and two weeks old seedlings were inoculated with larvae of *Meloidogyne incognita* at a level of 1 larva/g of soil. The root-knot indices were measured 45 days after inoculation and per cent index of resistance was determined (Bingefores, 1957).

Though all the varieties exhibited galling, two varieties, C-152 and 82-1-B expressed some degree of resistance. In the former variety no egg masses were encountered.

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EFFECT OF ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* ON FUSARIUM WILT OF FRENCH BEANS*

BY

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An experiment was set up to study the role of *Meloidogyne incognita* and wilt fungus, *Fusarium oxysporum f. solani* singly or in different combinations in causing wilt disease complex in french beans.

The wilt fungus was grown on potato dextrose agar medium for 8 days at 25°C and 5 discs of 7 mm diameter were used as inoculum for each plant. Freshly hatched second stage larvae of *M. incognita* were used for inoculation at 2000 larvae per plant. The seedlings were raised singly by sowing surface sterilized french bean seeds (var. Premier) in 20 cm earthen pots containing sterilized soil. Ten day old seedlings were used for inoculation. Treatments included were :— nematode alone (N), fungus alone (F), nematode and fungus simultaneously (N+F), nematode first and fungus 10 days later (N→F), fungus first and nematode 10 days later (F→N) and control (C) (without nematode and fungus). Each treatment was replicated 10 times. Observations on plant growth, root-knot index, root rot index and wilting were recorded 30 days after first inoculation. The root-knot index was recorded on 1 to 5 scale. The relative damage by the fungus was determined by scoring the extent of disease on a scale ranging from O (no xylem necrosis) to 5 (plant dead).

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Inoculations of nematode alone, simultaneously with fungus, and 10 days prior to the fungus drastically reduced the plant height and fresh shoot weight and also plants showed maximum wilt. Fungus alone and both the pathogens in different combinations severely decreased the fresh root weight but the plants showed moderate wilting. Similar reductions in shoot and root growth have been recorded for cowpea (Thomason *et al.*, 1959) and cotton (Martin *et al.*, 1956).

TABLE I

Effect of M. incognita *and* F. oxysporum f. solani *on growth, root-knot index, root rot index and wilting in french beans (mean of 10 replications)*

Treatments	Plant height (cm)	Fresh shoot weight (g)	Fresh root weight (g)	Root length (cm)	Root-knot index	Root rot index	Percentage wilt
N	6.76	2.55	1.60	6.00	5.00	0.00	0
F	9.46	4.74	0.81	5.60	1.00	3.70	40
N+F	5.74	1.96	0.44	3.82	5.00	4.50	70
N→F	5.50	2.62	1.06	4.54	4.40	3.80	70
F→N	8.68	3.96	0.66	6.06	4.20	4.00	30
C	25.46	12.62	2.34	13.75	1.00	0.00	0
C.D. at 5%	1.50	1.12	0.50	1.10	1.04	0.50	

The maximum root-knot index and root rot index was observed when both the pathogens were inoculated either in different combinations or alone. Inoculation of both the pathogens simultaneously and nematode inoculation prior to fungal inoculation gave maximum percentage of wilting while inoculation of fungus alone and fungus inoculation prior to nematode inoculation gave moderate percentage of wilting in french bean plants. These findings support observations of Khan and Saxena (1969), Porter and Powell (1967) Johnson and Littrell (1969). These results clearly indicate that the *Fusarium* wilt is increased in french beans in the presence of root-knot nematodes indicating a synergistic action between these two organisms.

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