

Investigations on the Control of the Banana Aphid *Pentalonia nigronervosa* Coq.

M. RAMANATHA MENON AND S. P. CHRISTUDAS

Division of Plant Pathology, Agricultural College & Research Institute, Vellayani

Received for publication August 20, 1966

The Banana aphid, *Pentalonia nigronervosa* plays an important role as the vector of the virus causing Bunchy Top disease of banana. Since this insect is the only agency through which the virus is transmitted, control of the aphid will be helpful in checking the spread of the disease. Eastwood (1933) recommended spraying of healthy plants with kerosene emulsion to destroy the aphids, and treatment of the diseased stools with undiluted kerosene for destroying both the plants as well as the aphids. Smith (1948) found dusts of 4% BHC and 1% DDT better than nicotine 3% dust or HETP 0.1% spray to control the aphid. Hassan (1958) observed that sprays of parathion, malathion, gusathion, diazinon, chlorthion and ekatin gave effective control of the insect. On the other hand, demeton and methyl demeton were found to be not translocated to the offshoots of the plants in sufficient amounts to kill the aphid.

In the light of the above findings, an experiment was laid out at the Agricultural College and Research Institute, Vellayani, to determine the comparative efficacy of some of the commonly available insecticides in controlling the banana aphid in the field. Three consecutive trials were conducted during the years 1959-62.

Materials and Methods

The experiments were laid out in a randomised block design with five treatments, one control, and four replications. Each plot had twenty banana plants of the *Nendran* variety, the spacing being eight feet. The gross size of the plot was 40' x 32', and the net size 24' x 16'. The treatments were applied fortnightly, and observations on aphid population were recorded on the first, seventh, and thirteenth day after treatment from six plants in each plot, leaving the border rows. The insecticides tested were:- Thiometon 0.025% (Ekatin of Sandoz Products, Bombay), Fish oil rosin soap 2% (of Kerala Soap Institute, Calicut), Endrin 0.02% (as Endrex 20 E. C. of Burmah Shell, Bombay), Methyl demeton 0.05% (Metasystox of Chika Private Limited, Bombay), Diazinon 0.03% (Basudin of Tata Fison, Bombay), for the first and second experiments. In the third experiment, fish oil rosin soap was not used since it was found ineffective in the previous trial, and it was replaced by Sayfos 70DP 0.02% (of Imperial Chemical Industries, Madras). The dilutions used were those recommended for aphids. The materials were sprayed on the leaves and leafsheaths of the plants with a knapsack sprayer, each plant receiving approximately 115 ml of the spray.

TABLE I

The average population per plot of the banana aphid
in the three experiments

| Treatment | Number of aphids per plot | | |
|-------------------------|---------------------------|----------|-----------|
| | Expt. I | Expt. II | Expt. III |
| Thiometon—0.025% | 38.4 | 1.7 | 9.0 |
| Fish oil rosin soap— 2% | 26.8 | 14.0 | .. |
| Sayfos 70 DP—0.02% | .. | .. | 12.6 |
| Endrin 0.02% | 11.0 | 0.6 | 6.5 |
| Methyl demeton 0.05% | 7.1 | 0.38 | 64.6 |
| Diazinon 0.03% | 3.8 | 0.23 | 4.1 |
| Control | 856.2 | 11.14 | 167.2 |
| C. D. (at 0.05) | 121.7 | 15.86 | 36.6 |

Results

The results obtained were analysed statistically, and it was observed that in the first experiment, even though there was difference in population under the five treatments with insecticides, there is no evidence to say that one insecticide is definitely superior to the others. The control plot however showed a significantly higher infestation, indicating that the effect of insecticides in reducing the aphid population was highly significant. Diazinon, methyl demeton, and endrin appeared to be the most effective. But it was not possible to draw any statistical conclusions about the supremacy of one insecticide over the others (Table 1).

In the second experiment, it was seen that thiometon, endrin, methyl demeton, and diazinon gave significantly higher control

of the aphids than that given by fish oil rosin soap. Among the four former insecticides, no significant difference in toxicity to the aphid is evident, as all of them were more or less equally effective in reducing the aphid population.

The results of the third experiment showed that all the insecticides under test (including sayfos in place of fish oil rosin soap) in general, as compared with control, were highly effective in controlling the aphid. Diazinon, endrin, thiometon, and sayfos were more effective than methyl demeton. The four former insecticides were not significantly different among themselves.

Discussion

A perusal of the results of the three experiments given above will show that endrin 0.02%, and diazinon 0.03% give consist-

ently the best results in reducing aphid population on banana plants. However, it is also evident that all the insecticides under test, viz., thiometon, fish oil rosin soap, sayfos, endrin, methyl demeton, and diazinon in general, are highly effective in reducing the population of the aphid in the field when compared with the aphid population in the untreated plots. Thiometon 0.025% is found to be highly effective in the second and third experiments, while it ranks the lowest in the first experiment. Fish oil rosin soap appears to be the least effective in both the two experiments in which it was used. Methyl demeton shows low toxicity in the third experiment, while in the other two, it is highly effective.

Among the six insecticides under study, three insecticides, viz., diazinon, endrin and fish oil rosin soap are contact in action while the other three, viz., thiometon, sayfos, and methyl demeton are purely systemic in action. An overall consideration of the results indicates that the contact insecticides, endrin and diazinon, are far more superior and consistent in action than the systemics. The low toxicity of fish oil rosin soap as a contact poison is due to its inherent low lethal action as compared with that of the synthetics.

Summary and Conclusions

Experiments were conducted to determine the comparative effect of some insecticides in controlling the banana aphid which is the vector of the virus causing Bunchy Top

disease of banana. From the results, it can be concluded that the population of the banana aphid can be brought down and maintained at a very low level by spraying endrin 0.02% or diazinon 0.03% at fortnightly intervals.

Acknowledgements

The authors wish to express their gratitude to Dr. J. Samraj, Professor of Plant Pathology and Dr. M. R. G. K. Nair, Professor of Entomology for their help and guidance, to Dr. C. K. N. Nair, Principal and Additional Director of Agriculture (Research) for affording the necessary facilities for the work, and to the Indian Council of Agricultural Research and the Kerala Government for sponsoring and financing the scheme of research on Bunchy Top disease of banana.

References

1. Eastwood, H. W. (1933) Bunchy Top Control—Early identification, eradication of infective aphids and destruction of diseased stools. *Agric. Gaz. N. S. W.* 44 (8): 611—614.
2. Smith, W. A. (1948) control of the banana aphid. *Qd. agric. J.* 66 (6): 351-352.
3. Hassan, M. S. (1958). Testing phosphorus compounds and chlorinated hydrocarbons against aphids. *Agri. Res. Rev.* (Engl. edn.) 36 (1): 79—93.