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A Case Study

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Mollitrichosiphum spp: A new record of aphid from Alder-large cardamom ecosystem in Sikkim

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ABSTRACT : Aphids (Hemiptera: Apihidoidea) pest problems were well known worldwide. A total 823 species in 222 genera and 18 sub families of the family Aphididae were known from the Indian sub continent. In Eastern Himalayas and North East India, 464 species in 147 genera in 15 sub families of aphids were known to be available. Sikkim belonged to NE India. From Sikkim, 26 important *Aphids* were reported so far. Three species of aphids were known to be associated with Alder (*Alnus nepalensis*) in North East India. Large cardamom (*Amomum subulatum* Roxb.) was an important cash crop of Eastern Himalayan region. It was sciophytes *i.e.*, the plant grew under shade. The crop grew somewhat wild in nature and damage due to insect pests was common. It was infested by various pests and diseases causing considerable amount of monetary loss. Surveillance was conducted in *alder* - large cardamom ecosystem in four different districts of Sikkim during 2011 to 2013. *Mollitrichosiphum* spp reported for the first time from Sikkim region. An observation about aphid species associated with alder tree in large cardamom ecosystem in Sikkim was presented.

KEY WORDS : *Alnus nepalensis, Aphis* spp., *Large cardamom, Mollitrichosiphum* spp., Sikkim

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INTRODUCTION

Aphids (Hemiptera : Apihidoidea) pest problems are well known worldwide (Stary and Ghosh, 1983). It acts as pest and vectors. A total 823 species in 222 genera and 18 sub families of the family Aphididae are known from the Indian region. The Himalaya is very rich in aphid diversity. In Eastern Himalayas and North East India 464 species in 147 genera in 15 sub families of aphids are known to available. Sikkim belongs to NE India. From Sikkim, Twenty six important *Aphids* were reported so far (Chakrabarti *et al.*, 2012). Six species of aphids are known to be associated with Alder (*Alnus nepalensis*) in North East India. Alder (*Alnus nepalensis*) is a multipurpose fast growing perennial tree found in the subtropical highlands of the Himalaya. A*lnus* – Cardamom intercropping is economically, sustainable farming practice in India, Nepal and Bhutan (Fig.1). It belongs to the family Betulacea. It is called *Utis in* Nepali language and Nepalese Alder in English. It occurs throughout

the Himalaya at 500-3000 m amsl from Pakistan through Nepal and Bhutan to Yunnan in southwest China (Sharma *et al.*, 2007). *Amomum subulatum* Roxb. is an important crop of Eastern Himalayan region. It is the main cash crop cultivated in Sikkim (Deka *et al.*, 2007, Deka *et al.*, 2011, Saju *et al.*, 2010, Kishore *et al.*, 2012 and Gudade *et al.*, 2014). Presences of wild relatives support the view of its origin in Sikkim. The crop was spread to Nepal and Bhutan from India (Singh, 1978, Gupta, 1983, Rao *et al.*, 1993 and Sharma *et al.*, 2009). India, Nepal, Bhutan and Myanmar are the cardamom producing countries. It belongs to family Zingiberaceae, the largest family of the order Scitamineae and is found throughout the tropics but predominant in Asia. It is sciophytes *i.e.*, the plant grows under shade. However dense canopy adversely affect the plant by restricting the entry of light and there by affecting photosynthetic activity. Shade trees are planted at a spacing of 12-15 m between plants for even shade distribution and 50 per cent shade was found ideal (Gupta *et al.*, 2012). The shade trees that are generally used in the large cardamom plantation area are *Alder* (*A. nepalensis*), *Panisaj* (*Termalia myriocarpa*), *Pipli* (*Bucklandia* sp.), *Malito* (*Macaranga denticulate*), *Argeli* (*Edgeworthes gardneri*), *Asare* (*Viburnus eruberens*), *Bilaune* (*Maesa cheria*), *Kharane* (*Symplocos* sp.), *Siris* (*Albizzia lebbeck*), *Faledo* (*Erythrina indica*), *Jhingani* (*Eurja tapanica*), *Chillowne* (*Schima wallichi*) etc. of these, the performance of large cardamom under Nitrogen fixing tree *A. nepalensis* proved to be highly beneficial in term of productivity and nutrient recycling (Gudade *et al*., 2013). The crop grows somewhat wild in nature and damages due to insect pests are common. It is infested by various pests and diseases causing considerable amount of monetary loss (Azad Thakur, 1980, Azad Thakur, 1982). Here, we have presented our observations about aphids associated with *Alnus* tree in large cardamom ecosystem in Sikkim.

EXPERIMENTAL METHODS

Surveillance was conducted under AICRPs Project in *alder* - large cardamom ecosystem in four districts of Sikkim namely, East Sikkim, West Sikkim, South Sikkim and North Sikkim during 2011 to 2013 (Fig. 2). Two type of surveillance was carried out *viz.*, fixed plot and roving surveillance. Fixed plots surveillance was conducted at Kabi (1800 m amsl) North Sikkim and Pangthang (2160 m amsl) East Sikkim at monthly interval. Roving surveillance was done in different *Alder* - large cardamom growing tracts in all the district of Sikkim. Aphid population in *alder* was recorded and identified in Indian Agricultural Research Institute, New Delhi. Secondary data were obtained from published journals and books.

EXPERIMENTAL RESULTS AND ANALYSIS

Surveillance was carried out in four district of Sikkim and *Aphids* in *alder* and large cardamom ecosystem recorded. There was only one species *viz.*, *Mollitrichosiphum* spp (Aphididae, Greenideinae) observed during the surveillance from Kabi (1800 m amsl) and Dzongu (1750 m amsl) area of North Sikkim in alder. This aphid remained congregated in colony in the twigs and young leaves of the *alder* plant (Fig. 3 and 4). The genus *Mollitrichosiphum* was created by Suenaga in 1934, based on hind tibiae with numerous transverse ridges, 6-segmented antennae and an elongated and pointed ultimate rostral segment. This genus contains 18 known species restricted mainly to Southeast Asia and divided into two subgenera, *Mollitrichosiphum* and *Metatrichosiphon* (Remaudiere and Remaudiere, 1997). Aphids of this genus typically colonizethe young leaves and branches of host plants in the Betulaceae, Elaeagnaceae, Fagaceae, Juglandaceae, Lauraceae, Meliaceae, Proteaceae, Sabiaceae and Sapindaceae families and more rarely the Simaroubaceae, Anacardiaceae and Rosaceae. This genus is polyphagous with a wide host range (Zhang and Qiao, 2010). There were three species of aphids namely *Cervaphis quercus* Takahashi, *Taoia indica* Ghosh and Raichoudhuri and *Mollitrichosiphum montanum* Ghosh and Raichoudhuri (v.d.G) were known to associate with *alder* plant in Khujama and Mao (Manipur), Kalimpong (West Bengal) and Kohima (Nagaland) at an altitude ranging 1800 m amsl to 1850 m amsl in the month of September and July (Ghosh and Raychoudhury, 1982). Other Important aphids reported from Sikkim were *Acyrthosiphon pisum* (Harris), *Aphis craccivora* Koch, *A. citricola* v.d.G, *A. gossypii* Glover, *A. fabae* Scopoli, *A. spiraecola* Patch, *Astegopteryx bambusae* (Buckton), *A. minuta* (v.d.G), *Aulacorthum magnoliae* (Essig and Kuwana), *Brachycaudus helichrysi* (Kalt), *Capitophorus hippophaes javanicus* H.R.L, *Cletherobius dryobius* Chakrabarti and Raychaudhury, *Greenidea* (T.) *formosana heeri* Raychaudhuri *et al.*, *Hyadaphis coriandri* (Das), *Hyalopterus pruni* (Geoffroy), *Lachnus tropicalis* v.d.G., *Macrosiphum rosae* (L) , *Melanaphis sacchari* (Zehntner), *Myzus parsicae* (Sulzer), *Pentalonia nigronervosa* Coquerel, *Rhophalosiphum maidis* (Fitch), *R. nymphaeae* (L), *Sitobion rosaeformis* (Das), *Subovatomyzus leucosceptri* (Basu), *Toxoptera autantii* (B.d.F) and *Toxoptra odinae* (v.d.G), (Chakrabarti *et al.*, 2012). Banana aphid, *Pentalonia nigronervosa f caladii* (Goot) was recorded in large cardamom, *Colocasia* spp, chill (Capsicum spp.) and tree tomato (*Cyphomandra crassicaulis*) (Fig. 5, 6 and 7). However, a perusal of literature survey revealed no association of *Mollitrichosiphum* spp. in *alder* or any other crop in Sikkim. Hence, this might forms the first report

Fig. 1: Alder- large cardamom ecosystem

Fig. 2 : Map of study area

Fig. 3 : *Mollitrichosiphum* at twigs of *Alder*

Fig. 4 : *Mollitrichosiphum* spp. at leaf of *Alder,*

Fig. 5: *Pentalonia nigronervosa* in cardamom

Fig. 6 : *P. nigronervosa* in chilli

Fig. 7: *P. nigronervosa* in tree tomato

Plate 1: Important photos related to Aphids in Sikkim

of *Mollitrichosiphum* spp. in *alder* from large cardamom ecosystem of Sikkim region.

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