



Va. 331

A Fire-Cured Variety With Black Shank Resistance

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VA. 331, A FIRE-CURED VARIETY WITH BLACK SHANK RESISTANCE

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The black shank disease caused by Phytophthora parasitica Dast. var. nicotianae (Breda de Haan) Tucker has been recognized in Virginia for 25 years (2). It was first found in the flue-cured tobacco area where it has, during some seasons, spread rapidly and caused heavy losses. It has been observed in fire-cured tobacco for about 15 years. The spread of black shank in the fire-cured tobacco area has been less rapid than in the flue-cured area. This probably results from the practice of growing fire-cured tobacco in a 3-year or longer rotation. The incidence of the disease, however, has continued to increase in fire-cured tobacco, and on a number of farms the losses have been extensive.

Black shank-resistant varieties were sought by growers as early as 1949. Vesta 55, a heavy-leaf flue-cured type, was grown as an emergency measure, but failed to produce good-quality fire-cured tobacco. Breeding work was begun to transfer resistance from Vesta 55 to fire-cured varieties. Progress in this work has been slow because of difficulty in obtaining good resistance in fire-cured type plants. However, improved plant types which have high resistance have been obtained from recent crosses. Since the true value of these new selections will have to be proved in performance tests, it has been decided to release a variety which has moderate black shank resistance for immediate use. It is the purpose of this report to describe this new variety, Va. 331, and indicate its commercial potential.

Parentage, Breeding History, and Description

Va. 331 originated from a cross of Vesta 55 on Walkers Broad Leaf. A single F₄ plant in the 1956 crop was the base for line selections in 1957. Further selections have been made each year for better plant type.

The plant type of Va. 331 is similar to that of Walkers Broad Leaf in that the leaves are large, pointed, and droop slightly from the middle to the tip. The spacing of the leaves is slightly wider than that of Walkers Broad Leaf. At maturity the leaves are not as heavy and droop less. During wind storms the top leaf may "turn over" more than other varieties. Under conditions favoring rapid and heavy growth, the leaves may become brittle and break more than leaves of other varieties.

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The cured leaf is predominantly reddish brown and resembles Walkers Broad Leaf; under average growing conditions, the leaf is likely to be slightly thinner. Leaf quality is generally good and meets market demands for a thin leaf. Since flea beetles in the field cause more severe injury on thin leaf tobaccos, the quality of Va. 331 may be reduced during years of heavy flea beetle infestation. The veining of the leaf is light, and the lateral veins are widely spaced.

Disease Resistance

The degree of black shank resistance of Va. 331 is moderate. Many growers tried this variety on black shank-infested soil and reported practically no losses, and were well pleased with its performance. An occasional grower has reported moderate losses from black shank. Overall black shank-resistance tests indicate that under average disease conditions the resistance will be satisfactory, but under severe conditions some losses can be expected.

Performance Records

The breeding line (6331) from which Virginia 331 was selected was entered in the advanced farm tests in 1958 and 1959, but the yield was medium low. For this reason, it was not entered in these tests in 1960 and 1961. Additional selections were made and tests at the Southside Research Station showed some improvement over the earlier selection. The latest selections were entered in the 1962 and 1963 advanced tests, in which yield was better and leaf quality was good. The performance data are summarized in Tables 1 and 2.

Seed of selections from which Virginia 331 originated were made available to growers with a black shank problem in 1961 and 1962. Reports from these growers have generally been favorable. The brittleness of the leaf has often been emphasized, and two growers have reported losses from black shank.

Discussion

At least 2 types of fire-cured leaf are required to fill market needs. These types of leaf cannot be produced by a single variety, so growers should use different varieties. Soil types, disease patterns, and environment are other factors the grower must consider in determining what varieties to plant. There are several good varieties of fire-cured tobacco, but few with disease resistance. Until recently, no fire-cured tobacco variety was available with black shank resistance. The need for such a variety has become so acute on some farms that a decision has been made to release Va. 331 at this time.

Table 1. Performance Data* For Va. 331 Compared To 3 Widely Grown Varieties.

Year and Locations	Va. 331	Walkers Broad Leaf	Lizard Tail Orinoco
1963 - 3 locations			
lbs/Acre	1227	1192	1051
\$/Acre	\$ 466	\$ 397	\$ 392
\$/cwt	\$ 37.97	\$ 33.33	\$ 37.27
1962 - 5 locations			
lbs/Acre	1757	1863	1729
\$/Acre	\$ 799	\$ 813	\$ 800
\$/cwt	\$ 45.21	\$ 43.31	\$ 46.05
1960 - 1 location			
lbs/Acre	1977	2272	1872
\$/Acre	\$ 825	\$1085	\$ 914
\$/cwt	\$ 41.73	\$ 47.76	\$ 48.82
1959 - 6 locations			
lbs/Acre	1603	1750	1772
\$/Acre	\$ 625	\$ 700	\$ 737
\$/cwt	\$ 38.99	\$ 40.00	\$ 41.59
1958 - 5 locations			
lbs/Acre	1502	1656	1603
\$/Acre	\$ 604	\$ 711	\$ 705
\$/cwt	\$ 40.21	\$ 42.93	\$ 43.98

*Value and price per 100 lbs., based on average price paid for government grades during the current and 2 previous years.

Table 2. Average Percentage Of Tobacco In Different Grade Groups In Tests Conducted At 5 Locations In 1962 And 3 Locations In 1963.

Variety and Year	Percent in Grade Group				
	X	C	B	A	Other
Va. 331					
1962	22	16	12	0	0
1963	17	69	0	0	15
Walkers Broad Leaf					
1962	19	23	58	0	0
1963	15	72	0	0	13
Lizard Tail Orinoco					
1962	23	24	35	18	0
1963	18	64	12	0	7

Va. 331 has a number of weaknesses: (1) the leaves are brittle and subject to storm damage and handling losses; (2) the leaf is thin and meets only a limited segment of market demands; and (3) plants are susceptible to black root rot. At the same time, Va. 331 has some desirable qualities: (1) moderate resistance to black shank, (2) reasonably good yields, and (3) good quality of cured leaf in a thin-leaf type. Resistance to black root rot is needed, but all good fire-cured varieties, with the exception of Walkers Broad Leaf, are susceptible to root rot. In using Va. 331 on black shank and root rot infested soil, growers should follow a 3-year or longer rotation. It is known that the incidence of black root rot is more severe in soil that has a pH reading above 5.8. It has also been shown that black shank losses are more severe and that carry-over of the black shank pathogen is greater in soil with a high pH (1). In planning the tobacco rotation on infested soil, these facts should be considered.

Progeny tests of individual plant selections in the F₁₁ generation of Va. 331 indicate that differences exist in the degree of their black shank resistance. It is probable that the level of resistance for the variety can be increased by intensive selecting of seed plants. The level of black shank resistance in Vesta 5, a bright-leaf variety, has been improved by this procedure. Foundation seed lines for Va. 331 are being carefully checked for resistance.

Summary

A description and performance data are given on a new variety of fire-cured tobacco, Va. 331. This variety originated from a cross of Walkers Broad Leaf on Vesta 55. It has some resemblance to the Walkers Broad Leaf parent, but the leaves are slightly wider spaced and thinner. Black shank resistance is moderate. The yield is good, and the quality of the leaf is good for a thin-leaf type.

Va. 331, under good growing conditions, may be more brittle than other varieties and greater storm and handling losses may result.

This variety is recommended for use on black shank-infested soil. Since the level of resistance is only moderate, Va. 331 should be used in rotations that will reduce soil infestation.

References

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2. Wingard, S. A. 1939. Discovery of tobacco black shank in Virginia. Plant Disease Reporter 23:369-370.