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Short Note

A New Record of *Heteropsylla cubana* Crawford and its Morphometric Study on *Albizia procera* (Roxb.) Benth. in Jharkhand

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ABSTRACT

Albiziaprocera (Roxb.) Benth is a common ornamental and medicinal plant species distributed throughout the India. This plant was found to be very susceptive to different insect pest attack. The present study was done to investigate *Heteropsylla cubana* infestation on *A. procera* and its morphometrics at Institute of Forest Productivity, Ranchi, India during 2014 and 2015. The infestation of *H. cubana* was first time observed *A. procera* in Jharkhand. Infestation pattern of *H. cubana* was recorded and it was found that *H. cubana* as a serious pest of *A. procera* in Jharkhand. Additionally, morphometrics of egg, nymphal stages and adult of this psyllid insect was also recorded in this study.

Keywords: Morphometric, *Heteropsylla cubana, Albiziaprocera,* seasonal incidence, Insect pest

Albizia procera (Roxb.) Benth. is a tree of family: Fabaceae with an open canopy up to 30 m tall. Bark smooth, pale grey-green, yellowish-green, yellowish-brown or brown with horizontal ridges. Leaves are bipinnate with 2-5 pairs of subopposite pinnate rachis 10-30 cm. *A. procera*is native to Asia from northern India through south-east Asia to the Philippines, Indonesia, Melanesia, and northern Australia (Nielsen 1979, Parrotta 1987, Venkataramany 1968). Fruits rich red or reddish-brown, flattened pods 10-20 x 1.8-2.5 cm, each containing 6-12 seeds. *A. procera*is a multipurpose tree and valued as cattle fodder (George and Kohli, 1957) in Philippines, cooked leaves are eaten as a vegetable (Hensleigh and Holaway, 1988) and other plant part used as a paper pulp, timber and fuel wood in South Asia, the Philippines and Australia (Orwa*et al.,* 2009). Its leaves are also used in traditional Indian medicine (Chopra, *et al.,* 1956, Kirtikar and Basu,1975). The bark is reported to be a strong poison, and the leaves are known to have insecticidal and piscicidal properties (Benthall, 1933, Chopra *et al.,* 1941). Also, used to treat ulcers and have insecticidal properties (Parrotta, 1987). *A. procera* has reported sometimes planted as a shade tree in tea gardens (Skoupy and Vaclav,1976) in its native range and used for afforestation of degraded lands (Venkataramany, 1968). *A. procera* is considered as a useful grained, strong, durable, timber species in its native range, where it is used for a variety of purposes and resistant to attack by dry-wood termites (Little and Wadsworth 1964, Venkataramany, 1968). Vigorous seedlings produce stout taproot contains nitrogen-fixing *Rhizobium* nodules (Parrotta, 1987) and also yields a reddish brown gum that is used as a gum substitute (Farooqi and Kapoor 1968).

Insect pests have always been a threat to agriculture as well as forest productivity in India. Similarly, *A. procera* trees have been damaged by about 50 insect pests belonging to Coleoptera, Hemiptera and Lepidoptera feed on young shoots, leaves, roots, sap, seeds, and dead wood in Southeast Asia. The termite *Coptoterme scurvignathus* is reported as a pest of the tree in India, while in Africa the termite *Ancistroterme samphidon* is a serious pest on young trees. *Heteropsylla cubana* Crawford is a tiny Psyllid (Psyllidae: Homoptera) native to Carabina Maxico and central South Africa (Moog, 1992). *H. cubana* was distributed around the world (Nair, 2007) and it has been reported as a serious pest of *L. leucocephala* (Tewari*et al.,* 2013), *Lucana pulverulenta, L. diversifolia, L. salvadorensis, Albiziaspp, Mimosa spp, Samanea saman*were reported in Indonesia (Anonymous, 2007). Geiger and Gutierrez (2000) has reported as a pest of *L. leucocephalla* in California and studied the ecology of this pest. Though, this pest has never been reported on *A. procera* from India. In this present study the infestation on *A. procera* and morphometric study of *Heteropsylla cubana* has been studied.

This study is a part of regular survey and monitoring of insect pest of forestry. During, survey of insect pests infestation of *H. cubana* was recorded on *A. procera*. The insect was sent for correct species identified to the Division of Entomology, IARI and specimens were deposited in National Pusa Insect Collection, New Delhi-12 (Accession No. 1529-1538/13). The identification report confirmed as species *Heteropsylla cubana*. The infestation of *H. cubana* on *A. procera* was observed at

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weekly interval on about 300 plants in different locations of Ranchi and nearby villages from February to July, 2014 and 2015. The infestation pattern and population was observed on visual observation basis. Some insect infested plant part was brought to the laboratory and different stages of the insect were separated and preserved in 70% alcohol. Slide of different stages (Egg, nymphs, and adult) were made and morphometric study was done under sterio-zoom microscope fitted with micrometer and drawing tube. The width and length of 12 individuals were takes randomly. At the same time photography was done under of each stages under sterio-zoom microscope (Olympus-MSZ16) fitted with digital camera. Data recorded was subjected to statistical analysis for mean and standard deviation estimation by the simple statistics analysis with the help of SPSS 18 computer software.

H. cubana was reported first time on *A. procera*in Jharkhand and India. The infestation of this pest was observed from February to July in 2014 and 2015 and it was observed that infestation of this pest starts from the month of March when the newly fleshes emerges and remains up to the June. When the temperature was increase population was increase while when rain fall occurs the population of this pest was declined. Both the nymph and adults feed gregariously on tender shoot, leaf and pod, resultantly curling of young leaf, yellowing of leaf, defoliation and immature pod drop.

Infestation: Adult female laid their eggs in groups inserting on tender leaf mostly on lower surface of leaves (Fig 1&2). Initially eggs were white in colour later they turned yellow followed by dark yellow at hatching. After hatching of eggs nymphs were started moving and search the tender plant part from where they suck cell sap and grow. Feeding of this insect resulted wilting to new shoots or to become bunchy due to top-shoot die. It was also observed that they aggregate at succulent plant part and fed gregariously. Both the nymph and adults were found to be feeding on tender shoots and leaves of *A. procera* and the leaves were found to be curled due to insect egg laying and feeding. The population of this pest was found to be maximum 218 insect (nymph+adult) /10 cm of shoot. While on tender upper leaf up to 18 insect per leaf were found regular feeding to the plant.

Morphometrics: This study was done for egg to adult stages. It is revealed from table 1 that, the length of egg was 0.266 mm (0.252-0.281) while width was recorded 0.113 mm (0.100-0.122). Length of first instar nymph was 0.286 mm (0.283-0.291) while width was recorded 0.174 mm (0.155-0.92). Length of second instar nymph was 0.510 mm (0.482-0.544) while width was 0.432 mm (0.344-0.562) recorded. Length of third instar nymph was 1.062 mm (1.002-1.106) while width was 0.568 mm (0.556-0.584) recorded. Length of fourth instar nymph was 1.222 mm (1.214-1.234) while width was 0.852 mm (0.848-0.862) recorded. Length of fifth instar nymph was 1.454 mm (1.432-1.506) while width was 0.672 mm (0.667-0.685) recorded. Length of male adult insect with wing was 2.106 mm (2.102-2.124) while width was 0.558 mm (0.553-0.576) recorded. While length of male adult insect without wing was 1.466 mm (1.456-1.508) recorded. Length of female adult insect with wing was 2.288 mm (2.235-2.353) while width was 0.596 mm (0.588-0.613) recorded. While, length of female adult insect without wing was 1.614 mm (1.544-1.662) recorded.

Psyllid population is distributed throughout the world and currently, 3850 psyllid species have been described worldwide (Li, 2011), which is probably less than half of the existing number of species. *H. cubana* is also reported throughout the world and it was introduced in India in 1988 (Anon, 2007a)and become a serious pest of *Leucaena leucocephala*. Hence, it is called as *Leucaenapsylla* distributed in South-East Asia to European countries. In the present study *H. cubana*is observed gregariously feeding on *A. procera*in Jharkahnd state of India. Only, Annonymous (2007) reported *H. cubana* on *Albiziaspp*as a host of psyllid in Indonasia, but none of the document or findings proved that *H. cubana* feed on *A. procera*. The adult female of this pest laid their eggs in groups on the surface of the newly emerged leaf. After emergence nymph starts feeding on the succulent parts of the plant in groups and become adult after fifth instar. Moog (1992) observed nymphal stages complete within 8-9 days. Nymph and adult psyllids were found feeding sap of the tender plant parts, leaf, fruit (Hertel, 1998) and population of this psylla was observed about 300 per 10cm shoot. Similarly, in India, the new shoots has been usually observed by heavy infestations; up to 3000 nymphs and adults per 15 cm of terminal shoot of *L. leucocephala* (Nair, 2007), and reduces 55% dry matter production (Palmer *et al.,*1989) and plant become leafless. Nimbkar (1990) given a report of heavy attack by *H. cubana* on *L. leucocephala* in Maharashtra. This psyllid was observed infested to *L. leucocephalla* and caused hundreds of millions of dollars damage in the Asia Pacific region (Heydon and Affonso, 1991). The morphometric study of this pest was done in this study and the measurement is supported by the findings of (Moog, 1992).

CONCLUSION

H. cubana was first time reported on *L. leucocephala* in India in the year1988 and none of the worker has reported this species on *A. procera.* This is the first report of infestation of this pest on *A. procera* with their overlapping successful generation on it. The infestation of this pest on *A. procera*and findings of this study is an indication of spreading host range of this pest in India and may be a serious threat for other associated species.

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Table 1: Morphometrics of different developmental stages of *H. cubana*.

Morphometric of different developmental stages		Range		Mean±SD
		Minimum	Maximum	
Egg	Length (mm)	0.25	0.28	0.266±0.008
	Width (mm)	0.10	0.12	0.110±0.006
1st instar	Length (mm)	0.28	0.29	0.286±0.004
	Width (mm)	0.15	0.19	0.174±0.013
2nd instar	Length (mm)	0.48	0.54	0.510±0.019
	Width (mm)	0.34	0.56	0.432±0.104
3rd instar	Length (mm)	1.00	1.10	1.062±0.033
	Width (mm)	0.55	0.58	0.568±0.011
4th instar	Length (mm)	1.21	1.23	1.222±0.007
	Width (mm)	0.84	0.86	0.852±0.007
5th instar	Length (mm)	1.43	1.50	1.454±0.024
	Width (mm)	0.66	0.68	0.672±0.007
♂adult with wing	Length (mm)	2.10	2.12	2.106±0.004
	Width (mm)	0.55	0.57	0.558±0.007
♂adult without wing	Length (mm)	1.45	1.50	1.466±0.018
♀adult with wing	Length (mm)	2.23	2.35	2.288±0.046
	Width (mm)	0.58	0.61	0.596±0.010
♀adult without wing	Length (mm)	1.54	1.66	1.614±0.042

Fig. 1: Different stages of *H. cubana*, A- eggs on the leaf; B- Nyph ; C & D- Adult.

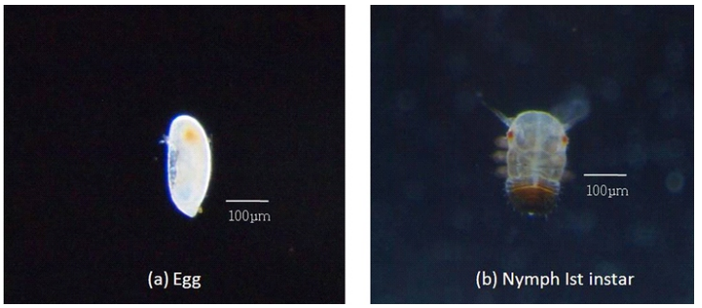

Fig 2: Egg and first nymphalinstatr of *H. cubana* under microscope

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