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INSECT DIVERSITY IN SOME RURAL AREAS DISTRICT BAGH JAMMU AND KASHMIR (PAKISTAN)

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ABSTRACT

The present study was designed to find species composition and diversity of insects in (Cultivated area, wild area, suburban) existing at different trophic level of food chain in Bagh. The study was conducted from November, 2017 to September, 2018. Fifty-two species of insects belonging to 33 families were recorded. The diversity of insects in all studied area were same but significant difference in density of insects was found.

Key words: cultivated area, wild area, suburban area, moth, beetles

INTRODUCTION

The Insecta class is an integral part of its inhabiting ecosystem (Kim et al., 1993). The species belonging to this class are notorious for their activities in destroying crops and other useful items of benefit to man. Hence, their benefits are deprived of spotlight. They play an important role in cycling the nutrients present in nature. Where they harm crops, their presence is also essential for pollination and decomposition.

Insect herbivory changes the quality, quantity, and timing of plant detrital inputs and can potentially have large effects on ecosystem cycling (Belovsky et al., 2000). It was found that grasshopper herbivory increased plant abundance because of greater availability (Belovsky et al., 2000). Hence, insect herbivores are important drivers of ecosystem processes by transforming living plant biomass into Frass and green fall (Hunter et al., 2001) and drive a significant fraction of above-ground to belowground Nitrogen and Phosphorus fluxes across entire ecosystems (Metcalf et al., 2014).

The provisioning services of insects as pollinator for over three quarters of wild

flowering plant species in temperate regions is crucial to the ecosystem. Nearly two-thirds of all plant species rely on insects for pollination. The most important pollinators are bees, beetles, butterflies and flies (Schoonhoven et al., 2004). Insects therefore, contribute to plant diversity and affect animal biodiversity through pollination indirectly.

There is little information available about crop pest, about nature and extent of damage and how to control vertebrate pests to save crops in the terms of economic returns for the study area. The present study was designed to prepare a checklist of insects and to find out population density of insects in District Bagh.

MATERIAL AND METHODS

The specimens were trapped using light. The specimens were euthanized using ethyl acetate vapors and brought back to the laboratory. The insects were observed under a Leica EZ 4 HD stereo zoom microscope. The identification was carried out with the help of keys of Holloway (1987, 1998) and Kristensen (1999).

RESULTS

Table 1: A Check List of diversity of insect Pest Speeciess

Sr No.	Family	Common name	Scientific name	Cultivated area	Wild area	Sub-urban area
1	Tettigoniidae	Katydid Nymph	<i>C. simplex</i>	✓	✓	✓
2	Elateridea	Headlight Elater	<i>P. noctilucus</i>	✓	✓	×
3	Cerambycidae	Long horned beetle	<i>B. rufomaculata</i>	✓	✓	✓
4	Lygaeidae	Milk weed	<i>O. fasciatus</i>	✓	×	✓
5	Tipulidae	Crane fly	<i>T. paludosa</i>	✓	✓	✓
6	Blattodea	Cockroach	<i>B. Americana</i>	✓	✓	✓
7	Phalanooguidea	Cellar\skull spider	<i>P. phalangioides</i>	✓	✓	✓
8	Pentatomidae	Brown Mamorated Stink bug	<i>H. halys</i>	✓	✓	✓
9	Bllattodea	Dry wood termite	<i>A. termite</i>	✓	✓	✓
10	Vespidae	Paper wasp	<i>P. bellicosus</i>	✓	✓	✓
11	Acrididae	Sutheastern grasshopper	<i>A. vulgaris</i>	✓	✓	✓
12	Apidae	Carpenter bee	<i>X. violacea</i>	✓	✓	✓
13	Tipulidae	Mosquito hawk	<i>T. vernalis</i>	✓	✓	✓
14	Syrphidae	Syrphid fly	<i>E. tenax</i>	✓	✓	✓
15	Tipuladia	Marsh crane fly	<i>T. oleracea</i>	✓	✓	✓
16	Pentatomidae	Green stink bug	<i>N. viridula</i>	✓	✓	×
17	Ichneumonidae	Ichneumonid wasp	<i>Ichneumon sp</i>	✓	✓	✓
18	Carabidae	Ground beetle	<i>M. tetraspilotus</i>	✓	✓	✓
19	Coccinelidae	7-spot ladybird	<i>C. septempunctata</i>	✓	✓	✓
20	Scarabaeidae	Scrab beetle	<i>C. macleayi</i>	✓	✓	✓
21	Sarcophagidae	Flesh fly	<i>Sarcophagus sp.</i>	✓	✓	✓
22	Cerambycidae	Longhorn beetle	<i>X. smei</i>	✓	✓	✓
23	Stratiomyidae	Black Soldier fly	<i>H. illucens</i>	✓	✓	✓
24	Protodiplatyidae	Earwig	<i>A. Martynovi</i>	✓	✓	✓
25	Blaberidae	German cockroach	<i>B. germanica</i>	✓	✓	✓
26	Tephritidae	Melon fly	<i>B. cucurbitae</i>	✓	✓	✓
27	Dermaptera	Pincher bug	<i>E. dermaptera</i>	✓	✓	✓
28	Phasmisa	Stick insect	<i>Phasmatodea</i>	✓	✓	×
29	Tettigoniidae	Bush cricket	<i>L. punctatissima</i>	✓	✓	✓

30	Erebidae	Red hairy caterpillar	<i>A. albistriga</i>	✓	✓	✓
31	Chrysopidae	Green lacewing	<i>C. carnea</i>	✓	✓	✓
32	Pyalidae	Mediterranean flour moth	<i>E. kuehniella</i>	✓	✓	✓
33	Maridia	Mirid bug	<i>C. dilutes</i>	✓	✓	✓
34	Scarabaeidae	Scrab beetle	<i>S. sacer</i>	✓	✓	✓
35	Dermaptera	Earwig	<i>E. dermaptera</i>	✓	✓	✓
36	Erebidae	Tiger moth caterpillar	<i>E. caja</i>	✓	✓	✓
37	Carabidae	Asian Groud beetle	<i>Chlaenius sp.</i>	✓	✓	✓
38	Lampyridae	Glow worm	<i>A. luminosa</i>	✓	✓	✓
39	Cerambycidae	Ribbed pine borer	<i>R. inquisitor</i>	✓	✓	✓
40	Mantidae	Praying mantis.	<i>M. religiosa</i>	✓	✓	×
41	Acrididae	Brown -headed grasshopper	<i>A. ruficornis</i>	✓	✓	✓
42	Acrididae	meadow grasshopper	<i>C. parallelus</i>	✓	✓	✓
43	Lympyridae	Lightning bug	<i>I. lympyridae</i>	✓	✓	✓
44	Vespeida	Paper wasp	<i>P. fuscatus</i>	✓	✓	✓
45	Sparassidae	Huntsman spider	<i>H. maxima</i>	✓	✓	×
46	Lucanidae	Gaint stage beetle	<i>D. titanus</i>	✓	✓	✓
47	Libellulidae	Blue marsh hawk	<i>O. glaucum</i>	✓	✓	✓
48	Acrididae	Common field grasshopper	<i>C. brunneus</i>	✓	×	✓
49	Papilionidae	Black swallow tail butterfly	<i>B. polyeucutes</i>	✓	✓	✓
50	Papilionidae	Black swallowtail butterfly	<i>B. dasarada</i>	✓	✓	✓
51	Lycidae	Net-winged beetle	<i>M. rhipidius.</i>	✓	✓	✓
52	Apidae	Male bombus bee	<i>B. terretris.</i>	✓	✓	✓

Table 4.2 Density of insects in different habitat types of District Bagh

S.no.	Scientific Name	Habitat Type		
		Sub Urban area	Cultivated area	Wild area
1	<i>C. simplex</i>	9.75±4.78	10±2.85	12.5±3.40
2	<i>P. noctilucus</i>	-	6.25±2.09	7.5±2.84
3	<i>B. rufomaculata</i>	3.33±0.88	7.5±3.52	8.75±0.94
4	<i>O. fasciatus</i>	13.33±0.88	6.66±1.85	6±1.73
5	<i>T. paludosa</i>	7.5±2.10	8.66±3.17	8.75±2.95
6	<i>B. Americana</i>	9.75±3.14	6.66±3.17	7.5±2.02
7	<i>P. phalangioides</i>	5±2.04	10±5.29	12.5±4.78

8	<i>H. halys</i>	6.66±1.85	12.5±5.31	10±6.02
9	<i>A. termite</i>	5±3.02	6.25±1.31	10±2.41
10	<i>P. bellicosus</i>	10±3.74	15±5.67	12.5±1.55
11	<i>A. vulgaris</i>	6.66±3.48	6.66±5.69	8.75±1.49
12	<i>X. violacea</i>	6.66±4.17	5±1.77	10±4.61
13	<i>T. vernalis</i>	11.25±2.98	6.66±3.28	10±4.72
14	<i>E. tenax</i>	6.25±1.88	10±3.05	8.75±1.76
15	<i>T. oleracea</i>	8.75±3.14	6.25±1.37	10±3.39
16	<i>N. viridula</i>	-	6.66±2.33	7.5±2.5
17	<i>Ichneumon sp.</i>	7.5±2.98	6.25±1.79	8±1.41
18	<i>M. tetraspilotus</i>	7±1.79	10±5.19	10±2.64
19	<i>C. septempunctata</i>	8.33±2.33	11.25±3.32	12.25±3.01
20	<i>C. macleayi</i>	6.66±3.66	10±3.05	12.5±3.30
21	<i>Sarcophagus sp.</i>	10±1.29	10±2.51	7.5±2.87
22	<i>X. smei</i>	6.33±2.40	6.66±1.85	10±1
23	<i>H. illucens</i>	9±1.36	8.33±2.40	10±3.39
24	<i>A. Martynovi</i>	8.66±2.02	6±2.19	9.5±1.32
25	<i>B. germinica</i>	6.25±2.05	6.66±3.48	8.33±1.76
26	<i>B. cucurbitae</i>	6.66±3.48	10±1.73	10±4.35
27	<i>E. dermaptera</i>	6.66±4.17	6.66±5.17	10.33±3.84
28	<i>Phasmatodea</i>	-	6.66±2.60	7.5±2.5
29	<i>L. punctatissima</i>	7±3.05	10±3.65	15±2.309
30	<i>A. albistriga</i>	7.5±3.59	10±3.46	7.5±2.62
31	<i>C. carnea</i>	6.66±2.72	10±2.30	7.25±1.65
32	<i>E. kuehniella</i>	7.75±2.17	6.66±4.70	8±3.46
33	<i>C. dilutes</i>	6.75±1.93	5±2.04	8.33±3.84
34	<i>S. sacer</i>	9±2.67	6.66±2.18	8.75±2.83
35	<i>E. dermaptera</i>	7±3.21	5±3.02	10±2.64
36	<i>E. caja</i>	10±1.52	7.5±2.53	9.75±1.65
37	<i>Chlaenius sp.</i>	6.75±1.10	4.5±1.04	8.33±2.90
38	<i>A. luminosa</i>	6.25±2.05	6.66±2.72	7.66±3.28
39	<i>R. inquisition</i>	6.66±3.28	7.33±4.84	6±1.95
40	<i>M. religiosa</i>	-	6.66±3.17	6.25±1.37
41	<i>A. ruficornis</i>	8±2.64	10±1.95	11.25±1.10
42	<i>C. parallelus</i>	6.66±3.84	5.75±1.79	9.66±2.33
43	<i>I. lympyridae</i>	6.66±2.90	6.33±2.60	11.66±2.84
44	<i>P. fuscatus</i>	8±1.82	7.5±2.95	12.5±2.5
45	<i>H. maxima</i>	-	6.66±2.33	10±2.48
46	<i>D. titanus</i>	5±3.02	7.66±1.66	11±2.65
47	<i>O. glaucum</i>	8±3.02	6.66±2.18	10±2.08
48	<i>C. brunneus</i>	6.25±1.70	11.25±2.39	-
49	<i>B. polyeucutes</i>	5±2.16	13.33±2.40	12.5±2.75
50	<i>B. dasarada</i>	7.33±2.60	10.5±2.17	12.25±2.46
51	<i>M. rhipidius</i>	6.25±2.13	6.5±1.84	10±1.15
52	<i>B. terretris</i>	10±2.64	9.75±2.86	12±2.54

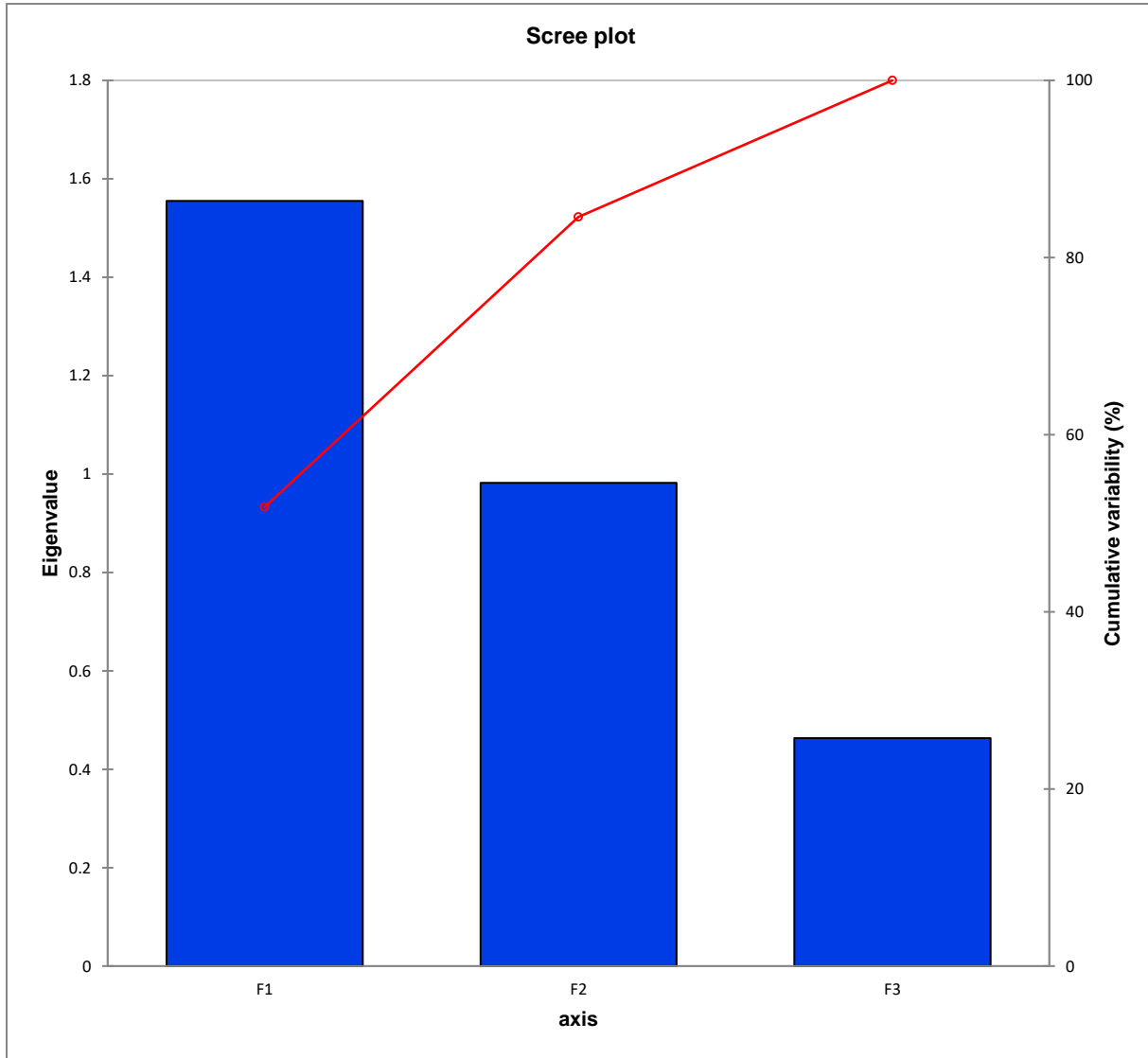


Figure 1. Scree plot of study area

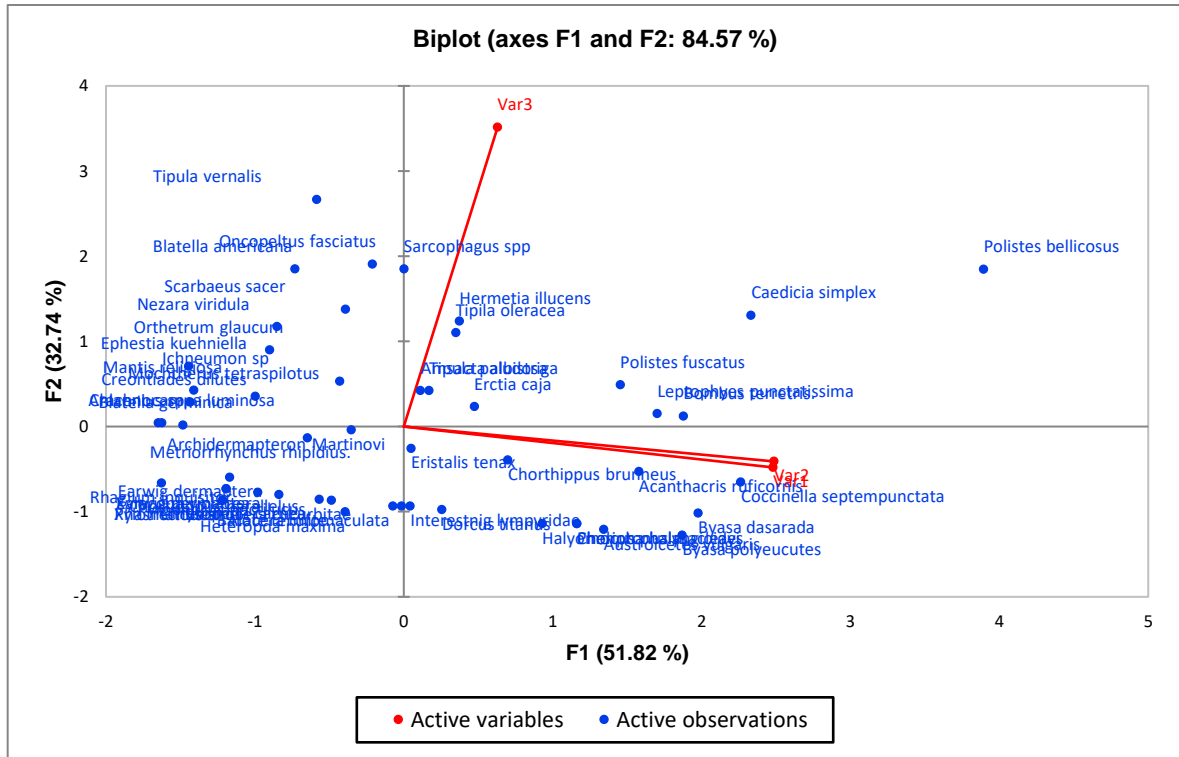


Figure 2. Biplot of insect species in the study area

DISCUSSION

A total of 52 species belonging to 33 families (Tettigoniidae, Elateridae, *Cerambycidae*, Lygaeidae, Tipulidae, Blattodea, Phalanooguidea, Pentatomidae, Vespidae, Acrididae, Apidae, Syrphidae, Ichneumonidae, Carabidae, Coccinelidae, Scarabaeidae, Sarcophagidae, Stratiomyidae, Protodiplatyidae, Tephritidae, Phasmida, Erebiidae, Crysopidae, Pralidae, Maridia, Dermaptera, Lampyridae, Mantidae, Sparassidae, Lucanidae, Libellulidae, Papilionidae and Lycidae) were collected from forested areas from Bagh.

The Nymph of Katydid (*C. simplex*) was found to be abundant. This species was worldwide in distribution (BBC et al., 2013) and was collected from pine trees, confirming the findings of Svatopaulk et al. (1989).

The Headlight Elater (*P. noctilucus*) was less in number. It was collected from tunnels in the outer layer of termite mounds.

During summertime, these glow at night attracting prey in the form of other insects (Levy, 2001). It has previously been reported in Belize, Saint Vincent, Grenadines, Hawaii and Panama (Meerman, n.d.). The Long-horned beetle (*B. rufomaculata*) was less in number. It was collected from forests, gardens and fruity trees. This species has a global distribution (Kariyanna et al., 2017).

The density of Milkweed bug (*O. fasciatus*) was highest in the sub urban area (13.33 ± 0.88). This species was collected from garden; they usually prey on wood, fruits and other vegetation. This species was widely distributed through North America, central America, Mexico and the southern areas in Canada (Attisano et al., 2013).

Brown Mamorated Stink bug (*H. halys*) was less in number. This species was collected from fruit tree orchard, soyabean fields. It was native to China, Japan, Korea and Taiwan (Hoebeker and Carter, 2003).

The scarab beetle (*C. macleayi*) was found to be abundant in wild and cultivated areas. This species was collected from dung cakes; it is attracted to light at night, reported by (Michelson et al., 1911). Some consume live plants and are considered agricultural pests. Some eat fruit, fungi, carrion, or insects. There's even a variety that subsists on the slime left by snails. But the most well-known diet item consumed by the scarabs are dung beetles.

The bush cricket (*L. punctatissima*) was abundant. This species was collected from the cool, dry temperate regions (Vicky, 1965). The distribution of this species was missing in Pakistan but it is abundant in Australia. They usually live in gum trees but are sometimes found in gardens on rose bushes or fruit trees.

The praying mantis (*M. religiosa*) was found to be less in number. This species was collected from different habitats; they are generally located in the warmer regions, particularly tropical and sub-tropical latitudes (Brackbury, 1991). The geographic distribution of this species was a wide spread with a nearly cosmopolitan distribution; it was present in all continents except Antarctica and South America (Berg et al., 2011).

The paper wasp (*P. fuscatus*) was abundantly present in the study site. This species was recorded from nests in woodlands and savannas. It was fairly common around human habitation, especially where exposed wood was present that may be used for nest material. This species was distributed from southern Canada to the United states to central America. The northern range is Chilcotin, British Columbia, and reaches as far south as Honduras (Jandt et al, 2014).

The huntsman spider (*H. maxima*) was abundantly found in the wild but nil in the sub urban area. This species has previously been observed in a cave in Laos

(Szalay, 2014). The common field grasshopper (*C. brunneus*) was abundant in cultivated area but nil in the wild. This species was recorded from dry, grassy habitat, it is often common in dry parkland, roadside and waste ground and was reported by Bushell and Hochkirch (2014). This species is distributed across Europe, North Africa, and temperate Asia (Cherrill et al., 2002).

The black swallow tail butterfly (*B. polyeucutes*) was abundantly present. It was collected from forests and wood (Häuser et al., 2005). Both the caterpillar and the adult are poisonous. The caterpillars of the Pipevine Swallowtail feed on the poisonous host plant, Aristolochia, also known as the pipevine.

CONCLUSION

Fifty-two species belonging to 33 families (Tettigoniidae, Elateridae, *Cerambycidae*, Lygaeidae, Tipulidae, Blattodea, Phalanooguidea, Pentatomidae, Vespidae, Acrididae, Apidae, Syrphidae, Ichneumonidae, Carabidae, Coccinelidae, Scarabaeidae, Sarcophagidae, Stratiomyidae, Protodiplatyidae, Tephritidae, Phasmida, Erebidae, Crysopidae, Pralidae, Maridia, Dermaptera, Lampyridae, Mantidae, Sparassidae, Lucanidae, Libellulidae, Papilionidae and Lycidae) were collected from forested areas from Bagh.

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