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FORAGING BEHAVIOR OF APIS FLOREA ON ANTIGONON LEPTOPUS IN SANGAMNER,DISTRICT AHMEDNAGER,MAHARASHTRA INDIA.

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ABSTRACT
Honey bees are useful to human being for getting honey, wax and venom. But they are also very much useful for increasing the yield of fruit bearing plants. Efficiency of the bees for pollination depends on its foraging rate, foraging speed, climatic conditions in that particular area. Sangamner is having Pomgranate as major cash crop. In the present study foraging behavior of *Apis florea* on *Antigonon leptopus* was done. The maximum foraging speed 1.58 min was found at the time of noon.

INTRODUCTION

In the world several species of honey bees are found. In India the commonly found species are. *Apis dorsata ,Apis mellifera, Apis indica and.Apis florea. Apis florea* is also called as little bee and also known by the name chhoti makhi in Hindi language .These are smaller than *A. indica* and yields very small amount of honey. These bees are not of gregarious nature and form a single comb. The colour of queen of *Apis florea* is golden brown whereas the drones are black with smoky grey hair. *Apis florea* is not economically important. These are found in all over the plains in Bengal, Assam and Central India. It build single vertical comb. It does not easily sting. Honey yield is poor about 0.5kg/year/hive. Honey bee is very thin can easily domesticated (Shukla and Upadhyay, 2014.).

The collection of pollen and nectar from flowering plants by bees is known as "foraging behavior" (Mattu *et al.* 2012). Crop pollination is one of the most important economic outcomes of honey bees. They are classified as generalists or specialists depending on their foraging habits Gebremedhn .et al 2014. The insects species help in the process of reproduction of plants through mediating pollen from flower to flower. Honey bees derived their food in the form of pollen and nectar. Bees and beekeeping provide the free ecosystem service in the form of crop pollination there by helping in conservation of forest and grassland ecosystem (Mattu *et al.*, 2012).

Study of foraging behavior of the himalayan honeybees *(Apis cerena* F.) on flowers of *Fagopyrum esculentum* M. and it's impact on grain quality and yield was studied by Singh 2008.Honey bees play an important role as natural pollinators for a variety of crop as well as plants growing in the wild. The researches have described pollination requirements of crop. Gebremedhn et al 2014. et al studied the relating climatic factors to foraging behavior of honeybees (*Apis mellifera*) during blooming period of *Guizotia abyssinica.* Painkra and Shrivastava 2015 studied effect of pollination by Indian honey bee *Apis cerana indica* on yield attributing characters and oil content of Niger,*Guizotia abyssibnica Cass*,in Surguja of Chattisgarh .Abou Shara 2014 studied the foraging behavior of honey bees, *Apis mellifera*.

Antigonon leptopus- *Antigonon leptopus* is a fast growing climbing vine that holds via tendrils, and is able to reach 25ft or more in length .It has cordate (heart shaped), sometimes triangular leaves 2 1/2to 7 1/2cm long the flowers are born in panicles ,clusted along the rachis producing pink or white flowers from spring to autumn(https//en Wikipedia org/wiki/*Antigonon leptopus.*).Much work has not been done on *Apis floarae* .Sangamner is having Pomegranates as major cash crop. The knowledge obtained by results of this work can be used to increase the production of this crop . Therefore the present work has been done.

MATERIALS AND METHODS

Study area

Sangamner area is located in the northern part of the Ahmednagar district of Maharashtra state. Sangamner is situated at 19°35°N and74°16'E.It is the second largest city by population in Ahmednagar district .My study area include Madhuban colony near Sangamner college.

Foraging behavior of honey bees

The collection of pollen and nectar from flowering plants by bees is known as foraging behavior. The foraging behavior was studied during the blooming of *Antigonon leptopus.* The collected data included foraging rate, spent per flower.*

Time spent per flower and flowering rate

Time spent by honey bee per flower was recorded using a stopwatch starting from landing on a flower to leaving that particular flower. Foraging rate was determined by counting the number of flowers visited by a single honey bee per minute. The study was carried out during October, November. December 2015 this is the peak season of flowering of Antigonon leptopus. These observations were taken during Morning (8.30am9.00am), Noon (12.30pm-1.00pm), Evening (5.30pm-6.00pm)hrs. every day and continuous for a period of 3 months.

RESULTS AND DISCUSSION

The results are shown in table 1 and 2.

Table 1. Time spent per flower

Bee Species	Average for 3 months viz. October, November, December.		
Apis florea	Morning (8.30-9.00)	Noon (12.30-1.00)	Evening (5.30-6.00)
	(45.51+46.14+44.87) =136.52/90 =1.52	(48.25+45.23+48.43) =141.91/90 =1.58	(42.68+49.45+49.88) =141.41/90 =1.57

Table 2. Foraging rate

Bee Species	Average for 3 months viz. October ,November ,December.		
	Morning (8.30-9.00)	Noon (12.30-1.00)	Evening (5.30-6.00)
Apis florea	(318+300+293) =911/90 =10.12	(350+384+372) =1106/90 =12.28	(338+283+261) =882/90 =9.8

Studies on foraging behavior of honey Bees i.e. *Apis florea* in terms of foraging speed and rate on the *Antigonon leptopus at* Sangamner, foraging data recorded on time spent per flower visited per minute and Foraging rate was calculated.. The difference in the foraging rate of honeybees across the different times of the day was recorded. A maximum foraging rate of 12.28 minute was found at 12.30-1.00 pm as compare to morning and evening. The highest foraging rate of honeybees were during 12.30-1.00 pm might indicate the suitability of the climatic condition and the blooming of flowers *Antogonon leptopus* was high in noon. The maximum foraging speed is 1.58 min was found at 12.30-1.00 pm at the time of noon because may be the blooming of flowers *of Antogonon leptopus* was high. Vaziritabar et al 2015 studied the comparative foraging behavior of esternbee, (*Apis cerana* F) and western honeybee (*Apis mellifera carnica*) in pollinating pear and apricot flowers in Taleghan ,Iran . They found that (*Apis cerana* F) is

more talented species when compared to (*Apis mellifera carnica.).Mahfouz et al 2012 carried out research on to determine the insect pollinator orders, visiting sesame seed crop fluctuation percent of Hymenopterous fauna during flowering period and foraging activity of some bee species* . They found among the bees selected for the study the number *of Apis mellifera* was maximum followed by *Xylocopa species.* and lastly *Anthidium sp.* They also observed that at all the time period. .Temperature, wind and relative humidity also affect the percentage of insects visiting sesame flowers. Mackenzie 1994 studied the foraging behavior of honey bees (*Apis mellifera* L) and bumble bees (*Bombus* spp) on cranberry (*Vaccinium macrocarpon* Ait) in south estern Massachusetts. The observed that bumble bees appear to be better cranberry pollinators than honey bees. Joshi and Joshi 2010 has studied foraging behavior of Apis Spp. Flowers in a Subtropical environment. They observed that the foraging activity of *A. cerana* was observed at a peak between 11.00 to 13.00 hours and then a steady decline was recorded which abruptly decreased between 17.00 to 18.00hrs.However , in the case of *A. mellifera* ,the increase was steady and reached its peak between 13.00 to 15.00 hrs.. In the present study peak foraging activity of A. florea was between 12.30. to 13.00 hrs on *A. leptopus.*

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