The Amazing World of ANTS

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Ants are the most conspicuous group of terrestrial insects ranging over virtually all the land out side the polar region. They are also numerically the most abundant and have successfully invaded the natural, agricultural and urban environments in the world.

They are eusocial insects of the family Formicidae, and along with the related families of wasps and bees, belong to the Order Hymenoptera. An ant can be easily distinguished from other insects by having elbowed antennae, narrow waist with one or two joints (nodes) between the thorax and the abdomen.

Ants inhabit in well organized communities, a way of life that offers significant advantages for survival, and maintain a sharp division of labour among them. A colony of ants includes several castes such as the queen, males and sterile female workers. During development they undergo complete metamorphosis passing through the egg, larvae, pupae and the adult stages.

Adults can be winged or wingless depending on their assigned caste. Workers comprise the wingless caste, while the queen and males emerge from pupae as winged reproductives. Usually the colony revolves around a single queen, which is the only sexually mature female and is the only individual capable of reproducing. Once a year the queen produces sexually mature male and female ants within the nest, and the male ants are responsible for fertilizing the queen. After participating in the nuptial flight where mating takes place, the queen sheds her wings and initiates a new colony. Males die soon after mating.

Ants are the most conspicuous group of terrestrial insects in any landscape due to their large colony size, ubiquitous presence in numerous habitats and the painful sting they inflict. There are about 15, 000 living ant species in 296 genera and 16 subfamilies in the world, of which 9 subfamilies including 2 endemic genera are recoded from Sri Lanka. The huge diversity, dominance in biomass and the presence in almost every habitat in an eco system made them the best indicators of habitat quality.

The wingless female worker ants are the most common and abundant form in an ant colony, and morphologically workers may be of one or several forms; monomorphic, dimorphic or polymorphic depending on the ant species. Many ants have monomorphic workers, but sub castes are called according to their sizes; minor, media, major workers. The worker polymorphism is well developed among the Marauder Ants (*Pheidologeton* sp.), where the super major workers are enormously sized (Fig. 1) and approximately about 50 times larger than the tiny minors.

Fig 1: Pheidologeton sp. (Super major worker)

The larger headed forms with powerful jaws termed soldiers, aid in defense of the colony, while minor forms or true workers perform a variety of duties for the colony; foraging, nest maintenance, building tunnels and food storage.

The length of the growth phase of the colony is highly dependent on environmental factors such as temperature, humidity etc. Growth of the colony ends when the colony is

large enough to produce alates, males and new queens. Most ant species have a single queen per colony but some species have multiple nests for at least one part of their life cycle.

Ants, as highly social animals, possess a complex system of internal communication that enables the colony to carry out its collaborative activities in nest building, food gathering, care of young and defense against enemies. Ants have proven to be the richest source of alarm pheromones (Chemical communication) among the social insects. Chemical releasers of alarm behavior have been identified among species belonging to the Subfamily Ponerinae, Dorylinae, Pseudomyrmecinae, Myrmicinae, Dolichderinae and Formicinae. They are released by the workers in an emergency situation to give clues about the danger, and defense against attackers will be carried out by the soldiers of the colony. Some ants leave scent trails that others can follow to the discovered food source.

Ants attack others while defending themselves in many ways. Some species are capable of inflicting painful bites or stings, while ants that belong to the sub family Formicinae eject highly acidic fluid (formic acid) in defense against their enemies.

Fig 2: Nest of Pheidole sp.

The nest morphology is often species specific, and the nesting site could be varied from a simple cavity in soil to extremely complex subterranean excavations. For instance, while *Pheidole* sp. and *Meranoplus* sp. form small solitary nests (Fig. 2) *Myrmecaria brunnea* (Fig. 3) produces large super colonies (Fig. 4) comprising hundreds of nests interconnected by underground

Fig 3: Myrmicaria brunnea (Kuru Koombiya)

Fig 4: Nest of Mymicaria brunnea

Fig 5: Nest of Oecophylla smaragdina

Fig 6: Nest of Camponotus sp.

passages over several kilometers in area. The Weaver ant, *Oecophylla smaragdina* is also known as the living sawing machines because of their ability to build large arboreal nests by weaving the living tree leaves together using the silk produced by its larvae (Fig. 5). The nest of *Camponotus* spp. is characterized by its crescent-shaped structure with a small nest hole at the centre (Fig. 6).

Lophomyrmex quadrispinosus forms a cluster of nests in loose dry soils exposed to intense sunlight (Fig. 7).

Fig 7: Nest of Lophomyrmex quadrispinosus

Usually ants have a wide variety of food preferences; plant seeds, nectar, honey dew secreted by sap sucking insects and fungus, but most are generalized or specialized carnivores that can exert an enormous control on the invertebrate populations in their vicinity. For example, the Trap-Jaw Ants, *Odontomachus* sp. (Fig.8) and *Diacamma* sp. are popular for their voracious predatory activities. The Shielded Ant, *Meranoplus bicolor* (Fig.9) and the Big-Head Ant, *Pheidole* sp. (Fig.10) are well known seed harvesters and play an important ecological role in seed dispersal. The Leaf cutter ants *Atta* sp. and *Acromyrmex* sp. in South America exclusively feed on a special fungus which cultivates inside their colonies. Thus they continually collect leaves and cut into pieces for the fungus to grow. They are referred to as the "fungus gradeners" and act as a serious pest in agriculture.

Fig 8: Odontomachus haematodus

Fig 9: Meranoplus bicolor

Fig 10: Pheidole sp. (Major worker)

According to the most recent work of Dias (2002), ants belonging to 9 subfamilies and 58 genera have been recorded from Sri Lanka, and this includes two endemic genera ; *Aneuretus* in the monotypic subfamily *Aneuretinae* (Wilson 1956) and *Stereomyrmex* (Bingham 1903) in the subfamily *Myrmicinae*. The Sri Lankan relict ant *Aneuretus simoni* Emery, is the sole surviving representative of one of the world's 14 ant subfamilies, and restricted to a few sites in Gilimale (a primary forest) and "Pompakelle" in the Ratnapura District. Among the recorded subfamilies in Sri Lanka, Myrmicinae is the largest with 30 genera and 201 species.

While conserving the threatened and endemic ant species is of urgent concern, invasive ants have become a world-wide problem because they feed on and contaminate human foods, infest structures and are able to inflict painful bites and stings. The most commonly encountered pest ant species are as follows.

The Red Imported Fire Ant, (*Solenopsis invicta*) (Fig.11) and the Black Crazy Ant, (*Paratrechina longicornis*) are considered as tramp species; introduced by human commerce to islands or continents of which they are not natives. They have proven to be outstandingly successful at

Fig 11: Solenopsis invicta

spreading within their new range, either in areas disturbed by human activity, including towns and cities, or in natural habitats. *Monomorium destructor* is the renowned tramp ant transported around the world via human commerce and trade. *Tapinoma melanocephalum* (Ghost Ant) is another nuisance pest species in houses and greenhouse environments. *Pheidole megacephala* is a serious threat to biodiversity due to displacement of most native invertebrate fauna and a pest of agriculture, and is the most species rich ant genus in the world. The Yellow Crazy Ant, *Anoplolepis gracilipes* (Fig.12) is associated with human-modified environments and is among the first hundred invasive species listed in the web. The Carpenter Ant, *Camponotus* sp. (Fig.13) is one of the largest and most heterogenous ant genera in tropical and neotropical regions, and does a serious damage to wooden structures excavating nest galleries inside.

Fig 12: Anoplolepis gracilipes (Ambalaya)

Fig 13: Camponotus sp. 1 (major worker)

Ants appear to be an ideal candidate for use as an indicator group because of their diverse, numerical and biomass dominance in almost every habitat throughout the world. In addition they are sensitive to environmental changes and the stationary nesting habitat allows them to be resampled over time. Furthermore, they play an important ecological role in terrestrial eco-systems as pests, predators, seed harvesters, fungus cultivators, soil turbators, pollinators, facultative and obligate symbionts, social parasites and vectors of diseases which make them the best indicators of habitat quality. Yet, very little work has been done on ant fauna of Sri Lanka. Hence, further studies on ants will add more significant data to the research world.

Deep underground is a little ant town…

From egg, larva, pupa to the adult that you see
My head, thorax and abdomen make up me
I have a hard exoskeleton; I'm soft inside
I dig under the soil where I live, eat and hide

I'm an ant, I'm an ant, ants come from eggs
I'm an ant, I'm an ant, and I have 6 legs
I'm an ant, an insect with 2 antennae
I'm an ant, I'm an ant. I work all day

My mom, the queen, is in charge of the nest
In thousands, we work with so little rest
I'm weak if alone, but in groups I can fight
To protect my nest all day and all night

I eat other insects, sweets, and seeds
I store honey in my stomach from flowers and trees
When I walk, I leave a smelly trail for my friends
So they can find my path from beginning to end

Deep underground is a little ant town.
Jennifer Fixman

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