

## Control of Plant Parasitic Nematodes Associated with Cotton

By

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### ABSTRACT

Field trials with DD, DBCP, EDB, Nemaphos and VC-13 were laid out during the winter seasons of 1965-68 on MCU 1 and MCU 3 cotton at the Agricultural College and Research Institute at Coimbatore for the control of nematode parasites of cotton. DD, EDB and VC-13 were applied a month before raising the crop, while, Nemaphos was applied 15 days after sowing. DBCP was tried as pre and post treatment nematicide in different concentrations. Though significant reduction was noticed population immediately after application of nematicides, the population increased to a high level from post planting period in all the treatments and was significantly more in the case of DD followed by VC-13. Higher yield of kapas was realised in treated plots. The maximum yield was registered in DD followed by DBCP.

### INTRODUCTION

Several species of plant parasitic nematodes viz., *Meloidogyne* spp. (O'Bannon and Reynolds, 1960, 1961), *Belonolaimus gracilis* Steiner, 1949 (Good and Steele, 1958,) *Rotylenchulus reniformis* Linford and Oliveria (1940), (Birchfield and Jone, 1961) and *Aphelenchus parietinus* Bastian, 1865 (Arndt and Steiner, 1931) have been found in association with cotton crop in the Western countries. The cotton crop is also attacked by the root-lesion nematode, *Pratylenchus* sp. in U.A.R. (Baker,

1962) the stunt nematode, *Tylenchorhynchus* sp. and the dagger nematode, *Xiphinema americanum* in Louisiana (Martin and Birchfield, 1955). In Tamil Nadu nematode parasites of the genera, *Rotylenchus*, *Helicotylenchus*, *Rotylenchus*, *Pratylenchus*, *Tylenchorhynchus* and *Hopiolaimus* have been observed in cotton growing tracts (Abu Bucker and Seshadri, 1968). The results of field experiments laid out during 1965-'68 at the Agricultural College and Research Institute, Coimbatore to assess the efficacy of certain nematicides are presented.

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## MATERIALS AND METHODS

Three nematicidal trials were taken up in the Central Farm, Agricultural College and Research Institute, Coimbatore during the winter seasons of 1965-68. The plot size was 6.1 x 4.3 metres. The nematicides tried were DD, EDB, DBCP, and VC-13 during 1965-66 and during 1966-68 EDB was replaced by Nemaphos. During 1965-67 and 1967-68 MCU 1 and MCU 3 crops were grown. A suitable control plot was maintained and the treatments were replicated six times.

DD was applied as pre-plant soil injection at 15 cm depth at 280 l/ha. EDB 10 per cent granule was spread uniformly over the soil at 320 kg/ha and the soil was turned in. VC-13, 75 per cent EC was mixed in water and applied to the plots at 1 litre in 400 litres of water to cover 450 square metres. These three nematicides were applied a month prior to sowing. DBCP (Nemagon) 60 per cent EC was applied in irrigation water twice,

once before sowing at 38 l/ha and the second two months after sowing at 18 l/ha. Nemaphos (O, O diethyl O-2 pyrazinyl) phosphorothioate 10 per cent was placed in the soil near the base of the plants, fifteen days after sowing at 2.25 kg a.i/ha. Soil samples were drawn from the plots a month before sowing and prior to the commencement of nematicidal application (pre-treatment), just before sowing (post-treatment or pre-planting), during the second month of the crop growth period (post-planting) and immediately after the completion of the harvest (post-harvest). The screening of the soil samples was done by adopting Cobb's shifting and gravity method and Baermann's funnel technique and the population of the nematodes in 500 ml of soil was assessed. The yield of kapas was also recorded periodically.

## RESULTS AND DISCUSSION

Among the different species of nematodes present, *Rotylenchulus* and

The examination of soil samples showed the presence of the following nematode parasites

Nematode genus	Population/500 ml of soil								
	Pre-sowing			Post-planting			Post-harvest		
	65-66	66-67	67-68	65-66	66-67	67-68	65-66	66-67	67-68
<i>Helicotylenchus</i>	62	200	98	112	573	443	446	785	1382
<i>Topoloaimus</i>	8	171	458	125	429	--	513	728	548
<i>Pratylenchus</i>	1233	303	403	579	1200	103	5113	1007	1500
<i>Rotylenchus</i>	33	541	485	275	1010	54	383	935	—
<i>Rotylenchulus</i>	3154	1758	2050	8191	1548	585	8242	880	1242
<i>Gylenchorhynchus</i>	16	1775	675	116	472	70	79	992	950
<i>Gylenchus</i>	29	587	259	156	1247	—	233	883	—

*Pratylenchus* were found to be the most predominating ones.

#### EFFECT ON NEMATODE POPULATION

The population of nematodes recorded under the different treatments (per

500 ml of soil-mean of 6 replications) in the three trials along with the results of statistical scrutiny are furnished in Table-1.

TABLE 1 Effect of nematicides on parasitic nematode population (Mean value)

Treatments	1965—66		1966—67		1967—68	
	Pretreat- ment	Post treat- ment	Pretreat- ment	Post treat- ment	Pretreat- ment	Post treat- ment
DD (Dichloro propane Dichloro propene)	4420.8	836.6	823.5	214.0	1010.16	198.33
EDB (Ethylene dibromide)	3141.6	1036.6	926.8	908.5	—	—
DBCP (Dibromo chloro propane)	1970.8	1654.1	930.1	360.3	958.50	210.33
VC-13 (Diethyl dichloro- phenyl phosphorothioate)	1733.3	1366.6	968.6	593.6	746.50	418.00
Nemaphos (Diethyl pyra- zinyl phosphorothioate)	—	—	—	—	974.66	942.17
Control (no treatment)	3537.5	3658.3	920.5	892.8	834.83	801.50
S. E.	—	407.76	—	63.04	—	31.86
C. D.	—	1161.22	—	179.53	—	90.73

#### YIELD OF KAPAS

The plots treated with nematicides have proved to be significantly superior

to the check plot in enhancing the yield (Table 2). On the whole DD treated plots gave consistently maximum yield of *kapas*.

TABLE 2. Yield of *Kapas* and net profit due to nematicide treatment.

Treatments	Yield of <i>kapas</i> in kg/plot			Mean net profit (+) or loss (—) Rs.
	1965—66	1966—67	1967—68	
DD	3.89 (1495)	4.545 (1745)	8.017 (3079)	+ 616
DBCP	3.55 (1365)	3.955 (1518)	6.399 (2456)	+ 422
EDB	2.99 (1149)	—	—	—
VC-13	2.91 (1119)	3.089 (1188)	6.435 (2472)	— 233
Nemaphos	—	3.427 (1319)	6.414 (2464)	—
Control	2.49 (949)	2.985 (1149)	5.793 (2226)	—
S. E.	0.15	199.14	479.97	—
C. D.	0.417	587.38	1415.50	—

(Figures in parenthesis denote yield of *Kapas* in kg/ha)

## ECONOMICS

Among the nematicides tested, DD DBCP and VC-13 are available in the market. The mean profit or loss due to treatment are also furnished in Table 2.

The results have indicated a sudden decline in the nematode population following the nematicidal treatments which increased subsequently soon after the establishment of plants. A similar trend has been reported by Sutherland and Adams (1966), Oostenbrink (1960), Epps *et al* (1964), Murant and Taylor (1965) and Goffart (1961).

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