



DIVERSITY OF ARTHROPOD FAUNA IN KING CHILLI (*CAPSICUM CHINENSE* JACQ.) ECOSYSTEM IN NORTH EAST INDIA

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ABSTRACT

A field experiment was carried out at the Horticultural Orchard, Assam Agricultural University, Jorhat during rabi (2014-15 and 2015-16) to investigate on arthropod diversity of king chilli. Altogether 110 species were found to be associated, of which 19 species were identified as pests, 63 as natural enemies and 27 species as casual visitors. Among the insect pests recorded, *Aphis gossypii*, *Myzus persicae*, *Bemisia tabaci*, *Bactrocera latifrons*, *Scirtothrips dorsalis* and *Polyphagotarsonemus latus* were major pests and *B. latifrons* has been reporting for the first time causing fruit rot in the region. The relative abundance of pests was higher (54.84%) in 2015-16 compared to 45.16% during 2014-15. Among the natural enemies recorded, 50 species were predators and 13 species were parasitoids, with most of them being reported for the first time in king chilli ecosystem. The relative abundance of predators was maximum during 2015-16 (56.41%) compared to 2014-15 (43.59%) and among the parasitoids, hymenopterans exhibited maximum relative abundance (88.89% each) in both the seasons. However, only Hypocreales was observed during 2014-15, and Diptera in 2015-16 with the relative abundance of 11.11% each. During the study, 27 species of insects were observed as casual visitors and their relative abundance was 46.67 and 53.33% during 2014-15 and 2015-16 respectively.

Key words: King chilli, Assam, diversity, arthropod, pests, natural enemies, rabi, Hymenoptera, Diptera, relative abundance, species diversity, parasitoids, predators, new records

King chilli (*Capsicum chinense* Jacquin) is known for its pleasurable and appetizing aroma. This chilli is an interspecific hybrid mostly of *Capsicum chinense* with some genes of *Capsicum frutescens* (Bosland and Baral, 2007). The chilli is also an important spice crop grown extensively in northeastern region of India, predominantly in the states of Assam, Manipur and Nagaland and belongs to the family Solanaceae. It is the world's hottest chilli pepper, 400x hotter than Tabasco sauce (Baruah et al., 2014); however, as of 2012 it was superseded by the Trinidad Moruga Scorpion (1,500,000- 2,000,000 SHU's). In Assam, and Nagaland it is known by many local names (Meghvansi et al., 2010). The fresh king chilli costs around 300-350 Rs/ kg and >1500-2000 Rs/ kg in dried chilli at local market, and it is exported too (Singh and Ghosal, 2010). This chilli also has superior cost benefit ratio/ ha, and in Assam, it reach up to 1:11.85 (Parasar and Deka, 2013). In Assam, few insects like *Aphis gossypii*, *Myzus persicae*, *Bemisia tabaci*, *Scirtothrips dorsalis* and *Polyphagotarsonemus latus* were known to infest this crop- Begam et al. (2016) and Buragohain et al. (2017).

It is also highly susceptible to viral diseases transmitted by aphids, whitefly and thrips (Talukdar et al., 2015; Baruah et al., 2016). Since little work has been done on arthropod diversity in king chilli ecosystem, the present study focusing on the pests and their natural enemies.

MATERIALS AND METHODS

The present study was carried out at the Experimental farm, Department of Horticulture, Assam Agricultural University, Jorhat, Assam (26°47'N, 94°12'E, 86.6 masl). Preparation of the field and raising of the crop were done by following package and practices for horticultural crops of Assam. The seeds for sowing were extracted from the healthy, uninfected, fully ripen fruits of king chilli collected from the local sources. The seed were then sown on 15th September, 2014 and 20th September, 2015 in V type plastic trays filled with coco-peat and one/two seeds were sown/ hole. The trays were then kept under insect proof polyhouse. The seedlings were then transplanted on 10th January, 2015 and 14th January, 2016, and recommended doses of manures and fertilizers were applied before transplanting. A

spacing of 75x75 cm was maintained in 100 m² and the activity of arthropods were observed at 15 days after transplanting at weekly intervals without insecticides application. The arthropods were photographed and collected by using aspirator, pit fall trap and insect collecting net. These were killed in chloroform and preserved in 80% ethanol in vials for small and soft bodied insects and pinning was done for larger insects. The samples were then sent to the ICAR-National Bureau of Agricultural Insects Resources (NBAIR), Bangalore for identification. The relative abundance of pests as well as their natural enemies was also calculated by counting the number of species in each season and sum of species and expressed in %. Similarly, relative abundance (%) of species within the season was also assessed by counting total species in each order and total number of species.

RESULTS AND DISCUSSION

The king chilli was found to be associated with 110 species of arthropods, of which 19 species were identified as pests, 64 as natural enemies, and 27 as causal visitors (Table 1,2). Among the insect pests, six species were major pests- viz., *Aphis gossypii* (Glover), *Myzus persicae* (Sulzer), *Bemisia tabaci* (Gennadius), *Bactrocera latifrons* (Hendel), *Scirtothrips dorsalis* (Hood) and *Polyphagotarsonemus latus* (Banks). Of these, *B. latifrons* is a new record of pest causing fruit rot. *Gryllotalpa africana* (Palisot de Beauvois), *Cofana* sp., *Empoasca* sp., *Amrasca biguttula biguttula* (Ishida), *Sogatella* sp., *Coccus* sp., *Phenacoccus* sp., *Monolepta signata* (Olivier), *Spodoptera litura* (F.), *Orvasca* sp., *Agrotis ipsilon* (Hufnagel), *Blattella* sp. and *Tetranychus* sp. were not causing serious damage, and hence are minor pests. 14 species of pests were identified during 2014-15 and 17 species during 2015-16 and the relative abundance of pests was maximum (54.84%) in 2015-16 compared to 45.16% during 2014-15. The pests were found to be- 9 hemipterans, 3 lepidopterans, 2 Trombidiformes and one species each from order Orthoptera, Coleoptera, Diptera, Thysanoptera and Blattodea. The relative abundance of hemipteran was maximum both in 2014-15 and 2015-16 (42.86 and 47.06%, respectively) followed by lepidopterans (21.43 and 17.65%, respectively). The numbers of pest species were low during rabi, 2014-15 as compared to 2015-16 and this might be due to early arrival of monsoon and also the experimental site was surrounded by solanaceous crops.

Earlier many insect pests had been observed, however, only few have been identified from king

chilli as reported by Begam et al. (2016), Bathari et al. (2016) and Buragohain et al. (2017) observed that *A. gossypii*, *S. dorsalis*, *B. tabaci* and *P. latus* were the major pests; and *Amrasca biguttula biguttula*, *Agrotis ipsilon* and *Monolepta signata* were found associated in Assam. However, Thangjam et al. (2017) observed that chilli was associated with 19 species of arthropod pests, of which 12 species (*M. persicae*, *B. latifrons*, *G. africana*, *Cofana* sp., *Empoasca* sp., *Sogatella* sp., *Coccus* sp., *Phenacoccus* sp., *S. litura*, *Orvasca* sp., *Blattella* sp. and *Tetranychus* sp.) are observed for the first time from Assam.

The present results are in conformity with those of Krishna Kumar et al. (1996) that thrips (*S. dorsalis* Hood), whitefly (*B. tabaci* Gennadius), aphid (*M. persicae* Sulzer), broad mites (*P. latus* Banks), fruit borer (*H. armigera* Hubner) and tobacco caterpillar (*S. litura* F.) were the major pests. Dey et al. (2001) and Chakraborti et al. (2015) also observed 21 insects and non-insect pests infesting chilli crop and found that *S. dorsalis*, *A. gossypii*, *P. latus* and *B. tabaci* were the major pests at West Bengal. Jadhav et al. (2004) also reported 39 genera and 51 species of insects and mites Sarwar (2012) and Roopa and Kumar (2014) also observed similar major pests. Boopathi et al. (2013) reported that fruit flies (*Bactrocera* sp.) caused extensive damage to capsicum in Mizoram and Wingsanoi and Siri (2012) also reported that *B. latifrons* (Hendel) is a serious pest in chilli in Indonesia.

Among the 64 natural enemies observed, 50 species were predators, 13 species were parasitoids and one strain of entomopathogenic fungus. Out of 50 species of predators, 22 species were coleopteran, 10 species were Araneae, 6 species were dipteran, 5 species were odonates, 2 species each were hemipteran, orthopteran and neuropteran and one species of mantodean. Under Coleoptera, 19 species belong to family Coccinellidae and one species each at Cantharidae, Carabidae and Staphylinidae. Also, 4 species belongs to family Syrphidae and one species each of Asilidae and Dolichopodidae under Diptera. In Odonata, two families and in Hemiptera, 2 species were observed. along with two Orthoptera and two of Neuroptera, and one Mantidae. Under Araneae, 10 species of spiders were observed During rabi 2014-15 and 2015-16, 34 and 44 predators were observed, respectively and the relative abundance was more during 2015-16 (56.41%). Highest relative abundance (41.18%) was recorded in coleopteran predators followed by Odonata and Diptera.

Table 1. List of pests/ predators observed in king chilli (rabi 2014-15, 2015-16)

Pests							
S. No.	Common name	Scientific name	Family	Order	2014-15	2015-16	Status
1	Mole cricket	<i>Gryllotalpa africana</i> (Palisot de Beauvois, 1805)	Gryllotalpidae	Orthoptera		+	Minor
2	Cotton aphid	<i>Aphis gossypii</i> (Glover, 1877)	Aphididae	Hemiptera	+	+	Major
3	Green peach aphid	<i>Myzus persicae</i> (Sulzer, 1776)	Aphididae	Hemiptera		+	Major
4	Silverleaf whitefly	<i>Bemisia tabaci</i> (Gennadius, 1889)	Aleyrodidae	Hemiptera	+	+	Major
5	Leaf hopper	<i>Cofana</i> sp.	Cicadellidae	Hemiptera	+		Minor
6	Leaf hopper	<i>Empoasca</i> sp.	Cicadellidae	Hemiptera	+	+	Minor
7	Leaf hopper	<i>Amrasca biguttula biguttula</i> (Ishida, 1912)	Cicadellidae	Hemiptera	+	+	Minor
8	White backed plant hopper	<i>Sogatella</i> sp.	Delphacidae	Hemiptera	+	+	Minor
9	Soft scale insect	<i>Coccus</i> sp.	Coccidae	Hemiptera		+	Minor
10	Mealybug	<i>Phenacoccus</i> sp.	Pseudococcidae	Hemiptera		+	Minor
11	Leaf beetle	<i>Monolepta signata</i> (Olivier, 1808)	Chrysomelidae	Coleoptera	+	+	Minor
12	Solanum fruit fly	<i>Bactrocera latifrons</i> (Hendel, 1912)	Tephritidae	Diptera	+	+	Major
13	Chilli thrips	<i>Scirtothrips dorsalis</i> (Hood, 1919)	Thripidae	Thysanoptera	+	+	Major
14	Tobacco cutworm	<i>Spodoptera litura</i> (F., 1775)	Noctuidae	Lepidoptera	+	+	Minor
15	Tussock Caterpillar	<i>Orvasca</i> sp.	Lymantriidae	Lepidoptera	+	+	Minor
16	Black cutworm	<i>Agrotis ipsilon</i> (Hufnagel, 1766)	Noctuidae	Lepidoptera	+	+	Minor
17	Cockroach	<i>Blattella</i> sp.	Blattellidae	Blattodea		+	Minor
18	Broad Mite	<i>Polyphagotarsonemus latus</i> (Banks, 1904)	Tarsonemidae	Trombidiformes	+		Major
19	Mite	<i>Tetranychus</i> sp.	Tetranychidae	Trombidiformes	+	+	Minor
Total					14	17	
Relative abundance (%)					45.16	54.84	
Predators							
S. No.	Common Name	Scientific name	Family	Order	2014-15	2015-16	Host
1	Transverse ladybird	<i>Coccinella transversalis</i> (F., 1781)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
2	Seven spot ladybird	<i>Coccinella septempunctata</i> (L., 1758)	Coccinellidae	Coleoptera	+		Soft bodied insects
3	Six-spotted zigzag ladybird	<i>Menochilus sexmaculatus</i> (F., 1781)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
4	Ladybird beetle	<i>Micraspis discolor</i> (F., 1798)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
5	Ladybird beetle	<i>Micraspis univittata</i> (Hope, 1831)	Coccinellidae	Coleoptera		+	Soft bodied insects
6	Ladybird beetle	<i>Coelophora bissellata</i> (Mulsant, 1850)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
7	Ladybird beetle	<i>Cryptogonus quadriguttatus</i> (Weise, 1895)	Coccinellidae	Coleoptera		+	Soft bodied insects
8	Ladybird beetle	<i>Cryptogonus bimaculatus</i> (Kapur, 1948)	Coccinellidae	Coleoptera	+		Soft bodied insects
9	Ladybird beetle	<i>Cryptogonus orbiculus</i> (Gyllenhal, 1808)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
10	Ladybird beetle	<i>Cryptogonus</i> sp.	Coccinellidae	Coleoptera	+	+	Soft bodied insects
11	Ladybird beetle	<i>Cryptogonus</i> sp.	Coccinellidae	Coleoptera	+	+	Soft bodied insects
12	Ladybird beetle	<i>Jauravia quadrinotata</i> (Kapur, 1946)	Coccinellidae	Coleoptera		+	Soft bodied insects
13	Ladybird beetle	<i>Propylea dissecta</i> (Mulsant, 1850)	Coccinellidae	Coleoptera		+	Soft bodied insects

(contd. Table 1)

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14	Ladybird beetle	<i>Propylea</i> sp.	Coccinellidae	Coleoptera		+	Soft bodied insects
15	Ladybird beetle	<i>Brumoides suturalis</i> (F., 1789)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
16	Ladybird beetle	<i>Scymnus nubilus</i> (Mulsant, 1850)	Coccinellidae	Coleoptera	+	+	Soft bodied insects
17	Ladybird beetle	<i>Platynaspis kapuri</i> (Chakraborty and Biswas, 2000)	Coccinellidae	Coleoptera		+	Soft bodied insects
18	Ladybird beetle	<i>Platynaspis</i> sp.	Coccinellidae	Coleoptera		+	Soft bodied insects
19	Ladybird beetle	<i>Harmonia dimidiata</i> (F., 1781)	Coccinellidae	Coleoptera	+		Soft bodied insects
20	Soldier beetle	<i>Cantharis pellucida</i> (F., 1792)	Cantharidae	Coleoptera		+	Small insects
21	Ground beetle	<i>Pheropsophus catoirei</i> (Dejean, 1825)	Carabidae	Coleoptera	+		Small insects
22	Rove beetle	<i>Paederus fuscipes</i> (Curtis, 1840)	Staphylinidae	Coleoptera	+	+	Small insects
23	Pentatomid bug	<i>Andrallus spinidens</i> (F., 1787)	Pentatomidae	Hemiptera		+	Lepidopteran larvae
24	Big eyed bug	<i>Geocoris</i> sp.	Geocoridae	Hemiptera	+	+	Soft bodied insects
25	Green lacewing	<i>Chrysoperla carnea</i> (Stephens, 1836)	Chrysopidae	Neuroptera	+	+	Eggs and soft bodied insects
26	Brown lacewing	<i>Micromus</i> sp.	Hemerobiidae	Neuroptera	+	+	Eggs and soft bodied insects
27	Preying mantids	<i>Mantis religiosa</i> (L., 1758)	Mantidae	Mantodea	+	+	Any insects
28	Cricket	<i>Trigonidium humbertianum</i> (Saussure, 1878)	Gryllidae	Orthoptera	+	+	Small insects
29	Cricket	<i>Trigonidium</i> sp.	Gryllidae	Orthoptera	+	+	Small insects
30	Scarlet marsh hawk	<i>Aethriamanta brevipennis</i> (Rambur, 1842)	<i>Libellulidae</i>	Odonata	+	+	Small insects
31	Ground skimmer dragonfly	<i>Diplacodes trivialis</i> (Rambur, 1842)	<i>Libellulidae</i>	Odonata	+	+	Small insects
32	Common Picture Wing	<i>Rhyothemis variegata</i> (L., 1763)	<i>Libellulidae</i>	Odonata	+		Small insects
33	Coromandel Marsh Dart	<i>Ceriagrion coromandelianum</i> (F., 1798)	Coenagrionidae	Odonata	+	+	Small insects
34	Pygmy dartlet	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	Coenagrionidae	Odonata	+	+	Small insects
35	Syrphid fly	<i>Episyrphus viridaureus</i> (Wiedemann, 1824)	Syrphidae	Diptera	+	+	Aphids
36	Syrphid fly	<i>Ischiodon scutellaris</i> (F., 1805)	Syrphidae	Diptera	+	+	Small insects
37	Syrphid fly	<i>Lathrophthalmus arvorum</i> (F., 1787)	Syrphidae	Diptera		+	Aphids
38	Syrphid fly	<i>Serratoparagus crenulatus</i> (Thomson, 1869)	Syrphidae	Diptera	+		Aphids
39	Robber fly	<i>Clephydroneura</i> sp.	Asilidae	Diptera	+	+	Small insects
40	Long legged fly	<i>Chrysosoma</i> sp.	Dolichopodidae	Diptera	+	+	Small insects
41	Jumping spider	<i>Myrmarachne orientalis</i> (Tikader, 1973)	Salticidae	Araneae	+	+	Small insects
42	Kerengga ant-like jumper spider	<i>Myrmarachne plateleoides</i> (Cambridge, 1869)	Salticidae	Araneae		+	Small insects
43	Metallic jumper	<i>Siler semiglaucus</i> (Simon, 1901)	Salticidae	Araneae		+	Small insects
44	Long jawed orb weaver	<i>Tetragnatha javana</i> (Thorell, 1890)	Tetragnathidae	Araneae	+	+	Small insects
45	Long jawed orb weaver	<i>Tetragnatha mandibulata</i> (Walckenaer, 1842)	Tetragnathidae	Araneae		+	Small insects
46	Wolf spider	<i>Lycosa mackenziei</i> (Gravely, 1924)	Lycosidae	Araneae	+	+	Small insects
47	Lynx spider	<i>Oxyopes</i> sp.	Oxyopidae	Araneae	+	+	Small insects
48	Orb-weaver	<i>Neoscona</i> sp.	Araneidae	Araneae		+	Small insects
49	Cobweb spider	<i>Theridula gonygaster</i> (Simon, 1873)	Theridiidae	Araneae		+	Small insects
50	Crab spider	<i>Camaricus formosus</i> (Thorell 1887)	Thomisidae	Araneae		+	Small insects
Total					34	44	
Relative abundance (%)					43.59	56.41	

** + denotes presence

Table 2. List of parasitoids and entomopathogenic fungi and visitors observed in king chilli
(rabi 2014-15, 2015-16)

S.No.	Parasitoids/ fungi	Family	Order	2014-15	2015-16	Host
1	<i>Telenomus</i> sp.	Platygastridae	Hymenoptera	+	+	Eggs of <i>Spodoptera litura</i>
2	<i>Trichogramma chilonis</i> (Ishii)	Trichogrammatidae	Hymenoptera	+	+	Eggs of lepidopteran insects
3	<i>Syrphophagus aeruginosus</i> (Dalman)	Encyrtidae	Hymenoptera	+		Syrphids
4	<i>Encarsia</i> sp.	Aphelinidae	Hymenoptera	+	+	Whiteflies
5	<i>Coccophagus ceroplastae</i> (Howard)	Aphelinidae	Hymenoptera		+	Scale insects
6	<i>Brachymeria</i> sp.	Chalcididae	Hymenoptera	+	+	Pupal parasitoid
7	<i>Campoletis</i> sp.	Ichneumonidae	Hymenoptera	+		Spodoptera larva
8	<i>Charops</i> sp.	Ichneumonidae	Hymenoptera	+		Spodoptera larva
9	<i>Diplazon</i> sp.	Ichneumonidae	Hymenoptera		+	Syrphids
10	<i>Podagrion</i> sp.	Torymidae	Hymenoptera	+		Ootheca of mantis
11	<i>Oomyzus</i> sp.	Eulophidae	Hymenoptera		+	Coccinellids pupa
12	Ensign wasps	Evaniidae	Hymenoptera		+	Cockroaches
13	<i>Cylindromyia</i> sp.	Tachinidae	Diptera		+	Stink bugs, noctuid moths etc.
14	<i>Metarhizium anisopliae</i> (Metchnikoff) Sorokin	Clavicipitaceae	Hypocreales	+		Aphids
Total Relative abundance (%)				9 50.00	9 50.00	
Sl. No.	Vectors	Scientific name	Family	Order	rabi 2014-15	rabi 2015-16
1	Ants	<i>Camponotus</i> sp.	Formicidae	Hymenoptera	+	+
2	Ants	<i>Cardiocondyla</i> sp.	Formicidae	Hymenoptera		+
3	Ants	<i>Dolichoderus</i> sp.	Formicidae	Hymenoptera	+	+
4	Ants	<i>Meranoplus</i> sp.	Formicidae	Hymenoptera	+	
5	Ants	<i>Polyrachis</i> sp.	Formicidae	Hymenoptera		+
6	Ants	<i>Tapinoma</i> sp.	Formicidae	Hymenoptera		+
7	Ants	<i>Technomyrmex albipes</i> (Smith, 1861)	Formicidae	Hymenoptera	+	
8	Ants	<i>Oecophylla smaragdina</i> (F., 1775)	Formicidae	Hymenoptera		+
9	Ants	<i>Pseudoneoponera rufipes</i> (Jerdon, 1851)	Formicidae	Hymenoptera	+	+
10	Sawfly	<i>Athalia</i> sp.	Tenthredinidae	Hymenoptera		+
11	Pumpkin beetle	<i>Aulacophora intermedia</i> (Jacoby, 1892)	Chrysomelidae	Coleoptera		+
12	Darkling beetle	<i>Derispia</i> sp.	Tenebrionidae	Coleoptera	+	
13	Net winged beetles	<i>Lycostomus</i> sp.	Lycidae	Coleoptera		+
14	Weevil	<i>Myllocerus</i> sp.	Curculionidae	Coleoptera	+	
15	Seychelles scale	<i>Icerya seychellarum</i> (Westwood, 1855)	Margarodidae	Hemiptera		+
16	Red cotton bug	<i>Dysdercus cingulatus</i> (F., 1775)	Pyrrhocoridae	Hemiptera	+	
17	Treehopper	<i>Oxyrachis tarandus</i> (F. 1798)	Membracidae	Hemiptera	+	
18	Pentatomid bug	<i>Dolycoris indicus</i> (Stål, 1876)	Pentatomidae	Hemiptera		+
19	Leaf footed bug	<i>Cletus punctiger</i> (Dallas, 1852)	Coreidae	Hemiptera	+	
20	Tea mosquito bug	<i>Helopeltis theivora</i> (Waterhouse, 1886)	Miridae	Hemiptera		+
21	Stilt-legged fly	<i>Mimegralla</i> sp.	Micropezidae	Diptera	+	
22	Soldier fly	<i>Sargus</i> sp.	Stratiomyidae	Diptera		+
23	Horse fly	<i>Tabanus</i> sp.	Tabanidae	Diptera	+	
24	Marsh fly	<i>Dichetophora</i> sp.	Sciomyzidae	Diptera		+
25	Katydid	<i>Conocephalus melanus</i> (De Haan, 1842)	Tettigoniidae	Orthoptera	+	
26	Tiger moth	<i>Amata</i> sp.	Erebidae	Lepidoptera	+	
27	Moth	<i>Tonica</i> sp.	Xyloryctidae	Lepidoptera		+
Total Relative abundance (%)					14 46.67	16 53.33

*** denotes presence

In case of parasitoids, 13 species were observed - 2 species belong to order Hymenoptera and one species under Diptera. Entomopathogenic fungus, *Metarhizium anisopliae* was also found to infect the aphids. In each of the seasons, 9 species were observed with the relative abundance of 50% each. Among the parasitoids, hymenopterans exhibited more relative abundance (88.89%). The number of natural enemies was observed maximum during rabi 2015-16. Among the predators, the number of coccinellids was high as they mainly feed on small soft bodied insects like aphids and whiteflies and these insects are the major pests in king chilli (Table 1, 2)

Earlier, Buragohain et al. (2017) and Begam et al. (2016) observed 6 species of coccinellids, and thus 44 predators, 13 parasitoids and one entomopathogenic fungus are now new reports. Syrphid fly (*Lathrophthalmus arvorum*) has been reported for the first time from Assam. The present results agree with those of Kalita et al. (1998) on coccinellids. In Malaysia, 5 coccinellids viz., *Menochilus sexmaculatus*, *C. transversalis*, *Harmonia octomaculata*, *Coelophora inaequalis* and *C. bissetata* were found to be associated with sucking pest of chilli (Rahman et al., 2010). Ingawale and Tambe (2007) and Saljoqi (2009) also reported that lady bird beetles, syrphids and *Chrysopa* larvae are the potential predators of aphids. Firake et al. (2013) also reported 6 species of coccinellids and 4 species of spiders preying on aphids like *Liphaphis erysimi*, *Brevicoryne brassicae* and *M. persicae* in brassicaceous crops in Meghalaya.

During the study, 27 species of insects were observed as causal visitors. Out of which, 10 species were Hymenoptera, 4 species belong to Coleoptera, 6 species were, 4 species were Diptera and 2 species of Lepidoptera (*Amata* sp. and *Tonica* sp.) (Table 2). During rabi 2014-15 and 2015-16, 14 and 16 species of insect visitors were observed with their relative abundance being 46.67 and 53.33%, respectively. Similarly, Kaur and Sangha (2016) also reported 41 arthropods to be associated with chilli crop, of which, 14 species were identified as pests and natural enemies, 12 species as casual visitors and 1 species of pollinator at Ludhiana.

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