

SEASONAL ACTIVITY OF PREDATORY WASPS ATTACKING ON EUROPEAN HONEYBEE, *APIS MELLIFERA* L. COLONIES IN NORTHERN HILL REGION OF CHHATTISGARH, INDIA

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Abstract: A study was carried out at Honey Bee Park of Raj Mohini Devi College of Agriculture and Research Station, Ambikapur under All India Coordinated Research Project on Honey Bees and Pollinators of Surguja District during 02 July 2021 to 24 September 2021 to study on seasonal activity of predatory wasps i.e. *Vespa tropica*, *Vespa auraria* and *Vespa orientalis* were observed. Among these three species *Vespa auraria* was found the most abundant and common enemies of honey bee, *Apis mellifera*. Peak predatory activity was observed during fourth week of July (3.00 wasps) i.e., 30 Standard meteorological week (SMW), when must often coincided with the floral dearth period. Morning and noontime were peak time of attack than late day, which most often coincided with the activity of bees. In this research paper details are being given about the *Vespa auraria* for the advantage of farmers, students and beekeepers so that they can manage the incidence of these enemies.

Keywords: *Apis mellifera*, Floral dearth, *Vespa tropica*, *Vespa auraria* and *Vespa orientalis*, Predatory wasp

INTRODUCTION

Predatory wasps pose a serious threat to apicultural industry in different parts of the world. A persistent attack of predatory wasps weakens the bee colonies resulting in absconding (Gupta *et.al.* 1977). Many species of wasps are serious enemies of honey bees and cause considerable damage (Mishra *et al.* 1989). A survey by Walton and Reid (1976) revealed that in 1975-76 *Vespa germanica* destroyed 3900 colonies and affected more than 10,000 others. Akre and Davis *et al.* 1978 reported that in Japan a group 30 *Vespa mandarina* was able to kill 25000 out of 30,000 bees in just three hours at the rate of one bee per hornet every 14 seconds. Sharma *et al.*, 1985 found that wasp attack most often coincides with the floral dearth period and monsoon season. This is resulting in the depletion of colony strength and economically discouraging the beekeepers. The giant hornet (*Vespa magnifica*) and little hornet (*V. basalis*) were serious predators to honey bees in Nepal. In an apiary two individuals killed an entire colony of *A. cerana* in an hour (Thapa *et al.* 2000). The species composition and activity of the wasp is different in different time. Abrol and Kakroo in 1998 found that the wasps attack was peak during July to September which most often coincided with the floral dearth period and monsoon season taking a heavy toll of honey bee colonies particularly the foragers. The attack of wasp is also different in different time of the day. The activity of the wasp is maximum in morning and noon time than that of late day and evening. The abundance of different species of wasps varies from different areas of the country. It is necessary to find

out the seasonal activity of wasps to adopt management tactics in peak period. The present study was undertaken to determine the species of wasps and their seasonal activity in Surguja District.

MATERIALS AND METHODS

A Field experiment was undertaken in the Honey Bee Park of Department of Agricultural Entomology at Rajmohini Devi College of Agriculture and Research Station, Ambikapur, under All India Coordinated Research Project on Honey Bees and Pollinators Surguja, Chhattisgarh, India, to find out the wasps and their peak period of incidence on honeybee (*Apis mellifera*) during floral dearth period i.e. June to September 2021. Five bee colonies of *A. mellifera* were selected randomly for weekly observations on the species of insect enemies visiting/infesting the bee hives right from dawn to dusk during June to September. The standard week-wise visits of number of these insect enemies were recorded from 6 AM to 6 PM and the data, thus obtained, were analyzed statistically.

RESULTS AND DISCUSSION

The incidence of Oriental hornet wasp (*V. orientalis*) was recorded from the first week of July to end of September (Table-1). The wasps were found to be more active from 6 AM to 2 PM during 27th to 39th standard weeks, i.e. from July to September, being the most favourable time for their infestation. The peak predatory activity occurred during July. The peak populations of wasps observed during fourth week of July (3.00 wasps) i.e., 30 Standard

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meteorological week (SMW). The number of wasps recorded in a day in standard week from 27th to 39th varied between 2.57 to 1.93, respectively, thereby indicating more incidences of wasps during the months of July. Abrol and Kakroo in 1998 reported that the many species of wasps, it's a serious enemies of honeybees causing considerable damage, of which *V. orientalis* was the most abundant and destructive ones, predated the bees during July-September, being the floral dearth period. Abrol and Karroo in 1998 found the peak period of wasps attack occurred during August to September and number of wasps on an average ranged from 0.10 to 13.58 per day during different months of year in Kashmir, India. Thapa *et al* in 2000 reported that *Vespa magnifica* and *V. basalis* were serious predators of honey bees in Nepal. But *V. magnifica* was not found there. Among *Vespa* species *V. basalis* is minor predator than others. The frequency of incidence of wasp was more in morning (7.00-9.00 am) and noon-time (12.00-14.00pm) where as incidence was minimum in late day). The frequency is low or absent in the cloudy and rainy days which coincided with the activity of the bees.

CONCLUSION

Vespa orientalis were the major predators of *Apis cerana* in study area. They cause serious damage to bee colony. The persistent attack of wasp cause absconding of colony which ultimately affects economy of beekeepers. The peak predatory activity occurred during July to September which often coincided with the floral dearth period, when forage sources become limited. So, appropriate management tactics should be applied in the peak predatory activity. Morning and noon times were the peak diurnal activities of wasps. Control of wasps can be done by destruction of their nests. It can be done by using different baits like chicken meat, mutton and fish. Wasps prefer dead, decaying and putrefied food materials containing alcohol but not the bees. This behavior of the wasps can be utilized for testing various baits as attractants. Physical killing of wasps by flapping can also reduce the number of wasps visiting apiaries. Combination of different methods will be effective for management of wasps.

Table 1. Incidence of *Vespa auraria* on *Apis mellifera* colony, during 02/07/2021 to 24/09/2021.

Date of observations	Months	SMW	Mean number of wasp/5 hive/ 5 min. at standard weeks						Grand mean
			6 - 8	8 - 10	10-12	12 - 2	2- 4	4 - 6	
			AM	AM	Noon	PM	PM	PM	
2/07/2021	July	27	2.80	3.80	3.6	3.00	1.00	1.20	2.57
9/07/2021		28	2.60	4.60	4.2	2.80	1.20	1.60	2.83
16/07/2021		29	2.20	4.20	3.8	3.20	1.80	1.80	2.83
23/07/2021		30	2.80	5.20	4.6	3.20	1.00	1.20	3.00
30/07/2021		31	2.40	3.80	3.2	2.60	1.20	1.40	2.43
6/08/2021	August	32	3.20	4.40	4	2.80	1.40	1.60	2.90
13/08/2021		33	2.80	4.80	3.8	2.20	0.80	1.20	2.60
20/08/2021		34	2.60	5.00	4.4	2.00	0.60	1.20	2.63
27/08/2021		35	2.20	4.20	3.6	2.40	1.20	1.80	2.57
3/09/2021	September	36	2.40	3.80	3.2	2.20	1.00	1.40	2.33
10/09/2021		37	2.20	3.20	2.6	2.80	1.20	1.60	2.27
17/09/2021		38	2.80	3.60	2.8	1.80	0.60	1.20	2.13
24/09/2021		39	2.20	3.60	2.4	1.60	0.80	1.00	1.93
Grand mean			2.55	4.17	3.55	2.51	1.06	1.40	2.54

(*SMW=Standard meteorological week)



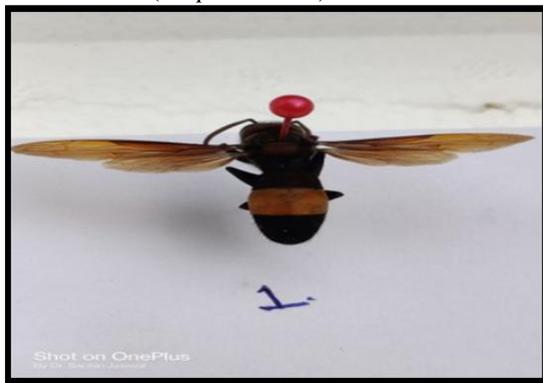
Fig. (a.) Experimental site, *Apis mellifera* colonies at Honey Bee Park, Ambikapur, Surguja.



Fig. (b.) Dorsal view of Oriental hornet wasp (*Vespa velutina*)



Fig. (c.) Ventral view of Oriental hornet wasp (*Vespa orientalis*)



1. *Vespa tropica*



2. *Vespa auraria*



3. *Vespa orientalis*



Nest of *Vespa auraria*

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