Bush type plants were previously reported to be tolerant to white mold. A determinate compact plant habit, however, may not always reduce disease severity. The near-isogenic determinate GN Nebraska #1 and also the determinate Pinto Ouray were as susceptible to white mold as the indeterminate GN Nebraska #1. We observed that the presence of the gene controlling the determinate habit of growth in nearly the same genetic background produced associated effects of shortened internodes and more numerous side branches creating a dense compact plant favorable for disease development.

An indeterminate semi-vine, Aurora, had a low level of S. sclerotiorum infection under a within-row spacing of 4-5 cm, but in a separate experiment under a within-row spacing of 30.5 cm, Aurora developed a much more dense canopy and became susceptible. The tolerance of Venezuela 350 also is attributed to its open upright plant habit. Various within-row spacings of Aurora and Venezuela 350 should now be compared in the same experiment to obtain additional evidence on the relationship of white mold tolerance to plant habit.

Measurement of percentage white mold infection of individual plant canopies in a homozygous line is slow and laborious, while rating on a row basis is more rapid and simple. A high correlation existed between the two methods of measuring white mold reaction, indicating that the row rating method could be effectively used to rapidly screen large numbers of lines or cultivars.

A close association existed between the high yielding ability of the GN Nebraska lines and white mold susceptibility. These lines possess vigorous indeterminate plant habits with dense canopies and late maturity. Their high total plant weight (biological yield) is associated with high seed yield. A breeding strategy must be devised to combine a plant architecture (similar to Aurora), a level of genetic resistance (similar to Black Turtle Soup), and a high seed quality and yield (similar to GN Tara). This will be difficult to achieve because of the close association of high seed yield, high biological yield, and susceptibility to S. sclerotiorum infection.

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## Sclerotinia sclerotiorum INOCULUM PRODUCTION IN WESTERN NEBRASKA

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Sclerotia of Sclerotinia (Whetzelinia) sclerotiorum are the primary survival structures of the fungus which causes white mold of dry beans in the North Platte Valley. Sclerotial populations were monitored in western Nebraska during 1974-1976 and preliminary results have been reported (BIC, 19:70-72). Sclerotial distribution throughout the 15 cm vertical soil profile were recovered from the 0-7.5 and 7.6-15.2 cm depths, respectively. In 1976 sclerotial populations were comparable in all fields sampled despite differences in occurrence of beans in the previous crop history and ranged from 1.6 $\pm$ 0.3 to 2.1 $\pm$ 0.3 sclerotia/kg soil in

fields annually planted to susceptible beans for 3 and more than 9 years, respectively. In 1976 a sclerotial population of 1 sclerotia/kg soil was recovered from a field where beans had been severely infected in 1973 and which was planted to nonsusceptible crops of sugar beets or corn during 1974-1976.

The relationship between sclerotial populations and white mold disease severity was determined in fields planted to susceptible indeterminate bean cultivars such as Great Northern (G.N.) UI#59 or Tara. Sclerotial populations ranging from the lowest (0.1 sclerotia/kg soil) to the highest (6.2 sclerotia/kg soil) caused 28 and 48% plant infection, respectively. However, similarly sized sclerotial populations caused widely differing disease severity, and in general no correlation existed between sclerotial populations and extent of white mold development.

Apothecial production was initially detected on August 6, 1974 and 1975, and August 3, 1976 (approximately 60 days after planting in all cases). An average of 10.5 and 13.8 apothecia/$m^2$ were found in bean fields in 1975 and 1976, respectively. During August, an average of 11.2 and 6.5 apothecia were found in a sugar beet field in 1975 and 1976, respectively. An average of two apothecia was produced by each sclerotium, regardless of the crop beneath which it germinated.

Apothecial production on August 22, 1976, was significantly greater beneath the canopies of G.N. UI#59 (26/$m^2$), G.N. Tara (30/$m^2$) and G.N. Code P #92, a compact bush, (34/$m^2$) than beneath small white Aurora (4/$m^2$) and dark Red Kidney Charlevoix (10/$m^2$). At least 90% of the apothecia were located either adjacent to the plant stems in or on the side of the irrigated row, regardless of plant growth habit. By August 31, 51% and 56% of the plants of Code P#92 and Tara, respectively, were infected by S. sclerotiorum as compared to less than 1% of the plants of Aurora or Charlevoix.

Significantly more apothecia were observed beneath Tara irrigated every 5 days when compared to application every 10 days or to Aurora irrigated at either frequency. By August 31, 30-40% of the Tara plants irrigated every 5 days were infected, while less than 3% plant infection occurred in the other treatments.

Apothecia remained viable for 7-9 days in the field and for 9 days in the laboratory. During incubation in the laboratory, an apothecium discharged on the average $2.58 \times 10^5$ ascospores per day with a mean total production of $2.32 \times 10^6$ ascospores.

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## BLOSSOM AND CANOPY ARCHITECTURE CHARACTERISTICS AFFECT *Sclerotinia sclerotiorum*

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White mold disease of dry edible beans, caused by Sclerotinia (Whetzelinia) sclerotiorum, is the major production problem of commercial