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S. P. SINGH. psylla infested leaf did cause smalling of leaves, no
G. L. TIWARI. symptoms were observed in plants inoculated with
D. C. PANDEY. sap from healthy leaves.

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**ASSOCIATION OF *TRIOZA OBLIQUA* WITH
VIRUS-LIKE SYMPTOMS AND SEEDS
STERILITY IN *CHENOPODIUM
AMARANTICOLOR****

Chenopodium amaranticolor Coste & Reyn is used widely in diagnosis and assay of plant viruses¹. During 1976-79, heavy infestation of *C. amaranticolor* with *Trioza obliqua* was noticed at NBRI, Lucknow, during April to June every year. Infested plants showed zig-zag twisting of petioles, thickening and swelling of veins, leaf curling and stunting of whole plants. Seeds collected from such plants did not germinate at all. Since the symptoms were similar to those induced by some plant viruses¹, studies were undertaken to ascertain whether the effect was due to a virus transmitted by *T. obliqua* or the symptoms including the seed sterility were toxinogenic effect of the psylla.

Plants of *C. amaranticolor* used during the tests were grown in an insect proof glass house. *T. obliqua* was maintained in an insectary on plants of 4-6 leaf stage. Different numbers, viz., 1, 2, 5, 10 and 20 were placed on a set of *C. amaranticolor*, each having 10 plants. The nymphs were caged with the plants for 7 days and symptoms recorded after one month. The results showed that except where one psylla was used per plant, the symptoms appeared in all sets. The time taken for the appearance of symptoms was, however, less where more psylla were placed per plant as indicated in Table I.

Exclusion of psylla from the plants showing symptoms, accomplished by removing all the infested leaves, resulted in emergence of symptomless new leaves. These were, however, small in size as compared to healthy plants. In another experiment, (1/1) sap prepared from infested plants, after removal of different stages of psylla, as far as possible, was rubbed on healthy *C. amaranticolor*. Control plants were simultaneously rubbed with sap from psylla-free *C. amaranticolor* leaves. While plants rubbed with

TABLE I

Effect of different numbers of T. obliqua on symptoms and sterility of C. amaranticolor plants

| Number of psylla nymph per plant | Number of plants exposed/ plants showing deformities | Time taken for appearance of deformities (days) | Seedling emerging from 500 mg of seeds |
|----------------------------------|--|---|--|
| 1 | 10/0 | .. | 188 |
| 2 | 10/4 | 16 | 7 |
| 5 | 10/10 | 10 | 0 |
| 10 | 10/10 | 7 | 0 |
| 20 | 10/10 | 8 | 0 |
| Control | 10/10 | .. | 198 |

The criteria used in the past to establish the toxinogenic effect are (i) to obtain a correlation in number of insects with the severity of symptoms²; (ii) to observe the growth and symptoms of the plants after removal of insects³. Absence of vein thickening and curling symptoms in newly emerging leaves of the plants where psylla were removed disproves the involvement of a virus. Smalling of the leaves observed in such plants may be due to effect of toxins already present in the plant tissue. Differentiation between toxic or virus effect, however, could not be made by correlating the number of psyllids on symptom severity. Although, *T. obliqua* induced seed sterility in *C. amaranticolor* is a hurdle for workers engaged in plant virus research, the finding might be of help in eradication of other susceptible weeds of *Chenopodium* species.

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*NBRI Research Publication No. (N.S.)

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