

# ***CAMPONOTUS* ANTS GETTING DUAL BENEFITS FROM APHIDS AS WELL AS NECTAR FROM HOST PLANT *HIBISCUS ROSA-SINENSIS*.**

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## **Abstract**

The present study is based on interaction of *Camponotus compressus* with plant, *Hibiscus rosa-sinensis*, and aphids associated with this host plant. These plants were studied near agricultural area at village Male, Maharashtra. The study period was from October 2016 to March 2017. These ants were predominantly associated with *Hibiscus rosa-sinensis* as well as aphids throughout the year. The frequency of ants appeared to be least during heavy monsoon, moderate during summer and maximum during retreating monsoon and winter. Though the nearby area show presence of other species of ants as well, this ant *Camponotus compressus* appear to be predominantly associated with the heavily aphid infested host plant of *Hibiscus rosa-sinensis*. *Camponotus compressus* were competently utilizing the nectar resources of host plant *Hibiscus rosa-sinensis* and honeydew from aphids.

**Index Terms** - Ants, *Camponotus compressus*, *Hibiscus rosa-sinensis*, aphids, nectar, honeydew.

## **Introduction**

Ants are social insects occurring in all types of habitat except in Antarctic region. The ant colony may occupy multiple nest sites ranging from terrestrial, underground as well as arboreal one.

Most of the ant species are omnivorous and combine phytophagous feeding with predation or scavenging [1]. Predation and scavenging help them to suffice protein need. Aphids consume phloem sap of the host plant and excrete sugar-rich honeydew [2]. Honeydew is important food for them providing carbohydrates. Nevertheless honeydew is a mixture of free amino acids, minerals, vitamins along with sugar. Honeydew is an important food source for ants [3]. Therefore making it very useful food source. However all aphids produce honeydew but all are not definitely attended by ants.

Aphids (Hemiptera, Aphididae) and ants (Hymenoptera, Formicidae) are the protagonists of one of the most studied model of mutualistic relationships in the animal kingdom: the first ones produce a carbohydrate-rich excretion named honeydew, which is collected by some ant species that provide aphids in return with protection and hygiene [4]. This aphid ant association has strong interaction with various host plants [5].

Several studies have suggested that aphid have many natural enemies like ladybeetles, bugs, hoverflies and several other organisms. Several ants deployed for exploration and recruitment are able to locate aphids. Aphids derive protection from predators because of aggressive behavior of ants. It is also noted that plant sap can be utilized via specific coccids which are kept by the ants in the interior of the stem [6].

In the present study the association between *Hibiscus rosa-sinensis*, aphids and *Camponotus compressus* is carried out. The host plant is known colloquially as Chinese hibiscus, China rose, Hawaiian hibiscus, rose mallow and shoe black plant. It is a species of tropical hibiscus, a flowering plant in the Hibisceae tribe of the family Malvaceae, native to East Asia.

*Hibiscus rosa-sinensis* is a bushy evergreen shrub or small tree growing 2.5–5 m (8–16 ft) tall and 1.5–3 m (5–10 ft) wide. The leaves are glossy and solitary. The brilliant red flowers in are seen in summer and autumn. The flowers have 5 petals and are 10 cm in diameter exhibiting prominent orange tipped red anthers.

The aphid colony exhibited white scaly appearance and with great density on host plants *Hibiscus rosa-sinensis*. In some cases the host plant *Hibiscus rosa-sinensis* was also having mealy bugs and scale insects on them.

## Material and Methods

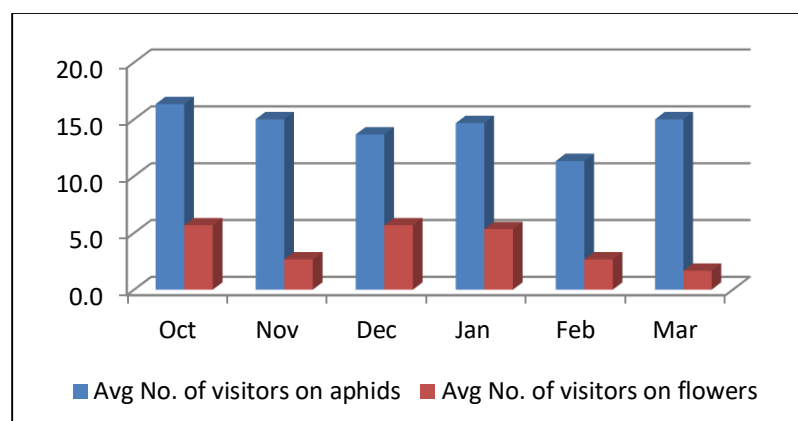
The present study was carried out in an agricultural area in Mulshi tehsil of Pune district, Maharashtra. This area is near village Male (18.500 N, 73.510 E) is characterized with paddy cultivation along with ornamental plants with some barren patches in between. Many garden flower plants were seen very commonly in these entire habitats including *Hibiscus rosa-sinensis*. Observations were recorded post monsoon during flowering period from October 2016 to March 2017. The host plants that are *Hibiscus rosa-sinensis* selected for study were having other flowering and fruiting plants in surrounding area making other plants equally competent to attract these ants. The host plants *Hibiscus rosa-sinensis* along with some other plants were infested with aphids. Also host plant *Hibiscus rosa-sinensis* and other nearby plants had occasional infestation of mealybugs and scale insects as well. The ants *Camponotus compressus* visiting each host plant *Hibiscus rosa-sinensis* on selected aphid infested branches as well as flowers were counted for an interval of 10 minutes during morning hours, with at least three records on each observation day. As the branch was aphid infested the ants *Camponotus compressus* visiting aphid colony was counted and also same number of observations carried out for flower visiting *Camponotus compressus* ants to have uniformity in collection of observations. The branches of host plant *Hibiscus rosa-sinensis* which were considered for observation was about 1 to 1.5 meters from ground level. One observation day was selected randomly during every month of study period. On the day of observation 3 observations were recorded intermittently with gap of 30 minutes between two observations. The worker ants of *Camponotus compressus* were collected and preserved using standard methods [7]. The ant was identified using [8].

## Observation

Table 1

Months	Average No. of <i>Camponotus compressus</i> visitors on aphids	Average No. of <i>Camponotus compressus</i> visitors on flowers
Oct	16.3	5.67
Nov	15.0	2.67
Dec	13.7	5.67
Jan	14.7	5.33
Feb	11.3	2.67
Mar	15.0	1.67

Graph1- Distribution of visitors during study period



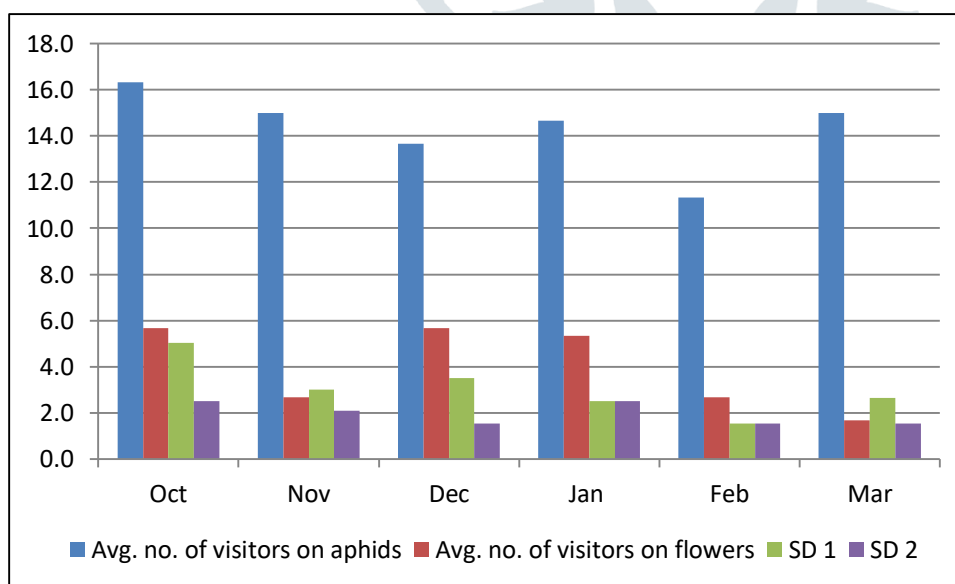
## Results and discussion

The selected study area was dominated by ornamental plants, flowering plants as well. It was also having fruit plants like mango, jackfruits, banana, coconut, tamarind, sapota etc. One of the most common plants was *Hibiscus rosa-sinensis* present in large nearby area. It was observed that this plant was many a time is affected by aphids infestation. It was also noted that the study area had occasional infestation of mealybugs, scale insects as well. It was also noted that ants are regular visitors of the host plant *Hibiscus rosa-sinensis* as well as aphids colony (Table 1, Graph 1). This incepted curiosity to understand the interaction between the trios. During the study it was observed that lot of harvester ant nests were in the study area. But they were never visitors to either the host plants *Hibiscus rosa-sinensis* or aphids. During preliminary field studies it was noted that the area show presence of many ant genera like *Monomorium*, *Solenopsis*, *Tapinoma* and *Camponotus* etc. Surprisingly the *Camponotus compressus* was the dominant visitor among all other ant genera. The aphid infested host plant *Hibiscus rosa-sinensis* was observed for the period of 10 minutes and the average number of visitors that is *Camponotus compressus* visiting aphids was found 14.33 whereas visitors that is *Camponotus compressus* visiting flowers of host plant was 3.94 during flowering period. After applying paired t test at alpha = 0.05 significant difference was noted (p value 0.0000347, Table 2) indicating visitors that is *Camponotus compressus* were more interested attending aphids than flowers ( Graph 2).

Table 2

t-Test: Paired Two Sample for Means (alpha=0.05)		
	<i>Camponotus compressus</i> visitors on aphids	<i>Camponotus compressus</i> visitors on flowers
Mean	14.33	3.94
Variance	2.89	3.26
p value	0.0000347	

Graph 2



\*SD 1 – Standard deviation for *Camponotus compressus* visitors on aphids, SD 2- Standard deviation for *Camponotus compressus* visitors on flowers.

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