

discovered. The ant partners of the recently found host plants not only belong to known species but to hitherto undescribed species as well, thus illustrating the need for a renewed basic taxonomic treatment. The extended number of *Cladomyrma* specimens of more than 150 samples, including many queens, is rather rare for tropical formicine ants. As most of the genera of formicine ants are characterized by the absence of discrete characters and an extensive variation in characters such as shape or position and number of hairs, large series are needed to extract species-specific characters. Thus, what might be a distinctive character in a limited number of samples might be just two extremes of a variation when many more specimens become available. Changes in the status of species might thus occur, and is well illustrated in this study. We nevertheless consider species acceptance better than the use of informal names not accompanied by diagnoses.

The best characters for separating species in *Cladomyrma* are in the male and the queen caste. Whereas few males are known, queens are unusually abundant in this material. Based on their variation, more species can be diagnosed than with workers alone. This, in turn, often makes it impossible to identify workers without their queen. This paper aims at reassessing the status of the previously described species, and describing the new species and their biology, and to present a key to the queen caste.

BIOLOGY OF *CLADOMYRMA*

A characteristic feature of all known species of *Cladomyrma* is the utilization of live pithy stems as nest sites: Colony-founding queens gnaw entrance holes in suitable soft young internodes and excavate a chamber in which they rear their first brood in isolation. The initial founding chamber is later expanded by the emerging workers (Maschwitz et al., 1991; Moog et al., 1998). Multiple colonizations of an individual plant sapling in different internodes are the rule, but eventually a single colony monopolizes the entire host plant. Sometimes foundress queens (e.g., those unsuccessful in penetrating comparatively old internodes) try to enter a nest chamber already occupied by another queen.

The result is either a chase-off or the death of at least one of the combatants (Moog et al., in prep.). Very rarely (< 0.5%), two queens are found to inhabit a single foundation chamber (e.g., in *C. dianeae* inhabiting *Neonauclea gigantea*), apparently without exhibiting aggressive behavior toward each other. With both increasing plant and colony size, other internodes will be colonized successively. Eventually the nest chambers run through stem, branches, and every twig (with the exception of *Neonauclea*, in which, even in adult trees, only swollen parts of the internodes (= ant domatia) are used as nest space. Size of mature colonies is variable, usually several thousand workers, but may reach 10,000 in a *Saraca* tree (8 m in height) and about 30,000 in *Neonauclea gigantea* (ca. 15 m).

In mature colonies the often physogastric queen is usually found in the lower part of the host plant, and the brood is dispersed throughout the colony space. There is probably a tendency toward a separation of male and queen alates. Whereas the alate queens concentrate in the proximate parts of the inhabited twigs, the males are often found closer to the apex. All *Cladomyrma* species tend coccoids inside the nest hollows and feed on honeydew excreted by their trophobionts (unpublished results). The majority of the coccoid partners are Pseudococcidae and the involved taxa belong to a large variety of species (D. Williams, personal commun.). The monogynous colonies of all species tested (*andrei*, *dianeae*, *maschwitzi*, *petalae*) protect young foliage of their host plants against herbivores and prune young plant tips of encroaching vegetation (*andrei*, *dianeae*, *maryatiae*?, *maschwitzi*, *nudidorsalis*, *petalae*, *yongi*; Moog et al., 1994; Moog et al., 1998, unpublished results). It is assumed that these observations hold for all *Cladomyrma* species, but this requires further confirmation. In addition, *Cladomyrma* workers exhibit a conspicuous behavior on the plant surface, in which they appear to clean minute particles from young leaves (and sometimes stem)—regularly—probably initial colonies of epiphylls or fungus spores. As a rule, mature colonies of *Cladomyrma* display aggressive behavior if the nest (= plant) is violently disturbed, however, there seems to exist a