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

T. N. Deka, B. A. Guda De, A. K. Vijayan and P. Chhetri

ABSTRACT: Aphids (Hemiptera: Aphidoidea) pest problems were well known worldwide. 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 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.) is 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

INTRODUCTION

Aphids (Hemiptera: Aphidoidea) 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 be 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. Alnus – 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

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ABSTRACT: Aphids (Hemiptera: Aphidoidea) 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.

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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 Gude 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 cardamom plantation area are Alder (A. nepalensis), Panisaj (Termalia myriocarpa), Pipili (Bucklandia sp.), Malito (Macaranga denticulate), Argeli (Edgeworthes gardneri), Asare (Viburnus eruberens), Bilaune (Maesa cheria), Kharane (Symlocos sp.), Siris (Albizzia lebeck), Faledo (Erythrina indica), Jhingani (URja 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 surveilance 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 colonize the 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, *Taoa 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 *Acrystoshiphon pismum* (Harris), *Aphis craccivora* Koch, *A. citricola* v.d.G. A. gossypii Glover, A. fabae Scopoli, A. *spiraecola* Patch, Astergoxeryx *bambusae* (Buckton), A. *minuta* (v.d.G), *Aulacorthum magnoliae* (Essig and Kuwana), *Brachycaudus helichrysi* (Kalt), *Capitophorus hippocrae javanicus* H.R.L., *Clethorobius dryobius* Chakrabarti and Raychaudhury, *Greenidea* (T.) *formosana heeri* Raychaudhuri et al., *Hyadaphis coriandri* (Das), *Hyalotheprus pruni* (Geoffroy), *Lachnus tropicalis* v.d.G., *Macrothem rosae* (L), *Melenaphis sacchari* (Zehntner), *Myzus parrisae* (Sulzer), *Pentalonia nigronervosa* Coquerel, *Rhopalosiphum maidis* (Fitch), *R. nymphaeae* (L), *Sitobion rosaformes* (Das), *Subovatomyzus leucoceptri* (Basu), *Toxoautara autantii* (B.d.F) and *Toxopota 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 persual 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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