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Observations on Some Parasitic Plants on Mango Trees in Malda district of West Bengal

Snehasish Routray[1*], Vimalkumar C.[2], Nisha Sulakhe[3], Monika Jha[4] and Ajit Pandey[5]

[1]Scientist (Agricultural Entomology), Division of Crop Protection,
ICAR-Central Institute for Subtropical Horticulture, Lucknow Lucknow (Uttar Pradesh), India.
[2]Scientist (Plant Pathology), Division of Crop Protection,
ICAR-Central Institute for Subtropical Horticulture, Lucknow Lucknow (Uttar Pradesh), India.
[3]Scientist (Agricultural Structure and Process Engineering), Division of Post Harvest Management,
ICAR-Central Institute for Subtropical Horticulture, Lucknow (Uttar Pradesh), India.
[4]Scientist (Economic Botany and Plant Genetic Resources),
ICAR-National Research Centre on Seed Spices, Ajmer (Rajasthan), India.
[5]Research Scholar, Department of Entomology,
Banda University of Agriculture and Technology, Banda (Uttar Pradesh), India.

(Corresponding author: Snehasish Routray)*
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ABSTRACT: Parasitic plants represent a significant biotic challenge that a plant may encounter during its crop cycle. These angiosperms depend upon the host trees for various kinds of requirements. A survey in mango orchards at Malda district of west Bengal indicated dominance of various ferns, mistletoes and Loranthus parasitizing on trees. The most dominant fern was *Drynaria quercifolia* with mean infestation of 79.66±9.11% and *Loranthus* Sp. was found to be the least dominant parasitic species (4.41±3.41%). The population dynamics, distributions, host ranges of such parasitic plants are scanty especially in perennial fruit crops like mango. There are a very fewer documentations on species diversity of such parasitic weeds affecting mango in Malda. This study indicated the need of further studies on the population dynamics, relative occurrence, interaction with host plants, interaction with other fauna, and further need of the management practices of such parasitic weeds on mango.

Keywords: Mango, Parasitic ferns, Loranthus, Mistletoes, West Bengal.

INTRODUCTION

Parasitic plants are the angiosperms which draw their nutrients and other requirements from the host plants with various kinds of adaptations. There are more than 3000 parasitic plant species under 18 families (Thorne, 1992). An estimated 1% of the flowering plants are known to be parasitic. Though they comprise of very lesser percentage of the all angiosperms their ecological traits associated have very profound impact on canopy structure, photosynthetic rate, plant vigor, overall plant growth, wood quality and economic produce of the trees. Approximately 60% of the total parasitic flowering plants are root parasites and the others are shoot parasites. The latter, with shrubby and woody growth, is referred to as mistletoes (Watson, 2011). Parasitic plants are usually observed on growing both on wild as well as cultivated plant species. Parasitic plants have caused significant reduction of citrus production in Ghana (Ohene, 2011).

Mango (*Mangifera indica* L.) is one of the choicest fruit crops of tropical and sub-tropical regions of the world. Its popularity and importance can easily be realized by the fact that it is often referred to as 'King of Fruits' in the tropical world. India ranks first among world's mango producing countries accounting for about 50% of the world's mango production. During 2022-23Rs 307.76 Cr worth of mangoes have been exported from India comparing to Rs. 264 crore last year. It has tremendous potential in boosting the economy of poor section of the society. The city of Malda also known as, English Bazar or, mango city is a well-developed center located in West Bengal. The region is famous for the Malda Mangoes which are exported across the world. The mango cultivation in Malda and its historical associations date back to very early times. The mango of Malda district is mentioned in the Hindu epic Mahabharata. Its cultivation started before Pala and Sena Dynasty. The Chinese traveler Hwen T'sang mentioned in his travelogues regarding the mangoes of Gaur (Saadat and Gupta 2017). In changing climate scenario mango faces numerous biotic stresses including diseases, insect pests and various parasitic plants. The parasitic plants *Loranthus* can grow abundantly on the branches of woody perennials such as mango. Under natural conditions, it is parasitic on fruit and forest trees with photosynthetic ability. The most common host is the mango in northern India and

60–90% of the mango trees are infected by the parasite (Subhashini *et al*., 2019). Further in Subtropical belts of West Bengal, the information on various other kinds of parasitic weeds on mango is scanty.

MATERIALS AND METHODS

A survey was carried out in Malda district of West Bengal belonging to the Vindhyan Alluvial Zone of West Bengal, during the period of July 2023 to August 2023 as a part of an exposure visit. Around 100 orchards were taken into consideration. Various dominant species of parasitic ferns, orchids and mistletoes were noted down followed by their identification by botanists. The infestation of various parasitic species of ferns and other parasitic plants were expressed in percentage. During the survey data were collected with respect to the location of the sampling, province, administrative district, agro-climatic zones, type of vegetation, mistletoe species and host plant species. Various parasitic plants were noticed infesting mango trees and samples of the same were collected during the survey (Fig. 1). The percentage infestation of various species was presented in the Table 1.

Fig. 1. Various parasitic plants affecting mango trees.

RESULTS AND DISCUSSION

Out of all the parasitic plants Oak leaf basket fern, *Drynaria quercifolia*, was found in dominating most of the branches with mean percentage infestation of 79.66±9.11 Followed by Fortune's Ribbon Fern, *Neolepisorus fortune* with mean percentage infestation of 29.21±9.31 (Table 1). Epiphytic Orchids, *Dendrobium* Sp. Were found dominating the mid part of branches with average 16.69±4.93 percentage infestation. The least infestation was noticed by African mistletoe, *Loranthus* Sp. (4.41±3.41). Various lichen species were noticed on the tree trunks. The parasitic plants were often noticed hampering in general growth of trees (Way, 2011). According to Bediako *et al*. (2013) the parasitic plants have caused stunted growth (65%), mortality (55%) and reduced yield (95%) of citrus in Ghana. Thus, they must be controlled to optimize the fruit plants growth and yield. *Mangifera indica* has also been reported to be parasitized by various mistletoes species such as., *Dendrophthoe falcata*, *D. neilgherrensis*, *Scurrulla cordifolia*, *Viscum articulatum*, *Taxillus incanus*, and *V. orientale* in Sri Lanka (Yapa *et al*., 2018). These parasitic plants interact with the host plants in withdrawing nutrients and minerals. The semi-parasites like *Dendrophthoe falcata* establish relationship with host vascular elements to draw nutrients (Singh, 2002).

Table 1: Infestation of various species of parasitic plants on mango.

Sr. No.	Common name	Scientific name	family	% branch infestation (mean±SE)
1.	Oakleaf basket fern	*Drynaria quercifolia*	Polypodiaceae	79.66^{a}±9.11
2.	Fortune's Ribbon Fern	*Neolepisorus fortunei*	Polypodiaceae	29.21^{b}±9.31
3.	Epiphytic Orchids	*Dendrobium* Sp.	Orchidaceae	16.69^{b}±4.93
4.	African mistletoe	*Loranthus* Sp.	Loranthaceae	4.41^{c}±3.41

Means sharing similar letters are not significantly different at P ≤ 0.05

Fig. 2. A. Oakleaf basket fern, B. Fortune's Ribbon Fern, C. Epiphytic Orchids, D. African mistletoe.

CONCLUSION AND FUTURE SCOPE

The study indicated that Oakleaf basket fern is the dominant parasitic species whereas, African mistletoe is the least dominant parasitic weed among all. But there is scanty information regarding their interaction with the host plants, extent of losses they cause etc. Further studies are required on the increased occurrence of parasitic plants, their effects on host plants and

development of control measure. Therefore, the study can enlighten the awareness of farmers, plant protectionists, horticulturists and researchers concerning to such parasitic weeds in Malda district of West Bengal to take further effective control methods in mango cultivation.

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