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Control of the Castor Shoot and Capsule Borer, *Dichocrocis punctiferalis* Guen

by

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Introduction: Castor *(Ricinus communis Linn.)* is one of the important oilseed crops grown in Madras State. The crop is subject to the attack of a number of insect pests and among them the castor shoot and capsule borer, *Dichocrocis punctiferalis* Guen is the most important one as it reduces the yield of beans considerably by boring into the capsules and tender shoots. Investigations were in progress since 1961 at the Agricultural College and Research Institute, Coimbatore to find out the efficacy of the recent synthetic insecticides in controlling the pest on castor. The results of the observations made during 1961 to 1966 are discussed in this paper.

Material and Methods: Observations were made during 1961 to 1963 on the incidence of the castor shoot and capsule borer on twelve perennial and four annual types of castor raised in the fields of the Oilseeds Section. In case of perennial types the observations were recorded every month throughout the year and in annual types they were recorded during the months from December to February. In all cases the total number of heads and affected ones were recorded and the percentage of infestation worked out. In addition the morphological features of the panicles of the types were also recorded.

Three field trials were conducted on TMV 3 castor during the years 1963 to 1966 in the Central Farm, Agricultural College and Research Institute, Coimbatore. In the experiment conducted during 1963-'64 the variants tried were sprays of parathion 0.05%, malathion 0.1%, DDT. 0.1%, BHC. 0.05%, trichlorphon (Dipterex) 0.1%, methyl demeton (Metasystox) 0.1% and carbaryl (Sevin) 0.1% with an untreated control, replicated four times. In the two trials so conducted during 1964-'65, and 1965-66, in addition to the above treatments, sprays of Imidan 0.1% and fenthion (Lebaycid) 0.1% were also added, and the treatments replicated three times. In all the trials, the first round of treatment was commenced at the time of formation of the inflorescence and the subsequent two rounds were given at intervals of twenty one days. Percentage of infestation by the pest was assessed both on head and capsule basis initially and at weekly intervals after treatment. Percentage of infestation on head basis was recorded by counting the total and affected number of heads in each

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plot. The percentage of damaged capsules was recorded by counting the total and affected number of capsules on five heads selected at random in each plot. The yield of beans was also recorded for each plot. The infestation and yield data were analysed statistically and interpreted.

Results and Discussion: (i) *Incidence of shoot and capsule borer on different types of castor* (1961 to 1963): The percentage of incidence on the different types varied from 60 to 100 per cent. The types TMV 1, OSS 22/61, OSS 24/61, OSS 32/61, OSS 56/61, OSS 59/61, OSS 60/61 and OSS 89/61 recorded 60 to 80 percent attack and these types possess lax panicles. The other types viz, CO 1, TMV 2, TMV 3, OSS 21/61, OSS 23/61, OSS 26/61, OSS 34/61 and RC 1068 recorded 82 to 100 percent attack and these types possess either very compact or slightly compact panicles with more of male flowers in a few cases. This observation is in conformity with the earlier report of David *et al* (1964) who have noticed that the extent of damage is more in the case of panicles having closely set capsules.

(ii) *Control of the castor shoot and capsule borer:* (a) *Infestation of the pest:* The summary of results of the statistical analysis of the data collected in respect of the incidence of the pest under the different treatments on the basis of earheads and capsules affected are presented in Table 1.

It is seen from the table that in all the years the differences in infestation, on both earhead and capsules basis under the different treatments have been statistically significant. When the incidence of the pest on the basis of earheads attacked is considered taking into account the mean of the three years, it is clearly seen that the treatment fenthion records the lowest incidence of the pest followed by imidan, carbaryl, DDT, parathion, BHC, malathion, trichlorphon and methyl demeton, control recording the maximum attack by the pest. Similarly when considered on the basis of capsules damaged the treatment imidan records the lowest damage followed by fenthion, trichlorphon, malathion, carbaryl, DDT, BHC, parathion and methyl demeton. The maximum damage to capsules has again been noticed in the untreated control. When the infestation by the pest, both on the basis of earheads attacked and percentage of capsules damaged is considered it may be concluded that fenthion is more efficacious in controlling the pest followed by imidan, carbaryl, DDT, BHC, malathion, parathion, trichlorphon and methyldemeton.

(b) *Yield:* The summary of results of the statistical analysis of the data collected in respect of yield of beans obtained under the different treatments as well as the economics of treatments are furnished in Table 1.

The yield of castor beans has been very low during 1963-64 due to failure of crop for want of adequate timely rains. The yield obtained has been

TABLE 1. *Effect of Infestation of Borer on Yield.*

S. No.	Treatments	Mean infestation of capsule borer (Transformed Value)								Mean Yield (kg/ha)			Net profit over control (Rs)	
		On earhead basis			Mean	On capsule basis			Mean					
		1963-64	1964-65	1965-66		1963-64	1964-65	1965-66		1963-64	1964-65	1965-66	1964-65	1965-66
1.	Parathion 0.05% ...	39.46	23.08	34.81	32.45	23.70	12.49	17.29	17.83	183	807	772	247	180
2.	Malathion 0.1% ...	42.05	27.41	32.12	33.84	21.67	12 49	15.36	16.47	172	736	640	192	64
3.	DDT. 0.1% ...	38.92	26.21	32.05	32.39	19.73	13.11	17.75	16.86	178	733	583	238	56
4.	BHC. 0.05% ...	44.09	23.32	32.71	33.37	22.70	11.70	17.04	17.15	291	660	647	146	100
5.	Trichlorphon 0.1% ...	44.79	23.98	33.16	33.98	19.63	12.63	16.23	16 16	140	807	696	227	84
6.	Methyldemeton 0.1% ...	41.22	27.10	34.83	34.38	23.85	15.33	18.52	19 23	226	770	481	188	–135
7.	Carbaryl 0.1% ...	36.87	25.74	30.97	31.19	20.34	12.79	17.24	16.79	205	587	705	49	132
8.	Imidan 0.1% ...	N.T.	24.50	35.05	29.77	N.T.	12 53	17.21	14 87	N.T.	706	689	Cost not known	
9.	Fenthion 0.1% ...	N.T.	25.62	32.88	29.25	N.T.	14.49	15.54	15.01	N.T.	697	685	,,	,,
10.	Control ...	51.77	39.34	48.26	46.46	37.38	22.70	27.49	20.19	127	440	473		
	Significant at P= ...	0.05	0.01	0.01		0.01	0.01	0.01		Not Significant	0.05	Not Significant		
	SEM ...	3.34	1.60	1.22		1.98	0.83	1.04			9 36			
	CD ...	9.42	3.56	3.44		5.58	2.36	2.93			28.40			

N T. = Not tried.

normal in the other two trials. However, the difference has been found to be significant only during 1964–65. During 1964–65 parathion has given the maximum yield of castor beans followed by trichlorphon, imidan, malathion, methyldemeton, DDT, fenthion, BHC and carbaryl. In the trial conducted during 1965–66 also parathion has recorded the highest yield of beans followed by carbaryl, trichlorphon, imidan, fenthion, BHC, malathion, DDT and methyldemeton. The lowest yield of beans has been obtained in the untreated control plot, when the mean of the yields obtained during the last two trials is considered parathion again records the highest yield followed by trichlorphon, imidan, fenthion, malathion, DDT, BHC, carbaryl, methyldemeton and control. In this connection it is to be noted that from the earlier studies conducted at Coimbatore David *et al* (1964) reported malathion and parathion to be more promising followed by DDT 10% dust and 0.1 % spray and BHC 10 % dust and 0.05 % spray.

(c) *Economics:* When the net profit that can be realised over the untreated control by way of the additional yield obtained is considered parathion again is the most economical one. The other treatments viz., trichlorphon, DDT, malathion, BHC, and carbaryl have also been found to be economical. As far as the other two promising insecticides, viz., fenthion and imidan are concerned, being newer formulations their cost is not known.

Conclusion: Varieties of castor possessing either very compact or slightly compact panicles with more of male flowers are damaged to a greater extent by the shoot and capsule borer. Application of three rounds of parathion 0 05 % spray at 21 days interval commencing at the time of formation of inflorescence may be recommended for appreciable control of the pest and for realising economically higher yield of beans. The other insecticides like fenthion, imidan, malathion, DDT, BHC, trichlorphon and carbaryl in the order mentioned can also be preferred for the control of the pest. Methyldemeton though a systemic insecticide is not effective when compared with other treatments in controlling the pest.

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