Buschinger and Winter, 1976). It is puzzling that these always had the black coloration and smooth sculpture of the "shiny" phenotype.

It is still unclear what causes phenotypic variation in *D. pocahontas*. In the following, we examine three potential explanations.

1. *D. pocahontas* is a hybrid of two or more *Leptothorax* (s. str.). Hybridization of different species of leptothoracine ants is a well known phenomenon both from the field and laboratory experiments (Buschinger, 1972; Seifert, 1984; Heinze, 1989; Jessen and Klinkicht, 1990; Douwes and Stille, 1991) and might explain the rareness as well as the large morphological variation of *D. pocahontas* adults. The "shiny" phenotype might result from a particular combination of genes from two parental species. Similarly, ordinary queens of *Acanthomyops latipes* (α-females) differ in morphology strongly from β-queens, which are hybrids between *A. latipes* and *A. claviger* (Wing, 1968).

In *Solenopsis* (Hung and Vinson, 1977) and *Leptothorax* (Heinze, 1989; Douwes and Stille, 1991), allozyme studies have been used to detect and analyze interspecific matings: Hybrids of the undescribed nearctic *Leptothorax* (s. str.) species A and B, e.g., are easily recognized by heterozygous enzyme patterns, as the two parental species are fixed for different electromorphs of Malate dehydrogenase, Isocitrate dehydrogenase (IDH), and 6- Phosphogluconate dehydrogenase. With the exception of IDH, which is slightly polymorphic in *Leptothorax* C (Heinze, 1989), these three enzyme systems are monomorphic also in those *Leptothorax* (s. str.), which live sympatrically with *D. pocahontas*, but differ between species. If *Doronomyrmex pocahontas* was a hybrid between these species, it should carry genes for the two enzyme electromorphs of both parental species and might thus exhibit hybrid enzyme phenotypes. Enzyme analyses did not show heterozygous patterns in *D. pocahontas*. However, parental alleles not necessarily are equally expressed in hybrids (e.g., Hung and Vinson, 1977).

2. *D. pocahontas* is a rare, non-parasitic species which hybridizes with *Leptothorax* C. Allozyme analyses cannot rule out this possibility. It would explain why some *D. pocahontas* queens had exclusively "shiny" sexual offspring, while others reared "dull" hybrid progeny.

3. *Doronomyrmex pocahontas* is the rare extreme variant of a non-parasitic species which exhibits a polymorphism of queens, workers, and males. Since *D. pocahontas* workers are morphologically very similar to those of *Leptothorax* C, their karyotypes and enzymes are almost identical, this species might in fact be *Leptothorax* C.

Environmentally or genetically mediated polymorphism is well known from numerous species of ants. Infestation with tapeworm cysticercoids or a fungus (formerly believed to be Haplosporidia, Sánchez-Peña et al., 1993) or different climatic conditions may have strong impact on coloration and also morphology of leptothoracine ants (Plateaux, 1972; Buschinger, 1973; Buschinger and Winter, 1983). A genetical polymorphism affecting queen morphology is known from *Harpagoxenus sublaevis* and *Leptothorax* sp. A (Buschinger, 1978; Heinze and Buschinger, 1989). In *Leptothorax (Myrafant) nylanderi*, pale coloration ("*pallens*"-morph) appears to be caused by a recessive allele (Plateaux, 1981 a, b).

The results of laboratory rearing experiments speak against an environmentally-based modification in the case of *D. pocahontas*, but a genetical mechanism might