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A preliminary study on phytophagous mites associated with the ornamental orchid cultivation in West Bengal, India

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Abstract: *Orchids are the most significant plants from the horticultural point of view. Ecologically, the orchids show a symbiosis with the fungi while in nature. Due to the attractive shape and colour of the orchid flowers, they are of highly economic value. Though India is a land of a rich variety of orchids but due to the increasing demand, many orchids of different genus and species are exported from other countries and frequently they carry various types of mites and these mites are introduced to our environment. Among these mites, spider mites, under family Tetranychidae, are significant pest which feed on plants by piercing plant cells with their mouth stylets. It is cosmopolitan in distribution and a common pest in a wide range of agricultural systems. During the study, more than 500 orchid plants of different genera and species were examined and mite samples were collected from two artificial orchid cultivation sites located at South and North 24 Parganas area of West Bengal, India. Three genera of Phytophagous mites with five species were recorded during the study*

Key Words: *Phytophagous mites, Ornamental orchid ,West Bengal, India*

1. INTRODUCTION:

During the study, more than 500 orchid plants of different genera and species were examined and mite samples were collected from two artificial orchid cultivation sites located at South and North 24 Parganas of West Bengal, India. Three genera of Phytophagous mites with five species were recorded during the study period from January, 2022 to October, 2024. Spider mite infestation is a major problem on ornamental plants and very few studies have been conducted to study the diversity of mite fauna on ornamental plants in West Bengal, India. Mites are the most diverse microarthropods of the phylum Arthropoda which belong to the subphylum Chelicerata and subclass Acari. Spider mites are placed under the family, Tetranychidae. These mites are the predominant arthropods which encounter quarantines. These spider mites are extremely small, rarely seen with the naked eye as reddish, black or yellow spots on plants, the adult females measure about 0.4 mm (0.016 in) long[1]. *Tetranychus urticae* Koch, 1836[2], which is commonly known as red spider mite or two-spotted spider mite is extremely polyphagous and has a very short life cycle. Many spider mite species intercepted at the port of entry belonged to the genus *Tetranychus viz., T. evansi* Baker & Pritchard *T. fijiensis* Hirst *and T. kanzawai* Kishida, because of the inter-continental movement of fruits, flowers and ornamental plants [3]. The spider mites feed on single cells which are pierced with stylet-like mouthpart and the cell contents are removed and thus they damage to the spongy mesophyll, palisade parenchyma, and chloroplasts [4]. *T. urticae* populations can increase extremely fast in hot and dry conditions, upto 70 times of the original population in six days only [5]. *T. urticae* is known to attack about 1200 species of plants [6]. The life cycle of *T. urticae* has been studied by several authors [7,8,9,10,11] which passes through five developmental stages: egg, larva, protonymph, deutonymph, and adult. *T. urticae*, belongs to an assemblage of web spinning mites [12]. *Eutetranychus orientalis* (Klein, 1936), *Oligonychus indicus*, *Tetranychus macfarlanei* Baker & Pritchard were also recorded, *Tetranychus urticae* Koch and *Tetranychus truncatus* Ehara were recorded during the study.

2. LITERATURE REVIEW AND METHODOLOGY :

The present paper is based upon identification of mites collected from the orchid plants. During the study, more than 500 orchid plants of different genera and species were examined and mite samples were collected from two artificial orchid cultivation sites located at Purba Barisha of South 24 parganas and near Rajarhat area of North 24 Parganas of West Bengal, India. Three genera of Phytophagous mites with four species were recorded during the study period from January, 2022 to October, 2024. Observations were recorded as per their nature of association with the host plants regarding phytophagous group. During early morning before sunset the mites were collected from the infected orchid leaves by using camel hair brush and put in 70% alcohol. For morphological characterisation study of spider mites, permanent slides of male and female specimens were prepared using Hoyer's medium. The specimens were observed under high resolution compound microscope and the taxonomic characters were noted. Characters such as chaetotaxy of hysterosoma and legs and the shape of male genitalia, aedeagus was used for species level identification. Slide mounted specimens were identified based on the available species description and taxonomic keys provided by Gupta (1985), Gupta and Gupta (1994), Ehara (1995), Srinivasa et al. (2012) and Zeity et al. (2016) [13,14,15,16,17]. Some of the works done in this area of horticulture of India are Mohanasundaram (1987) [18], Chatterjee and Gupta (1995) [19] Jose et al. (1999) [20], Dhooria (1999, 1999a) [21, 22], Karmakar et al. (2010) [23] etc. Gupta (2012), reviewed occurrence of mites from India. Pal and Sarkar (2009) [24], Sundararaj et al. (2021) [25], etc. reviewed the occurrence of insects on these plants in India.

3. RESULT AND DISCUSSION:

Three genera of Phytophagous mites with five species were recorded during the study mainly from the leaves of *Vanda* hybrids, *Oncidium sphacelatum*, *Schoenorchis gemmate*, and *Cattleya* hybrids. The predominant mites recorded during the study were *Tetranychus urticae* Koch , *Tetranychus truncatus* Ehara were recorded during the study and *Eutetranychus orientalis* (Klein, 1936), *Oligonychus indicus*, *Tetranychus macfarlanei* Baker & Pritchard were also recorded.

Figure 1.1. Geo tagged photograph showing the study area of ornamental orchid cultivation located at Thakurpukur, South 24 PGS, West Bengal, India

Figure 1.1. Geo tagged photograph showing the study area of ornamental orchid cultivation located at Rajarhat area, North 24 PGS, West Bengal, India

Figure 2. Mites infected leaf of *Schoenorchis gemmate* orchid during collection

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