

## Polyrhachis Ants and Bacterial Symbiosis

WHILE working with the lac insect, *Lakshadia mysorensis* growing on *Shorea talura*, in Bangalore, India, I found the ant, *Polyrhachis rastella* Latr. v. *formicata* Em. intimately associated with it. All the species of *Polyrhachis* ants I have come across, build their nests underground while the above-mentioned ant lives entirely on trees. I found its nest not only on *Shorea talura* but also on mango and other trees where the leaves were just broad enough to be webbed or rather glued together to serve as small nests for this ant. It seems to have acquired the habit of living on trees in adaptation to an intimate association with scale insects. While surveying the possibilities of spreading itself in a lac plantation, where there was no scarcity of food in the form of honey excreted by the lac insects, I could not imagine why the ant was so scarce there. I never found two nests on the same tree or even a large one so that the greatest search had to be made to discover its nest. What natural factors check this ant from multiplying itself, has never been clear to me.

*Polyrhachis formicata* is further interesting as secreting a strong odour pleasant to the human nose. While the odour was characteristically allied to amyacetate, traces of a ketone and an amine as well were detectable. An organic chemist kindly suggested the smell might be that of amyformate since most ants produce formic rather than acetic acid. I asked a colleague in the Indian Institute of Science to prepare some amyformate for me which had an unpleasant smell. Many other esters were also tried but the odour of the ant *Polyrhachis formicata* approximated more to amyacetate than to any other ester tried. I also know another ant which produces the odour of ethyl acetate and where no appreciable smell of formic acid is formed so that the generalisation

that all ants produce formic acid in some form is not justified.

*Polyrhachis menelas* For. is also found in the lac plantation in Bangalore. It lives underground and as far as the lac cultivating area is concerned it may be looked upon as non-existing by which I mean to emphasise its degree of frequency. This ant emits a weak but appreciable formic acid odour.

Further three allied species of *Polyrhachis* ants, found in Bangalore outside the lac plantation, were examined, each species having an odour characteristic to it and all living underground building very small nests, with about 200 individuals in each nest. All the species of *Polyrhachis* I have studied line their nests with a web, the habit of living on a tree or underground making no difference in this respect.

A bacteriological examination of the intestine revealed the presence of rod-shaped bacteria in the midgut of *Camponotus ligniperda* and *Formica fusca*. I had from time to time also isolated the Bacteria in pure cultures of all these European and Indian ants, so that I was able to see there was no great morphological difference among them. The intestines of many Pentatomid bugs contain long bacteria but these bugs as a class, when compared with all the ants carrying symbiotic bacteria, show a variation, whereas all these ants exhibit a striking uniformity. So far I have examined only five species of *Polyrhachis* ants and it would be worth while extending such observations to other species. Should this note attract the attention of other workers on ants I shall be most grateful to receive say 5 specimens of each species of *Polyrhachis* ants preserved in 96% alcohol.

S. MAHDIHASSAN.

C/o The American Express Co.,

Berlin,

July 30, 1939.