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Biodiversity of Short-Horned Grasshopper (Acrididae : Orthoptera) at Varanasi, Uttar Pradesh

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Abstract

Biodiversity of orthopteran insects were studied in Varanasi district during 2006 and 2007 different cropping system. The 11 species of orthopteran insects were collected from three families. During survey, *Oxya nitidula* Walker was found to be abundant in *kharif* season on the paddy, *Oryza sativa* and on weeds like, *Imperata cylindrica* and sugarcane during *Zaid* season whereas, *Acrida* sp. was found to be more abundant on cauliflower, *Brassica oleracea* var *botrytis* during *rabi* season. During both year of survey *Oxya nitidula* Walker and *Oxya* sp. were found more to be abundant in mid to last *kharif* season.
Key words : Biodiversity, Orthoptera, *Oxya nitidula*, Acrididae, *Oryza sativa.*

Biodiversity is the species richness in an ecosystem. The number of known species of Orthoptera from around the world is about 20,000. Out of that, 1,750 species which is about 8.75% are known from India (2). They are found in different diverse ecosystem from sea level to high altitude of Himalaya hills (3). Short-horned grasshopper is the one of the diverse and important phytophagous pests of Orthoptera. Some grasshopper causes damage to tree seedlings (4) and agricultural crops. Host plant shifting ability may also found in grasshoppers when their main host is absent. So that, they some time became a promising pest of crop and forest trees. During 1962, 4,000 hectares of cotton (value $ 300,000) were destroyed by locust (5). Therefore, keeping in view of diversity with host plant interaction of orthopteran insects were carried out in the present investigation.

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Methods

The present investigation was carried out during *kharif* to *Zaid* season in 2006 and 2007. The survey was made on different cropping system at Varanasi district and materials were collected. The insects were collected by sweeping net, swept over vegetations and also trapped with the help of light trap in the night. The collected materials were immediately killed with the help of killing bottle and materials were drawn to laboratory in moisture absorptive envelops to avoids spoilage. The collected materials were sorted out, processed and preserved in the Insect Biosystematics Laboratory of Department.

Results and Discussion

After an intensive survey of different cropping system were made and 11 species from three families of order Orthoptera were collected from Varanasi region (Fig. 1). Kati et al. (6) and Claude et al. (7) reported a total of 34 and 111 species of grasshopper in different habitat of Greece and Switzerland, respectively. The different host plants were also recorded associated with these orthopterans (Table 1). Under Acrididae family eight species were recorded. Out of these *Hieroglyphus banian* (Fabricius) was found on *Oryza sativa* L. and *Zea mays* L. hosts in medium number of population and in low population on *Saccharum officinarum* L., *Sorghum bicolor* L., *Vigna unguiculata* L., *Abelmoschus esculentus* L., and *Phaseolus vulgaris* L. hosts. The *Oxya nitidula* Walker and *Oxya* sp. were high in population on *Oryza sativa* L. and medium in population on *Zea mays* L.

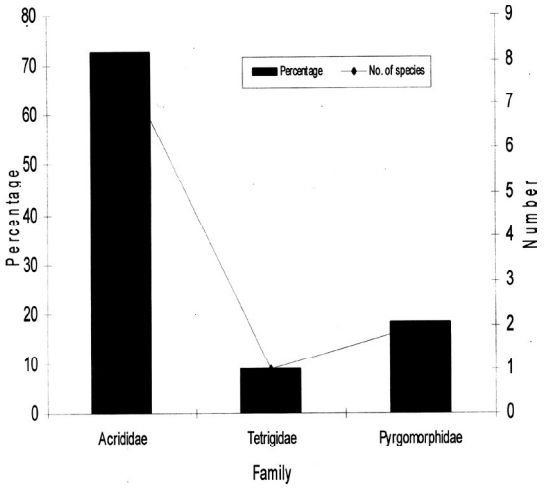

Figure 1. Grasshopper collected during survey.

and *Sorghum bicolor* L. whereas low in population on *Saccharum spontaneum* L.,*Trifolium alexandrum* L., *Imperata cylindrical, Brassica oleracea* var *capitata* L., *Brassica oleracea* var *botrytis* L., *Raphanus sativus* L., *Abelmoschus esculentus* L., *Capsicum* sp. and *Saccharum munjo* hosts. The *Acrida* sp. was found to be high in population on *Zea mays* L., and *Oryza sativa* L. and medium on *Cynodon dactylon, Brassica oleracea* var *capitata* L., *Brassica oleracea* var *botrytis* L. and low in population on *Saccharum officinarum* L., *Sorghum bicolor* L., *Raphanus sativus* L., *Abelmoschus esculentus* L., *Capsicum* sp. The *Chrotogonus trachypterus* (Blanchard) was found in germinating field of *Zea mays* L., *Saccharum officinarum*, also in grasses of dry land, *Triticum aestivum* field, *Allium cepa* L., *Abelmoschus esculentus* L., *Allium sativum* L. and *Solanum tuberosum* L. in low population. The *Poekilocerus pictus* Fabricius was found on *Calotropis* sp. as medium population. On *Carica papaya* L., *Jatropha curcas* L., and on *Psidium guajava* L. low population was found *Acrida* sp. was also found. on papaya plants. The *Scistocerca* sp. was found in low population on most of the hosts recorded. The *Tetirx* sp. of family Tetrigidae was found in *Oryza sativa* L. field as high population but low in *Zea mays* L., *Brassica oleracea* var *botrytis* L., *Raphanus sativus* L., *Abelmoschus esculentus* L., *Capsicum* sp., *Brassica pleracea* var *capitata* L., *Solanum melongena* L. and *Sorghum bicolor* L. field. The *Atractomorpha* sp. was found from *Oryza sativa* L. and *Zea mays* L. field in medium population and low on *Saccharum offcinarum* L., *Sorghum bicolor*

Table 1. Orthopteran-Host[1]- interaction during survey. Very High–****, High–***, Medium-**, Low–*. (1) Only collected from that but not confident to feed also.

Family	Insect	Host plant	Occurrence	Remark
		Oryza sativa L.	**	
		Zea mays L.	**	
		Saccharum officinarum L.	*	
	Hieroglyphus banian (Fab.)	*Sorghum bicolor* L.	*	
		Vigna unguiculata L.	*	
		Abelmoschus esculentus L.	*	
		Phaseolus vulgaris L.	*	
		Oryza sativa L.	*	
		Saccharum officinarum L.	*	
	Aiolopus sp.	*Zea mays* L.	*	
		Weeds	*	
		Oryza sativa L.	***	
		Zea mays L.	**	
		Sorghum bicolor L.	**	
		Saccharum spontaneum L.	*	
		Trifolium alexandrum L.	*	
		Imperata cylindrica	*	
	Oxya nitidula Walk.	*Saccharum munjo*	*	
		Brassica oleracea var. *capitata* L.	*	
	Oxya sp.	*Brassica oleracea* var. *botrytis* L.	*	

Table 1. Continued.

Family	Insect	Host plant	Occurrence	Remark
		Raphanus sativus L.	*	
		Abelmoschus esculentus L.	*	
		Capsicum sp.	*	
Acrididae		*Oryza sativa* L.	***	
		Cynodon dactylon	**	
		Zea mays L.	****	
		Saccharum officinarum L.	*	Papaya is
		Sorghum bicolor L.	*	also
	Acrida sp.	*Grasses*	*	found
		Brassica oleracea var *capitata* L.	**	host
		Brassica oleracea var *botrytis* L.	*	plant
		Raphanus sativus L.	*	
		Abelmoschus esculentus L.	*	
		Capsicum sp.	*	
		Germinating *Zea mays* L.	*	
		Cajanus cajan L.	*	
		Saccharum officinarum	*	
		Grasses of dry	*	
		Triticum aestivum L.	*	
	Chrotogonus trachypterus	*Trifolium alexandrum* L.	*	
	(Blanch.)	*Sorghum bicolor* L.	*	
		Allium cepa	*	
		Abelmoschus esculentus L.	*	
		Allium sativum	*	
		Solanum tuberosum L.	*	
		Carica papaya L.	*	
		Jatropha curcas L.	*	
	Poekilocerus pictus Fab.	*Calotropis procera*	**	
		C. gigentia	**	
		Psidium guajava L.	*	
		Oryza sativa L.	*	
		Saccharum officinarum L.	*	
		Zea mays L.	*	
		Saccharum munjo	*	
		Sorghum bicolor L.	*	
		Saccharum spontanum	*	
		Solanum melongena L.	*	
	Schistocerea sp.	*Capsicum annum*	*	
		Cynodon dactylon	*	
		Brassica oleracea var *botrytis* L.	*	
		Raphanus sativus L.	*	
		Abelmoschus esculentus L.	*	
		Capsicum	*	
		Trifolium alexandrum	*	
		Imperata cylindrica	*	
		Oryza sativa L.	***	
		Zea mays L.	*	
	sp. 1	*Sorghum bicolor* L.	*	
Tetrigidae		*Brassica oleracea* var *botrytis* L.	*	
		Raphanus sativus L.	*	
		Abelmoschus esculentus L.	*	
		Capsicum sp.	*	
		Brassica oleracea var capitata L.	*	
		Solanum melongena L.	*	
		Oryza sativa L.	**	
		Zea mays L.	**	

Table 1. Continued.

Family	Insect	Host plant	Occurrence	Remark
		Saccharum officinarum L.	*	
		Sorghum bicolor L.	*	
		Solanum melongena L.	*	
Pyrgomorphidae	*Atractomorpha* sp.	*Brassica oleracea* var *capitata* L.	*	
		Brassica oleracea var *botrytis* L.	*	
		Raphanus sativus L.	*	
		Abelmoschus esculentus L.	*	
		Solanum tuberosum L.	*	
		Zea mays L.	*	
	Pyrgomorpha sp.	*Oryza sativa* L.	*	
		Brassica oleracea var *capitata* L.	*	
		Brassica oleracea var *botrytis* L.	*	

L. *Solanum melongena* L., *Brassica oleracea* var *capitata* L., *Brassica oleracea* var *botrytis* L., *Raphanus sativus* L., *Abelmoschus esculentus* L., *Solanum tuberosum* L and *Solanum melongena* L. hosts. The Bhowmik and Haldar (8) recorded the grasshopper in Himachal Pradesh of 28 species and subspecies, distributed over 25 genera and seven subfamilies of Acrididae from different hosts. In the family Pyrgomorphidae two species viz. *Atractomorpha* and *Pyrgomorpha* sp. were abundantly collected from *Oryza sativa* L. and *Brassica oleracea* var *botrytis* L.

References

1. Ehrlich P. R. and A. H. Ehrlich. 1981. *Extinction* : *The causes and consequenees of the disappearance of species.* Random House, New York, USA.
2. Tandon S. K. and A. K. Hazra. 1998. *Faunal diversity in India : Orthoptera.* Pp. 183—188. ENVIS Cen., Zool. Surv. India, Kolkata.
3. Bhowmik H. K. and K. N. Rui. 1982. Note on collection of grasshoppers (Orthoptera : Acrididae) from Shiwalik hills. *Ind. Museum Bull*. 17 : 48—54.
4. Joshi P. C., J. A. Lockwood, N. Vashishth and A. Singh. 1999. Grasshopper (Orthoptera : Acridoidea) community dynamics in a moist deciduous forest in India. *J. Orthop. Res.* 8 : 17—23.
5. Steedman A. 1990. *Locust handbook*. 3rd edition. NRI, Chatham. 204 pp.
6. Kati V., M. Dufrene, A. Legakis, A. Grill and P. Lebrun. 2004. Conservation management for Orthoptera in the Dadia reserve, Greece. *Biol. Conserv*. 115 : 33—44.
7. Claude E. S., B. Matthias, Thomascochi and D. Peter. 2006. *Hot spots and richness pattern of grasshopper species in cultural landscapes. Biodiv. Conserv.* DOI 10.1007/5 10531—006-9089-7.
8. Bhowmik H. K. and P. Haldar. 1983. Preliminary Distribution records with remark on little known species of acridae (Orthoptera : Insecta) from the Western Himalayas (HP). *Rec. Zool. Surv. India* 81 : 167 —191.