



RESEARCH ARTICLE

Species Composition and Relative Abundance of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) in Western Uttar Pradesh

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ABSTRACT

Among the mango pests, mango hoppers are most serious and widespread pests. Large number of nymphs and adults of the hoppers puncture and suck the sap from tender shoots, inflorescence and leaves of mango crop, which cause non-setting of flowers and dropping of immature fruits, thereby reducing the yield. In North India, two species of Mango leafhoppers- *Idioscopus clypealis* (Leth.) & *Amritodus atkinsoni* (Leth.) are reported. Bag trap method and sweep net methods were used to collect the hoppers. Maximum number of hoppers of both the species was recorded in the month of May. *Idioscopus clypealis* (Leth.) showed an increase in its population from February onwards till it reached its peak in May in all the study areas viz., Aligarh (11-348 in year 2004-05 and 9-387 in year 2005-06), Bulandshahar (18-360 in year 2004-05 and 14-399 in year 2005-06), Bareilly (6-294 and 5-321 in year 2004-05 and 2005-06 respectively) and Badaun (8-323 in year 2004-05 and 7-350 in year 2005-06), then population of *Idioscopus clypealis* (Leth.) showed a fall till October in Bareilly and Badaun areas and till November in Aligarh and Bulandshahar areas, after that they were not found on mango trees. *Amritodus atkinsoni* (Leth.) showed an increase from March onwards and it also reached its peak in May in all the study areas, viz., Aligarh (15-202 and 17-219 in year 2004-05 and 2005-06 respectively), Bulandshahar (19-218 and 20-233 in year 2004-05 and 2005-06 respectively), Bareilly (8-168 in year 2004-05 and 10-195 in year 2005-06) and Badaun (11-188 in year 2004-05 and 12-205 in year 2005-06). After this, population of *Amritodus atkinsoni* (Leth.) showed a fall and then a second peak was recorded in its population in the month of August, after which population of *Amritodus atkinsoni* (Leth.) showed a fall till the end of December, then the hoppers disappeared. *Idioscopus clypealis* (Leth.) was abundant in all the four study areas for six months (From February to July) and *Amritodus atkinsoni* (Leth.) showed its abundance for the next five months (from August to December). In the month of January, no hopper was found on mango trees.

Keyword: *Idioscopus clypealis* (Leth.), *Amritodus atkinsoni* (Leth.), Species composition, Relative abundance.

INTRODUCTION

The mango, *Mangifera indica* (Linn.) is one of ancient fruit of Indian origin. It is grown in India in large extent and is considered as a king of all the fruits. In India, the largest producer state of mango is Uttar Pradesh; where 5, 38, 383 acres area is under mango cultivation and constitutes nearly 90% of the area under the fruits. In the Western part of Uttar Pradesh mango orchards are distributed in large numbers. In proportion to its area of cultivation, its production is very low. Out of many factors responsible for its low productivity, one of the major factors is threat of insect pests, which cause a major loss to mango industry. Among the mango pests, mango hoppers are most serious and widespread pests throughout the country. Large number of nymphs and adults of the hoppers puncture and suck the sap from tender shoots, inflorescence and leaves of mango crop, which cause non-setting of flowers and dropping of immature fruits, thereby reducing the yield. Hoppers also excrete a secretion, called honey dew. In moist weather, it encourages the development of fungi like *Meliola mangiferae* (Earle), resulting in growth of sooty mould on dorsal surface of leaves, branches and fruits. This black coating interferes with the normal photosynthetic activity of the plant, ultimately resulting in non-setting of flowers and dropping of immature fruits. This damage is called as Honey Dew Disease (Butani, 1993). Hoppers remain active throughout

the year in cracks and crevices of mango trunk, but they are recorded on twigs, when young leaves and inflorescence are available (Patel *et al.*, 1994). In North India two species of Mango leafhoppers-

Idioscopus clypealis (Leth.) & *Amritodus atkinsoni* (Leth.) are reported so far. So the present study includes the species composition of these two hopper species and their relative abundance in different ecological conditions of Western Uttar Pradesh.

MATERIALS AND METHODS

The experiments were carried out in various environmental conditions of Western Uttar Pradesh from April 2004 to March 2006. The experimental sites are located at Aligarh, Bulandshahar, Bareilly and Badaun Districts. Bag trap method (Verghese and Rao, 1987) was adopted for recording the hopper population from January to April. In the bag trap method, each inflorescence was covered with a polythene bag (60x30cm), provided with a cotton swab, soaked in ethyl acetate. Both adults and nymphs were trapped inside the bags. The bags were brought to the laboratory and nymphs and adults were separated. From May to December, when adult hoppers were abundant, as compared to nymphal stages, the sweep method was used for collecting the hoppers with the help of insect collecting net.

The hoppers, collected and preserved, were taken to the laboratory and identified. Both the species i.e. *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) were identified on the basis of their morphological variations, as *Idioscopus clypealis* (Leth.) is smaller in size and light-brown in colour with the creamish coloured scutellum, having two triangular dark spots on it. On the other hand *Amritodus atkinsoni* (Leth.) is larger in size and dark-brown to blackish in colour with scutellum having arrow mark on it. After identification, adults of each species were segregated and species composition was worked out.

RESULTS AND DISCUSSION

During the experiments in all the study areas, it was observed that only two species of mango leaf hoppers were found in Western Uttar Pradesh, viz. *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.). The adults of *Amritodus atkinsoni* (Leth.) and *Idioscopus clypealis* (Leth.) were observed and counted separately from April 2004 to March 2006 in all the four study areas and great variations in their relative abundance had been noticed. Maximum number of *Idioscopus clypealis* (Leth.) (360 in year 2004-05 and 399 in year 2005-06) and maximum number of *Amritodus atkinsoni* (Leth.) (218 and 233 in year 2004-05 and 2005-06 respectively) were recorded in the month of May in Bulandshahar study area (Table-1, Fig.-1&2).

In all the study areas, *Idioscopus clypealis* (Leth.) showed an increase in its population from February onwards till it reached its peak in May in all the study areas viz., Aligarh (11-348 in year 2004-05 and 9-387 in year 2005-06), Bulandshahar (18-360 in year 2004-05 and 14-399 in year 2005-06), Bareilly (6-294 and 5-321 in year 2004-05 and 2005-06 respectively) and Badaun (8-323 in year 2004-05 and 7-350 in year 2005-06) then population of *Idioscopus clypealis* (Leth.) showed a fall till October in Bareilly and Badaun areas and till November in Aligarh and Bulandshahar areas, after that they were not found on mango trees (Table-1 to 4, Fig.-1 to 8). Verghese and Rao (1987) recorded that the peak of mango leafhoppers coincided with the pea size of fruit. In the present study, it has been found that the fruits attained the pea size in the month of May, thus providing the support for present investigation. Patel *et al.* (1990) had observed that the adults of *Idioscopus clypealis* (Leth.) occurred in large number in May, but their number decreased from July to October; thus, confirming the results of present author. These findings are also in coincidence with Dalvi and Dumbre (1994) and Hiremath and Hiremath (1994).

However, *Amritodus atkinsoni* (Leth.) showed an increase from March onwards and it also reached its peak in May in all the study areas, viz., Aligarh (15-202 and 17-219 in year 2004-05 and 2005-06 respectively), Bulandshahar (19-218 and 20-233 in year 2004-05 and 2005-06 respectively), Bareilly (8-168 in year 2004-05 and 10-195 in year 2005-06) and Badaun (11-188 in year 2004-05 and 12-205 in year 2005-06). After this, population of *Amritodus*

atkinsoni (Leth.) showed a fall and then a second peak was recorded in its population in the month of August. During August, the number of adult hoppers of *Amritodus atkinsoni* (Leth.) was 196 in year 2004-05 and 213 in year 2005-06 in Aligarh, 209 in year 2004-05 and 230 in year 2005-06 in Bulandshahar, 164 in year 2004-05 and 192 in year 2005-06 in Bareilly and 185 in year 2004-05 and 202 in year 2005-06 in Badaun, after which population of *Amritodus atkinsoni* (Leth.) showed a fall till the end of December, then the hoppers disappeared (Table-1 to 4, Fig.-1 to 8). During their study on *Amritodus atkinsoni* (Leth.), Patel et al. (1990), Babu et al. (2002) and Dwivedi et al. (2003) reported that the adult hopper population of this pest was observed from March onwards; thus, confirming the findings of the present author. Dwivedi et al. (2003) and Sharma and Sharma (2011) recorded the peak population of *Amritodus atkinsoni* (Leth.) in June.

The relative abundance of both the species showed that *Idioscopus clypealis* (Leth.) was abundant in all the four study areas for six months (From February to July) and *Amritodus atkinsoni* (Leth.) showed its abundance for the next five months (from August to December). In the month of January, no hopper was found on mango trees.

Table- 1: Species Composition and Relative Abundance of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) in Aligarh

Months	Year 2004-05				Year 2005-06			
	Sps. Comp.		Rel. Abun. (%)		Sps. Comp.		Rel. Abun. (%)	
	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II
Apr.	241	36	87.00	13.00	255	43	85.57	14.43
May	348	202	63.27	36.73	387	219	63.86	36.14
June	247	117	67.86	32.14	275	124	68.92	31.08
July	218	133	62.11	37.89	228	138	62.30	37.70
Aug.	186	196	48.69	51.31	210	213	49.65	50.35
Sep.	145	152	48.82	51.18	158	161	49.53	50.47
Oct.	68	120	36.17	63.83	79	126	38.54	61.46
Nov.	7	71	8.97	91.03	13	72	15.29	84.71
Dec.	0.0	27	-	100	0.0	22	-	100
Jan.	0.0	0.0	-	-	0.0	0.0	-	-
Feb.	11	0.0	100	-	9	0.0	100	-
Mar.	71	15	82.56	17.44	75	17	81.52	18.48

Sp. I – *Idioscopus clypealis* (Leth.)

Sp. II – *Amritodus atkinsoni* (Leth.)

Table- 2: Species Composition and Relative Abundance of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) in Bulandshahar

Months	Year 2004-05				Year 2005-06			
	Sps. Comp.		Rel. Abun. (%)		Sps. Comp.		Rel. Abun. (%)	
	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II
Apr.	252	41	86.01	13.99	266	47	84.98	15.02
May	360	218	62.28	37.72	399	233	63.13	36.87
June	268	128	67.68	32.32	291	135	68.31	31.69
July	226	147	60.59	39.81	235	157	59.95	40.05
Aug.	194	209	48.14	51.86	219	230	48.78	51.22
Sep.	153	161	48.73	51.27	172	173	49.86	50.14
Oct.	74	127	36.82	63.18	88	132	40.00	60.00
Nov.	10	75	11.76	88.24	18	77	18.95	81.05
Dec.	0.0	31	-	100	0.0	26	-	100
Jan.	0.0	0.0	-	-	0.0	0.0	-	-
Feb.	18	0.0	100	-	14	0.0	100	-
Mar.	80	19	80.81	19.19	84	20	80.77	19.23

Sp. I – *Idioscopus clypealis* (Leth.)

Sp. II – *Amritodus atkinsoni* (Leth.)

Table- 3: Species Composition and Relative Abundance of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) in Bareilly

Months	Year 2004-05				Year 2005-06			
	Sps. Comp.		Rel. Abun. (%)		Sps. Comp.		Rel. Abun. (%)	
	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II
Apr.	218	24	90.08	9.92	228	29	88.72	11.28
May	294	168	63.64	36.36	321	195	62.21	37.79
June	212	96	68.83	31.17	235	108	68.51	31.49
July	181	108	62.63	37.37	198	119	62.46	37.54
Aug.	163	164	49.85	50.15	176	192	47.83	52.17
Sep.	118	122	49.17	50.83	129	134	49.05	50.95
Oct.	41	94	30.37	69.63	56	105	34.78	65.22
Nov.	0.0	52	-	100	0.0	55	-	100
Dec.	0.0	18	-	100	0.0	14	-	100
Jan.	0.0	0.0	-	-	0.0	0.0	-	-
Feb.	6	0.0	100	-	5	0.0	100	-
Mar.	46	8	85.19	14.81	51	10	83.61	16.39

Sp. I – *Idioscopus clypealis* (Leth.) Sp. II – *Amritodus atkinsoni* (Leth.)

Table- 4: Species Composition and Relative Abundance of *Idioscopus clypealis* (Leth.) and *Amritodus atkinsoni* (Leth.) in Badaun

Months	Year 2004-05				Year 2005-06			
	Sps. Comp.		Rel. Abun. (%)		Sps. Comp.		Rel. Abun. (%)	
	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II	Sp. I	Sp. II
Apr.	228	32	87.69	12.31	242	36	87.05	12.95
May	323	188	63.21	36.79	350	205	63.06	36.94
June	238	108	68.79	31.21	262	125	67.70	32.30
July	212	124	63.10	36.90	223	131	62.99	37.01
Aug.	181	185	49.45	50.55	193	202	48.86	51.14
Sep.	136	143	48.75	51.25	146	148	49.66	50.34
Oct.	56	106	34.57	65.43	61	113	35.06	64.94
Nov.	0.0	65	-	100	0.0	66	-	100
Dec.	0.0	23	-	100	0.0	17	-	100
Jan.	0.0	0.0	-	-	0.0	0.0	-	-
Feb.	8	0.0	100	-	7	0.0	100	-
Mar.	58	11	84.06	15.91	63	12	84.00	16.00

Sp. I – *Idioscopus clypealis* (Leth.) Sp. II – *Amritodus atkinsoni* (Leth.)

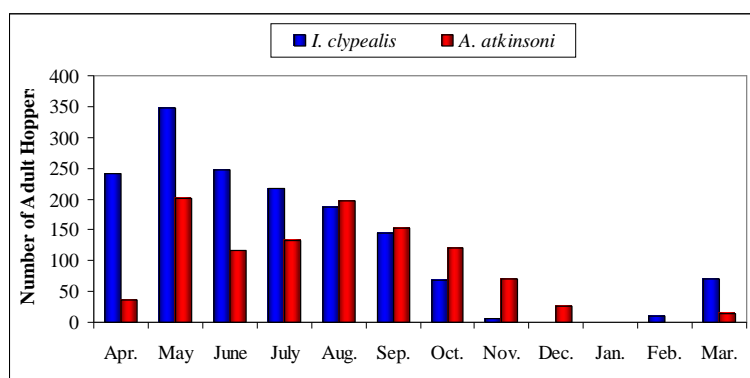
Fig.- 1: Species Composition of Mango Leafhopper in Aligarh (Apr. 2004 - Mar. 2005)

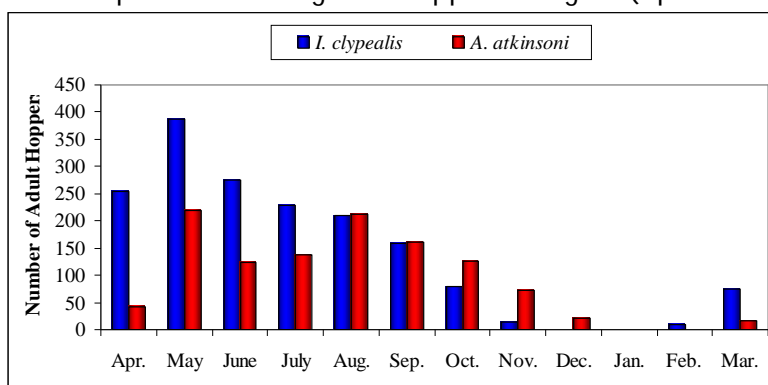
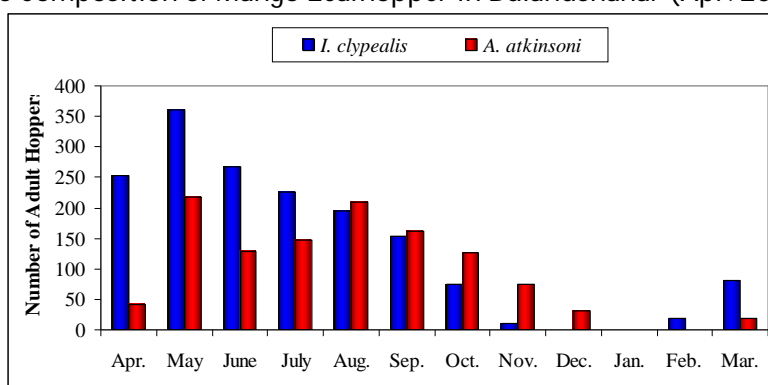
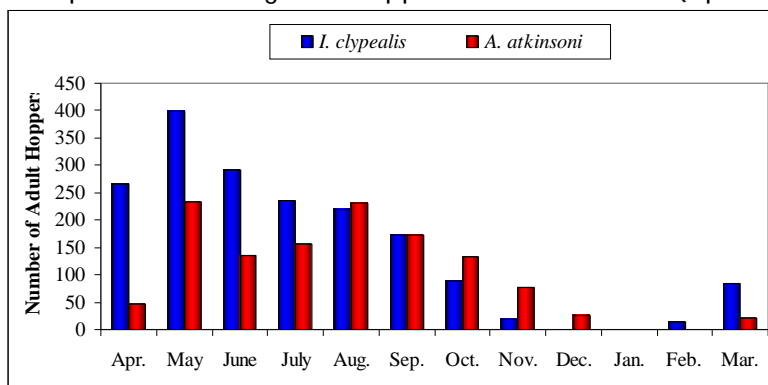
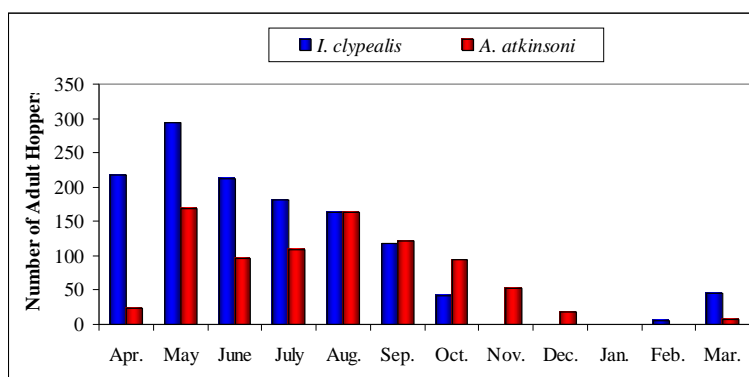
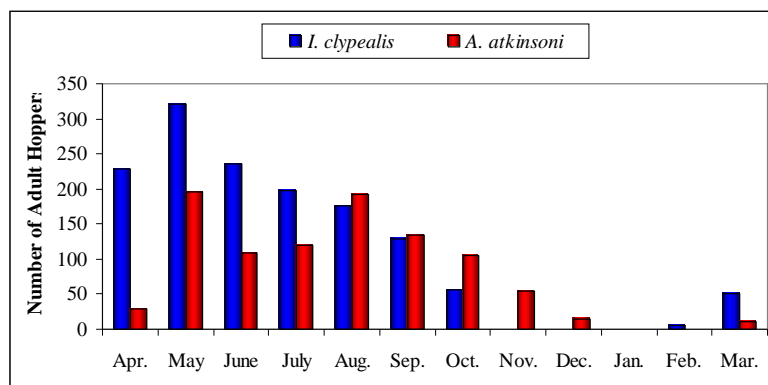
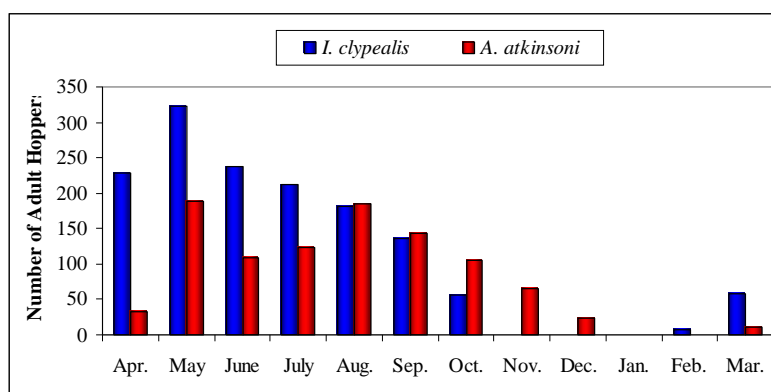
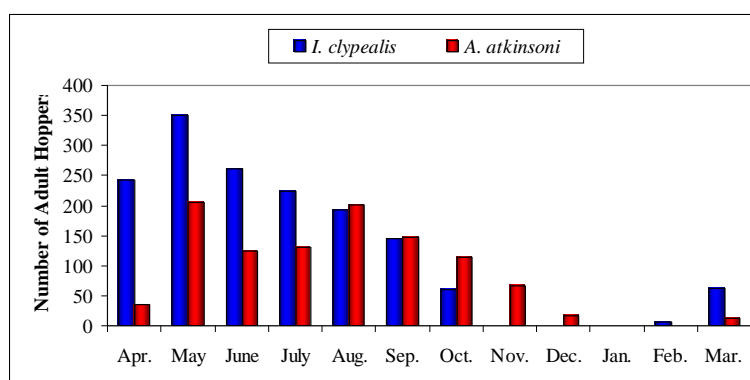
Fig.- 2: Species Composition of Mango Leafhopper in Aligarh (Apr. 2005 - Mar. 2006)**Fig.- 3:** Species Composition of Mango Leafhopper in Bulandshahar (Apr. 2004 - Mar. 2005)**Fig.- 4:** Species Composition of Mango Leafhoppers in Bulandshahar (Apr. 2005 - Mar. 2006)**Fig.- 5:** Species Composition of Mango Leafhopper in Bareilly (Apr. 2004 - Mar. 2005)

Fig.- 6: Species Composition of Mango Leafhopper in Bareilly (Apr. 2005 - Mar. 2006)**Fig.- 7:** Species Composition of Mango Leafhopper in Badaun (Apr. 2004 - Mar. 2005)**Fig.- 8:** Species Composition of Mango Leafhopper in Badaun (Apr. 2005 - Mar. 2006)

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