

R. G. Henderson

L. Spasoff

*Sears Special
and Virginia 310:*

NEW VARIETIES OF VIRGINIA FIRE-CURED TOBACCO

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SEARS SPECIAL AND VIRGINIA 310 -
NEW VARIETIES OF VIRGINIA FIRE-CURED TOBACCO

R. G. Henderson, Professor and L. Spasoff, Assistant Professor of
Plant Pathology, Virginia Polytechnic Institute

The greatest market demand for fire-cured tobacco in past years has been for a heavy dark-colored leaf of the type produced by the Lizard Tail Orinoco variety. In more recent years, however, there has been an increasing demand for a thinner and lighter-colored leaf such as that from Walkers Broad Leaf and Virginia 331. The thin reddish-brown leaf of the Virginia 331 variety brought especially good prices in 1966 and 1967. To meet the changing market requirements for different leaf types and the grower's need for plants with disease resistance, new varieties are being produced. This publication describes Sears Special and Virginia 310, new varieties released for seed increase this year.

Breeding History and Description

Sears Special - The cross from which Sears Special was selected was made by the late R. D. Sears, Assistant Professor of Agronomy, Southside Virginia Research Station, Charlotte Court House, Virginia. The parent varieties were Little Dick and Virginia 312. A description of the Little Dick variety is not available, but, in general terms, it was a heavy-leafed variety similar to Hastings and Lizard Tail Orinoco. The Virginia 312 parent was a broad-leafed type with high resistance to black root rot and mosaic. Sears Special inherited moderate root rot resistance from the Virginia 312 parent and high quality from the Little Dick parent.

The leaves of Sears Special are medium in width and length. The upper leaves on mature plants are wrinkled or "furrowed" as shown in Figure 1, upper right. The leaf margin has a tendency to roll downward. The color of mature plants in the field is a dark dull green. The leaf blade is soft and pliable. Spacing of leaves is about like that of Walkers Broad Leaf.

The predominant color of cured leaves is medium brown and the weight is slightly thinner than that of Walkers Broad Leaf. The variety cures easily with a low percentage of green grades.

Virginia 310 - The breeding of this variety involved Vesta 55 (flue-cured type), West Kentucky 2, Virginia 312 and Hastings. The last cross was made to Hastings. Selections were made in each generation for plant type, leaf quality, and disease resistance. The selection released for seed increase in 1968 was F₇ generation from the last cross.

Plants of Virginia 310 do not closely resemble any parent used in crosses but have some characteristics of each one of the parents. The leaf spacing is closer than that of any parent plant. The leaves are large like those of Virginia 312 and Vesta 55 but tend to fold upward from the midrib similar to those of Hastings. The texture of the green leaf is soft. Leaf thickness is intermediate between that of Hastings and Virginia 312. The upper leaves have a crinkled appearance which results from the veins being depressed slightly below the lamina. The leaves at maturity droop somewhat but not as much as the heavy leaves of Lizard Tail Orinoco (Figure 1, lower left and right respectively).

The cured leaf of Virginia 310 is medium or reddish-brown in color. The percentage of green grades in the farm and small plot tests was high, which suggests that the variety is slow to mature or difficult to cure.

Disease Resistance in New Varieties

To black root rot ^{1/} - Sears Special was bred for black root rot resistance but it does not have the full complement of resistance of the Virginia 312 parent. The degree of resistance is classified as moderate.

^{1/} Caused by Thielaviopsis basicola (Berk. & Br.) Ferr.

Virginia 310 has low resistance to black root rot. Under mild conditions for root rot, it appears to have considerable tolerance. But under conditions more favorable for disease development it loses the tolerance.

To black shank ^{2/} - Virginia 310 has moderate resistance to black shank. The level of resistance is sufficient to give satisfactory black shank control in a 3-year or longer rotation but some losses may occur with continuous tobacco culture on infested soil.

Sears Special is susceptible to black shank.

Performance Record

Sears Special, Virginia 310 and other selected varieties were tested for yield, value and quality under small plot and farm conditions during the years 1965-1967. The fertilization rate in these tests was moderate. Rainfall at all locations was generally irregular and deficient. In 1967, one farm test planting was severely damaged by hail, therefore its data were not included in the averages given. In another farm test in 1967, 9 plants of Walkers Broad Leaf and 5 of Lizard Tail Orinoco were lost to black shank. With this exception, the performance tests were conducted in the absence of major diseases. Performance and grade distribution data from all tests are summarized in Tables 1 through 6.

The yields for all varieties in the small plot test (Table 1) were moderately good overall but were slightly low in 1965. The average pounds per acre by varieties showed Walkers Broad Leaf leading with 2174 and Sears Special in second place with 2133. These two varieties reversed positions in value per acre, due to the much higher price per 100 pounds for the Sears Special. The average prices per 100 pounds was in range of \$40.67 for Virginia 331 to \$46.97 for Sears Special.

^{2/} Caused by Phytophthora parasitica (Dast.) var. nicotianae (Breda de Haan) Tucker.

Variety yields in the farm tests (Table 2) were about 25 percent lower than those in the small plot test. This lower yield was consistent for the 3-year period. The reasons for this difference in yield were not apparent. Fertilization rates were about the same at all locations but rainfall may have been more unfavorable at the farm sites. The yields of individual varieties in the farm tests did not follow the trends of those in the small plot test. Walker Broad Leaf, however, ranked first in value for the 3-year period in both tests. Sears Special was noticeably poorer and Virginia 331 better in average price per 100 pounds in the farm test as compared to the small plot test.

The combined performance data for the small plot and farm tests are summarized in Table 5. The average pounds per acre for the 3-year period varied from a low of 1783 for Lizard Tail Orinoco to a high of 1897 for Walkers Broad Leaf. Sears Special with an average of 1841 was midway between the high and low varieties. The average value per acre ranged from \$832 for Sears Special to \$758 for Virginia 331. This shift in position of varieties for value as compared to yield is explained in the average price per 100 pounds. Sears Special led in price with an average of \$45.19 and Virginia 310 was low with an average of \$40.52.

The percentages of tobacco in grade and color groups for the small plot and farm tests are given in Tables 3 and 4 and are averaged for both tests in Table 6. Walkers Broad Leaf and Lizard Tail Orinoco had higher percentages of heavy leaf (B) grades than the other varieties. Virginia 310 and Sears Special were higher in thin leaf (C) grades. The percentages of tobacco in color groups are not very different for varieties except that Virginia 310 was high and Sears Special low in green (G) grades. Virginia 331 was slightly higher in light brown (L) grades than other varieties.

Discussion

The general characteristics of the fire-cured tobacco varieties considered in this publication are summarized in Table 7. These varieties, under good growing and curing conditions, will perform moderately well. Under different farm conditions, some varieties will do better than others. Where there is danger of the black shank disease occurring, growers should use either Virginia 310 or Virginia 331. Virginia 331, on light soils of Nottoway and Lunenburg counties, has produced a light-colored leaf that has been in increasing demand on the market. A few growers in these counties have tried Virginia 310 on an experimental scale and have reported favorable results. In tests reported above, Virginia 310 had a high percentage of green grades which sold for a lower price, resulting in a lower value per acre. The growers who have tried this variety have not reported any difficulty in curing. In experimental tests, the different varieties were grown and usually harvested together. If a grower had a solid planting of Virginia 310, it could be cut at the optimum time and handled in the curing barn to best suit the variety. In this way, the undesirable green grades could be greatly reduced or eliminated.

The increased demand in recent years for thin, light-colored fire-cured tobacco has not reduced the demand for the heavy, dark-colored grades. Good crops of Lizard Tail Orinoco tobacco still sell for a reasonably good price. Growers should try to produce tobacco of high quality as well as high yield. If the variety a grower has been using does not produce high-quality tobacco, he should consider changing to another variety. The greatest return can be expected when the variety is selected to suit the soil conditions and fertilized according to the needs of the soil.

Summary

New varieties of fire-cured tobacco are described as follows:

Sears Special - A medium broad-leafed variety with moderate resistance to black root rot, that yields well, cures easily, and has high quality.

Virginia 310 - A medium broad-leafed variety that has moderate resistance to black shank, yields slightly more than Virginia 331 but is slightly later and requires greater attention in curing.

Data on yield, value, price per 100 pounds, and grade percentages from small plot and advanced farm tests are given for the new varieties and 3 widely grown varieties.

Table 1. Performance of new varieties compared with widely grown varieties in small plot tests, Charlotte Court House, Virginia.

| Comparison by year | Va. 331 | Va. 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|---------------------------------|--------------|--------------|------------------|---------------------|----------------------|
| <u>Pounds/acre</u> | | | | | |
| 1965 | 1707 | 1792 | 1839 | 1786 | 1553 |
| 1966 | 1977 | 2208 | 2118 | 2063 | 2060 |
| 1967 | <u>2489</u> | <u>2208</u> | <u>2442</u> | <u>2674</u> | <u>2312</u> |
| Average | 2058 | 2069 | 2133 | 2174 | 1975 |
| <u>Value/acre ^{1/}</u> | | | | | |
| 1965 | \$733 | \$716 | \$888 | \$749 | \$702 |
| 1966 | 867 | 923 | 1091 | 1004 | 1061 |
| 1967 | <u>911</u> | <u>935</u> | <u>1027</u> | <u>1034</u> | <u>919</u> |
| Average | \$837 | \$858 | \$1002 | \$929 | \$894 |
| <u>Price/cwt</u> | | | | | |
| 1965 | \$42.96 | \$39.98 | \$48.29 | \$41.95 | \$45.17 |
| 1966 | 43.85 | 41.80 | 51.51 | 48.67 | 51.50 |
| 1967 | <u>36.60</u> | <u>42.36</u> | <u>42.04</u> | <u>38.68</u> | <u>39.74</u> |
| Average | \$40.67 | \$41.46 | \$46.97 | \$42.73 | \$45.26 |

^{1/} Based on average prices paid for U. S. Government grades during the current and previous 2 years.

Table 2. Performance of new varieties compared with widely grown varieties in advanced farm tests.

| | Va. 331 | Va. 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|---------------------------------|--------------|--------------|------------------|---------------------|----------------------|
| <u>Pounds/acre</u> | | | | | |
| 1965 | 1382 | 1566 | 1450 | 1436 | 1444 |
| 1966 | 1644 | 1840 | 1636 | 1688 | 1708 |
| 1967 | <u>1616</u> | <u>1652</u> | <u>1560</u> | <u>1736</u> | <u>1620</u> |
| Average | 1547 | 1686 | 1549 | 1620 | 1591 |
| <u>Value/acre ^{1/}</u> | | | | | |
| 1965 | \$628 | \$610 | \$645 | \$603 | \$619 |
| 1966 | 740 | 711 | 676 | 799 | 735 |
| 1967 | <u>668</u> | <u>672</u> | <u>664</u> | <u>735</u> | <u>705</u> |
| Average | \$679 | \$664 | \$662 | \$712 | \$686 |
| <u>Price/100</u> | | | | | |
| 1965 | \$45.41 | \$38.94 | \$44.48 | \$42.01 | \$42.86 |
| 1966 | 45.01 | 38.64 | 41.32 | 47.33 | 43.03 |
| 1967 | <u>41.56</u> | <u>40.42</u> | <u>42.00</u> | <u>42.14</u> | <u>43.63</u> |
| Average | \$43.89 | \$39.38 | \$42.73 | \$43.95 | \$43.11 |

^{1/} Based on average prices paid for U. S. Government grades during the current and previous 2 years.

Table 3. Average percentage of tobacco in grade and color groups in small plot tests conducted at Charlotte Court House, Virginia, 1965-67.

| Groups | Va. 331 | Va. 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|---------------------|---------|---------|------------------|---------------------|----------------------|
| <u>Grade groups</u> | | | | | |
| Lugs (X) | 26 | 22 | 24 | 33 | 30 |
| Thin Leaf (C) | 35 | 49 | 44 | 11 | 19 |
| Heavy Leaf (B) | 34 | 29 | 32 | 56 | 51 |
| Other | 6 | 0 | 0 | 0 | 0 |
| <u>Color groups</u> | | | | | |
| Light Brown (L) | 8 | 0 | 4 | 0 | 6 |
| Med. Brown (F) | 25 | 18 | 39 | 35 | 37 |
| Dark Brown (D) | 0 | 0 | 17 | 0 | 15 |
| Mixed (M) | 27 | 36 | 30 | 33 | 27 |
| Green (G) | 40 | 46 | 10 | 32 | 15 |

Table 4. Average percentage of tobacco in grade and color groups in advanced farm tests, 1965-1967.

| Groups | Va. 331 | Va. 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|---------------------|---------|---------|------------------|---------------------|----------------------|
| <u>Grade groups</u> | | | | | |
| Lugs (X) | 25 | 25 | 26 | 24 | 27 |
| Thin Leaf (C) | 38 | 29 | 35 | 34 | 25 |
| Heavy Leaf (B) | 31 | 42 | 36 | 38 | 43 |
| Other | 6 | 3 | 4 | 3 | 4 |
| <u>Color groups</u> | | | | | |
| Light Brown (L) | 12 | 2 | 2 | 10 | 1 |
| Med. Brown (F) | 22 | 3 | 36 | 14 | 27 |
| Dark Brown (D) | 19 | 15 | 6 | 21 | 15 |
| Mixed (M) | 32 | 17 | 31 | 34 | 22 |
| Green (G) | 15 | 62 | 26 | 20 | 35 |

Table 5. Overall average performance of varieties in small plot and farm tests. (Data from Tables 1 and 2 summarized)

| Comparison by years | Va. 331 | Va. 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|------------------------|--------------|--------------|------------------|---------------------|----------------------|
| <u>Pounds/acre</u> | | | | | |
| 1965 | 1544 | 1679 | 1644 | 1611 | 1498 |
| 1966 | 1811 | 2024 | 1877 | 1875 | 1884 |
| 1967 | <u>2052</u> | <u>1930</u> | <u>2001</u> | <u>2205</u> | <u>1966</u> |
| Average | 1802 | 1878 | 1841 | 1897 | 1783 |
| <u>Value/acre</u> | | | | | |
| 1965 | \$681 | \$663 | \$766 | \$676 | \$361 |
| 1966 | 804 | 817 | 884 | 902 | 898 |
| 1967 | <u>790</u> | <u>804</u> | <u>845</u> | <u>884</u> | <u>812</u> |
| Average | \$758 | \$761 | \$832 | \$821 | \$790 |
| <u>Price/cwt</u> | | | | | |
| 1965 | \$44.10 | \$39.48 | \$46.59 | \$41.96 | \$24.09 |
| 1966 | 44.39 | 40.36 | 47.09 | 48.10 | 47.66 |
| 1967 | <u>38.49</u> | <u>41.65</u> | <u>42.22</u> | <u>40.09</u> | <u>41.30</u> |
| Average | \$42.06 | \$40.52 | \$45.19 | \$43.28 | \$44.30 |

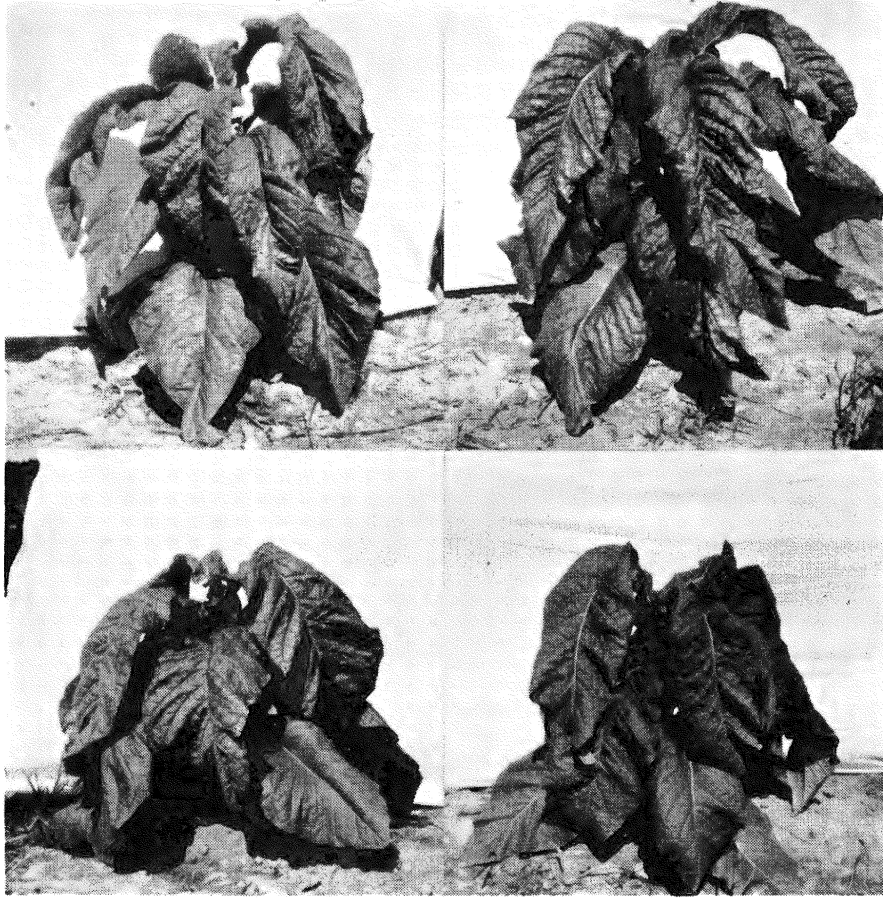


Figure 1. Plants of fire-cured tobacco varieties in test at Charlotte Court House, Virginia. Upper left, Walkers Broad Leaf. Upper right, Sears Special. Lower left, Virginia 310. Lower right, Lizard Tail Orinoco.

Table 6. Overall average percentage of tobacco in grade and color groups in small plot and farm tests 1965-1967 (Data in Tables 3 and 4 summarized).

| Groups | Va. 331 | Va. 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|---------------------|---------|---------|---------------|------------------|-------------------|
| <u>Grade groups</u> | | | | | |
| Lugs (X) | 25 | 24 | 25 | 28 | 28 |
| Thin Leaf (C) | 36 | 39 | 40 | 22 | 22 |
| Heavy Leaf (B) | 32 | 35 | 34 | 47 | 47 |
| Other | 6 | 2 | 2 | 2 | 2 |
| <u>Color groups</u> | | | | | |
| Light Brown (L) | 10 | 1 | 3 | 5 | 4 |
| Med. Brown (F) | 24 | 11 | 38 | 24 | 32 |
| Dark Brown (D) | 10 | 8 | 12 | 11 | 15 |
| Mixed (M) | 30 | 26 | 31 | 34 | 24 |
| Green (G) | 28 | 54 | 18 | 26 | 25 |

Table 7. General characteristics of 5 varieties of fire cured tobacco.

| Characteristics | Virginia 331 | Virginia 310 | Sears Special | Walkers Br. Leaf | Liz. Tail Orinoco |
|-------------------------------|-----------------|-----------------|------------------|---------------------|----------------------|
| <u>Growing plant:</u> | | | | | |
| Black shank resistance | moderate | moderate | susceptible | susceptible | susceptible |
| Black root rot resistance | low-fair | low-fair | moderate | fair | susceptible |
| Resistance to storm damage | poor | moderate | fair | fair | fair |
| Tendency to "fire" | light | light | light | light | moderate |
| Suckering | moderate | moderate | moderate | moderate | heavy |
| Leaf spacing | medium | close | medium | medium | med. close |
| Leaf size | medium | large | med. large | large | medium |
| Time of maturity | medium | med. late | med. late | med. late | medium |
| <u>Cured Leaf:</u> | | | | | |
| Manner of curing | easy | difficult | easy | easy | difficult |
| Predominant color | light brown | red-brown | red-brown | red-brown | dark |
| Size of midrib | medium | medium | medium | medium | medium |
| Leaf body | thin | medium | medium | medium | heavy |