

EFFECT OF SOIL ON THE ROOT-KNOTS CAUSED BY *MELOIDOGYNE INCOGNITA* IN *ABELMOSCHUS ESCULENTUS*¹

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ABSTRACT

In the present study on soil, uncultivated soil, showed lesser intensity of root galling as compared to cultivated ones. Soils of Sambhar and the fields adjoining Ajmer road were poor biotypes for nematodes in both cultivated and uncultivated areas.

INTRODUCTION

The soil represents a complex environment involving several physical, chemical and biological factors. Extreme moisture as well as desiccation may reduce nematode populations, and this may be made use of in their control. The concentration of oxygen in soil-air depends upon the biological and chemical activity going on in the soil. It may vary according to the type of soil, its physical properties like porosity and the amount of water present in the soil.

MATERIAL AND METHODS

The soils from various areas adjoining Jaipur were collected. These included soil from Sambhar, fields along Ajmer road, Dudu, the University Campus and Durgapura Soil from both cultivated and uncultivated areas were obtained. An analysis of soil samples is presented in Table-1. The seedlings were raised in pots 14×14.5 cm. containing 1.5 kg. autoclaved soils of both cultivated and uncultivated areas. The pots were surface sterilized with 4% Formaldehyde solution. They were inoculated with 500 freshly hatched larvae of *M. incognita* by pouring larval suspension in the soil. After 45

days of inoculation, results were recorded (Table-2) and statistically analysed using one way classification (Lewis, 1971).

OBSERVATIONS

The number of galls per 'g' of root weight are summarised (Fig. 1). Heavy galling has been recorded in the cultivated soils obtained from fields near Ajmer Road and Sambhar. Least galling was seen in plants grown on uncultivated soil from Dudu. Almost all the uncultivated soils produced scanty galling and the plant growth was satisfactory. The soils from Sambhar and fields along Ajmer road were poor biotypes of nematodes in both cultivated and uncultivated areas. The highest root knot index 'D' was found in plants raised on cultivated soils from Sambhar and fields along Ajmer road, while 'A' in the uncultivated soil of Dudu.

DISCUSSION

It is evident from the present study that the plants grown in the cultivated soils show heavy galling, particularly from field along Ajmer road and Sambhar. The heavy galling appeared to be due to a higher percentage of sand and Po-

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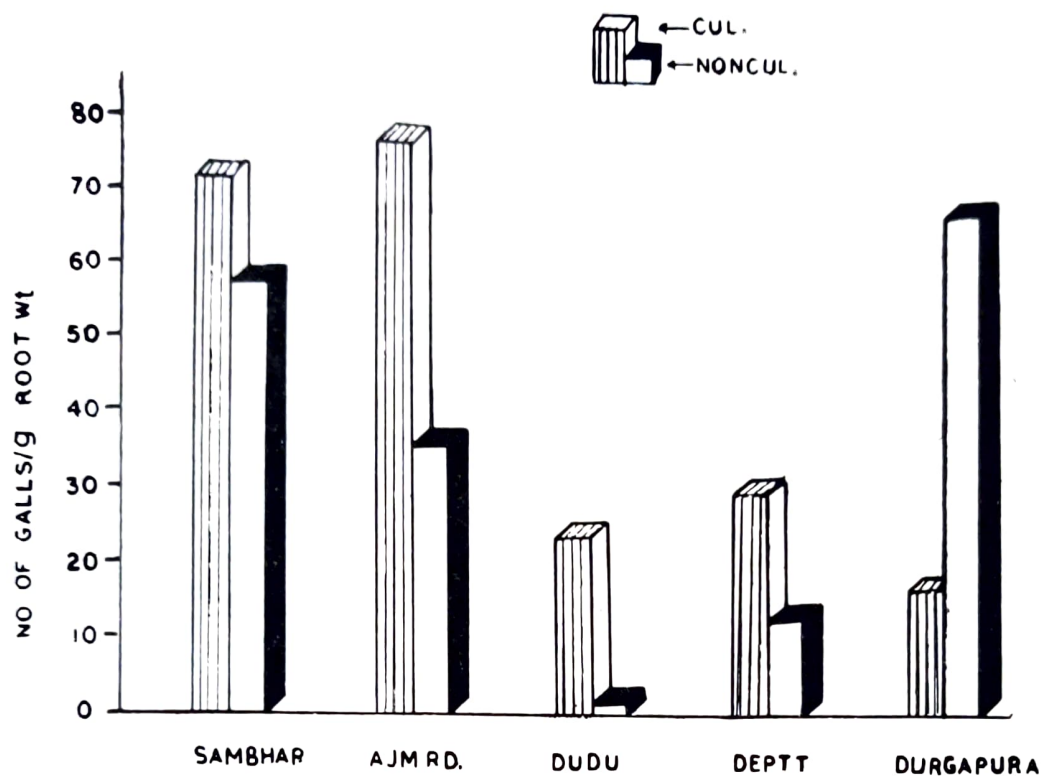


Fig. 1 Galls per gram of root weight on cultivated and uncultivated soils.

TABLE I
ANALYSIS OF SOIL SAMPLES*

Soil type	pH	Electro- conducti- vity.	Mechanical Fractions %			CaCO ₃	Organic carbon	P ₂ O ₅ kg/ha	K ₂ O ₆ Kg/ha	Soil moisture
			Sand	Silt	Clay					
Ajmer road cultivated	8.1	0.21	69.32	21.55	8.5	1.0	0.13	59	112	1.10
Ajmer road cultivated	7.8	0.25	70.6	21.2	9.2	Nil	0.08	121	108	1.25
Dudu cultivated	8.4	1.0	41.34	12.45	28.65	12.6	0.22	63	106	3.52
Dudu uncultivated	7.9	0.30	49.32	13.0	28.7	8.5	0.08	83	102	1.74
Durgapura cultivated	7.8	0.30	80.52	12.4	6.15	Nil	0.06	54	80	5.65
Durgapura uncultivated	7.7	2.50	80.05	12.57	6.8	Nil	0.08	34	84	1.85
Sambhar cultivated	8.0	0.3	87.0	5.05	2.65	4.5	0.16	86.4	152	0.75
Sambhar uncultivated	8.1	0.4	91.0	4.63	3.01	Nil	0.09	39.4	132	0.50
University campus cultivated	8.5	0.2	88.0	7.32	2.80	Nil	0.15	102.6	148	0.50
University campus uncultivated	8.3	0.3	89.0	6.85	3.25	Nil	0.09	52.2	148	0.50

*Courtesy of Soil Survey Organisation, Durgapura, Jaipur.

TABLE II

EFFECT OF SOILS (CULTIVATED AND UNCULTIVATED) ON *M. incognita* ROOT-KNOTS.

Soils from	Length (cm)		Fresh weight (g)		Dry weight (g)	Average No. of galls/g root weight	No. Root-knot Index
	Root	Shoot	Root	Shoot			
1	2	3	4	5	6	7	8
<i>Sambhar</i>							
Cultivated	..	8.0	13.4	0.83	0.7	0.1	72.28 D
Uncultivated	..	6.3	15.66	1.13	1.2	0.08	57.52 C
Variance ratio:							
F ₁ -calculated	..	4.5045	2.297	6.7252	2.0454	9.6111	413.8551 ..
F ₅ -Tabulated at 1%	..	99.2	99.2	99.2	99.2	99.2	99.2 ..
<i>Ajmer Road</i>							
Cultivated	..	8.6	11.0	0.9	0.57	0.18	77.77 D
Un-cultivated	..	6.0	17.25	1.33	0.82	0.34	36.09 B
Variance ratio:							
F ₁ -calculated	..	2.2556	20.3007	14.3846	5.2869	2.6064	3.1377 ..
F ₅ -Tabulated at 1%	..	99.2	99.2	99.2	99.2	99.2	99.2 ..
<i>Dudu</i>							
Cultivated	..	6.0	14.8	0.5	1.0	.09	24.0 B
uncultivated	..	7.0	15.0	2.0	1.2	.17	1.5 A
Variance ratio:							
F ₁ -calculated	..	1.7733	1.7733	2.4493	2.1456	20.2742	2.0459 ..
F ₅ -Tabulated at 1%	..	99.2	99.2	99.2	99.2	99.2	99.2 ..
<i>University Campus</i>							
Cultivated	..	8.5	16.0	1.62	1.75	.15	30.27 B
uncultivated	..	8.2	18.5	6.65	1.75	.2	13.07 B
F ₁ -calculated	..	1.33	12.9912	3.4238	0.3333	28.2282	162.5666 ..
F ₅ -Tabulated at 1%	..	99.2	99.2	99.2	99.2	99.2	99.2 ..
<i>Durgapura</i>							
Cultivated	..	7.66	15.0	1.35	2.0	0.2	17.04 B
Uncultivated	..	8.0	15.8	1.1	0.77	0.17	61.81 C
F ₁ -calculated	..	58.9636	1.1771	1.4985	1.5	78.0909	2.0771 ..
F ₅ -Tabulated at 1%	..	99.2	99.2	99.2	99.2	99.2	99.2 ..

A, 0-10 (Trace galling) ; B, 11-40 (Light galling) ; C, 41-70 (Moderate galling); D, 71-100 (Heavy galling) ; E, 100 and above (severe galling).

tassium salts (Table-I). Both these factors appear to be favourable for the development of galls. These findings are in accord with Khan *et al.*, (1969) and Marks and Sayre (1964). Cultivated and uncultivated soils of Dudu are most unfavourable to galling since, they have a higher percentage of clay as the mechanical fraction

of the soils. These results are in conformity with the views of Bessey (1911) and Wallace (1963). However, according to Swaroop (1962) larvae of *Meloidogyne incognita* predominated in majority of soil samples tested. Wallace (1963) observed that sand provides a good medium for multiplications of plant parasitic nema-

todes. He has given emphasis on moisture retention capacity of soil for the prevalence of poor and good biotypes.

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