

## Biology of *Monomorium (Holcomyrmex) criniceps* Mayr. in South India

by

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**Introduction :** The small black house and garden ant, *Monomorium (Holcomyrmex) criniceps* Mayr. is well known in almost all areas in South India occurring round about houses and in dry gardens. Although its life history and habits are known from other parts of the world, not much is known from South India. The observations on the ant made in Coimbatore are given in this paper.

This is one of the commonest species occurring in dry and hard soil in fields, gardens and pathways around houses. It is usually found carrying grains in farm houses. On account of this habit, the whole group of *Holcomyrmex* has attained great importance as harvesters. Wheeler (1910) found that the hairs on the labium were greatly elongated and directed forward and concluded that the arrangement must aid in the carrying of the grains. By its varied food and its attendance on injurious insects like aphids it becomes one of the most important insects in this region.

**Nesting :** The ant is a terrestrial one and nests only in the soil. The site of the nest is usually in an open place without any vegetation covering it. It makes a small hole of about 5 mm in width and brings out the particles of earth to the entrance in pellets. These are left behind around the entrance as small loose craters about 10 mm away from the entrance to the nest. Neither the crater nor the entrance are very prominent and may sometimes be indistinguishable. From the entrance the nest goes deeper into the soil in winding galleries many of which are found in the upper layers of the soil within about half a foot. Internally the galleries extend to the sides to about two feet or more. The galleries ramify along the pathway and extend into chambers which are larger in size and may vary in size from one to three inches in different seasons. These chambers are used as granaries for storing grass seeds brought in by the workers. Another large chamber is found at a lower depth with the walls well plastered within which the different immature stages of the ant are found. Although the different instars of the larvae are housed in the same chamber, they are separated out into different groups according to their stage inside the chamber itself.

It is usual to find many nests in the same site. When examined some of them turn out to be auxiliary ones in which there may be no queen but only different kinds of workers. In these nests the granaries also are not generally found.

**Seasonal History:** The ant usually swarms during the rains received in the South West Monsoon in July and continues swarming till October. The winged males and females are found in numbers in the nests along with the other forms of the ant and move about freely. They fly out, mate and settle down to form new nests. The females drop the wings and find the nests by themselves. Many nests spring up during the rainy season due to the activity of the ants. The ants continue to be active and the nests may continue without interruption for a year or even more. Many nests continue side by side in the same site for many years also.

**Organisation within the Colony:** The nest contains only one queen and several varieties of workers. The workers vary in size from very small to very large ones. Usually there are two forms which are distinguishable which are called the worker minor and the worker major. All the workers from the smallest to the largest take part in all activities in the nest as well as outside.

In observation nests the workers were noticed grooming the eggs, larvae and pupae. Occasionally the queen also attended to this work on some of the larvae. The larvae which were not attended to were seen to shrivel and die. The queen sometimes ate away some of the grubs as part of the food.

**Food and other Habits:** The ant always uses a regular track through which both the incoming and the outgoing ones move. All the forms of workers take part in the work outside the nest and bring home the food material. The food generally consists of grains which are available in the vicinity. Cholan (*Sorghum*) is a favourite food but many kinds of grass seeds also are taken. *Cenchrus* is a common grass from which the seeds are taken and stored in the nest and hollyhock and other weeds also form a part of their diet. The grains are taken as whole ones to the nest with the husks still intact. The small workers are the most industrious trying to pull more than their weight. The large workers often move about without carrying any load but a limited number also help in the work. The chaff is removed in the nest and thrown outside which accumulates in small heaps. When the grains are stored they are kept separately in one

place near the brood chamber. Every nest contains several kinds of grains at the same time. The auxiliary nests do not contain any granaries.

The ant usually moves rather slowly and steadily along a well-defined route. When an obstruction is placed on the track, a number of them crowd in the path indicating that the path is marked by scent rather than by sight. They take a long time to go over or around the obstruction. The path gets marked out clearly on the ground by the constant movement of number of ants on them. When the track leads through places covered with grass the ant tries to keep away from the grass as much as possible. When the ant has to climb on plants the path is not so regular but the individuals are seen to move along the same route. If more aggressive ants like *Camponotus* or *Monomorium* come across their way, the ants wait till the others go away and proceed on the journey. Neither of the ants attack each other on their regular routes. If the ants are disturbed near their nests they run about hastily and many of the large workers come out but active stinging is not restored to. The workers keep moving in and out during the time rather than attack the intruder. Very often single foragers are also found which should be of the 'scout' or 'excitement centre' type which search out sources of food and attract the others to such places.

Apart from grains, the ant also feeds on the honeydew of aphids like *Aphis gossypii* and *Aphis craccivora*, and of coccids on various plants. It takes also dead insects to its nest by the combined effort of a number of individuals. The remains of many of these insects are found in the entrances of the nests. The young ones are fed by the workers with regurgitated liquid food. Wheeler (1910) has observed that it feeds the young ones with bits of grains also. This has not been noted in the present case.

The population of the nest varies with the season and is most numerous in the semi-wet season in September-October. A nest examined in this season contained the following individuals. The counts of the ants were made by measuring out the ants in glass tubes in alcohol and taking the average of the contents of the tube.

Workers major	288	Grains stored Cholam	1/4 lb.
Intermediate forms	412	<i>Cenchrus</i> seeds	2 oz.
Workers	2644	Hollyhock	1 1/2 oz.
Eggs	311		
Larvae	1044		
Pupae	289		

The ant does not prevent other ants coming near or nesting in the vicinity of the nest. Nests of *Monomorium (Monomorium) sp.* and *Pheidole javanica* have been found within half a foot of the nest and the individuals of the species coming in contact with each other every now and then.

It has been observed several times that when it is about to rain the ants shift the grains to places of safety. All the workers, whether they are big or small, carry loads of grain and move along a particular track both ways three or four abreast. They usually move to some place under the shade of a tree or a building. Even if the rain is not received the next morning the track is seen to be abandoned which indicates that the grain has been taken to a different place during the night. This shows that the humidity and pressure exert physiological reactions which influence the ants to take the stored material to places of safety in a more sheltered environment.

**Life History:** Observations on the life history were carried out in nests reared in jars in the laboratory. The nests were kept moist so as to allow the ants to mould them to the shape desired by them. Water and sugar solution were provided in the jar for their feeding. The eggs and larvae were separated out for studying the instars and the stadia. Workers were introduced with these eggs and larvae so that normal development may be obtained. The workers were replenished every now and then. The workers attended on the eggs and larvae but there was mortality among them. The grains gathered and stored in the nests by the ants were used for feeding the workers.

The eggs were about 0.25 mm. in length and lasted on an average 7.58 days with a range of from 4 to 10 days. There were three instars in the larval stage with the stadia ranging from 2 to 4, 5 to 7 and 2 to 3 days with averages of 2.5, 5.9 and 2.4 days. The pupae were naked attended on by the workers and queen. The duration ranged from 7 to 9 days with an average 7.9 days. The total life cycle lasted 26.3 days.

**Parasites and Inquilines:** No parasites were noted on the ants or their larvae.

A spider closely resembling the ant has always been found to be associated with the ant. It moves about freely with the ant in the pathways and enters the nest also. It has been noted also inside

the nest. The ant tolerates the spider and does not harm it in anyway. This mimicking and free-access condition is of the synoekete - xenobiosis relationship of the inquilines.

**Economic Status of the Ant:** The harvesting and storing of useful grains makes the ant an enemy of the farmer. Apart from the loss that may be incurred by the carrying away of the grains, the ant helps in transporting the seeds of the plants concerned and disseminating them to the fields as weeds in the standing crop. After rains some of these seeds sprout out in patches in the field and give indication of the activity of the ants.

The ants also attend on aphids and coccids and give them scope for multiplication and dissemination. However the presence of the ants give indication of the aphids and coccids which otherwise may not be distinguishable.

Being an ant closely associated with the ground it walks on, it can easily be kept in check by the application of insectides around places where its incursions are to be avoided. Chlordane, Heptachlor or Aldrin applied around nurseries have kept the ants away and given good germination of seeds. The complete eradication of the ant is, however, difficult as it is able to find alternative places for building the nest with comparative ease.

**Acknowledgments:** The writer thanks the University of Madras for kindly according permission to publish the material which formed part of a thesis for the M. Sc. degree. Thanks are also due to Sri M. Basheer, the then Government Entomologist who acted as supervisor for the study.

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