

isolation. The differences between the original population (including the "preparasite") and the "new" host population may refer to sexual pheromones, to preferred mating times and sites, or to size of sexuals, all varying within species with sufficiently large ranges.

The geographic shift of the "host" population, or the spreading of the "preparasite" into other host populations, according to my hypothesis, provides the third important contribution to the formation of a social parasite, together with polygyny and an alternative mating strategy. This step may be responsible particularly for the type of parasitism which originates from the preparasitic condition.

Thus, the "preparasite" may be already completely workerless, or produce only very few workers, the host species remains polygynous, and queens of the new parasite and the (now) host species coexist. A typical inquiline has been formed, which subsequently may more or less diverge morphologically from the host species. Apparently this is the most "easy" and thus most frequent way of origin of a parasite.

As BUSCHINGER (1970) has already suggested, the incipient parasite may still be able to produce a certain, low number of workers. The nests with many "preparasites" in a supercolony will not produce sufficient workers, but may depend upon a net intake of worker brood (pupae) from neighboring nests with more "normal" queens. Brood exchange is not uncommon in polydomous ant species (ROSENGREN and PAMILO 1983). Due to the increasing genetic distance between the "preparasite" and its "host" the colonies with "normal" workers will increasingly resist the pillaging of their brood, and thus may select the "preparasite" workers for becoming more aggressive. When genetic isolation is finally completed, similar as in inquilines, the parasite has become a slave-maker, which will be further selected for higher fighting and raiding effectivity. Of course, the parasitic queens also have to get into host colonies by force, and it is not surprising that they usually fight with the same species-specific techniques as their workers during slave-raids.

When a "preparasite" producing no workers is confronted with a "host" population which is only facultatively polygynous or where a transition to monogyny occurs, the host population may select for more aggressive "preparasite" queens who have to overcome the resistance of host colonies against the adoption of young queens. The parasite does best when eliminating the host colony queen(s), as is observed in the "murder-parasite" *D. goesswaldi* (BUSCHINGER and KLUMP 1988). The fact that the latter species is parasitizing the facultatively polygynous *L. acervorum*, and may eliminate several host species queens in one nest, is not a serious discrepancy in this hypothesis. It may have attained the "murder" behaviour while parasitizing predominantly monogynous populations of *L. acervorum*. In the genus *Epimyrma* we observe a similar phenomenon: Most species coexist with monogynous host species, and throttle their queens to death, but *E. stumperi* is living with a (secondarily?) polygynous host species, and eliminates all host queens met with in a nest (KUTTER 1951).

Finally, the "preparasite" may have lost the capacity to found new colonies independently, but has retained the capacity to produce some workers. The "host" form slowly went over to strict monogyny and monodomy, thus preventing the preparasite to develop slave-making behavior. Like in the case of a "murder" parasite, the "preparasite" still has to invade "host" nests, and it will also be selected for aggressivity resp. for developing a behavior to replace the host queens. Different from a "murder" parasite, however, selection then could favor a higher worker production again, thus forming a temporary parasite.

The origin of temporary parasites is most difficult to understand, and admittedly represents the least conclusive part of this hypothesis. In addition to a switch from polygyny towards monogyny other factors may be involved. Thus, it is striking that temporary parasites usually have high worker numbers, and attack host species with large colonies (*Lasius fuliginosus*, host *L. umbratus*; *Bothriomyrmex* spp., hosts *Tapinoma* spp.), as compared to most slave-makers. Large colonies are difficult to overwhelm for slave-raiding, and they