It ripens October 5. Approximately 80% of the surface is covered with bright red. This red is characterized by readings of Lightness 41.41, Chroma 32.00 and Hue 21.27 on the Hunter Color Difference Meter using the pink standard plate C2 9647. (Hunter Associates Lab Inc., Fairfax, VA). The ground color is yellow. The cavity is deep, medium broad, acute, and russetted. The stem is approximately 20 mm long and slender. The calyx is large and open in a medium deep wide cavity. The calyx tube is short, wide, and conical. The flesh is cream colored, firm, medium-fine, tender and juicy in texture. The flavor is sprightly sub-acid and the quality is good.

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Isozyme genotype: The apple cultivar 'Freedom' was one of 54 distinct cultivars characterized for isozyme genotype in 6 isozyme systems. The results of the complete study have been submitted for publication in the Journal of the American Society for Horticultural Science. An abbreviated description of the methods used and the genotype determined for 'Freedom' will be presented below.

Materials and methods: Young leaf tissue was thoroughly crushed in ice cold 0.05M tris-maleate pH 8.5 containing 20% glycerol (v/v) 10% soluble polyvinylpyrrolidone, 0.5% Triton X-100 and 14 mM 2-mercaptoethanol. The extracts were subjected to horizontal starch gel electrophoresis on a tris citrate/lithium borate system at pH 8.1 (Selander et al., 1971) and on a histidine gel at pH 6.5 (Cardy et al., 1980). Slices from the tris citrate/lithium borate gel were assayed for aspartate aminotransferase, glucose phosphate isomerase and triose phosphate isomerase. Diaphorase, 6-phosphogluconate dehydrogenase and isocitrate dehydrogenase were assayed on slices from the histidine gel. The assay conditions were minor modification of standard recipes given in Shaw and Prasad (1970) and Vallejos (1983). Most of the assays were also described in Chyi and Weeden (1984).

The cultivar 'Freedom' exhibited specific and invariant genotypes at each of the loci identified in Table I. The genotype of 'Freedom' as well as another common cultivar with at least one allele in common with Freedom are also given in the Table. The isozyme phenotype was uniform among all 'Freedom' trees sampled and could be determined as long as healthy young leaves were available.

TABLE I

Freedom isozyme genotypes.		
Isozyme ¹	Genotype ²	Cultivars possessing similar alleles ³
6PGD-1	ad	Delicious (ac); Golden Delicious (dd)
6PGD-2	normal	Delicious and Golden Delicious
AAT-1	bc	Delicious (bc)
AAT-2	cc	Delicious (cc)
GPI-2	bc	Delicious (cc) (b allele unique to

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TABLE I-continued

Freedom isozyme genotypes.		
Isozyme ¹	Genotype ²	Cultivars possessing similar alleles ³
TPI-2	ab	'Freedom' Golden Delicious (bc)
DIAP	ab	Delicious (ab)
IDH-1	bb	Golden Delicious (bb)
IDH-2	aa	Golden Delicious (aa)

5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 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6225 6230 6235 6240 6245 6250 6255 6260 6265 6270 6275 6280 6285 6290 6295 6300 6305 6310 6315 6320 6325 6330 6335 6340 6345 6350 6355 6360 6365 6370 6375 6380 6385 6390 6395 6400 6405 6410 6415 6420 6425 6430 6435 6440 6445 6450 6455 6460 6465 6470 6475 6480 6485 6490 6495 6500 6505 6510 6515 6520 6525 6530 6535 6540 6545 6550 6555 6560 6565 6570 6575 6580 6585 6590 6595 6600 6605 6610 6615 6620 6625 6630 6635 6640 6645 6650 6655 6660 6665 6670 6675 6680 6685 6690 6695 6700 6705 6710 6715 6720 6725 6730 6735 6740 6745 6750 6755 6760 6765 6770 6775 6780 6785 6790 6795 6800 6805 6810 6815 6820 6825 6830 6835 6840 6845 6850 6855 6860 6865 6870 6875 6880 6885 6890 6895 6900 6905 6910 6915 6920 6925 6930 6935 6940 6945 6950 6955 6960 6965 6970 6975 6980 6985 6990 6995 7000 7005 7010 7015 7020 7025 7030 7035 7040 7045 7050 7055 7060 7065 7070 7075 7080 7085 7090 7095 7100 7105 7110 7115 7120 7125 7130 7135 7140 7145 7150 7155 7160 7165 7170 7175 7180 7185 7190 7195 7200 7205 7210 7215 7220 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FIG. 1.



FIG. 2.



FIG. 3.

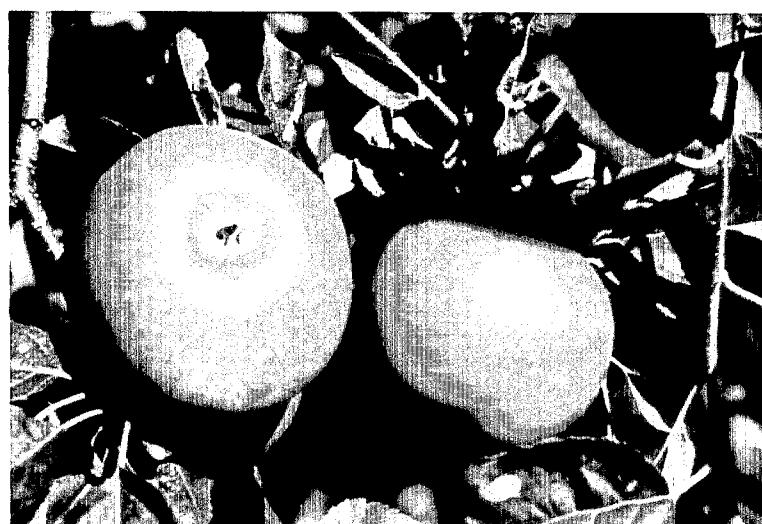


FIG. 4.

