

obtained only from late December to early January. Reproduction in this species appears to be seasonal.

*Locality.*—From wet soil around roots of cultivated grass in the sewage farm, Trivandrum, Kerala, collected on 6-1-1972.

*Mylonchulus hawaiiensis* (Cassidy, 1931) Andrassy, 1958.

The present specimens closely fit into the description of Mulvey and Jensen<sup>2</sup> and Jairajpuri<sup>3</sup>, but the buccal cavity is slightly larger (24 to 28 × 15 to 18 μ).

*Locality.*—From wet soil around roots of coconut palms and cacti, Kazhakuttom, Trivandrum District, 15-2-1972.

*Mylonchulus brachyuris* (Butschli, 1873) Andrassy, 1958

The present examples agree well with the description of Mulvey and Jensen<sup>2</sup> and Jairajpuri<sup>3</sup> but the submedian teeth are smaller and only five rows of transverse denticles are present in the buccal cavity.

*Locality.*—From soil around mixed vegetation subjected to periodic drying during summer, Kariyavattom and Pattom, Trivandrum District, 27-10-1971.

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Department of Zoology,  
University of Kerala,  
Kerala, May 22, 1972.

C. MOHANDAS.

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#### EFFECT OF ACHROMYCIN (TETRACYCLINE HYDROCHLORIDE) ON BRINJAL LITTLE-LEAF PATHOGEN\*

LITTLE-LEAF of brinjal has recently been shown to be of mycoplasmal origin<sup>1,2</sup>. Incubation period of the little-leaf pathogen was lengthened when graft inoculated brinjal plants were given treatments with tetracycline antibiotics through cotton wicks and symptoms were suppressed when *Vinca rosea* plants were sprayed or fed through cotton wicks by the same treatment<sup>1</sup>. However, there is

little information whether the effect is permanent or temporary. In the present studies brinjal plants showing typical symptoms of little leaf were sprayed with 0, 100, 250 and 500 ppm solution of tetracycline hydrochloride on alternate days for 27 days using a total of 14 sprays. Each treatment was replicated 4 times using one plant as a replicate. Experiments were conducted during March to May (Maximum temperature, 35 ± 5° C; minimum temperature, 20 ± 7° C) and June to November (Maximum temperature, 35 ± 7° C; minimum temperature, 15 ± 6°). Results of the two experiments revealed that plants treated with 500 ppm of the antibiotic resumed normal growth in respect of leaf size and length of internodes (Fig. 1) 30 to



FIG. 1. Brinjal little-leaf disease. Left—untreated; Right—treated with tetracycline.

37 days after the last spray. In other treatments also, recovery was observed but it was not pronounced. However, disease symptoms started reappearing 16 to 63 days after the last spray; i.e., 14 sprays of the tetracycline suppressed the symptoms only for 20 to 30 days. Repetition of spraying with 500 ppm of the antibiotic 7 times on alternate days after the reappearance of the disease symptoms again resulted in the production of healthy leaves 39 days after the last spray of this second round. The symptoms, however, reappeared 47 days later.

The above experiments clearly reveal that the effect was purely temporary and the pathogen was not completely inactivated. To confirm this, non-infective cicadellid, *Cestius phycitis* (Distant) were given acquisition access for 10 days on the plants which had recovered from the disease and were then confined to healthy brinjal plants for 15 days. These cicadellids were able to transmit the pathogen. Disease symptoms did not appear in the control plants. Thus, the tetracycline treatment did not eliminate the pathogen in the host plant, though the titre of the pathogen must have decreased

substantially so as to result in suppression of disease symptoms.

Department of Zoology-

Entomology,

Punjab Agricultural University

Ludhiana, June 2, 1972.

O. S. BINDRA.

A. S. SOHI.

H. L. KHATRI.

G. S. DEOL.

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### AN INDUCED APHID-RESISTANT, NON-WAXY MUTANT IN TURNIP, *BRASSICA RAPA*

THE aphid, *Lipaphis pseudobrassicae* (Davis)\* is the most serious pest of the *Brassica* crop in India. Some of the oleiferous *Brassicae*-like yellow sarson (*B. campestris* var. *sarson*) are so susceptible that the crop fails completely in years of severe aphid infestation. Consequently this important variety of *Brassica* is rapidly going out of cultivation as the farmers are afraid of taking risks with this crop. Widespread use of insecticides in the control of aphids is handicapped as most of the pesticides are lipophyllic<sup>1</sup> and being soluble in edible oils pose health hazards to human beings. Under these conditions artificial induction of aphid-resistant mutations commends itself.

Dormant seeds of two varieties of turnip (*B. rapa*), Pusa Sweti and P.T.W. Globe were irradiated with 80, 100 and 120 KR gamma-rays from a cobalt 60 source and also treated with 0.05, 0.1 and 0.15% aqueous solution of ethyleneimine (EI) and 0.025, 0.05 and 0.1 molar solution of hydrazine at 7.5 pH. The seeds were first sown in pans and the seedlings, when they were three weeks old, were transplanted into pots as well as into the field. The plant population was scored for the non-waxy type of morphological mutations which can be easily identified, in the early stages, amidst the waxy plants, by their oily green parts

\* The Indian forms of the mustard aphid are distinguished as *Lipaphis pseudobrassicae* (Davis) from the European ones which are called *Lipaphis crisimii* (Kaltenbach). At present it is difficult to say whether these two names are synonymous or denote different species as the progeny arising by hybridization of these two forms have not, so far, been studied. In the absence of this information it seems desirable to retain the Indian species as distinct from the European ones. We are grateful to Dr. M. G. Ramdas Menon, Systematic Entomologist, Division of Entomology, I.A.R.I., New Delhi, for this information.

and the absence of the whitish powdery wax which sticks to the fingers on touching.

Ten non-waxy mutants, two from each of the treatments, 80 and 100 KR gamma-rays, 0.05% ethyleneimine, 0.025 and 0.05 molar solution of hydrazine respectively were recognised in the variety Pusa Sweti. No such non-waxy mutant appeared in the other variety, P.T.W. Globe, in any of the treatments indicating a varietal difference with regard to the mutability of this locus (Table I).

The non-waxy mutants in Pusa Sweti were found to be resistant to aphids under field conditions while all the other plants were showing injury due to aphid attack.

Differences in the waxiness of plants occur between species in the genus *Brassica* and may be correlated with relative susceptibility to aphids. The aphid was found to flourish best on brussels sprouts (*B. oleracea* var. *botrytis*) and cabbage (*B. oleracea* var. *capitata*). Dwarf Essex rape (*B. napus*) was found to be very susceptible and Narrow Stem Kale (*B. oleracea* var. *acephala*) to be fairly susceptible and turnip (*B. rapa*) to be resistant<sup>2</sup>. Both the *oleracea* varieties and *B. napus* have waxy blue-green leaves whereas the turnips have light green leaves with less wax. A Narrow Stem Kale was found to segregate on selfing for plants with and without cuticular wax on their leaves. In natural field infestation the non-waxy plants were not colonized by the cabbage aphid, *Brevicoryne brassicae*, whereas large colonies were found on waxy plants. Besides being resistant to cabbage aphids the non-waxy plants were resistant to white fly also<sup>5</sup>.

Qualitative as well as quantitative differences in cytoplasmic wax contents may be of importance. *B. oleracea* varieties and *B. rapa* contain either 15-non-acosanone (C<sub>29</sub>H<sub>58</sub>O) or 15-non-acosanol, the ketone and alcohol form. While both were present in brussels sprouts neither was identified in white mustard, *B. alba*, which is known to be fairly resistant to mustard aphids<sup>1</sup>.

Other factors besides non-waxiness may be involved in resistance to aphids. The glucoside sinigrin was found to be a specific stimulant for host selection by *Brevicoryne brassicae*<sup>6</sup>. Also lines of Kale with some resistance to aphids but not with waxless leaves can be bred. It may be that such lines have a low sinigrin content. It would thus appear that although sinigrin may be a specific stimulus for host selection by the aphid, resistance can be determined by the non-waxy nature of the *Brassica* plants. It could be that the non-waxy plants are less readily recognised by