

EFFECT OF INBREEDING IN SOYBEAN CYST NEMATODES ON INFECTION
CAPABILITIES OF SOYBEANS

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Soybean Cyst Nematode (SCN) Heterodera glycines, was first observed in the United States in North Carolina in 1954. Since its discovery, the SCN has become a major pest of soybeans in the southern and eastern United States. Genetic studies of plant parasitic nematodes have been limited in number and scope. The main reason being the difficulty in carrying out controlled single-pair crosses. Genetics of the association between soybean and the soybean cyst nematode is poorly understood. A major obstacle to any work on the genetics of SCN has been the genetic variability which is inherent in field population. Breeding soybeans for resistance to the soybean cyst nematode requires bio-assay of plant/nematode association. Several bio-assay techniques have been reported.

At the Delta Center, an extensive project has been underway to investigate the use of pruned soybeans in hydroponics as a bio-assay for soybean cyst nematode development. Our approach to working with SCN is to develop a new technique which is a modification of hydroponics system. The primary objective of this study was to develop true inbred lines from wild SCN population by single male-female matings, and to document the effect of inbreeding on SCN development in susceptible and resistant soybeans.

Several soybean cyst nematode inbreds were developed from a wild population by single male-female matings. After increasing them on a susceptible soybean variety, each population was examined for developmental pattern on three soybean lines, Peking, PI 88788 and PI 90763 along with the susceptible Lee 74. Soybean seedlings (emerging roots) were exposed to a SCN population for 16 hours and transferred to hydroponics. Adult males were enumerated as they left the roots. After 20 days, immature juveniles (J_2 , J_3 , J_4) and mature females were recorded from stained roots. All three SCN population infected the susceptible variety Lee 74 equally, whereas, the infection on PI 90763 varied considerably. The number of males and females were approximately the same in Lee 74 for all populations. However, in one of the three populations, the proportion of males in Peking was much higher than females. Very few immature juveniles were observed in Lee 74 and Peking, but a large number of J_3 and J_2 were found in PI 90763.

The variation in the developmental pattern among the three soybean cyst nematode populations indicated that inbreeding resulted in segregation for pathogenicity in the wild (heterogeneous) population.