

RESEARCH NOTE

FUSARIUM WILT OF NICOTIANA ARENTSII¹

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In recent field evaluations of a large number of breeding lines of *Nicotiana tabacum* L., and *Nicotiana* species for resistance to leaf diseases in Georgia, it was found that *Nicotiana arentsii* Goodspeed (Subgenus *Petunioides*, Section *Undulatae*) (3) was extremely susceptible to Fusarium wilt. Fusarium wilt was not observed on any other plants in the nursery involving more than 400 entries. Included in this nursery were several common varieties of flue-cured tobacco known to be relatively susceptible to wilt.

N. arentsii plants grew well in the field reaching a height of about 1.5 m. The plants appeared vigorous and healthy until early August when most plants suddenly began wilting. The gross external symptoms (Figure 1-A) were a general wilt, yellowing of the lower leaves and stems, and a gradual and progressive death of the leaves up the stem. Unilateral wilting, 'crook-neck' of stems, and dwarfed leaves are typical wilt symptoms on common flue-cured tobacco varieties (4), but these symptoms were not well defined on diseased *N. arentsii* plants. However, some bud deformity (Figure 1-B) was evident on *N. arentsii* plants with advanced

symptoms. Internal wilt symptoms of the stem (Figure 1-C and 1-E) were identical to that of common tobacco varieties (4).

Isolations from the brown vascular stem tissue always yielded a *Fusarium* species. Isolations from the vascular tissue several cm above the brown discolored areas often yielded an identical *Fusarium*. Similarly, apparently healthy bud cuttings from diseased plants kept at about 20C rooted well, but the cuttings later succumbed when returned to a warmer environment, indicating the fungus was distributed in plant parts not showing vascular symptoms. Limited pathogenicity studies in the greenhouse and growth chamber showed that flue-cured tobacco (cvs. Hicks Broadleaf and McNair 12) and sweet potato (cvs. Georgia Red and Porto Rico) were also susceptible. However, upland cotton (cv. Atlas) plants did not develop wilt under the same environmental conditions. Thus, the pathogen causing Fusarium wilt of *N. arentsii* was identified as *Fusarium oxysporum* Schlecht. f. sp. *batatas* (Wr.) Snyd. & Hans., since forma species *nicotianae* has recently been invalidated (1).

N. arentsii is reported to be resistant to the following diseases: tobacco rattle, tobacco etch, wildfire, root knot and cyst nematodes (2). Thus, it appears this species of

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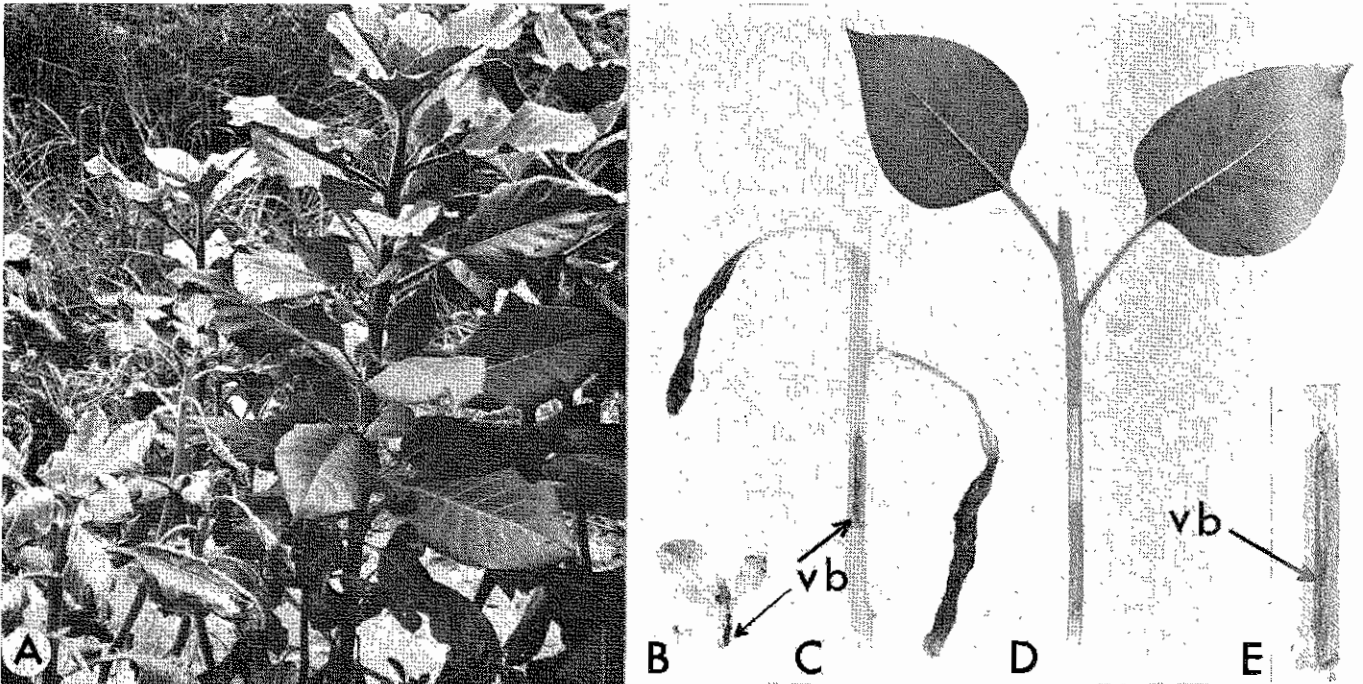


Figure 1.—Fusarium wilt of *Nicotiana arentsii*. A. Gross symptoms of Fusarium wilt of *N. arentsii* in the field. A healthy plant is on the right; B. Deformed bud from a diseased plant. The arrows indicate browning of the vascular tissue (vb); C. portion of a diseased stem with the outer tissue removed to show the brown discoloration of the vascular tissue; D. A portion of a healthy stem with the outer tissue removed to expose healthy white vascular tissue; E. Insert is an enlarged view (C) of the vascular tissue showing the brown discoloration.

Nicotiana may have potential value in breeding varieties resistant to the above diseases. However, due to the susceptibility of the species to *Fusarium* wilt, breeders should be sure that lines derived from this species are carefully evaluated for *Fusarium* wilt before release as a variety. This would be important in the warmer regions of the world where tobacco is produced and especially where plant parasitic nematodes might result in increased susceptibility due to disease interactions. This species may also have some utility to plant pathologists as a bioassay plant for detection of the tobacco wilt organism in soil and for comparative pathogenicity

studies.

LITERATURE CITED

1. Armstrong, G. M., and Joanne K. Armstrong. Formae speciales and races of *Fusarium oxysporum* causing tracheomycosis in the syndrome of disease. *Phytopathology* 58:1242-1246. 1968.
2. Burk, L. G., and H. E. Heggstad. The genus *Nicotiana*: a source of resistance to diseases of cultivated tobacco. *Econ. Bot.* 20:76-88. 1966.
3. Goodspeed, T. H. The genus *Nicotiana*. Chronica Botanica Company, Waltham, Mass. 536 p. 1954.
4. Lucas, G. B. Diseases of tobacco. 2nd ed. Scarecrow Press, New York. 778 p. 1965.