with green fruits. Pupa makes an exit hole and slides into it through which the adult fly emerges. Following the emergence of the fly, the fruit cracks along the inner side of the curve (Fig. 1) exposing the fruit tissues and is rendered unfit for marketing. About 2 and 4% of the fruits were damaged by the midge in the spring seasons of 1973 and 1974 respectively, while the attack was not seen during the later part of 1973. Yield loss due to the pest was of the order of 5% in spring 1974. Earlier, Harris (1938) listed *Asphondylia* sp. as one of the injurious pests of brinjal crop in Tanganyika but did not mention the nature of its damage. The present report forms the first record of the pest on brinjal crop from India.

None of the tested insecticides reduced the gall midge incidence significantly, indicating their ineffectiveness in controlling the pest.

Thanks are due to Dr. G. S. Randhawa, Director, for facilities and encouragement and to Dr. Richard, H. Foote, Chief of Systematic Entomology Laboratory, U.S.D.A. (A. R. S.), Beltsville, Maryland, for identification of the pest.


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**Fig. 1. Damage caused of *Asphondylia* sp.**

In spring 1974, observations on the midge incidence were recorded from a chemical control trial conducted for the control of *Leucinodes orbonalis* Guen., wherein the insecticides were sprayed at fortnightly intervals commencing from the first fruit set. The field trial was laid out in randomized block design with three replications on the variety, Dhingra's Multiple Purple.

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Dosage Kg ai/ha</th>
<th>Per cent fruit infestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbaryl</td>
<td>1.00</td>
<td>4.12</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>2.00</td>
<td>4.08</td>
</tr>
<tr>
<td>Quinalphos</td>
<td>0.50</td>
<td>2.78</td>
</tr>
<tr>
<td>Chlorfenvphos</td>
<td>0.50</td>
<td>3.21</td>
</tr>
<tr>
<td>Methomyl</td>
<td>0.50</td>
<td>3.48</td>
</tr>
<tr>
<td>Pyrethrins</td>
<td>0.086</td>
<td>3.49</td>
</tr>
<tr>
<td>Endosulfan</td>
<td>0.70</td>
<td>3.13</td>
</tr>
<tr>
<td>Ptoxin</td>
<td>0.50</td>
<td>3.72</td>
</tr>
<tr>
<td>Control</td>
<td>. . .</td>
<td>3.55</td>
</tr>
</tbody>
</table>

**C.D. (0.05)*** Not significant

*Data were statistically analysed after transforming the percentages to arc sin values.

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**‘LITTLE LEAF’ DISEASE OF GRAPEVINE FROM INDIA**

Grape (*Vitis vinifera*) is an important commercial crop, extensively cultivated in some parts of India. A number of diseases of fungal origin have been reported from this country but there is no report of any disease caused by virus/mycoplasma-like organisms. However, a number of viral diseases of grapevines have been reported from other grape growing countries. Surveys conducted during the year 1973 revealed a disease of grapevine variety 'Merlot Noir' showing 'little leaf' symptoms in the grapevine germplasm collection maintained at the Indian Institute of Horticultural Research, Hessarghatta. The characteristic feature of the disease is smalling of the leaves. The shape and size of the leaves are altered and the leaves become so small and deformed that it becomes difficult to recognize them as grape leaves. The colour of the leaves turn light yellow instead of green and cupping of the leaves was also observed to a certain extent. Internodes are usually close because of the retarded growth of the stem. In early stages, the growth is spindly and tend to become more zigzag at the nodes. The distance between internodes becomes very short and the nodes and internodes are characteristically thin and weak. The general growth of the plant is retarded (Fig. 1). Comparatively very few lateral branches have been observed on the diseased plants. The axillary branches proliferate and produce many secondary branches which are small, thin and weak. No flower and fruit formation has been observed among the infected plants even at the age of 3 years. Roots of the diseased plants have been found to be severely stunted, and produced very few and weak rootlets.

The disease was not transmitted by mechanical sap inoculation to herbaceous hosts though different methods of sap inoculation using different buffers.
of different molarities and pH, with or without additives were tried. The disease could be transmitted by grafting or budding of the diseased scion onto the healthy rootstock of the var. Emperor. The symptoms of the disease were observed within 40–50 days following grafting and budding.

Ishii et al. Now many reports have appeared about the mycoplasma-like bodies in the yellows disease and antibiotic therapy of mycoplasma-like organisms have also been demonstrated. Recently Goheen et al. reported the association of a Rickettsia-like organism with Pierce's disease of grapevine and its remission with heat treatment.

Heat therapy.—Diseased cuttings were given hot water treatment at 40, 45, 50 and 55°C for one hour in a water bath and then planted in pots. The cuttings treated at 45 and 50°C showed recovery 30–35 days after planting and produced normal leaves but the symptoms reappeared after the lapse of 50–60 days.

Antibiotic therapy.—Cuttings (rooted and plain) obtained from diseased plants were treated with 1000 ppm solution of Oxytetracycline hydrochloride for 24 hours and then they were planted in pots for further observation. The treated plants showed recovery symptoms within 25–30 days following antibiotic treatment and produced normal size of leaves and shoots (Fig. 2). The effect of oxytetracycline hydrochloride persisted for about 30–35 days after which the symptoms reappeared which could be suppressed further with another dose of 1000 ppm solution of oxytetracycline hydrochloride.

The causal agent of yellows diseases of plants were thought to be due to viruses. At present, considerable evidence suggests non-viral etiology. Japanese workers demonstrated the presence of pleomorphic mycoplasma-like bodies in the case of four different yellows diseases and also reported that tetracycline antibiotics produced remission of the disease in plants infected with mulberry dwarf. On the basis of these findings they proposed that yellows disease agents might be mycoplasma-like organisms rather than viruses. Stoddard and KenKnight suggested a sensitivity of certain yellows diseases to antibiotics and later it was confirmed by

**Fig. 1.** Grape plant showing little leaf symptoms.

![Fig. 1](image1)

**Fig. 2.** Plant showing recovery after treating with oxytetracycline hydrochloride antibiotic.

The results obtained from the present studies showed that there is a spontaneous remission of little leaf symptoms when the infected cuttings are subjected to heat as well as to antibiotic treatment, indicating thereby that the grapevine little leaf disease may be due to mycoplasma-like organisms. However, this will be confirmed by further studies.

The authors are highly grateful to Dr. G. S. Randhawa, Director, Indian Institute of Horticultural Research, Bangalore, for providing facilities and encouragement. Thanks are also due to Dr. S. S. Negi, for supplying cuttings of diseased grape plant and also the healthy indicator plants of grapes.

Indian Institute of Horticultural Research
255, Upper Palace Orchards
Bangalore-560006, July 6, 1974.

Letters to the Editor

3. — ibid., 1954, 43, 47.

EFFECT OF HOPLOLAIMUS INDICUS ON GERMINATION OF GREEN GRAM

DURING our investigation on Hoplolaimus indicus very poor germination of green gram (Phaseolus aureus Roxb.) seed was recorded in the culture pots having high nematode population. In order to find out the effect of different population levels of this nematode on the germination of green gram this experiment was laid.

Six different populations in log series, of H. indicus viz., 0, 10, 100, 1,000, 10,000, 100,000 mixed separately in 100 g steamsterilized moistened sandy soil, each contained in 10-0 cm Petri dishes. One hundred surface sterilized (with 0.2% mercuric chloride solution) green gram seeds, variety Pusa Baisakhi, were sown in each dish in five replications. Dishes were kept at random at room temperature (30-35°C) for six days when final germination was counted. All the seeds were taken out of the soil washed cleanly in running tap water and stained in cotton blue-lactophenol solution. Stained seeds were individually teased and examined microscopically in order to see the parasitic behaviour of the nematodes. Data in relation to seed germination is presented in Table I.

No difference in germination at 0 and 10 inoculum level was noticed while with other treatments it differed significantly. Seedlings of 0 and 10 inoculum levels germinated on the 3rd day whereas in 100 and 1,000 levels the germination was delayed by one day. At 10,000 and 1,00,000 levels very poor emergence of seedlings above the soil was noticed. However, it was observed that a bunch of secondary roots started coming out just above the infected portion of the developing radicle which turned brownish. Occasionally swelling of roots near infected portion was also noticed (Fig. 1).

![Fig. 1. Effect of different population levels of H. indicus on germination of green gram seeds.](image)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Population</th>
<th>Germination percentage Mean of 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>89.0</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>88.2</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>63.0</td>
</tr>
<tr>
<td>4</td>
<td>1,000</td>
<td>38.6</td>
</tr>
<tr>
<td>5</td>
<td>1,000</td>
<td>11.6</td>
</tr>
<tr>
<td>6</td>
<td>1,00,000</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Presence of nematode was also observed in between seed coat and cotyledon as well as inside the cotyledon at high inoculum levels. A maximum of 10 nematodes (adult and larvae) were found penetrated in the radicle portion of the just sprouted seeds at 10,000 and 1,00,000 inoculum levels. A few were also noticed in the plumule portion. Although, apparently some injury to the leaf primordia was also observed, but no nematode could be traced in this portion. It appears that nematode attack immediately after sprouting of seeds, retarded their growth prevented their emergence out of the soil and eventually caused death.

It is apparent from the above observations that the nematode population plays a vital role in seed germination if present in soil in high population.

Authors are highly grateful to Dr. S. W. Akhtar, Director, Sugarcane Research Institute, Pusa, Dr. A. P. Miahra, Regional Director, Agricultural...