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A Leaf Bioassay Technique for Determining the Conidial Activity of *Paecilomyces* spp. against *Eligma narcissus* Roth*

M.I.MOHAMED ALI AND R.V. VARMA

Division of Plant Pathology and Entomology
Kerala Forest Research Institute, Peechi 680 653

Two common methods to test the efficacy of fungal isolates against insect pests are direct application of fungal spores on to the insect or allowing insects to feed on leaves treated with fungal spores. In the above two methods, it was often difficult to quantify the exact lethal concentration in terms of spores/cm^2 leaf area. In the present study, a leaf surface bioassay technique has been standardised using two fungal pathogens - *Paecilomyces farinosus* (Holm : Fr) and *F. fumosoroseus* (Wize) Brown & Smith, both isolated from the pupae of *Eligma narcissus* Roth, a serious pest of *Ailanthus triphysa* Roxb.

Leaf discs of 20 ± 2 cm^2 were cut out from leaves of *A. triphysa*. These leaf discs were treated with 0.2 ml of the spore suspension on the dorsal side, prepared from 7-day-old cultures of *P. farinosus* and *P.fumosoroseus* in 0.05% Tween 20. The concentration of spores varied from 0-10^5 conidia/cm^2. Fourth instar larvae of *E.narcissus* maintained in the laboratory on *A.triphysa* leaves were used for the bioassay. Two leaf discs were provided for groups of 5 larvae and there were four replicates. The treated leaf discs were kept on moist filter paper in Petri dishes (90 x 15 mm) and five larvae each were released. The larvae were allowed to feed on treated leaves for 48 h and subsequently the larvae were shifted to plastic jars and fresh feed material was provided and observed for 96 h or till the larvae died and got completely infected, which ever was earlier. During the course of the experiment, the time of final mortality, leaf area consumed and mortality of insects were observed and recorded. Concentration - mortality data were subjected to probit analysis (Finney, 1977).

No mortality was observed during the first 24 h after the initiation of the experiment. However, rate of feeding was poor in the case of larvae provided with treated leaf discs (Table 1). In the control sets, the whole leaf discs were consumed within 24 h. The infection and spread of the fungal pathogens were total by 72- 96 h. In all infected larvae, feeding by 72 h was nil in treatments 10^5, 10^4 and 10^3 spores/cm^2 and poor (20-30%) in 10^2 spores/cm^2. The rate of infection was rapid in treatments with high concentrations and the larvae were completely covered with fungal mycelium in 72 h and spore mass was produced in 7 days. The uninfected larvae and the larvae in control pupated normally and adults emerged.

When the probit analysis of concentration - mortality rate between the two fungal

Table 1. Per cent mortality of *E. narcissus* due to *P. farinosus* (*P. far*) and *P. fumosoroseus* (*P. fum*)

Treatment conidia/cm^2	% Mortality at 72 h		% leaf area consumed in 48 h	
	P. far	*P. fum*	*P. far*	*P. fum*
100000	80.0	65.0	12.5	25.0
10000	70.0	40.0	25	50.0
1000	35.0	10.0	50	80.0
100	25.0	5.0	80	90.0
10	5.0	Nil	90	100.0
0	Nil	Nil	100.0	100.0

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Table 2. Probit analysis of concentration - mortality response of larvae of *E. narcissus* to *Paecilomyces farinosus* and *P. fumosoroseus*

Pathogen	Chi^{2*}	b	LC_{50} conidia/mm^2	Fiducial limit	
				lower	upper
P. farinosus	1.214	0.615	27.3	9.7	97.9
P fumosoroseus	3.894	0.724	262.1	76.9	701.9

* All lines are significantly a good fit ($P < 0.05$).

pathogens was compared, it was found that LC_{50} for *P.farinosus* was only 27.3 conidia/mm^2, whereas for *P.fumosoroseus*, it was 262.1 conidia/mm^2. This indicates the highly virulent nature of *P. farinosus* (Table 2).

Ignoffo *et al.* (1983) suggested that to attain 99, 90 and 50% mortality of a destructive filed population of the colarado potato beetle larvae, *Leptinotarsa decemlineata* it would require 200, 16.25 04 0.75 kg of conidia/ha respectively assuming that formulation of *Beauveria bassiana* containing 10^9 conidia/kg is used. Our study indicated that a spore cocentration of > 10^5 conidia/mm^2 of *P.farinosus* may be required to induce an infection in over 80% of the field population of the pest, if sprayed at the right time while only 65% of the field population may be controlled with *P.farinosus*. However, elaborate trials are required to confirm these results under field conditions.

KEY WORDS : *Eligma narcissus, Paecilomyces farinosus, Paecilomyces fumosoroseus, Ailanthus triphysa*

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