



Persistence helps masquerading ant raiders

Similarities between human beings and social insects extend even to stealing. One ant species, probably too lazy to forage, has found when it comes to pilfering food from other ant colonies, the right "perfume" can pay off.



RAGHAVENDRA GADAGKAR

SOCIAL insects such as ants, bees, wasps and termites fascinate us. However, few believe we have direct lessons to learn from them. Much like our fascination for a tribal society, it's more a question of wanting to know how they do things.

Our curiosity about social insects relates to various aspects of their life — rules and regulations, division of labour, seats of power and control — and, yes, cheating and thievery, too. There is hardly anything in human society that does not have a parallel in insect societies. One fundamental difference, however, is the predominantly chemical mode of communication and recognition in insects, in contrast with the largely visual mode in humans. Much as a police dog smells out human beings, social insects can sense an outsider trying to enter their nest.

In social insect colonies, some individuals reproduce while others specialise in sacrificing personal reproduction and behaving altruistically to help their colony members to survive and reproduce. In analogy with human societies, these specialised groups of individuals are called castes. Thus, there are reproductive castes, worker castes, soldier castes and so on.

Modern sociobiology explains the apparently paradoxical, altruistic behaviour of the sterile worker castes by arguing that aiding close genetic relatives is not really altruistic from the genetic point of view. Indeed, social insects typically live in large family groups so that altruism is automatically directed towards genetic relatives. To facilitate direction of help towards relatives and away from non-relatives, social insects have a strong sense of camaraderie.

Familiar smells

Each nest has a characteristic odour, which is verified by the guards of a colony before permitting entry. But how are these colony-specific odours acquired? In most species studied, colony-specific odours are derived from the food and nesting material that all members come into contact with and rub on each

other and, perhaps, the body odours of the individuals themselves. In some subtle way, the resultant composite odour of each colony is different from that of others, thus enabling nest-mate differentiation.

Simple as it is, this mechanism of recognising nest-mateship is susceptible to cheating. Michael Breed and his team at the University of Colorado in USA recently documented an interesting case of cheating in the neo-tropical ant *Ectatomma ruidum*. Thievery is quite common in this species. Forager ants often avoid searching for food and instead attempt to steal food from neighbouring colonies. Not surprisingly, these thieves are dragged away from nest entrances by guards of the colonies being robbed. For some reason, the guards do not kill the thieves — they seem to let them off with a warning, as it were. Such leniency on the part of the guards is exploited by thieves who try to sneak in repeatedly. Their persistence seems to pay off not because of

The guard ants do not kill the thief ants. They seem to let them off with a warning, as it were, and the "thieves" exploit the leniency.



the many attempts they make but because, by repeatedly coming into contact with the guards and other members of the alien colony, the thieves acquire the smell of that colony.

This has been proved in experiments conducted by Breed and his colleagues. Thieves from a colony were repelled less often by guards of an alien colony than the non-thieves. More importantly, non-thieves that were experimentally forced to spend 24 hours with members of another colony were also repelled less often than were other non-thieves of their colony. By acquiring an alien colony's odours, the thieves masquerade as residents of neighbouring colonies. One thief was even observed to be offered food by residents of an alien colony. The moral of the story? Persistence pays.

But why should the guards of a colony let thieves off so leniently? Indeed, in a related species called *Paraponera clavata*, the guards dismember thieves and consequently, theft is less common. Perhaps this is because the cost of theft relative to that of trying to injure the thieves, is low in *Ectatomma ruidum*, but not so in *Paraponera clavata*. This can be investigated by a cost-benefit analysis. As always, the answer to one question raises at least one more question — but that's why nature is so fascinating. ■



Raghavendra Gadagkar is chairperson of the Centre for Ecological Sciences at the Indian Institute of Science in Bangalore.