

Diversity, bioecology and biosystematics of aphidophagous predators of eastern Himalaya and Northeast India

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Summary

Aphids (Hemiptera, Aphidoidea) are important plant pests and vectors of several plant pathogens. India, particularly the Himalaya, is very rich in aphid diversity. A total of 823 species in 222 genera and 18 subfamilies of the family Aphididae are known from the Indian region that includes 464 species in 147 genera in 15 subfamilies in Eastern Himalaya and Northeast India. Aphidophagous predator species are varied and include species of Coccinellidae (Coleoptera), Syrphidae (Diptera), Chrysomelidae (Coleoptera) and some Lepidoptera and spiders in Eastern Himalaya and Northeast India. The diversity of Coccinellidae shows that 78 species in 31 genera in 4 subfamilies prey upon 122 species of aphids in 7 subfamilies. The major genera are *Coelophora* Mulsant, *Cryptogonus* Mulsant, *Chilocorus* Leach, *Oenopia* Mulsant and *Scymnus* Kugelann. There are 31 genera represented by single species. *Coccinella septempunctata* has very wide prey range with 25 aphid prey species. The other polyphagous species are *Oenopia kirbyi* Mulsant (15 prey species), *O. sauzeti* Mulsant (14 prey species), *Cheilomenes sexmaculata* (Fabricius) (11 prey species) and *Harmonia eucharis* (Mulsant) (10 prey species). These predators are mostly associated with the aphid species of the subfamily Aphidinae. Only *Megalocaria dilatata* (Fabricius) is associated with hormaphidine aphids. Coccinellids have been recorded from different agro- and forest ecosystems. Although they are polyphagous in general, some degree of specificity has been noted with aphids and their agro-ecosystem. Species diversity is greater in the agro-ecosystem than the forest ecosystem. Coccinellids are found throughout the year, but the maximum number of species was recorded during May. Members of Chilocorinae and Sticholotidinae were not found from October to December. Coccinellids are found mostly between altitudes of 501 and 2000m and their number sharply declines beyond these altitudes. The syrphid diversity indicates that the larvae of 13 species prey on 12 species of aphids in 9 genera. *Betasyrphus serarius* Weidemann has the highest host range (6 aphid prey) in this area. All the syrphid predators have been found in association with species of Aphidinae. The other aphidophagous predators are Chrysomelidae (Coleoptera) (4 species), Lycaenidae (Lepidoptera) (2 species) and some species of spiders that are of minor importance.

Key words: Insecta, aphidophagous Coccinellidae, Syrphidae, diversity, seasonal and altitudinal distribution, Eastern Himalaya and Northeast India

Introduction

Aphids (Hemiptera, Aphidoidea) being exclusively plant parasitic and well known vectors of several plant pathogens have received attention throughout the globe as well as in the Himalaya, India. Systematic aphidological studies have been attempted and significant explorations of aphids in India were made since 1960. From the records it is evident that the Himalaya and Peninsular India have received more attention than other phyto-geographical zones (CHAKRABARTI 2009) due to their floral assemblages and climatic conditions.

The Himalaya is one of the youngest and highest mountain systems of the world. The uplift of the Himalaya since late Cenozoic has influenced the environment of the region and its surroundings as well as the climate and vegetation in Asia and across the globe (SHI et al. 1998, LI & PAN 2002). The Himalaya is traditionally demarcated into Eastern Himalaya or East Himalaya that lies between Namcha Barwa Peak (29°37' 50"N latitude and 95°03'19"E longitude) and the River Teesta 26°42'43.78"N latitude and 88°35'50.20"E longitude in the east, Northwest Himalaya lies beyond the River Kali westward (latitude 14°29'45"N and longitude 14°44'39.02"E). In between these zones lies the Central Himalaya. Occasionally, a portion of the Himalaya between the River Kali and the River Sulejtj (30°15'14.84"N latitude and 73°30'55"E longitude) within Northwest Himalaya is also called Western Himalaya (MANI 1974).

CHAKRABARTI (2009) made a review on the aphids from the Indian region and pointed out that 823 species in 222 genera and 18 subfamilies occur here. Since then, 2 more species of aphids have been added to this list from Northwest Himalaya (CHAKRABARTI 2011). The above species include 464 species in 147 genera from Eastern Himalaya and Northeast India and 575 species in 177 genera from Northwest Himalaya.

Aphids are frequently attacked by their natural enemies. The occurrence and abundance of different natural enemies regulate the abundance of aphid population and thus act as important biocontrol agents (FRAZER 1988). Hymenopteran wasps of the subfamily Aphidiinae (Braconidae) are common aphidophagous parasitoids while the predator groups are varied but mostly dominated by ladybirds (Coccinellidae, Coleoptera) and hover flies (Syrphidae, Diptera). Besides lacewings (Neuroptera), midges (Cecidomyiidae, Diptera) and anthocorid bugs (Anthocoridae, Hemiptera), several species of spiders (Araneae) and larvae of a few lepidoptera are occasionally found as predators of aphids. Accounts of the aphidophagous parasitoids from Eastern Himalaya and Northeast India are available from the works of RAO (1969), STARY & GHOSH (1983), and RAYCHAUDHURI (1990) as well as many other works. Aphidophagous parasitoids have been documented from Northwest Himalaya by RAO (1969), STARY & GHOSH (1983), BHAGAT (1994), CHAKRABARTI & DEBNATH (2009a) and a few other workers, while aphidophagous predators, from Northwest Himalaya have been documented by Rao (1969), CHAKRABARTI & DEBNATH (2009b), AGARWALA et al. (1984), AGARWALA & GHOSH (1988) and some other workers.

Several aphidophagous predators have been recorded from Eastern Himalaya and Northeast India. Studies on bio-ecology and biosystematics of several such species were also made from these regions. However, a consolidated account of the diversity of such predators and information on their bio-ecology and biosystematics is still lacking from these areas. Accordingly, such an account of the diversity as well as a review of the works done on the bio-ecology of these aphidophagous predators from Eastern Himalaya and North-east India has been provided here.

Material and Methods

Insects found in association with aphids in Eastern Himalaya and Northeast India were collected and observed for evidence of being aphid predators. Such specimens were sometimes kept in plastic containers along with aphids for confirmation of their feeding habit. Upon confirmation, these were collected, preserved, identified and stored. Records and reports of aphid predators made by other workers from these areas have also been taken into account.

Immature specimens were generally collected and kept in plastic vials (10x 4cm) along with prey specimens for several days mostly at room temperature. Everyday fresh prey aphids were provided as food for the developing predators. This method was continued until the immature became an adult. Adults were then mounted and identified.

Results and discussions

The major predators recorded from Eastern Himalaya and Northeast India are ladybirds and hoverflies. In addition, some chrysomelids (Coleoptera), cecidomyiids (Diptera), neuropterans, lepidopteran larvae and spiders were occasionally reported.

Ladybirds or Coccinellid beetles

Aphidophagous coccinellids are ubiquitous throughout most of the world. They are regarded as bio-indicators (IPERTI & PAOLETTI 1999) and provide more general information about the ecosystem (ANDERSON 1999). Over and above, they are important and effective group of predators (HODEK & HONEK 1996, DIXON 2000) of aphids and many other soft skinned insects. The biology and ecology of the family have been reviewed extensively (HAGEN 1962, HODEK 1973, FRAZER 1988, HODEK & HONEK 1996). Although surveys for aphids have been made extensively throughout India, it appears that information on these aphidophagous coccinellids are mostly restricted to the hilly terrain of Arunachal Pradesh, Manipur, Meghalaya, Mizoram Nagaland, Sikkim, Tripura and West Bengal in Eastern Himalaya and Northeast India. A complete list of coccinellids collected along with their prey aphids, plant hosts, localities and altitudes is provided in Appendix I. The following information was obtained from the list of coccinellids.

Diversity

Coccinellid diversity, relative to other aphidophagous predators, is always high in India and the same trend has also been observed in the present area. Several reports on aphidophagous coccinellids are available (RAYCHAUDHURI et al. 1979, AGARWALA & RAYCHAUDHURI 1981, GHOSH & RAYCHAUDHURI 1982, AGARWALA et al. 1980, 1981, 1987, AGARWALA 1983, SINGH & SINGH 1985, 1988, 1991, AGARWALA & SAHA 1986, SINGH et al. 1986, DEVI et al. 1994, HEMCHANDRA et al. 2010, SAHA & AGARWALA 1986). The above reports and also further records reveal that altogether, 78 species in 31 genera and 4 subfamilies are known so far from the area (Table 1). Members of the subfamily Coccinellinae dominate in this list having 41 species in 18 genera. The major genera are *Scymnus* Kugelann (with 12 species), *Oenopia* Mulsant (with 7 species), *Coelophora* Mulsant (with 6 species), *Cryptogonus* Mulsant (with 6 species) and *Chilocorus* Leach (with 4 species). There are 31 genera that are represented by single species, 9 genera with 2 species and 8 genera with 3 species in the area (Table 3). Some characteristic species are shown on Plate II and III at the end of this book.

Ladybird-aphid association

Ladybirds prey on 122 aphid species in 7 subfamilies. However, they prefer those of the subfamily Aphidinae where 84 aphid prey species are found. Next to Aphidinae are the species of subfamily Greenideinae where 11 prey aphid species are recorded. The association of coccinellid species with the number of aphid prey species in different subfamilies is provided in Table 1. Predators are in general not very host specific (FRAZER 1988). Among the species, *Coccinella septempunctata* L. has very wide prey range with 25 aphid prey species, 18 from Aphidinae, 4 from Calaphidinae, 2 from Lachninae and 1 from Greenideinae. (Table 1). The coccinellids having 10 or more prey aphids (Table 2) are *Oenopia kirbyi* Mulsant (15 prey species), *Oenopia sauzeti* Mulsant (14 prey species), *Propylea quatuordecimpunctata* (L.) (12 prey species), *Megalocaria dilatata* (Fabricius) (12 prey species), *Cheilomenes sexmaculata* (Fabricius) (11 prey species) and *Harmonia eucharis* (Mulsant) (10 prey species). It has been observed that *Propylea quatuordecimpunctata* (L.) has 10 prey aphids and all are from the subfamily Aphidinae. The prey ranges of coccinellids in different subfamilies of aphids for the seven most polyphagous species are presented in Table 2. This shows that none of these polyphagous species accept species of the subfamilies

Table 1: Coccinellid species and their prey aphid species association in different subfamilies.

Abbreviation: Anoeciinae=Ano; Aphidinae=Aphi; Calaphidinae=Cala; Eriosomatinae=Erio; Greenideinae=Gree; Hormaphidinae=Horma; Lachninae=Lach.

Subfamily of Coccinellidae	No. of species	Aphid prey species number							Total
		Ano	Aphi	Cala	Erio	Gree	Horma	Lach	
Coccinellinae	41	2	44	5	1	8	6	4	70
Chilocorinae	9	0	14	0	0	1	1	1	17
Scymninae	25	1	21	4	0	2	1	1	30
Sticholotidinae	3	0	5	0	0	0	0	0	5
Total	78	3	84	9	1	11	8	6	122

Table 2: Prey association of some Polyphagous Coccinellid species (at least 10 prey items). Abbreviation same as **Table 1**

Coccinellidae species	Ano	Aphi	Cala	Erio	Gree	Horma	Lach	Total
<i>Coccinella septempunctata</i>	0	18	4	0	1	0	2	25
<i>Oenopia kirbyi</i>	0	10	3	0	1	0	1	15
<i>Oenopia sauzeti</i>	0	12	1	0	1	0	0	14
<i>Propylea quatuordecimpunctata</i>	0	12	0	0	0	0	0	12
<i>Megalocaria dilatata</i>	0	4	0	0	2	5	1	12
<i>Cheilomenes sexmaculata</i>	0	8	2	0	1	0	0	11
<i>Harmonia eucharis</i>	0	6	2	0	1	0	1	10

Aiceoninae and Eriosomatinae as their prey. *Megalocaria dilatata* (Fabricius) is the only coccinellid in this group that preys on five species of aphids in the subfamily Hormaphidinae. Thirty one species of coccinellids have been recorded so far having only single prey aphid species. This includes 16 species that are restricted only on the subfamily Aphidinae, 5 on Calaphidinae, 3 each on Greenedeinae and Lachninae, 2 in Hormaphidinae and 1 in Eriosomatinae. Among the 10 species having 2 prey aphid species, 6 are restricted to Aphidinae, 2 each in Calaphidinae and Hormaphidinae. Altogether 7 species have 3 prey aphid species range that include 5 in Aphidinae, 3 in Calaphidinae, 1 each in Eriosomatinae, Lachninae and Greenedeinae. The distribution of these prey aphid species in different subfamilies is given in Table 3.

Ladybirds in different ecosystems

Aphids are obligatory plant parasites and are either monophagous or oligophagous or polyphagous. Some studies on the aphidophagous predators in different agro-and forest ecosystems in the area have been made. SHANTIBALA et al. (1987) studied the coccinellids preying on 9 aphid species infesting 11 different fruit plants in Manipur at altitudes varying between 300 and 2000m. They found 6 coccinellid species on *Aphis gossypii* Glover infesting *Artocarpus heterophyllus* (= *integrifolia*) Lam, *Psidium guajava* and *Pyrus malus* at altitudes 700-2000m. *Hyalopterus pruni* (Geoffroy) that infests *Prunus dulcis* (Mill.) (= *amygdalus*) and *Prunus persica* (L.) has 9 coccinellid predators but with only one common species viz., *Cryptognatus bimaculatus* Kapur. *Rhopalosiphum nymphae* (L.) which infests *Prunus dulcis* (Mill.) from March to May has two coccinellid predators. *Citrus grandis* Merr. is infested by *Toxoptera citricidus* (Kirkaldy) which has only two coccinellid species. On the other hand, two other species of this genus, *T. odinae* (v.d.G) infesting *Rhus semialata* and *T. aurantii* (B.d.F.) infesting *Citrus aurantium* Linn. each have only one coccinellid species. The above study shows that on *Prunus dulcis* (Mill.) all the coccinellid species are different on their respective aphid hosts. The coccinellid species, *Chilocorus rubidus* (Hope) is only associated with *Nippolachnus* sp. SHANTIBALA et al. (1995) while studying the population dynamics of *Cervaphis quercus* Takahashi on *Quercus serrata* Thunberg observed 6 coccinellid species during the month from March to June. SINGH et al. (1995) found 9 species of coccinellids feeding on *Tuberculatus nervatus* Chakrabarti and Raychaudhuri infesting *Quercus serrata* Thunberg at two elevations, 780m and 1750m. The study showed variations of

abundance of both the aphid and its natural enemies not only at different times of the year, but also at two different elevations. They observed that the highest peaks of both aphids and coccinellids were in the month of January.

DEBJANI & SINGH (1998) studied the succession of aphids and their natural enemies on cauliflower in Manipur. They found that four aphid species viz., *Myzus persicae* (Sulzer), *Lipaphis erysimi* (Kaltb.), *Brevicoryne brassicae* (L.) and *Aphis gossypii* Glover infest this crop. Only three coccinellids, *Coccinella septempunctata* L., *C. transversalis* Fabricius, *Cheilomenes sexmaculata* (Fabricius) are associated with these aphids on this crop. However, in the early crop only *C. septempunctata* L. is found but in mid and late crops all three species are prevalent. DEBJANI & SINGH (op.cit.) studied the prey-predator interaction with the cabbage aphid, *Brevicoryne brassicae* (L.) and two coccinellids, *Cheilomenes sexmaculata* (Fabricius) and *Coccinella transversalis* (Fabricius) at three different sites in Manipur and found that the predator population closely synchronized with that of the prey and there is a positive correlation between aphid and coccinellid population. DEVI et al. (2002) in a study on the natural enemies of *Cervaphis rappardi indica* Basu on *Cajanus cajan* (L.) ecosystem found seven species of coccinellids including *Cheilomenes sexmaculata* (Fabricius), *Coelophora* (= *Lemnia*) *bissellata* (Mulsant) and *Oenopia quadripunctata* Kapur that occur throughout the period of aphid abundance from May to February, having a peak during November.

NONITA et al. (2007) studied the predatory complex on egg plants (*Solanum melongena* L.) and found 5 coccinellid predators feeding on *Aphis gossypii* Glover. It was observed that *Scymnus* sp. was the dominant species (51.2% of the total predators) on this crop. In another study (HEMCHANDRA et al. 2010) the coccinellid diversity between the agro-ecosystem and forest-ecosystems was compared. It was found that out of the 2363 specimens comprising 36 species of coccinellids, 2290 specimens comprising 35 species are aphidophagous in the agro-ecosystem. The population of *Cheilomenes sexmaculata* (Fabricius) was highest. The dominant species are *Cheilomenes sexmaculata* (Fabricius), *Coccinella septempunctata* L., *Micraspis discolor* (Fabricius), *Coelophora saucia* (Mulsant) and *Pseudoaspidimerous flaviceps* (Walker). They indicated the dominance index as 0.08 i.e 8% species are dominant. In the collection from the forest ecosystem, they collected 1756 specimens out of which 1372 specimens are aphidophagous comprising 25 species. The species are also heterozygous and more diverse in forest ecosystem.

Table 3: Prey range of coccinellids having up to 3 prey aphids. Abbreviation same as **Table: 1**

Total no. of host prey	No. of the species	Aphid subfamilies						
		Ano	Aphi	Cala	Erio	Gree	Horma	Lach
1	31	2	16	3	1	4	2	3
2	9	0	14	4	0	0	0	0
3	8	0	20	2	0	2	0	0

Seasonal distribution

The populations of aphids are very much influenced by the abiotic and biotic factors. In the Himalaya, only a few studies have been made (AGARWALA & DIXON 1985, SAHA & AGARWALA 1986) on the abundance of aphids in relation to abiotic and biotic factors. The populations of coccinellids are density dependent in relation to aphids (DIXON 2000). SHANTIBALA et al. (1995) studied the population dynamics and seasonal fluctuation of *Cervaphis quercus* Takahashi and 15 associated coccinellid species found on this aphid in Manipur. SINGH et al. (1995) studied the field density of *Tuberculatus nervatus* Chakrabarti & Raychaudhuri and the associated predators. DEBJANI & SINGH (1998) while studying natural enemies of aphids on cauliflower in Manipur studied the seasonal abundance of predators in Manipur.

The available information shows that coccinellids are found throughout the year (Fig. 1). However, the maximum numbers of species were recorded during May while representatives of Chilocorinae and Sticholotidinae were not found from October and December on aphids.

Vertical distribution

In the Himalaya the floral characteristics change with the altitude (MANI 1974) and accordingly different aphid species have colonized different phyto-geographical areas. Some reports on the vertical distribution of aphids in the Himalaya have been made (RAYCHAUDHURI et al. 1979, GHOSH & RAYCHAUDHURI 1977, 1979, 1980, 1982, CHAKRABARTI 1981).

Reports on the altitudinal distribution of Coccinellids are very scanty. SHANTIBALA & SINGH (1991) made such a study on the

29 Coccinellids found in Manipur and Nagaland and observed that the preferred altitudinal stratum for Coccinellids is 501-1000m.

In the present study the altitudinal ranges have been grouped into 4 zones: 0-500m; 501-1000m; 1001-1500m; and 2000m and above. The available records on the collections of 78 coccinellids from Eastern Himalaya and Northeast India were presented (Fig. 2) and analyzed. It showed that the overall distribution of coccinellids is found between 501 and 2000m. Only two species, one in Scymninae and other in Sticholotidinae have been recorded at altitudes below 500m. Again the number falls sharply above 2000m although aphids are present in moderate numbers at altitudes above 2000m.

Hoverflies or Syrphids (Diptera: Syrphidae)

Larvae of syrphids are considered quite effective predators of aphids. Not very much serious work has been done on this group from the area, although some species have been recorded so far (RAYCHAUDHURI et al. 1978, RAYCHAUDHURI et al. 1979, AGARWALA et al. 1981, 1984, 1987, AGARWALA 1983). The above studies give reports mostly from Manipur, West Bengal, Sikkim and Nagaland.

All the above records and the present investigation reveal that only 13 syrphid species in 10 genera are prevalent in Eastern Himalaya and Northeast India. The list of syrphid species, their prey aphid species, host plants, locality and months of collection are given in Appendix-II. As in coccinellids, host specificity is rarely observed in syrphids. Only 12 aphid species in 9 genera recorded as prey of these syrphids. *Betasyrphus serarius* Weidemann has the maximum, with 6 aphid prey species. The species have been recorded at altitudes between 750-1750m.

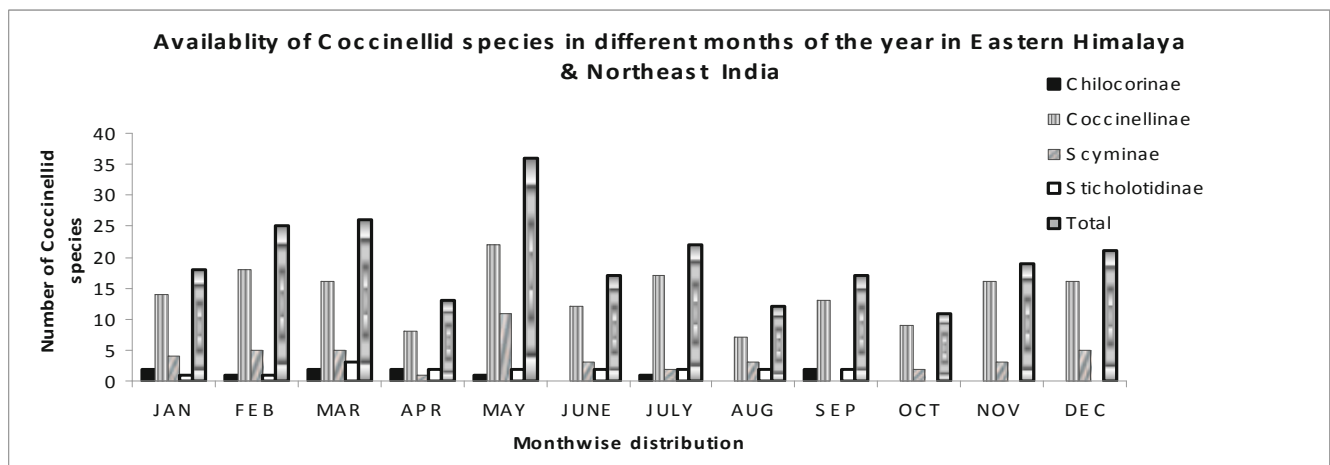


Figure 1

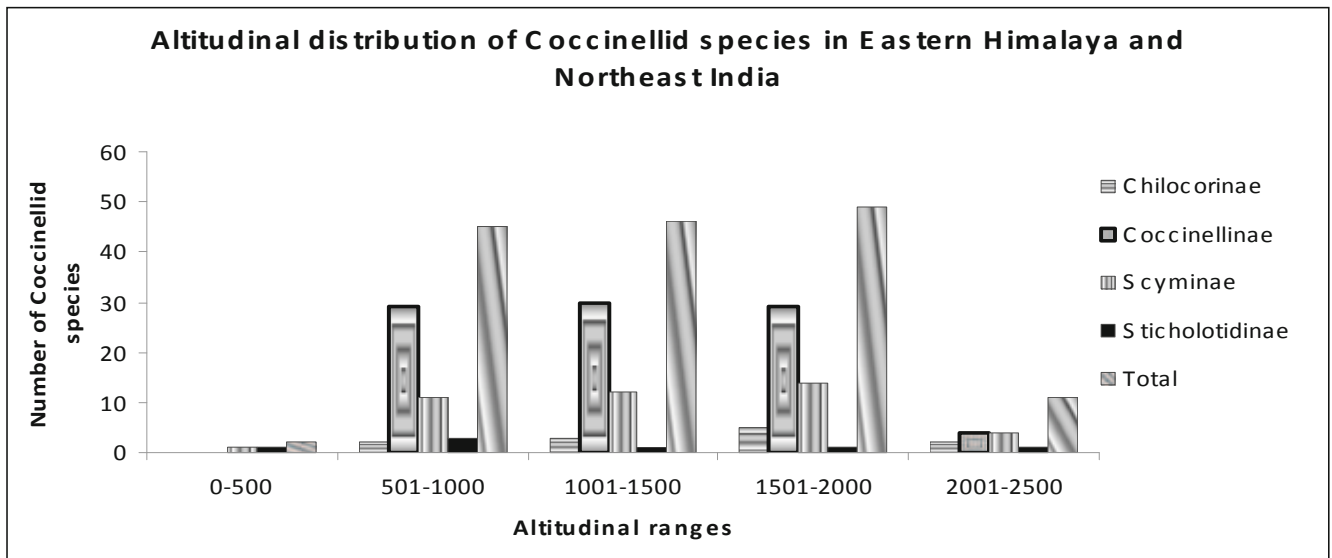


Figure 2

Other aphidophagous predators

RAYCHAUDHURI et al. (1979) reported 2 aphidophagous chrysomelid (Coleoptera) predators from Kalimpong (W. B). AGARWALA & RAYCHAUDHURI (1981) reported 2 other chysomelid species from Sikkim. AGARWALA & SAHA (1984, 1986) reported *Chilades lajus lajus* (Cramer) and *Taraka hamada mendesia* Fruhstorfer (Lepidoptera, Lycaenidae) that prey on *Toxoptera aurantii* B.d.F and *Ceratovacuna silvestrii* (Takahashi) in Agartala (Tripura) and Shillong (Meghalaya). RAYCHAUDHURI et al. (1979) reported 6 spider species from Kalimpong and 1 spider from Bhutan. AGARWALA (1983) reported 4 spider species preying on *Macrosiphum rosae* (L.) and *Sitobion rosaeformis* (Das) infesting roses in Kalimpong (W.B) between November and May.

Acknowledgement

The authors thanks Dr. V. V. Ramamurthy, National Co-ordinator, ICAR Network Project on Insect Biosystematics and the University Grants' Commission, New Delhi for financing the work, and the Head, Department of Zoology, University of Kalyani for laboratory facilities.

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APPENDIX – I: Aphidophagous Coccinellids & their association with aphid preys, host plants, localities and months of availability in Eastern Himalaya & Northeast India

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
Subfamily:- Chilocorinae Tribe:- Chilocorini					
<i>Brumoides suturalis</i> (Fab.)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> (L.)	1800	Khujama, Manipur	December
	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> (L.)	1666	Namchi, Sikkim	March
	<i>Aphis fabae</i> Scopoli	<i>Quercus</i> sp.	1675	Gangtok, Sikkim	December
	<i>Aphis gossypii</i> Glover	<i>Duranta plumeiri</i> Jacq.	1950	Manipur	September
	<i>Aphis nerii</i> B.d.F.	Indet			
	<i>Hayhurstia atriplicis</i> (L.)	Indet			
	<i>Hydaphis coriandri</i> (Das)	Indet			
	<i>Lipaphis erysimi</i> (Kalt.)	Indet			
<i>Chilocorus hau-seri</i> Weise	<i>Toxoptera odinae</i> (v.d.G.)	<i>Anacardium occidentale</i> (L.)	1100	Mangan, Sikkim	February
<i>Chilocorus nigretus</i> (Fab.)	<i>Ceratovacuna silvestrii</i> (Takahashi)	Indet			
<i>Chilocorus politus</i> (Mulsant)	<i>Nippolachnus piri</i> Matsumura	Indet			
<i>Chilocorus rubidus</i> Hope	<i>Brachysiphoniella montana</i> (v.d.G.)	<i>Cynodon dactylon</i> (L.) Pers.	785	Chingmeriong, Manipur	September
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	May
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	May
	<i>Nippolachnus piri</i> Matsumura	<i>Pyrus communis</i> L.			
Tribe:- Platynaspidini					
<i>Platynaspidium bimaculata</i> Pang & Mao	<i>Aphis spiraecola</i> Patch	<i>Capsicum frutescens</i> (L.)	1675	Gangtok, Sikkim	January
<i>Platynaspis indicus</i> Devi, Singh & Singh	<i>Aphis spiraecola</i> Patch	<i>Capsicum frutescens</i> (L.)	1675	Gangtok, Sikkim	January
	<i>Greenidea (T.) formosana heeri</i> Raychaudhuri et al.	<i>Psidium guajava</i> L.	2100	Darjeeling, W.B	April
	<i>Macrosiphoniella yomogifoliae</i> (Shinji)	<i>Artemisia vulgaris</i> L.	1800	Chakabama, Manipur	July
<i>Platynaspis</i> sp.	<i>Greenidea (T.) formosana heeri</i> Raychaudhuri et al.	<i>Psidium guajava</i> L. <i>Syzygium cumini</i> (L.)	2100	Darjeeling, W.B	April
<i>Priscibrumus uropygialis</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Pyrus malus</i> Borkh.	750-2000	Manipur	March
Subfamily : Coccinellinae Tribe: Coccinellini					
<i>Adalia bipunctata</i> (L.)	<i>Brachycaudus helichrysi</i> (Kalt.)	Indet	1250	Kalimpong, W.B	May
<i>Adalia tetraspilota</i> (Hope)	<i>Aphis pomi</i> De Geer	Indet			
	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Artemisia vulgaris</i> L.	1250	Kalimpong, W.B	June
	<i>Brevicoryne brassicae</i> (L.)	Indet			
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus dulcis</i> (Mill.) Webb	785	Uripok, Manipur	March
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica napus</i> L.	785	Manipur	December
	<i>Myzus persicae</i> (Sulzer)	<i>Solanum nigrum</i> L.	1250	Kalimpong, W.B	November

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Alloneda dodecaspilota</i> (Hope)	<i>Cervaphis quercus</i> Takahashi	<i>Alnus nepalensis</i> D. Don			December
	<i>Eutrichosiphum dubium</i> (v.d.G.)	<i>Lithocarpus</i> sp.	1900	Manipur	July
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Hordeum vulgare</i> L.	1666	Namchi, Sikkim	December
	<i>Taoia indica</i> (Ghosh & Raychaudhuri)	<i>Alnus nepalensis</i> D. Don	1850	Khujama, Manipur	September
	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Chingmeirong, Manipur	October
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	785	Chingmeirong, Manipur	October
<i>Aiolocaria hexaspilota</i> (Hope)	<i>Rhopalosiphum padi</i> (L.)	<i>Oryza sativa</i> L.	1850	Khujama, Manipur	September
<i>Anegleis cardoni</i> (Weise)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Lathyrus sativus</i> L.	785	Chingmeirong, Manipur	July
	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> L.	1666	Namchi, Sikkim	May
	<i>Aphis fabae</i> Scopoli	<i>Quercus</i> sp.	1666	Namchi, Sikkim	December
	<i>Aphis gossypii</i> Glover	<i>Pyrus malus</i> L.	700-2000	Manipur	June-October
	<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp.	1250	Kalimpong, W.B	May
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica</i> sp.	785	Manipur	July
	<i>Macrosiphum euphorbiae</i> (Thomas)	Indet			
	<i>Toxoptera aurantii</i> (B.d.F.)	<i>Schima wallichii</i> (DC.) Korth	1500	Mangan, Sikkim	May
<i>Toxoptera citricidus</i> (Kirkaldy)	<i>Citrus grandis</i> Merr.	700-2000	Manipur	March	
<i>Bothrocalvia albo-lineata</i> (Gyllenhal)	<i>Eulachnus thunbergii</i> (Wilson)	<i>Pinus khasya</i> Royal ex. Gordon	1325	Manipur	February
<i>Bothrocalvia lewisii</i> Crotch	<i>Eulachnus thunbergii</i> (Wilson)	<i>Pinus khasya</i> Royal ex. Gordon	1325	Manipur	February
<i>Calvia championorum</i> Booth	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Chingmeirong, Manipur	July
<i>Cheilomenes sexmaculata</i> (Fab.)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	1900	Tizit, Manipur	January
	<i>Aphis craccivora</i> Koch	<i>Dolichos lablab</i> (L.)	785	Uripok, Manipur	July
	<i>Aphis gossypii</i> Glover	<i>Pyrus malus</i> Borkh.	700-2000	Darjeeling, W.B	April
		<i>Solanum melongena</i> L.	700-2000	Manipur	May
	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Chromolaena odorata</i> (L.) King & Robins.	700-2000	Dimapur, Nagaland	April
	<i>Greenidea (T.) formosana heeri</i> Raychaudhuri et al.	<i>Psidium guajava</i> L.	700-2000	Darjeeling, W.B	April
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus persica</i> (L.)	750-2000	Manipur	February-March
	<i>Melanaphis donacis</i> (Passerini)	<i>Arundo donax</i> L.	785	Uripok, Manipur	June
	<i>Toxoptera aurantii</i> (B.d.F.)	<i>Citrus aurantium</i> L.	750-2000	Manipur	September
	<i>Toxoptera citricidus</i> (Kirkaldy)	<i>Citrus grandis</i> Merr.	750-2000	Manipur	September
	<i>Tuberculatus paiki</i> H.R.L	<i>Quercus serrata</i> Thunb.	1300	Canchipur, Manipur	July
<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	750-1750	Manipur	November-February	

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Coccinella septempunctata</i> (L.) (Plate III)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	1666	Namchi, Sikkim	February
	<i>Aphis citricola</i> v.d.G	<i>Capsicum</i> sp.	1666	Namchi, Sikkim	May
	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> (L.)	1666	Namchi, Sikkim	May
	<i>Aphis gossypii</i> Glover	<i>Ageratum conyzoides</i> L.	1666	Namchi, Sikkim	December
		<i>Solanum melongena</i> L.	700-2000	Manipur	May
	<i>Aphis spiraecola</i> Patch	<i>Capsicum frutescens</i> L.	1675	Gangtok, Sikkim	January
	<i>Aulacorthum magnoliae</i> (Essig & Kuwana)	<i>Sechium edule</i> (Jacq.) Sw.	1875	Gangtok, Sikkim	November
	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Artemisia vulgaris</i> L.	1666	Namchi, Sikkim	May
	<i>Eulachnus thunbergii</i> (Wilson)	<i>Pinus khasya</i> Royle & Gordon	700-2000	Manipur	August
	<i>Greenidea (T.) formosana heeri</i> Raychaudhuri et al.	<i>Psidium guajava</i> L.	2100	Darjeeling, W.B	June
	<i>Hyadaphis coriandri</i> (Das)	<i>Coriandrum sativum</i> L.	1675	Gangtok, Sikkim	October
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus dulcis</i> (Mill.)	700-2000	Mangan, Sikkim	May
	<i>Lachnus tropicalis</i> v.d.G	<i>Quercus</i> sp.	1666	Namchi, Sikkim	May
	<i>Lipaphis erysimi</i> (Kalt.)	Indet			
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa canina</i> L.	1500	Kalimpong, W.B	May
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	700-2000	Mangan, Sikkim	May
	<i>Myzus persicae</i> (Sulzer)	<i>Solanum nigrum</i> L.	1250	Kalimpong, W.B	June
	<i>Pentalonia nigronervosa</i> Coquerel	<i>Musa</i> sp.	1100	Kalimpong, W.B	May
	<i>Neoacyrtosiphon holsti</i> (Takahashi)	Indet			
	<i>Subovatomyzus leucosceptri</i> Basu	<i>Turnera</i> sp.	2080	Pelling, Sikkim	May
	<i>Taovia indica</i> (Ghosh & Raychaudhuri)	<i>Alnus nepalensis</i> D. Don	1250	Kalimpong, W.B	December
	<i>Toxoptera aurantii</i> (B.d.F.)	<i>Citrus</i> sp.	1250	Kalimpong, W.B	May
	<i>Toxoptera odinae</i> (v.d.G.)	<i>Rhus semialata</i> Murry	700-2000	Manipur	March
	<i>Tuberculatus paiki</i> H.R.L	<i>Quercus serrata</i> Thunb.	1200	Kalimpong, W.B	November-February
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	750-1750	Manipur	November-February
	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Chingmeriong, Manipur	June

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Coccinella transversalis</i> Fabricius (Plate II, Fig 5)	<i>Aphis craccivora</i> Koch	<i>Dolichos lablab</i> (L.) Sweet	785	Uripok, Manipur	September
	<i>Aphis citricola</i> v.d.G.	<i>Bidens pilosa</i> L.	1850	Manipur	September
	<i>Aphis gossypii</i> Glover	<i>Psidium guajava</i> L.	700-2000	Manipur	October-January
		<i>Solanum melongena</i> L.	700-2000	Manipur	May
	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Gynura angulosa</i> (DC.)	1850	Manipur	September
	<i>Cervaphis quercus</i> Takahashi	<i>Quercus</i> sp.	1950	Manipur	July
	<i>Rhopalosiphum padi</i> (L.)	<i>Oryza sativa</i> L.	1850	Manipur	September
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	750-1750	Manipur	November-February
<i>Tuberculatus indicus</i> Ghosh, L.K	Indet				
<i>Coelophora bis-sellata</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Ageratum conyzoides</i> L.	785	Chingmeirong, Manipur	September
		<i>Solanum melongena</i> L.	700-2000	Manipur	April
	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> (L.)	1675	Gangtok, Sikkim	May
	<i>Cervaphis quercus</i> Takahashi	<i>Quercus</i> sp.	1950	Manipur	July
	<i>Macrosiphoniella yomogifoliae</i> (Shinji)	<i>Artemisia vulgaris</i> L.	1800	Chakabama, Manipur	July
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1100	Kalimpong, W.B	May
<i>Coelophora saucia</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Luffa cylindrica</i> (L.)	755	Manipur	February
	<i>Aphis craccivora</i> Koch	<i>Smithia sensitiva</i> Aiton	785	Lamphelpat, Manipur	February
	<i>Melanaphis donacis</i> (Passerini)	<i>Arundo donax</i> L.	785	Uripok, Manipur	February
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1100	Kalimpong, W.B	March
<i>Coelophora sex-areata</i> Mulsant	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Clerodendron</i> sp.	2000	Wokha, Manipur	May
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	1440	Mangan, Sikkim	January
	<i>Mollitrichosiphum montanum</i> (v.d.G)	<i>Rosa</i> sp.	1600	Lamblang, Manipur	May
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	June
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	785	Uripok, Manipur	February
	<i>Shinjia orientalis</i> (Shinji)	Fern	1600	Lamblang, Manipur	May
	<i>Taoia indica</i> (Ghosh & Raychaudhuri)	<i>Alnus nepalensis</i> D. Don	1250	Kalimpong, W.B	May
<i>Coelophora unicolor</i> Fab.	<i>Myzus persicae</i> (Sulzer)	<i>Sonchus</i> sp.	1666	Namchi, Sikkim	May
	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	1250	Kalimpong, W.B	May
<i>Coelophora inaequalis</i> (Fab.)	<i>Macrosiphum</i> sp.	<i>Artemisia vulgaris</i> L.	1250	Kalimpong, W.B	May
<i>Coelophora</i> sp.	<i>Aphis gossypii</i> Glover	<i>Galinsoga parviflora</i> Cav.	1666	Namchi, Sikkim	May
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	May

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Harmonia dimidiata</i> (Fabricius) (Plate II, Fig 1)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	1800	Pipima, Manipur	February
	<i>Aiceona titabarensis</i> (Raychaudhuri & Ghosh)	<i>Litsea polyantha</i> Lam.	785	Canchipur, Manipur	May
	<i>Aphis gossypii</i> Glover	<i>Sesamum indicum</i> L.	785	Uripok, Manipur	April
	<i>Cervaphis raptardi indica</i> Basu	<i>Cajanus cajan</i> (L.)	900	Manipur	March- September.
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	Indet	750-1750	Manipur	October-February
	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus griffithii</i> Hook.f.& Thomson	1250-1550	Champhai, Manipur	July- October
<i>Harmonia eucharis</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Colocasia esculenta</i> (L.)	1850	Khujama, Manipur	September
	<i>Cervaphis quercus</i> Takahashi	<i>Quercus serrata</i> Thunb.	1950	Chakabama, Manipur	July
	<i>Eulachnus thunbergii</i> (Wilson)	<i>Pinus khasya</i> Royle ex. Gordon	1325	Manipur	February
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus</i> sp.	1400	Kohima	July
	<i>Macrosiphoniella yomogifoliae</i> (Shinji)	<i>Artemisia vulgaris</i> (L.)	1850	Khujama, Manipur	September
	<i>Mollitrichosiphum montanum</i> (Ghosh & Raychaudhuri)	<i>Alnus nepalensis</i> D. Don	1850	Khujama, Manipur	September
	<i>Myzus varians</i> Davidson	<i>Prunus dulcis</i> (Mill.)	700-2000	Manipur	February- May
	<i>Tuberculatus paiki</i> H.R.L	Indet	785	Canchipur, Manipur	May
<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	Indet	750-2000	Manipur	November-February	
<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Chingmeriong, Manipur	July	
<i>Harmonia octomaculata</i> (Fabricius) (Plate II, Fig 2)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	1800	Khujama, Manipur	December
	<i>Aiceona litseae</i> Basu & H.R.L	<i>Litsea polyantha</i> Lam.	785	Canchipur, Manipur	May
	<i>Aphis gossypii</i> Glover	<i>Luffa cylindrica</i> (L.)	755	Manipur	November
	<i>Tuberculatus paiki</i> H.R.L	<i>Quercus serrata</i> Thunb.	785	Canchipur, Manipur	January
	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Chingmeirong, Manipur	July
<i>Harmonia</i> sp.	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Gynura angulosa</i> DC.	1100	Ranipool, Sikkim	November
	<i>Myzus persicae</i> (Sulzer)	<i>Gynura angulosa</i> DC.	1100	Kalimpong, W.B	May
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1250	Kalimpong, W.B	May
	<i>Tuberolachnus salignus</i> (Gmelin)	<i>Salix</i> sp.	2350	Thimpu, Bhutan	November
<i>Hippodamia variegata doubledayi</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Luffa cylindrica</i> L.	1900	Tizit, Manipur	March
	<i>Sitobian miscanthi</i> (Takahashi)	Indet			
<i>Megalocaria</i> sp.	<i>Eutrichosiphum taoi</i> Ghosh et al.	<i>Quercus serrata</i> Thunb.	2000	Ukhrul, Manipur	May

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Megalocaria dilatata</i> (Fabricius)	<i>Aphis nasturtii</i> Kalt.	Indet			
	<i>Aphis spiraeicola</i> Patch	<i>Cucumis sativus</i> L.	501-2000	Manipur	July
	<i>Astegopteryx bambusae</i> (Buckton)	<i>Bambusa arundinacea</i> (Retz.)	1550	Mangan, Sikkim	December
	<i>Astegopteryx minuta</i> (v.d.G.)	<i>Bambusa</i> sp.	1550	Mangan, Sikkim	December
	<i>Ceratovacuna lanigera</i> Zehntner	<i>Saccharum officinarum</i> L.	1100	Manipur	June
	<i>Ceratovacuna silvestrii</i> (Takahashi)	Indet			
	<i>Cervaphis schouteniae</i> v.d.G.	Indet			
	<i>Greenideoida ceyloniae</i> v.d.G.	Indet			
	<i>Pentalonia nigronervosa</i> Coquerel	Indet			
	<i>Pseudoregma bambusicola</i> (Takahashi)	<i>Bambusa</i> sp.	785	Manipur	February
	<i>Pyrolachnus piri</i> (Buckton)	Indet			
<i>Toxoptera aurantii</i> (B.d.F.)	<i>Citrus</i> sp.	1600	Mangan, Sikkim	May	
<i>Micraspis allardi</i> (Mulsant)	<i>Aphis gossypii</i> Glover	Indet			
	<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp.	785	Chingmeriong, Manipur	December-March
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica</i> sp.	785	Manipur	September-March
	<i>Myzus persicae</i> (Sulzer)	<i>Solanum nigrum</i> L.	1250	Kalimpong, W.B	February
<i>Micraspis discolor</i> (Fabricius)	<i>Aphis craccivora</i> Koch	<i>Dolichos lablab</i> (L.) Sweet	1675	Gangtok, Sikkim	May
	<i>Aphis gossypii</i> Glover	<i>Ageratum conyzoides</i> L.	750-2000	Manipur	June
	<i>Aphis spiraeicola</i> Patch	<i>Sonchus</i> sp.	1100	Mangan, Sikkim	May
	<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp.	900	Manipur	May
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica rapa</i> (L.)	1100	Kalimpong, W.B	February
	<i>Myzus persicae</i> (Sulzer)	<i>Solanum tuberosum</i> L.	1100	Kalimpong, W.B	February
	<i>Pentalonia nigronervosa</i> Coquerel	<i>Colocasia esculenta</i> (L.)	1666	Namchi, Sikkim	February
	<i>Rhopalosiphum nymphae</i> (L.)	<i>Salvinia molesta</i> D. Mitch	1675	Gangtok, Sikkim	January
<i>Toxoptera odinae</i> (v.d.G.)	<i>Mangifera indica</i> L.	785	Uripok, Manipur	June	
<i>Micraspis inops</i> (Mulsant)	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	750-1750	Manipur	November-February
	<i>Tuberculatus paiki</i> H.R.L.	<i>Quercus serrata</i> Thunb.	785	Canchipur, Manipur	July
<i>Monolepia signata</i> (Olivier)	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	956	Mangan, Sikkim	November
<i>Oenopia conglobata</i> (L.)	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Aurondo donax</i> L.	785	Canchipur, Manipur	January
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	May
	<i>Toxoptera aurantii</i> (B.d.F.)	<i>Citrus aurantium</i> L.	750-2000	Manipur	September

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Oenopia kirbyi</i> Mulsant	<i>Aphis fabae solanella</i> Theobald	Indet	1250	Kalimpong, W.B	April
	<i>Aphis gossypii</i> Glover	<i>Psidium guajava</i> L.	785	Canchipur, Manipur	November
	<i>Eulachnus thunbergii</i> (Wilson)	<i>Pinus khasya</i> Ro- yle ex Gordon	1100	Manipur	February
	<i>Eutrichosiphum</i> <i>raychaudhurii</i> (Ghosh)	Indet			
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus persi-</i> <i>ca</i> (L.) Batsch.			
	<i>Macrosiphoniella</i> <i>yomogifoliae</i> (Shinji)	<i>Artemisia vulgaris</i> L.	1900	Tizit, Manipur	January
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	April
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1250	Kalimpong, W.B	May
	<i>Myzus dycei</i> Carver	<i>Urtica dioica</i> L.	1850	Kikurma, Manipur	December
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Hordeum vulgare</i> L.	1666	Namchi, Sikkim	May
	<i>Rhopalosiphum</i> <i>nymphaeae</i> (L.)	<i>Prunus dulcis</i> (Mill.)	1675	Gangtok; Sikkim	May
	<i>Toxoptera aurantii</i> (B.d.F)	<i>Schima wallichii</i> (DC.) Korth	1800	Jakhama, Manipur	July
	<i>Tuberculatus paiki</i> H.R.L	<i>Quercus serrata</i> Thunb.	750- 2000	Manipur	June
	<i>Tuberculatus nervatus</i> Chakrabarti& Raychaudhuri	<i>Quercus serrata</i> Thunb.	750- 2000	Manipur	June-October
<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus acutis-</i> <i>sima</i> Carruth.	1600	Champhi, Manipur	June	
<i>Oenopia luteopus-</i> <i>tulata</i> Mulsant	<i>Acyrtosiphon</i> <i>pisum</i> (Harris)	<i>Pisum sativum</i> (L.)	1900	Tizit	March
	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> L.	1950	Chakabama, Manipur	January, May
	<i>Aphis gossypii</i> Glover	Indet	1675	Gangtok, Sikkim	May
	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Clerodendron</i> sp.	2500	Manipur	May
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus dulcis</i> (Mill.)	750- 2000	Manipur	May
	<i>Macrosiphoniella sanborni</i> (Gillette)	<i>Artemisia vulgaris</i> L.	1600	Lamblang, Manipur	May
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa canina</i> L.	2134	Darjeeling, W.B	May
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1100	Kalimpong, W.B	April
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1100	Kalimpong, W.B	May
<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Chingmeirong, Manipur	October.	
<i>Oenopia mani-</i> <i>purensis</i> Devi, Singh & Singh	<i>Cervaphis rappardi indica</i> Basu	<i>Cajanas cajan</i> L.	1600	Lamblang, Manipur	March

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Oenopia quadri-punctata</i> Kapur	<i>Aiceona litseae</i> Basu & H.R.L	<i>Litsea polyantha</i> Juss.	785	Canchipur, Manipur	November
	<i>Aphis fabae solanella</i> Theobald	Indet	1500	Champhai, Manipur	February
	<i>Aphis gossypii</i> Glover	<i>Psidium guajava</i> L.	785	Chingmeriong, Manipur	May
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus persica</i> (L.) Batsch.	785	Manipur	March
	<i>Toxoptera aurantii</i> (B.d.F.)	<i>Schima wallichii</i> (DC) Korth	1500	Mangan, Sikkim	May
	<i>Tuberculatus paiki</i> H.R.L	<i>Quercus serrata</i> Thunb.	1800	Manipur	February
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	1800	Manipur	November- February
	<i>Tuberculatus indicus</i> Ghosh	<i>Quercus acutis- sima</i> Carruth.	1750	Champhai, Manipur	July
<i>Oenopia sauzeti</i> Mulsant (Plate II, Fig 3)	<i>Aphis fabae</i> Scopoli	Indet	1675	Gangtok, Sikkim	November
	<i>Aphis gossypii</i> Glover	<i>Pyrus malus</i> L.	750- 2000	Manipur	June-Oct
	<i>Aphis spiraeicola</i> Patch	Indet	2100	Darjeeling, W.B	May
	<i>Brachycaudus</i> sp.	<i>Crotolaria salti- ana</i> Andrews	1250	Kalimpong, W.B	December
	<i>Capitophorus hippo- phaes javanicus</i> H.R.L	<i>Polygonum orientale</i> L.	1675	Gangtok , Sikkim	December
	<i>Cervaphis quercus</i> Takahashi	<i>Quercus acutis- sima</i> Carruth.	1950	Chakabama, Manipur	July
	<i>Cletherobius dryobius</i> Chakrabarti & Raychaudhuri	<i>Prunus cerasus</i> L.	1666	Namchi, Sikkim	December
	<i>Coloradoa artemisicola</i> Takahashi	<i>Artemisia vulgaris</i> L.	1600	Lamblang, Manipur	May
	<i>Macrosiphoniella pseudoartemisiae</i> Shinji	<i>Chrysanthemum coronarum</i> L.	1250	Kalimpong, W.B	July
	<i>Macrosiphoniella yomogifoliae</i> (Shinji)	<i>Artemisia vulgaris</i> L.	1800	Khujama, Manipur	July
	<i>Macrosiphoniella sanborni</i> (Gillette)	<i>Chrysanthemum</i> sp.	2100	Darjeeling, W.B	February- March
	<i>Mollitrichosiphum montanum</i> (v.d.G.)	<i>Alnus nepalen- sis</i> D. Don	1800	Kohima, Nagaland	July
	<i>Myzus cerasi</i> (Fab.)	<i>Artemisia vulgaris</i> L.	1800	Kohima, Nagaland	July
<i>Toxoptera aurantii</i> (B.d.F.)	<i>Schima wallichii</i> (DC.) Korth	1500	Mangan, Sikkim	May	

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Oenopia sexareata</i> (Mulsant) (Plate II, Fig 6)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	1900	Tizit, Manipur	March
	<i>Aphis citricola</i> (v.d.G.)	<i>Bidens pilosa</i> L.	1800	Chakabama, Manipur	July
	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> L.	785	Manipur	March-September
	<i>Aphis gossypii</i> Glover	<i>Artocarpus heterophyllus</i> Lam.	1550	Champhai, Manipur	July
	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Clerodendron</i> sp.	2000	Kalimpong, W.B	May
	<i>Cervaphis quercus</i> Takahashi	<i>Quercus acutissima</i> Carruth.	1950	Chakabama, Manipur	July
	<i>Macrosiphoniella yomogifoliae</i> (Shinji)	<i>Artemisia vulgaris</i> L.	1850	Khujama, Manipur	September
	<i>Myzus dycei</i> Carver	<i>Urtica dioica</i> (L.)	1900	Tizit, Manipur	March
	<i>Shinjia orientalis</i> (Shinji)	Fern	1600	Ukhrul, Manipur	May
<i>Oenopia</i> sp.	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus dulcis</i> (Mill.)	750-2000	Manipur	February-March
<i>Phrynocaria unicolor</i> (Fabricius)	<i>Taonia indica</i> (Ghosh and Raychaudhuri)	<i>Alnus</i> sp.	1800	Manipur	August
<i>Propylea dissecta</i> (Mulsant)	<i>Eriosoma lanigerum</i> (Hausmann)	Indet			
<i>Propylea japonica</i> (Thunberg)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	750	Manipur	November
	<i>Aphis craccivora</i> Koch	Indet			
	<i>Aphis gossypii</i> Glover	<i>Duranta repens</i> L.	785	Chingmerirong, Manipur	November
	<i>Aphis nerii</i> B.d.F.	Indet			
	<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp.	785	Chingmerirong, Manipur	June
	<i>Hydaphis coriandri</i> (Das)	Indet			
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica</i> sp.	750	Manipur	April
<i>Myzus persicae</i> (Sulzer)	<i>Solanum nigrum</i> L.	1250	Kalimpong, W.B	June	
<i>Rhopalosiphum padi</i> (L.)	<i>Zea mays</i> (L.)				
<i>Propylea quatuordecimpunctata</i> (L.) (Plate II, Fig 4)	<i>Acyrtosiphon pisum</i> (Harris)	<i>Pisum sativum</i> L.	1250	Kalimpong W.B	May
	<i>Aphis craccivora</i> Koch	<i>Cajanus cajan</i> (L.) Mill	1675	Gangtok, Sikkim	June
	<i>Aphis gossypii</i> Glover	<i>Duranta erecta</i> L.	1500	Champhai, Manipur	November
	<i>Aphis nerii</i> B.d.F.	<i>Solanum</i> sp.	1200	Kalimpong, W.B	December
	<i>Aphis spiraeicola</i> Patch	<i>Ageratum conyzoides</i> L.	1675	Gangtok, Sikkim	November
	<i>Hysteroneura setariae</i> (Thomas)	Indet			
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica</i> sp.	750	Manipur	May
	<i>Melanaphis sacchari</i> (Zehntner)	<i>Zea mays</i> (L.)	1100	Kalimpong, W.B	July
	<i>Myzus persicae</i> (Sulzer)	<i>Gynura angulosa</i> DC.	1100	Kalimpong, W.B	May
	<i>Pentalonia nigronervosa</i> Coquerel	<i>Musa</i> sp.	1250	Kalimpong, W.B	June
	<i>Scizaphis graminum</i> (Rondani)	Indet			
<i>Toxoptera aurantii</i> (B.d.F.)	<i>Citrus</i> sp.	1675	Gangtok, Sikkim	March	

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Synonycha grandis</i> (Thunberg) (Plate II, Fig 7)	<i>Aphis gossypii</i> Glover	<i>Dolichos lablab</i> (L.)	785	Uripok, Manipur	April
	<i>Pseudoregma alexendari</i> (Takahashi)	<i>Bambusa</i> sp.	2100	Darjeeling, W.B	July
		<i>Bambusa</i> sp.	1200	Kalimpong, W.B	July
	<i>Tuberculatus indicus</i> Ghosh, L.K	<i>Quercus serrata</i> Thunb.	785	Manipur	February
Subfamily:- Scymninae					
Tribe:- Aspidimerini					
<i>Cryptogonus ariasi</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Pyrus malus</i> L.	700-2000	Manipur	April
<i>Cryptogonus bimaculatus</i> Kapur	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus persica</i> (L.) Batsch.	700-2000	Manipur	February-March
	<i>Toxoptera citricidus</i> (Kirkaldy)	<i>Citrus grandis</i> Merr.	700-2000	Manipur	March
	<i>Tuberculatus paiki</i> H.R.L.	<i>Quercus serrata</i> Thunb.	785	Canchipur	January
<i>Cryptogonus complexus</i> Kapur	<i>Aiceona titabarensis</i> (Raychaudhuri & Ghosh)	<i>Litsea polyantha</i> Juss.	1001-1500	Manipur	February
<i>Cryptogonus nitidus</i> Kapur	<i>Aphis gossypii</i> Glover	<i>Gynura</i> sp.	501-1000	Manipur	August
<i>Cryptogonus quadriguttatus</i> (Weise)	<i>Aphis gossypii</i> Glover	<i>Abelmoschus esculentus</i> (L.)	1560	Champhai, Manipur	August
	<i>Cervaphis quercus</i> Takahashi	<i>Quercus</i> sp.	1800	Wokha, Manipur	March
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Prunus dulcis</i> (Mill.)	750-2000	Manipur	February-March
	<i>Lachnus tropicalis</i> (v.d.G.)	Indet			
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	1100	Kalimpong, W.B	May
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	1100	Kalimpong, W.B	May
	<i>Melanaphis sacchari</i> (Zehntner)	<i>Zea mays</i> L.	1100	Kalimpong, W.B	July
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1100	Kalimpong, W.B	May
<i>Toxoptera aurantii</i> (B.d.F.)	<i>Schima wallichii</i> (DC.)	1500	Mangan, Sikkim	May	
<i>Cryptogonus</i> sp.	<i>Aphis gossypii</i> Glover	<i>Chromolaena odorata</i> (L.)	501-1000	Manipur	October
<i>Horniolus dispar</i> Weise	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Gynura angulosa</i> DC	1100	Ranipool, Sikkim	May
<i>Horniolus guimetii</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Colocasia esculenta</i> (L.)	1800	Chakabama, Manipur	May
	<i>Aphis spiraeicola</i> Patch	Indet			
<i>Horniolus nigripes</i> Miyatake	<i>Uroleucon compositae</i> Theobald	Indet			
Tribe:- Hyperaspidini					
<i>Hyperaspis maindroni</i> Sicard	<i>Aphis fabae</i> Scopoli	<i>Quercus</i> sp.	1500	Mangan, Sikkim	May
	<i>Aphis gossypii</i> Glover	<i>Duranta erecta</i> L.	785	Chingmeriong, Manipur	May
	<i>Aphis spiraeicola</i> Patch	<i>Bidens pilosa</i> L.	750-2000	Manipur	June

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Hyperaspis marginaloides</i> Canepari	<i>Aphis fabae</i> Scopoli	<i>Cestrum nocturnum</i> L.	1800	Chakabama, Manipur	March
	<i>Aphis gossypii</i> Glover	<i>Colocasia esculenta</i> (L.)	750-2000	Manipur	May
	<i>Aphis spiraeicola</i> Patch	<i>Ageratum conyzoides</i> L.	1100	Ranipool, Sikkim	May
Tribe:- Scymnini					
<i>Nephus regularis</i> (Sicard)	<i>Aphis gossypii</i> Glover	<i>Psidium guajava</i> L.	750-2000	Manipur	November
	<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp.	1250	Champhai, Manipur	December
	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica</i> sp.	785	Chingmeriong, Manipur	January
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1100	Kalimpong, W.B	May
<i>Nephus</i> sp.	<i>Astegopteryx minuta</i> (v.d.G.)	<i>Bambusa</i> sp.	1550	Mangan, Sikkim	December
<i>Scymnus (Neopullus) fuscatus</i> Boheman	<i>Greenidea (T.) formosana heeri</i> Raychaudhuri et al.	<i>Psidium guajava</i> L.	750-2000	Manipur	February
<i>Scymnus (Pullus) castaneus</i> Sicard	<i>Aphis craccivora</i> Koch	<i>Dolichos lablab</i> (L.) Sweet	1675	Gangtok, Sikkim	March
	<i>Aphis fabae</i> Scopoli	<i>Cestrum</i> sp.	785	Chingmeriong, Manipur	June
	<i>Aphis gossypii</i> Glover	<i>Capsicum frutescens</i> L.	750-2000	Manipur	May
<i>Scymnus (Pullus) giganteus</i> Kamiya	<i>Aphis gossypii</i> Glover <i>Tuberculatus indicus</i> Ghosh L.K	<i>Bidens pilosa</i> L. Indet	1666	Namchi, Sikkim	December
<i>Scymnus (Pullus) gracilis</i> Motschulsky	<i>Aphis pomi</i> de Geer	Indet			
<i>Scymnus (Pullus) hilaris</i> Motschulsky	<i>Aphis gossypii</i> Glover	<i>Artocarpus heterophyllus</i> Lam.	1666	Namchi, Sikkim	December
	<i>Greenidea (T.) formosana heeri</i> Raychaudhuri et al.	<i>Psidium guajava</i> (L.)	1675	Gangtok, Sikkim	December
	<i>Tuberculatus paiki</i> H.R.L.	<i>Quercus serrata</i> Thunb.	1500	Canchipur, Manipur	August
<i>Scymnus (Pullus) hingstoni</i> Kapur	<i>Melanaphis bambusae</i> (Fullway)	Indet			
<i>Scymnus (Pullus) py-rochellus</i> (Mulsant)	<i>Aphis gossypii</i> Glover	<i>Duranta plumeiri</i> Jacq.	1950	Manipur	January
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa canina</i> L.	1400	Mangan, Sikkim	November
<i>Scymnus (Pullus) quadrillum</i> Motsch.	<i>Aphis gossypii</i> Glover	<i>Luffa cylindrica</i> (L.)	785	Lamphelpat, Manipur	October
	<i>Aphis nerii</i> B.d.F.	Indet			
	<i>Aphis rumicis</i> L.	Indet			
	<i>Myzus persicae</i> (Sulzer)	<i>Solanum</i> sp.	1666	Namchi, Sikkim	May
	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Zea mays</i> L.	1675	Gangtok, Sikkim	May
<i>Scymnus (Pullus) sappoensis</i> (Ohta)	<i>Aiceona titabarensis</i> (Raychaudhuri & Ghosh)	Indet			
<i>Scymnus (Pullus) xermapelinus</i> Mulsant	<i>Aphis fabae</i> Scopoli	<i>Vicia faba</i> L.	1250	Kalimpong, W.B	June
	<i>Aphis gossypii</i> Glover	<i>Capsicum frutescens</i> L.	2100	Darjeeling, W.B	March
	<i>Brevicoryne brassicae</i> (L.)	<i>Brassica</i> sp.	2100	Darjeeling; W.B.	May

Predator	Aphid host	Plant host	Altitude (m a.s.l.)	Locality	Month
<i>Scymnus</i> (<i>Scymnus</i>) <i>nubilus</i> Mulsant	<i>Aphis craccivora</i> Koch	<i>Crotolaria juncea</i> L.	1550	Champhai, Manipur	July
	<i>Aphis fabae</i> Scopoli	<i>Cestrum nocturnum</i> L.	750- 1750	Manipur	November- February
	<i>Aphis gossypii</i> Glover	<i>Abelmoschus es- culentus</i> (L.)	785	Manipur	February
	<i>Aphis nerii</i> B.d.F.	<i>Solanum melongena</i> L.	785	Chingmeriong, Manipur	February
	<i>Pentalonia nigronervosa</i> Coquerel	<i>Musa</i> sp.	1100	Kalimpong, W.B	May
	<i>Rhopalosiphum nymphaeae</i> (L.)	Indet			
	<i>Therioaphis trifolii</i> (Monell)	Indet			
	<i>Toxoptera odinae</i> (v.d.G.)	<i>Wendlandia gla- brata</i> DC.	500	Manipur	February
<i>Uroleucon compositae</i> (Theobald)	<i>Carthamus</i> sp.	2100	Darjeeling, W.B	January	
<i>Scymnus</i> sp.	<i>Taoia indica</i> (Ghosh & Raychaudhuri)	<i>Alnus nepalensis</i> D. Don	2400	Mao, Manipur	May
	<i>Aphis gossypii</i> Glover	<i>Solanum melongena</i> L.	700- 2000	Manipur	April
Subfamily:- Sticholotidinae Tribe:- Sti- cholotidini					
<i>Sticholotis bino- tata</i> (Gorham)	<i>Brachycaudus helichrysi</i> (Kalt.)	<i>Ageratum conyzoides</i> L.	2100	Darjeeling, W.B	March- September
	<i>Hyalopterus pruni</i> (Geoffroy)	<i>Arundo donax</i> L.	785	Manipur	January
<i>Jauravia assa- mensis</i> Kapur	<i>Aphis gossypii</i> Glover	Indet	500- 2000	Manipur	March- September
	<i>Myzus persicae</i> (Sulzer)	Indet			
<i>Pharoscygnus flexibilis kashmi- rensis</i> Kapur	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> L.	785	Manipur	February- March
Abbreviations: W.B.= West Bengal					

APPENDIX- II: Aphidophagous Syrphids & their association with aphid preys, host plants, localities and months of availability in Eastern Himalaya & Northeast India

Predator	Aphid host	Plant host	Locality	Alt. (mt.)	Month
<i>Allograpta javana</i> (Weid)	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	Kalimpong W.B	1250	April
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	Kalimpong W.B	1250	April
<i>Betasyrphus serarius</i> Weid	<i>Aphis craccivora</i> Koch	<i>Dolichos lablab</i> (L.)	Kalimpong W.B	1250	November
	<i>Aphis gossypii</i> Glover	<i>Capsicum frutescens</i> (L.)	Kalimpong W.B	1250	November
	<i>Aulacorthum magnoliae</i> (Essig and Kuwana)	<i>Sechium edule</i> (Jacq.)	Kalimpong W.B	1250	July
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	Kalimpong W.B	1250	July
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	Kalimpong W.B	1250	July
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	Manipur	750-1750	July
<i>Epistrophe griseocinctus</i> (Braneti)	<i>Rhopalosiphum maidis</i> (Fitch)	<i>Hordeum vulgare</i> (L.)	Mangan (Sikkim)	1500	November
<i>Episyrphus balteatus</i> (De Geer)	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	Manipur	750-1750	June
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	Moirang (Manipur)	1725	May
	<i>Melanaphis sacchari</i> (Zehntner)	<i>Zea mays</i> (L.)	Kalimpong W.B	1250	July
	<i>Myzus persicae</i> (Sulzer)	<i>Solanum tuberosum</i> (L.)	Gangtok (Sikkim)	1675	May
<i>Ischiodon scutellaris</i> (Fab.)	<i>Aphis spiraecola</i> Patch	<i>Artemisia vulgaris</i> L.	Loktak (Manipur)	768	June
	<i>Aphis gossypii</i> Glover	<i>Solanum melongena</i> L.	Manipur	700-2000	December
	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	Manipur	750-1750	November-February
<i>Melanostoma orientale</i> L.	<i>Melanaphis sacchari</i> (Zehntner)	<i>Saccharum officinarum</i> (L.)	Mangan (Sikkim)	1500	December
<i>Metasyrphus (M) confrater</i> (Wied)	<i>Tuberculatus nervatus</i> Chakrabarti & Raychaudhuri	<i>Quercus serrata</i> Thunb.	Manipur	750-1750	November-February
<i>Paragus indicus</i> Brun.	<i>Aphis spiraecola</i> Patch	<i>Bidens pilosa</i> L.	Kalimpong W.B	1250	June
<i>Paragus serratus</i> Fab.	<i>Aphis craccivora</i> Koch	<i>Vicia faba</i> (L.)	Moirang (Manipur)	1725	May
	<i>Aphis gossypii</i> Glover	<i>Solanum melongena</i> L.	Manipur	700-2000	May
<i>Sphaerophoria scripta</i> (L.)	<i>Lipaphis erysimi</i> (Kalt.)	<i>Brassica nigra</i> (L.)	Kalimpong W.B	1250	November
	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	Kalimpong W.B	1250	January
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa</i> sp.	Kalimpong W.B	1250	December
<i>Sphaerophoria javana</i> Wied.	<i>Sitobion rosaeformis</i> (Das)	<i>Rosa</i> sp.	Moirang (Manipur)	1725	May
<i>Syrphus serarius</i> Wied	<i>Aphis craccivora</i> Koch	<i>Impatiens balsamina</i> (L.)	Kalimpong W.B	1250	July - October
	<i>Cryptomyzus taoi</i> H.R.L	Indet	Dimapur (Nagaland)	700-2000	February
	<i>Macrosiphum rosae</i> (L.)	<i>Rosa canina</i> (L.)	Kalimpong W.B	1250	April

Abbreviation: W.B.= West Bengal; Alt.= Altitude

Tafel II



1



5



2



6



3



4



7

Some aphidophagous Coccinellidae from India: 1- *Harmonia dimidiata* Fabricius, 2 - *Harmonia octomaculata* Fabricius, 3 - *Oenopia sauzeti* Mulsant, 4 - *Propylaea quatuordecimpunctata* (Linné), 5 - *Coccinella transversalis* Fabricius, 6 - *Oenopia sexareata* (Mulsant), 7 - *Synonycha grandis* (Thunberg).

Tafel III



Coccinella septempunctata Linné, 1758, the most common aphidophagus ladybird.