



Fig. 2. The postulated relation between the primary ecological adaptation of *Zacryptocerus varians* and its most distinctive social traits.

avoid harm by crouching low and using the flanges and spines arrayed over the top of their bodies as a shield. The antennae are withdrawn into deep scrobes lining the sides of the head. The turtle-like anatomy appears to have evolved in conjunction with at least two other features. The soldier caste has a shield-shaped head which it employs much like the blade of a bulldozer. Lacking long, sharp mandibles, it cannot cut or puncture the bodies of enemies in the manner of the soldier caste of most ant species. And because of its rigid body form, it cannot bring its sting or abdominal glands into easy play. The armoured body form also has the consequence of preventing self-grooming of the abdominal tip. As suggested earlier, the strange mode of abdominal trophallaxis practised by *Z. varians* may be a compensation for this incapacity. The short mandibles and rigid body of the minor worker might also explain why adult transport has never been observed in the species.

Finally, the heavy reliance on scavenging, entailing the consumption of large quantities of liquid and semiliquid food, is a concomitant of the virtual failure of the workers to handle solid food collected outside the nest or to feed solid particles directly to the larvae. This specialization explains the high state of oral trophallaxis observed within the *Z. varians* colony.

The ecological explanations offered here are evolutionary hypotheses based upon intuitively judged correlations. They were derived by the comparison of *Z. varians* with other ant species, so that peculiarities in ecology and behaviour could be identified and linked with one another in a logical manner. The testing of this scheme

awaits further correlations among other species of arboreal and non-arboreal ants, especially within and around the tribes Cephalotini, Cataulacini and Meranoplini, some of whose members resemble *Zacryptocerus* in details of anatomy and ecology. Among the cephalotines the primitive and little-known genus *Procrypto-cerus* seems the most promising. These ants are in some respects intermediate in morphology between more typical myrmicine ants and the most advanced members of the Cephalotini, including *Zacryptocerus*. Whether they are also intermediate in ecology and behaviour is the key question.

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