



## DIVERSITY AND DISTRIBUTION PATTERN OF HYMENOPTERA IN DISTRICT BAGH, POK, PAKISTAN

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### ABSTRACT

**Main aims of current study were to discover the distribution pattern and to assess the diversity of Hymenoptera from District Bagh, PoK, Pakistan. Samples were collected from various habitats including forest, farmland and human areas with altitude of 3300-3500 meters during July to December 2018. In total of 38 surveys, from 472 specimens, forty-one species under 19 genera belonging to eight families were identified. They were playing various ecological role from pollinator to decomposers. Distribution pattern among identified species revealed that nineteen species were occasional, thirteen were abundant while nine were rare in explored site. Vespidae was dominant with twelve species followed by Formicidae, Apidae and Pompilidae.**

**Key words:** Hymenoptera, Bagh, distribution, diversity, families, genera, species,

Within Animal Kingdom, Insect is one of the most dominant and successful group due to their high adaptability to every habitat, social organization and also strong defensive mechanism (Carrol et al., 1973). They have wide role in terrestrial ecosystem ranging from pollination to parasitoid (Weisser and Seimann, 2004). It's pollinating efficacy ranging from habitat to habitat as crop plants 70% and tree plants 98% (Klein et al., 2006). Beside this they have critical role in nutrient recycling, dispersal of seeds, maintenance of soil structure, fertility and can predate by other predators. Loss of such enormous biodiversity will directly effect on maintenance of ecosystem (Klein et al., 2006). Animals under order Hymenoptera ranges from minute to large size and consist of about 1, 00,000 identified species worldwide including specialized and advanced creatures. Insects in Hymenoptera not only play crucial role in maintenance of ecosystem but also boost up human economy such as bees provide honey and waxes. (Devy and Davidar, 2003) reported that Apis bee's play major role in pollination of 86 species of trees at the rate of 18% and 22% rate of understory shrubs in evergreen forest of the Western Ghats. Ichneumonid and braconid wasps are used as powerful bio-control agents against harmful pest instead of using chemicals. In general Order Hymenoptera comprises most of familiar members including Apis bees, ants, wasps and non Apis bees. Most hymenopterans show a great diversity

of habitat and behavioral complexity including social association. Therefore, due to changing in climatic condition and interlude in association between species may affect diversity of this group. There is great need to file the diversity position of hymenopterans to realize potential dangers to their existence. Despite of presence of huge biodiversity in district Bagh no potential work has been done on this important group. Therefore keep in mind the importance of this group the current study was conducted to determine the distribution and to assess the diversity of Hymenopteran insects from District Bagh, PoK, Pakistan.

### MATERIALS AND METHODS

Insects were collected from different localities and varied habitats of District Bagh including of Tehsil Bagh and Tehsil Dirkot. Areas chosen for sampling include agriculture farmland, human habitats and forest. A detail of the distribution pattern of areas covered over 38 surveys was documented. During early day time maximum collections were made, with collections done either by hand picking or using mouth aspirators for crawling and minute insects. Aerial nets were also used for active fliers, bowl traps and light traps were also used. Collected insects were killed with hydrogen cyanide, before mounting/ pinning rectangular cards. Specimens were also preserved in vials with 70 % ethyl alcohol. Taxonomic analysis was done following the

earlier literature, of Siddiqui et al. (2015), Mahmood et al. (2012), Bolton- AntCat.org (2014), Hook (2008), and Gavin Broad (2014).

Sampled records were analyzed using PASW 18.0 and % distribution of species was calculated.

**RESULTS AND DISCUSSION**

During the present study 472 specimens were collected, and these identified under eight families, 19 genera and 41 species. Individuals were classified into

categories of abundant, occasional and rare. Of the 41 species, 19 were observed to fall under the category occasional, 13 abundant while nine were rare. Table 1 provides the details of species diversity and distribution pattern in Table 2. These results reveal that the Vespidae was the most dominant family with twelve species (29 %) followed by Formicidae with nine (21%) and Apidae with seven species (17%). Despite of presence of huge insect fauna no work has been done on entire class insecta from selected area. Hymenoptera is of importance in IPM, in particular, in biological control.

Table 1. Diversity of Hymenoptera and their distribution (District Bagh)

Family	Species	Families	Distribution in category			
			Occasional	Abundant	Rare	
Apidae	<i>Apis dorsata</i>	Apidae		✓		
	<i>A. florea</i>	Apidae		✓		
	<i>A. cerana</i>	Apidae		✓		
	<i>Bombus asiaticus</i>	Ichneumonidae	✓			
	<i>Bombus branickii</i>	Formicidae	✓			
	<i>Bombus tunicatus</i>	Vespidae	✓		✓	
	<i>Bombus melanurus</i>	Braconidae			✓	
Ichneumonidae	<i>Diadegma insulare</i>	Halictidae	✓			
	<i>Diadromus collaris</i>	Pompilidae		✓	✓	
	<i>Diadegma semiclausum</i>	Chrysididae	✓	✓	✓	
<b>Total</b>			<b>19</b>	<b>13</b>	<b>9</b>	
Formicidae	<i>Formica fusca</i>					
	<i>Camponotus compressus</i>					
	<i>Camponotus sericeus</i>					
	<i>Camponotus oblungus</i>					
	<i>Camponotus japonicas</i>					
	<i>Pheidole nietneri</i>					
	<i>Pheidole latinoda</i>					
	<i>Monomorium pharaonis</i>					
	<i>Monomorium longi</i>					
	Vespidae	<i>Delta dimidiatipenne</i>				
		<i>Vespa orientalis</i>				
		<i>Vespa velutina</i>				
<i>Polistes dominula</i>						
<i>Polistes olivaceus</i>						
<i>Polistes gallicus</i>						
<i>Polistes indicus</i>						
<i>Polistes olivaceus</i>						
<i>Polistes stigma tamulus</i>						
<i>Vespula germanica</i>						
<i>Vespula flaviceps</i>						
<i>Vespula nursei</i>						
Halictidae	<i>Halictus sp.</i>					
	<i>Sphecodes sp</i>					
Chrysididae	<i>Chrysis sp.</i>					
Braconidae	<i>Charmon extensor</i>					
	<i>Marsheila sp.</i>					
	<i>Cosmophorus sp.</i>					
Pompilidae	<i>Hemipepsis acer</i>					
	<i>H. indica</i>					
	<i>H. lusca</i>					
	<i>H. veda</i>					

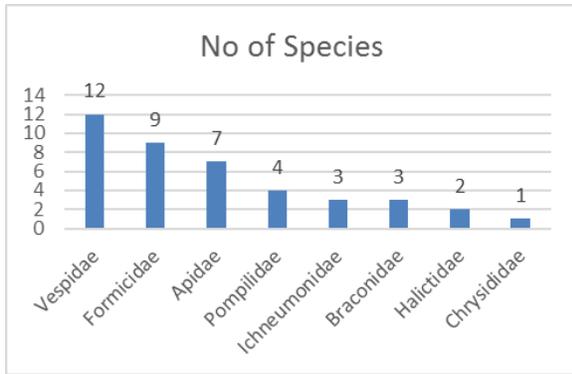


Fig. 1. Family wise diversity

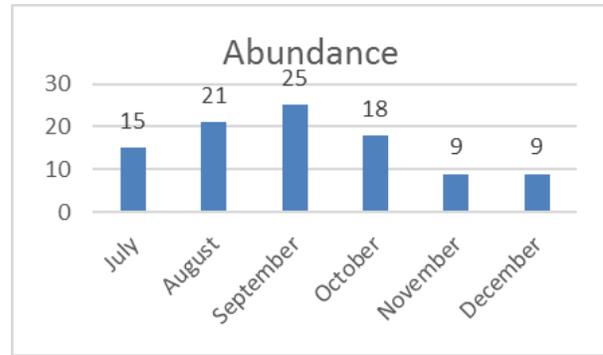


Fig. 2. Species abundance-monthwise

The species abundance differs over months- 15 species in July, 21 in August, 25 in September, 18 in October, 09 in November and December. Family Apidae, Formicidae and Vespidae were common in July, August while in addition of Ichneumonidae and Braconidae were common in September, October and November. Various hymenopterans belonging to Halictidae, Pompilidae and Chrysididae were almost absent during November and December; Ichneumonidae and Braconidae being completely absent during July and August. During rainy season insects were maximum while minimum in winter (Tewari and Kaushal, 2007). Insect abundance depends on presence of flower on plants (Frith and Frith, 1985) as observed in the present study. Subhakar et al. (2011) observed six hymenopterans playing role in pollination in bitter gourd. Bharti (2008) reported 199 ant species with altitudinal diversity in the Himalayan region.

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