

RESEARCH NOTE

ENTOMOLOGICAL ASPECT OF CHILLI NARROW LEAF DISORDER (NLD)

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Chilli crop in Sri Lanka is subjected to ravages by several insect pests and diseases which cause a variety of leaf malformations. Chilli leaf curl complex, the disorder recorded in 1939 can be caused by the direct feeding of thrips (*Scirtothrips dorsalis* Hood), mites *Polyphagotarsonemus latus* (Banks) or viruses transmitted by whitefly (*Bemisia tabaci* (Gennadius)) and aphids (*Aphis gossypii* Glover and *Myzus persicae* (Sulzer)). Another leaf disorder known as chilli little leaf was first recorded in the districts of Jaffna, Puttalam and Vavunia in 1957. Little leaf disorder makes its appearance towards the latter stage of the chilli crop. The leaves in this case are progressively reduced in size up to less than 0.5 cm in length. The incidence of chilli little leaf is comparatively low and ranges from 3-8% in most of the years. The exact nature and causal basis of this condition is not yet known.

The malady of chilli known as the chilli Narrow Leaf Disorder (NLD) was first brought to the notice of the research personnel of the Department of Agriculture in 1981 from a lowland chilli cultivation in Pimburattewa in the district of Pollonnaruwa. Subsequently the problem spread to other major chilli growing areas and gained economic significance. The first symptoms of this disorder appears on the tender most leaves which become light

brownish green or yellow. Subsequently the leaves become narrow and elongated. This follows with the dormant extra axillary buds being induced resulting in bushy appearance. Although chilli leaf malformations such as leaf curl and little leaf are prevalent in other chilli growing countries, Sri Lanka is the only country, as far as we know, to contend with the chilli Narrow Leaf Disorder.

There were indications at the time of the investigations reported in this paper was carried out in Yala 1987 that NLD could be caused by direct feeding of insects or by a disease transmitted by them. Therefore, studies were carried out to elucidate the role of insects as causal agents of NLD.

Three experiments were conducted in the farmers field in Bulnewa in Mahavali "H" area. The extent of the field chosen for the experiment was 2 ha. In the first experiment, 20 chilli seedlings (variety, MI 2) randomly selected one day after transplanting were uprooted and replaced with chilli seedlings of the same age raised entirely under insect and disease free conditions in the greenhouse of the Regional Agricultural Research Centre, Maha Illuppallama. Ten of these plants were enclosed separately with wooden framed cages of 35 cm x 35 cm x 60 cm covered with insect proof nets. The other ten plants were allowed

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to grow without being enclosed. The enclosed plants were given weekly spraying of monocrotophos at the concentration of 0.18% active ingredient (a.i.) to ensure further protection from insects. The rest of the seedlings in the field along with the uncaged ten seedlings were subject to biweekly spraying. Weekly observations were made for the appearance of NLD systems. In the second experiment, the species of insects associated with diseased chilli plants in the farmer's field were collected with the help of an aspirator or a moist camel hair brush.

Five individuals from each species of insects given in the Table-1 were introduced to each of the six week old healthy seedlings (variety, MI 2) raised in insect proof cages. Each cage had only one plant and the experiment was replicated 4 times. The third experiment was conducted to investigate if the NLD is caused by some toxins injected by insects during the process of feeding. Ten chilli plants of two months of age which were severely affected with NLD were selected from the farmer's field. The plants were defoliated and sprayed with monocrotophos at the concentration of 0.18% a.i. to free from insects and were kept enclosed in insect proof cages. Observations were made for about 30 days for the development of NLD symptoms on the new flush.

Table 1. Insect species used for transmission studies

1. Planthoppers and leafhoppers
Sogatodes pusanus (Distant)
Cicadulina bipunctata (Melichar)
Empoasca canara sp.
Deltocephalus sp.
2. Whitefly
Bemisia tabaci (Gennadius)
3. Aphids
Aphis gossypii Glover
Myzus persicae (Sulzer)
4. Thrips
Scirtothrips dorsalis Hood

During Yala 1987, more than 80% of the chilli plants in the farmers field where the experiments were carried out were severely affected with NLD. In the first experiment all the caged and uncaged plants developed NLD symptoms.

In the second experiment, none of the seedlings infested with insects produced symptoms of NLD. The seedlings infested with thrips showed typical symptoms of upward curling. Infestation of mites produced brown discoloration on the lower surface of the tender leaves. The results of these experiments proved that NLD is not a disease transmitted by insects.

In the defoliated experiment all the new flush of the plants developed NLD symptoms indicating that NLD is not due to a mechanical injury caused by insect feeding or due to toxins injected by insects during the cause of feeding. If the NLD is caused by direct feeding of insects, the new flush should not exhibit symptoms once the insects are eliminated. Similarly if the symptoms are caused by insect toxins, new flush should be normal with the passage of time after the insects are eliminated.

Subsequent to this study various aspects of NLD have been investigated by several workers as a result of which many hypotheses have been put forward. However, the nature of NLD and the factors causing it still remain elusive.