Phytophagous Mites of Economic Plants: Taxonomy

Logical Control

Phytophagous

Photosynthesis

Attacking Spider Mite

Stethorus Preying Mites

Life History

Walnut Malus Mite

Apple Rust Mite

Climbing Mite

Willow Gall Mite

Grape Enzyme
PART-1
GENERAL
Phytophagous mites were of secondary importance before introduction of pesticides and fungicides in the spray programme and improvement of culturing practices. These two factors are primarily involved in the upsurge of these mites as plant pests. The former by disrupting the natural bio-control existing through predators and predatory mites and later by improving the quality of plants and thus increasing their nutritive value to pests. As a result of this faunal disturbances, the orchards have become highly artificial environments and insect and mite pests as their most important fauna.

Like insects, plant mites feed on wide range of economic plants and cause considerable damage to fruit, foliage and stored products. The importance of plant mites as pests and disease carriers has now been felt all over the world and there is a global concern of preventing or minimising the damages caused by these acari to economic plants. Efforts are being intensified to identify the phytophagous mites of crops and utilize their natural biotic agents of control. The best known phytophagous mites are the Eriophid, Tetranychid and Tenuipalpid mites which are of particular significance to cause
severe damages to economic plants. They cause premature defoliation which results stunting of plant growth, reduction in fruit size and flavour. The piercing punctures made by them on the leaf surface results water loss. Excessive webbing entangles fungal spores. Some species even advance towards the developing fruit to produce rusty patches or corky areas on the fruit and thereby reduce its market value. Continued infestations for several years cause a gradual reduction in the fruit buds set for the following growth season on the tree, sharply declines the yield and finally put the plant out of production. They also cause skin irritation to pickers at the time of harvest.

Eriophyid mites induce severe deformities on the host plants in the form of galls, warts, crowded buds, outgrowth of excessive hairs and witches-broom effects. Many of them are known to be vector of viruses to crops as wheat streak mosaic (WSMV), fig mosaic (FMV), Peach mosaic (PMV) and Current reversion virus (CRV).

Rhizoglyphus mites attack bulbs, stored products resulting discolouration of the leaves in the field and drying and rotting of bulbs in storage, which in turn become infested with various fungal diseases.

SCOPE IN INDIA AND NORTH WESTERN HIMALAYAN REGION

Although, the importance of phytophagous mites as pests of economic plants has been recognised as early as
1758 when *Tetranychus telarius* (Linn.) was reported on Cauliflower, Pepper, Cucumber, Soyabean, Radish, *Petrobia latens* Muller 1776 on onion, Carrot and Lettuce and *T. desertorum* Banks 1900 on Cucumber, Brinjal and Soyabean.

In India considering the minute size of acarina and the notion that no economic stimulus exists for their study, their studies remained neglected. The extensive usage of DDT and oil sprays favoured the development of mites to a limit where they become of grave concern to crop failures. This stimulated the attention of Entomologists of India towards acarina and remarkable information about them is now coming out. However, most of the information deals with their taxonomy, while biological and ecological aspects have hardly been touched.

From 1920 Mann et. al. reported *Hemitarsesonemus latus* (Banks) on Potato and called its injury as *Potato tambra disease*. Kulkarni called the injury of the mite on chilli as *Chilli murda disease*. Channa Basvana (1966) put forth an excellent monograph of *Eriophyoideae* of India and for the first time lime lighted the presence of many economically important plant feeding mites mainly from Karnataka and Delhi. Later Gupta and Chai made contributions on the taxonomy of other groups. Prasad (1974) published a catalogue of mites in India. In all 328 species of mites belonging to 76 genera, 15 families and 3 suborders are known to occur on plants in India. Among these phytophagous families, the *Tetranychidae* (15 genera, 55 species), *Tenuipalpidae* (10 genera, 35 species) and *Eriophyidae* (20 genera, 76 species) are important
and exclusive plant feeders. This shows the investigations are creeping towards magnification very steadily.

The North western Himalayan region which includes Himachal pradesh and Jammu and Kashmir, is rich in varied and diversified vegetation. The climatic conditions are ideally suited for the cultivation of temperate fruit, which at the same time serve a good acarinarium for varied species of plant feeding mites. Except casual records of 2 species from Jammu and Kashmir by Gupta (1976) and Menon et al. (1971) and eight from Himachal pradesh, Maninder and Ghai (1978) et al. (1971) and Gupta and Gupta (1978) no taxonomical survey has been made to explore the acarine fauna of this vast and rich region of India.

ASPECTS OF PRESENT WORK

At the instance of the guide systematic survey of plant feeding mites of North western Himalayan region was undertaken. A total of 400 plant samples infested with mite pests were collected from different places of Srinagar, Baramulla, Anantnag, Uri, Lolab and Sonamarg valley (Kashmir province); Kishtwar, Udhampur, Doda, Rajouri, Poonch, Mendhar, R.S.Pura, and Jammu (Jammu province); Kargil, Saspole, Thiksey, Shey and Leh (Ladakh) and Kulu, Solan, Palampur and Simla (Himachal pradesh).

To determine the primary hosts and host-plant range of economically important species, which was suspected to be located at high altitudes in the mountainous valleys of the region; the author had to accompany three trekking expeditions which included Srinagar-Tarsar and Marsar (3962 m) and Srinagar to Inshan Margan
(Kishtwar 4114.4 m).

Taxonomical identify of these mite samples were made and compared either through available literature or through the courtesy of various Acarologists. A good number of plant mites hitherto unrecorded from this region, India and the world were identified and described. Most of them were found serious pests on cereals, vegetables, fodder crops and fruit trees.

A total of 58 species belonging to 28 genera were identified. Out of which 17 species are new to science, 24 species and 10 genera are the new records to India and 50 species and 20 genera are being recorded for the first time from North western Himalayan region. Thirty seven species are phytophagous belonging to the families Tetranychidae, Temuipalpidae, Eriophyidae and Acaridae; 21 species are predatory belonging to families phytoseiidae and Anystidae.

Mite species infesting forest plantations ornamental plants, medicinal herbs, hops and cultivated mushrooms were also determined. Distribution, host range, population density and damaging symptoms of these were assessed and evaluated through extensive field surveys and observations.

Field and laboratory experiments to study the biology, life-cycle and seasonal history of some common and widespread pest mite species viz. Tetranychus turkestani (Ugarov and Nikolaki), Bryobia rubrioculus (Scheuten), Phytophagus pyri (Pgst.) and Colomerus vitis (Pgst.) infesting economic crops and orchards in the Jammu and Kashmir state were performed. The impact of various
ecological factors viz. temperature, humidity and photoperiod on the biology, behaviour and distribution of these mites were assessed and evaluated both under field and laboratory conditions. Natural biotic agents of control monitoring the population of these mites were determined. Preliminary investigations on the behaviour and degree of control of some potential predators and predatory mites were assessed to evolve some practical aspects of long-term control strategy of these mites in the Agroecosystem.

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