NEMATODES ASSOCIATED WITH *Phaseolus vulgaris* IN TANZANIA

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The following nematode genera were found to be associated with *Phaseolus vulgaris* in Tanzania : *Meloidogyne*, *Aphelenchoides*, *Tylenchus*, *Trichodorus*, *Ditylenchus*, *Helicotylenchus*, *Pratylenchus*, *Hemicycliophora* and *Aphelenchus*. Of the plant parasitic genera, *Meloidogyne* had the highest soil population densities.

P. vulgaris was found, under pot experimental conditions, to be an alternate host for the main nematode species associated with two common intercrops : coffee (*Meloidogyne* n.sp.) and banana (*Meloidogyne incognita incognita*, *Pratylenchus goodeyi* and *Helicotylenchus multicinctus*). *P. goodeyi* and *H. multicinctus* numbers were significantly higher in association with *P. vulgaris* than they were with their original host (banana), as was root infestation with *Meloidogyne incognita incognita*.

Meloidogyne was found on *P. vulgaris* at all sites sampled in the Usambara Mountains, Tanga Region, and at 62% of all sites in Kilimanjaro and Arusha Regions. At most sites, *P. vulgaris* was grown in pure stand, once each year during the rains, followed by an eight to nine months fallow. This suggests that the *Meloidogyne* species and populations in question are able to survive the fallow period on weeds or without a host. Reducing or eliminating the fallow period with susceptible crops, particularly if through irrigation or susceptible *P. vulgaris* cultivars, will raise field populations of *Meloidogyne* if appropriate rotations are not introduced.

Heavy root parasitism by *Meloidogyne* without galling was found at 37% of the sites in the Usambaras and at 28% of the sites in Arusha Region. A new *Meloidogyne* species was associated with non-gall formation.

Meloidogyne species identified on *P. vulgaris* were *M. incognita incognita*, *M. hapla* and four new species. Selecting for resistance should not therefore be solely against the four polyphagous species (*M. incognita incognita*, *M. javanica*, *M. arenaria* and *M. hapla*) and the restricted number of pathotypes assigned to them by some authorities.

Of the 50 *P. vulgaris* lines examined in the field, 19 had percentage root system galling figures of under 10% and ten had scores between 10 and 30%, with various *Meloidogyne* species. When the eight lines with the lowest scores in the field were

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tested in pots against the *Meloidogyne* species (n.sp.) population giving the highest galling rates : P 285 and RKSPS 3-16 showed high degrees of resistance and Masai Red showed some resistance. The recommended cultivars Lyamungu 85, Canadian Wonder and G 5621 (Lyamungu 90) showed high infestation rates at most sites. They will lead to an increase in field population numbers, particularly in the case of Lyamungu 85 which appears to show some tolerance to certain populations. Tolerance was observed in a number of other lines.

Further distribution, identification and pot screening work are necessary, as well as pathogenicity work.

References

Cuthbert, J. (in press). Nematodes associated with *Phaseolus vulgaris* in Tanzania. In: Smithson, J.B. (Ed.). Proceedings of Ninth SUA/WSU Bean CRSP and Second SADCC/CIAT Regional Bean Research Workshop, Morogoro, Tanzania, 17-22 September, 1990.

Screening Bean Germplasm for Economic Resistance to Insect Pests

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In much of the world, consumers prefer produce that is cosmetically clean and free of blemishes, while even slightly damaged crops may be by-passed at the marketplace. These extremely high standards have been relatively easy to maintain (along with high yields), in part because of the continuing availability of effective pesticides. However, a growing concern for the environment and ever-increasing regulatory constraints now threaten that supply of chemical plant protectants. The concept of integrated pest management (IPM) with its emphasis on the use of multi-component strategies suggests that plant resistance to insects is an attractive alternative or supplement to insecticides; but the research effort to support this (although growing) has not been great, particularly for many horticultural crops.

We believe that significant differences in degree of insect attack occur among established cultivars, thus avoiding the need for plant breeders to select from exotic wild types for sources of resistance. These differences among cultivars could become increasingly important to growers as their arsenal of chemicals continues to dwindle. Since 1975, when research support permitted, we have compared selected cultigens of bean in the laboratory, greenhouse, or field for injury from insects feeding on seed or plant. Although no immunity has been noted in these comparisons, we have identified consistent differences for each insect studied except for Mexican bean beetle. In some cases, we have conducted heritability trials with promising types although these findings are not discussed here. Table 1 summarizes our findings to date while Table 2 presents a partial list of ratings derived from this research that is available in its entirety to the industry upon request.