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'FREEDOM' A New Disease-Resistant Apple

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A second disease-resistant apple from the New York State Agricultural Experiment Station has been named 'Freedom'. This apple has been grown without any disease-controlling sprays for 23 years at Geneva. Apple scab, powdery mildew, cedar apple rust, and fire blight have not been a problem on these trees in that time. 'Freedom' is a very productive, large, attractive apple of good quality.

ORIGIN

The cross which gave us 'Freedom' was made in 1958 by the senior author. The pedigree is listed in Figure 1.

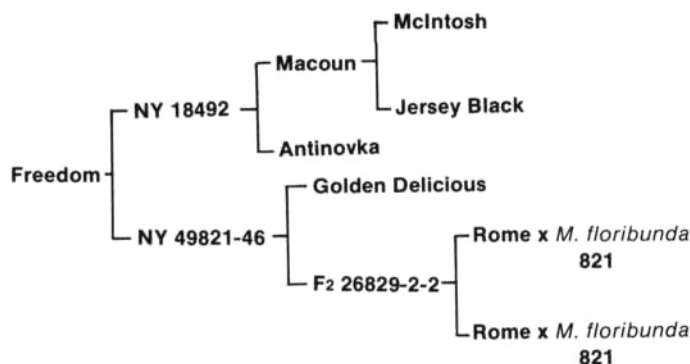


Figure 1.—Pedigree of 'Freedom'.

Five-hundred-twenty-one seeds of this cross were obtained and 120 of them were planted and screened for resistance to apple scab. Thirty-two resistant seedlings were planted in the field in 1959. 'Freedom' first fruited in 1965 and was propagated for further testing that year. In 1970, it was sent out for trial by the New York State Fruit Testing Cooperative Association. It has been widely tested across the state and in other states since that time.

It was decided to introduce this selection as a variety and Freedom was chosen as the name to recognize its freedom from apple scab. It was further decided to patent this variety in an effort to generate some financial support for the apple breeding project from those who will most benefit from it, the nurserymen and growers.

DESCRIPTION OF FREEDOM

'Freedom' has been extensively tested in the greenhouse and in the field for resistance to the major apple diseases. It is highly resistant to apple scab in the greenhouse showing only small non-sporulating, necrotic spots on the inoculated leaves. In the field no symptoms of scab have ever been found on 'Freedom'. Both parents of this variety are resistant to scab with the male parent carrying the "*Malus floribunda*" (Vf) type of resistance and the female parent carrying the "Antonovka" type of resistance. On crossing 'Freedom' with scab susceptible cultivars, 25-40 per cent of the seedlings showed no sporulating lesions when inoculated with scab. This is higher than the proportion of resistant seedlings in crosses between NY 49821-46 x susceptible varieties. We believe that 'Freedom' has genes for resistance to scab from both parents. Because 'Freedom' has two types of scab resistance in its parentage, this resistance may prove to be more durable.

In the greenhouse tests, 'Freedom' showed pycnia of cedar apple rust after inoculation, but we have

only seen rust symptoms on this variety once in the field. Even in the Hudson Valley where rust is a very severe problem, no symptoms were seen. This difference between greenhouse and field readings frequently occurs because conditions for infections can be kept optimum in the greenhouse to a degree seldom found in the field.

For fire blight in the greenhouse 'Freedom' was given a score of "2" which is a resistant rating. In the field on the USDA scale from 1-10 (2) "8" is the worst fire blight infection that has been observed. This means there is some entry into 2-year-old wood and not more than 4-6 per cent of the tree infected.

We do not have a good greenhouse technique for evaluating mildew resistance in apples. However, 'Freedom' has been evaluated for resistance to mildew in the field for many years. Mildew lesions can be found on the leaves in most years, but the occurrence of infected terminals on which the disease usually overwinters is quite rare.

'Freedom' has been reported to be resistant to four canker diseases as well (1). These are European canker, apple anthracnose, collar rot, and papery bark or silver leaf. The level of resistance is not great enough to constitute the sole means of control, but it would make alternative methods of control easier.

Although the level of cedar apple rust and fire blight resistance is less than that of 'Liberty' (the first disease resistant or tolerant apple named by the Geneva Station), it is still great enough to permit the growing of 'Freedom' without protective fungicidal and bactericidal sprays.

The tree habit of 'Freedom' is vigorous and spreading. Most of the buds on 1-year-old wood will break in the spring to form spurs. These spurs will remain productive for 2-3 years. The leaves of 'Freedom' are large, rather thick, and leathery in texture. The shape of the leaf is elliptic, the apex is acuminate, the base is obtuse, and the margins coarsely serrate. The upper surface is glabrous and dark green in color, and the lower surface is tomentose and a greyish green. The stipules are long (12 mm) and narrow and not very persistent. The shoots are reddish in color, nearly glabrous at the base and tomentose towards the tip. There are scattered oval lenticels oriented longitudinally along the shoots.

'Freedom' blooms about May 15 at Geneva or about 3 days after 'McIntosh', which means that it is

a midseason bloomer. It produces good pollen and has been used successfully as a pollen parent with many varieties. It is reported to be hardy to winter cold, and the blossom buds withstood -5 C on April 21, 1981.

'Freedom' is a very productive and precocious variety (Table 1), based on observations of 25 young

Table 1.—Number of fruits, fruit weight, and total weight of fruit on 25 trees of 'Freedom', 'Liberty', and 'McIntosh' on M9 rootstock. Planted 1980.

	Number of fruit 1982	Number of fruit 1983	Mean weight/fruit grams	Total weight kilograms
Freedom	59	1129	132	156.8
Liberty	80	1024	45	52.4
McIntosh	1	303		

trees on M9 rootstocks that were planted in 1980. At Geneva it ripens about October 5 or with 'Delicious'. The fruit is large (69 x 85 mm), oblate in shape with 80 per cent bright red stripes on a yellow background. The cavity is deep, medium broad, acute, and russeted. The stem is about 20 mm long and rather 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. Flavor is sprightly subacid, and the quality is good. It is a dual purpose type apple. It is good to eat fresh and makes good sauce and juice.

'Freedom' will keep in refrigerated storage until January.

AVAILABILITY

A patent is pending for 'Freedom'. Trees will be available from the New York State Fruit Testing Cooperative Association and from any other nurseries who wish to apply for a license to sell it.

LITERATURE CITED

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