Agri. Res. J. Kerala, 1981. 19 (2) 102—104

EFFECT OF SOME PESTICIDES ON THE GROWTH AND SPORULATION OF *FUSARIUM OXYLPORUM* SCHLECT PALHOGENIC TO BROWN PLANT HOPPER *NILAPARVATA LUGENS* STAL

Certain pesticide chemicals have been reported to adversely affect the growth and/or sporulation of entomogenous fungi (Hall and Dunn, 1959; Yendol, 1968). *Fusarium oxysporum* Schlect has been found to be an efficient pathogen on brown plant hopper *Nilaparvata lugens* in Kerala (Kuruvilla and Jacob, 1978). Various insecticides and fungicides are being used to control pests and diseases of rice. The present studies were hence undertaken to determine the effect of commonly used pesticides on the growth and sporulation of *F. oxysporum.*

The pesticides (Table 1) were tested for their effect on the fungus by adding them to the medium on which the fungus was grown. The pesticide was mixed with 250 ml of oat meal agar at 42°C taken in conical flasks giving the concentration of the pesticides as shown in the Table 1. The flasks were agitated thoroughly and the media poured into sterile petridishes and allowed to solidify. Each plate was then inoculated with one .loopful of a spore suspension of *F. oxysporum* containing 3.1 x 10^6 conidia per ml. Plates of pure oat meal media inoculated with the fungus served as control. Each treatment was replicated four times. Radial growth of the fungus was measured on the ninth day when growth in the control had completely covered the dish. To assess sporulation, six discs each of 6 mm diameter were cut from different areas of the culture and suspended in 100 ml of sterile distilled water in a conical flask. The spore counts were made with the aid of a haemocytometer and expressed as the number of conidia/ml.

Data presented in Table 1 reveal that all the fungicides tested had completely inhibited the fungal growth while the insecticides caused varying degrees of inhibition. Fenthion suppressed the fungal growth considerably recording a growth reduction of 53 per cent. Dichlorvos and formothion ranked next inhibiting the growth of the fungus to an extent of 44.44 and 40.97 per cent respectively. BHC, phosphamidon and carbaryl were less inhibitory in effect showing 37.04, 33.31 and 23.31 per cent reduction respectively. Quinalphos and fenitrothion were least inhibitory with only 19.58 and 16 68 per cent reduction respectively. Fungicides have already been reported to reduce germination and growth of entomopathogenic fungi considerably (Hall and Dunn, 1959; Yendol, 1968). This is not generally true for insecticides (Benz, 1971). Inhibition of growth of *Metarrhizium anisopliae* (*Metsch*) sor. and *Entomophthora* sp. by carbaryl has been reported by Cadatal and Gabriel (1970). Dirimanov and Angelova (1962) have reported that BHC inhibited growth of *Beauveria bass/ana* (Bals.) Vuil. Urs *et. al.* (1967) also has observed that BHC is highly toxic to *B. bassiana* and *M. anisopliae* while phosphamidon is the least toxic. Phosphamidon has also shown low toxicity to *Cephalosporium lecanii* Zimm (Easwaramoorthy and Jayaraj, 1977). In the present findings phosphamidon showed high toxicity to *F. oxysporum.* Similarly Ekalux was less harmful to *F. oxysporum* but it was shown to be quite harmful to C. *lecanii* (Easwaramoorthy and Jayaraj, 1977)

Table 1

Effect of pesticides on the growth and sporulation of *F. oxysporum*

Pesticides and concentration (% a.i)		Diameter of colony (in mm) on 9th day	Percent inhibition over control	Sporulation on 9th day (spores/ml)	Per cent increase (+) decrease (—) of spores over control
Fenitrothion (Sumithion)	0.05	74.99	16.68	1.60×10^6	-44.83
Quinalphos (Ekalux)	0.05	72.38	19.53	2.01×10^6	-30.69
Carbaryl (Sevin)	0.2	69.01	23.31	1.72×10^6	-40.70
Phosphamidon (Dimecron)	0.05	60.02	33.31	1.55×10^6	-46.56
Hexachloro cylo hexane (BHC)	0.2	56.66	37.04	0.55×10^6	–81.63
Dichlorvos (Nuvan)	0.05	53.13	40.97	1.94×10^6	-47.93
Formothion (Anthio)	0.05	50.00	44,44	1.94×10^6	-33.11
Fenthion (Lebaycid)	0.05	42.30	53.00	1.69×10^6	–41.72
Control		90.00		2.90×10^6	

Note: There was no growth of the fungus in media containing the fungicides Thiram, Dithane M 45 and Difolatan.

Sporulation was inhibited by all the insecticides. BHC showed the maximum decrease of 81.63 per cent in sporulation. Dichlorvos, phosphamidon, fenitrothion, fenthion and carbaryl had also shown inhibitory effect ranging from 40.70 to 47.93 per cent. Quinalphos and formothion had comparatively very low inhibitory effect with a reduction of 30.69 and 33.11 per cent respectively. There is no relation between effect on vegetative growth and sporulation of the fungus as exerted by the insecticides. Based on less inhibition of both vegetative growth and sporulation, Ekalux and Sevin may be taken as the most compatible among the pesticides tested. None of the fungicides tested is compatible with the pathogen.

The authors thank the Kerala Agricultural University, for granting permission to publish this paper which formed part of the M. Sc. (Ag.) thesis submitted

by the senior author. Grateful acknowledgements are due to Dr. M. R. G. K. Nair, Emeritus Scientist, Division of Entomology, College of Agriculture, Vellayani for critically reviewing the manuscript.

സംഗ്രഹം

ഫ്യൂസോറിയം ഓക്സിസ്പോറം എന്ന ഷഡ്പദ രോഗകാരിയായ കുമിളിനെ സാധാരണ ഉപയോഗത്തിലിരിക്കുന്ന ചില കീടനാശിനികളും കുമിൾ സംഹാരികളും എങ്ങനെ ബാധിക്കുന്നു എന്നതിനെപ്പറ്റി പഠനം നടത്തി. തൈറാം, ffleiajooroKxylnJ എം. 45, ഡൈസംഫോട്ടോൺ എന്നീ കുമിൾ സംഹാരികളും ഫ്യൂസോറിയത്തിന്റെ വളർച്ചയെ പൂർണ്ണമായും നശിപ്പിക്കുന്നതായി കണ്ടു. കാർബാറിൽ (സെവിൻ), കിനാൽഫോസ് (ഇക്കാലക്സ്) എന്നീ കീടനാശിനികളും മേൽപറഞ്ഞ കുമിളിന്റെ വളർച്ചയിലും സ്പോറുൽപാദനത്തിലും താരതമ്യേന കുറച്ചു ദൂഷ്യഫലങ്ങളും ഉളവാക്കുന്നവയാണെന്നു തെളിഞ്ഞു.

Division of Entomology
College of Agriculture
Vellayani, Trivandrum.

SUMA KURUVILLA
ABRAHAM JACOB

References

Benz, G. 1971 Synergism of micro-organisms and chemical insecticides. In *"Microbial Control of Insects and Mites"* (H. P, Burges and N. W. Hussey, eds.) pp. 327-353. Academic Press, New York.

Cadatal. T. D. and Gabriel, B. P. 1979. Effect of chemical pesticides on the development of fungi pathogenic to some rice insects. *Philipp. Ent.* 1:379–395.

Dirimanov, M. and Angelova, R. 1962. The effect of insecticides on the development of the fungus *Beauveria bass/ana* (Bals.) Vuill. *Rast, Zasth.* 10: 63-67

Easwaramoorthy, S. and Jayaraj. S. 1977. Effect of certain insecticides and fungicides on the growth of the coffee green bug fungus *Cephalosporum lecanii* Zimm *Madras agric. J.* 64; 243-246.

Hall, I. M. and Dunn, P. H. 1959. The effect of certain insecticides and fungicides on fungi pathogenic to the spotted alfalfa aphid *J, econ. Ent.* 52: 28-29.

Kuruvilla, S. and Jacob, A. 1978 *Fusarium oxysporum* Schlect, an entomogenous fungus of *Nilaparvata lugens* Stal. Abstract of papers, Symp. on Rice Research and Development, K. A. U. 1978, 41.

Rama Raja Ura. N. V. Govindu, H. C. and Shivashankara Shastry, K. S. 1967. The effect of certain insecticides on the entomogenous fungi *Beauveria bass/ana* and *Metarrhizium anisopliae* j. *Invertebrate. Pathol.* 9 398-403

Yendol, W. G. 1968. Factors affecting germination of *Entomophthora conidia J. Invertebrate pathol.* 13 116–121.

(M. S. received on 23.4.79)