

Our preliminary investigations have shown that four numbered black bean lines (70001, 70002, 70003, 70004) with erect growth habit and high yields have higher root weights than Black Turtle Soup (BTS) or Strain 39 (a Univ. of California selection out of BTS), which have prostrate and semi-prostrate growth habits, respectively. The purpose of this investigation was to determine if root morphological differences occur within these lines and cultivars under field conditions. Measurements were made during vegetative, full bloom, pod elongation, seed initiation, and fully filled immature pod growth stages.

Total root weight was partitioned into weight of adventitious roots (those arising from the upper hypocotyl just below the soil surface); basal roots (those arising from the basal portion of the hypocotyl); and taproot (including any lateral roots arising from it). Basal roots were counted, and the sum of their diameters at the point of attachment to the base of the hypocotyl was determined.

Basal root weight was found to comprise the highest portion of the total root biomass. Significantly higher basal root weights were obtained for all numbered lines as compared to BTS and Strain 39. Similar results were found for taproot weight, with the exception of 70002 and Strain 39 which were not significantly different from each other. No differences in basal root numbers were found, although total basal root diameters were significantly higher for all numbered lines when compared with the two commercial cultivars. There were no significant differences with regard to adventitious root weight.

When pooled over all entries, basal root weights and taproot weights increased up to the seed initiation stage, then significantly decreased between that stage and the fully filled immature pod stage indicating that root senescence had begun.

Our data indicate that basal root thickening rather than number is responsible for higher basal root weight. The erect growth habit of the four numbered lines may have resulted from higher basal root weight. Higher taproot weight may also have contributed to the erect growth habit in some lines.

Literature cited

1. Tanaka, N. 1964. Studies on the three types of root system formation in leguminous crops plants. Agri. Bull. Sage Univ. 30:31-34.
2. _____, 1977. Studies on the growth of root systems in leguminous crops. Agr. Bull. Sage Univ. 43:1-82.

RELATIONSHIP OF ROOT SIZE TO LODGING AND SEED YIELD IN SOME BLACK BEANS

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Direct harvesting of dry beans is beginning to gain acceptance among commercial growers. Uprightness of plants (lodge resistance), a desirable

characteristic for direct harvesting, is generally lacking among black bean cultivars. Some researchers working with various field crops have reported that a large root size decreases lodging. Weber and Fehr (1) have reported that lodging in soybeans lowers combine-harvestable yields. The purpose of this investigation was to measure root size differences, if any exist between cultivars and selected black bean lines, and to determine if root size is related to lodging and seed yield.

Four numbered black bean lines - 70001, 70002, 70003, 70004 - selected primarily for their erect growth habit and large root size, and two commercial cultivars, Black Turtle Soup (BTS) and Strain 39 (a Univ. of California selection out of BTS) were evaluated under field conditions. Measurements were taken during vegetative, full bloom, pod elongation, seed initiation and fully filled immature pod growth stages.

All numbered lines had significantly higher total root weights and lower shoot:root ratios than BTS or Strain 39. Uprooting resistance, a measure of root strength, was also significantly higher for all lines. Total root weight, pooled over all entries increased up to seed initiation but showed a significant decrease at the fully filled immature pod stage indicating the initiation of root senescence. There was no significant difference in uprooting resistance between these last two stages of pod development.

Significantly higher seed yields and biological yields were obtained for all four numbered lines as compared to BTS or Strain 39. Based on visual ratings for lodging just prior to harvesting, all numbered lines were significantly more erect than the commercial cultivars.

Our study indicates that root size variability exists within black beans. Although more extensive investigations are needed, our data suggest that a larger root size may be conducive to reduced lodging and increased seed yields in black beans.

Literature cited

1. Weber, C.R. and W. P. Fehr. 1966. Seed yield losses from lodging and combine harvesting in soybeans. Agron. J. 58:287-289.

THE USE OF ETHEPHON AS A SCREENING TOOL FOR THRIPS RESISTANCE IN COWPEA (*Vigna unguiculata* L. WALP)

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Cowpea in West Africa can be severely damaged by flower thrips (*Megalurothrips sjostedti*). These insects cause abscission of the young flower buds and peduncles to the extent that flowering can be completely prevented. Similar abscission effects can be obtained after application of the growth regulator ethephon as a foliar spray. We have found that varietal differences in thrips resistance identified by our grain legume entomologists are correlated with resistance to ethephon. The correlation between peduncle abscission of