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SHORT NOTE

COMPARATIVE EFFICACY OF PLANT EXTRACTS AT DIFFERENT TIME INTERVALS AGAINST DIAMOND BACK MOTH, *Plutella xylostella* L.

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The deleterious effects of plant extracts on insects can be manifested in several ways including toxicity, mortality, antifeedant, growth inhibition, suppression of reproductive behavior and reduction of fecundity and fertility. Unlike synthetic insecticides, plant chemicals have varying mechanisms of activity against insects, which are not always the knock down kind. The slow but long lasting action of neem is a good example of this mechanism. The question of whether data sets of different time intervals have an association that can be made out early during the course of bioassay needs to be answered. Therefore an attempt was made to know, if there is any association in the mortality patterns at 96 h after treatment and at adult emergence of diamond back moth, (DBM) *Plutella xylostella* L., the test insect of the present study.

Fifteen plants belonging to Euphorbiacae family were selected on the basis of literature survey and local availability. The plants tested were, *Euphorbia nivulia* (L.), *Euphorbia pulcherrima* Willd., *Sauropus androgynus* (L.), *Euphorbia tibucalli* L., *Euphorbia antiquorum* (L.), *Jatropha curcas* (L.), *Croton bonplandianum* Baill, *Breynia officinalis* Willd., *J. gossypifolia* (L.), *Ricinus communis* (L.), *Phyllanthus acidus* (L.), *P. emblica* (L.), *Manihot glaziovii* Miller., *Bridelia Montana* Willd. and *Mallotus philippinensis* Lam.

The plant parts collected were dried and defatted and the mare was soxhlet extracted with ethanol. Ethanol extracts of different parts of plant species were tested on second instar larvae of diamond back moth, *P. xylostella*, each at 20% concentration including control and the bioassays were conducted by following the leaf dip method (Kumar *et al.*, 2000). Clean mustard leaves cut in to suitable sizes with stalks intact were dipped in respective concentrations of the extract for 15 seconds and air dried in shade and transferred to petri plate. Ten freshly hatched second instar larvae of DBM were released on to these treated leaf bits. Each such leaf represented one replication and three replications were maintained. The mortality data were recorded at 24 h interval till adult emergence. The total per cent mortality data were calculated and corrected using Abbott's formula (Abbott, 1925).

Leaf extracts of plants tested indicated that there was no significant correlation between the per cent mortality at 96 h and at adult emergence (Fig. 1). In case of seed extracts, the mortality data for 20 per cent concentrations showed significant relationship between the 96 h and adult emergence data sets. Unlike the earlier, the bark extracts at 20 per cent concentration were found uncorrelated. The results clearly suggest that the association of mortality data for different concentrations may not match in all the situations (Fig. 1).

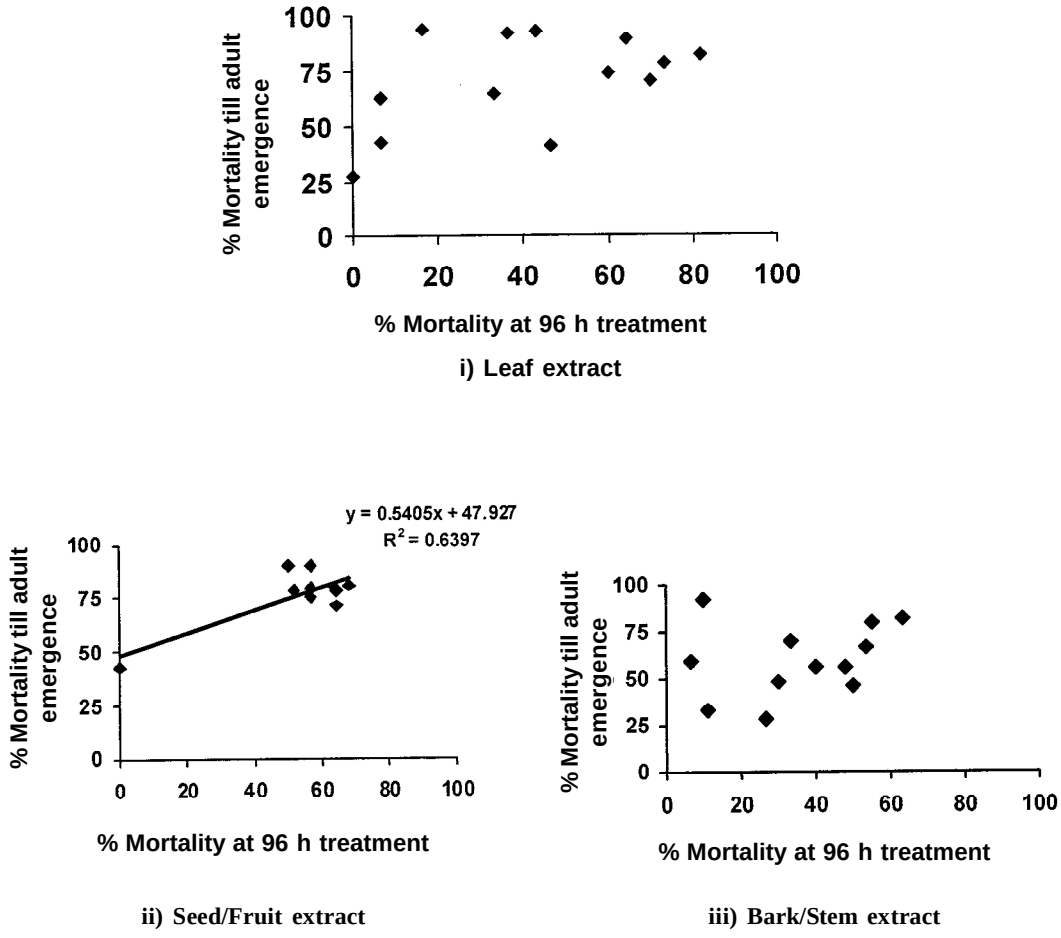

Fig. 1. Relationship between percent mortalities at 96h post treatment and at adult emergence at 20% concentrations of different extracts of Euphorbiaceae plants against II instar larvae of diamondback moth, *P. xylostella.*

Therefore it appears that in the case of seed extracts some relationship between the early and late mortality data can be expected. However, the foregoing in general, indicate a lack of association between the response patterns of larvae to plant extracts of any kind at early and late stages of the bioassay. On the other hand, it is possible that once exposed, the chemical might remain largely unaffected in the insect system, so that it keeps interfering with the vital hormonal balances even after the insect has been removed from the direct exposure to the chemical. This results in causing mortality of the test insects over an extended period, which was observed in the present study up to the adult emergence stage of *P. xylostella*. Owing to varying manifestations of this kind of chemical and the insect interactions, the mortality of the test insects are not uniformly spread over all stages of growth and leads to a situation of poor correlations

between the death at 96 h and at adult emergence, when compared across different extracts.

The results also revealed that there was no strong association between response pattern of insects to plant extracts at early (96h post treatment) and late stages (at adult emergence) of the bioassays. Many plants have defense chemicals that have varying mechanisms of activity against insects, rather than direct toxicity. This is essence resulted in slow death of the insect and results also substantiated that plant chemicals are relatively slow acting chemicals. Thus the results suggest that the early observations alone are not reliable indicators of the complete potency of plant extracts, where the activity can extend up to the adult stages. In other words, the trends in mortality at early stages may not provide a complete picture of the end results in bioassays of plant extracts against insects.

REFERENCES

Abbott, W.S. 1925. A method for computing the effectiveness of an insecticide. *Journal of Economic Entomology,* **18**: 265-267.

Kumar, A.R.V., Jayappa, J. and Chandrashekar, K. 2000; Relative insecticidal value, a new index for evaluating the insecticidal value of neem trees. *Current Science,* **79**: 1474-1478.