

cecropia trees, except at high elevations and on islands where *Cecropia* has colonized without ants (Janzen, 1973). It occurs from southern Mexico to Paraguay and northern Argentina, and on several Caribbean islands. It is generalized in its use of *Cecropia* species, even within microhabitats. I have observed colonies of *A. alfari* inhabiting *C. obtusifolia* Bertoloni, *C. peltata* L. and *C. insignis* Liebmman in Costa Rica, and *C. peltata*, *C. palmatisecta* Cuatrecasas, and *C. libradensis* Cuatrecasas in Venezuela. I have collected *A. ovaticeps* from *C. obtusifolia*, *C. peltata*, and *C. insignis* in Costa Rica and from *C. peltata* in Venezuela.

The *A. alfari* group as a whole is found in more disturbed habitats than other obligate *Cecropia* inhabitants such as *A. muelleri*, *A. constructor*, and *A. xanthochroa* (Benson, 1985; Longino, unpubl. obs.). The two species within the *A. alfari* group, although frequently occurring in adjacent trees, may also exhibit slightly different habitat preferences with respect to each other. *A. alfari* sensu stricto is found in habitats at the high end of the disturbance spectrum. In Costa Rica, *A. alfari* is the most frequently encountered species in *Cecropia* trees along roadsides and pasture edges, in areas that are far from forest or forest patches. It also occurs in and around forest patches, but there it occurs at a lower frequency, sharing *Cecropia* populations with several other *Azteca* species (Longino, 1989). *Azteca alfari* also exhibits a wide geographical range, occurring at the tropical/subtropical transitions in Mexico and Paraguay. This species' presence at the geographical and climatic limits of the ant-*Cecropia* association may be related to its affinities for disturbed, open habitats in the center of its range.

In contrast, *A. ovaticeps* seems to be associated more with wet forest habitat or, at least, forest edge, and its geographic range is smaller and more centrally located. Although perhaps associated with disturbance in the form of treefall gaps or shifting river edges, it does not seem to thrive in areas of continual anthropogenic disturbance. At the La Selva biological station in Costa Rica it is the most common *A. alfari* group species, whereas at other sites farther from intact forest *A. alfari* sensu stricto is more abundant. Judging from old collections, *A. ovaticeps* was very common along river margins in the Amazon basin. With increasing human disturbance, *A. alfari* may be much more common in this area than it used to be. Davidson has made dozens of collections of ants from *Cecropia* trees at and around Cocha Cashu Biological Station in Manu National Park, Peru, an extremely remote area with almost no human disturbance; all have been *A. ovaticeps*. In contrast, her collections from the nearby Tambopata reserve, a site with somewhat more disturbance, contain an *A. alfari* queen in addition to many *A. ovaticeps* queens.

A long-standing debate revolves around whether the ant-*Cecropia* association is a mutualism (reviewed in Bailey, 1922; and Janzen, 1969). Recent studies suggest that the *A. alfari* group may be less



Figure 47. Distribution of *A. alfari* and *A. ovaticeps*.

effective than other *Azteca* species in defending *Cecropia* trees from herbivores (Andrade and Carauta, 1982; Andrade, 1984). In Costa Rica, *A. alfari* group species are slow to respond to mechanical disturbance of their nest trees, and their nest trees suffer increased herbivory and reduced growth relative to trees inhabited by other obligate *Cecropia* ants (Longino, unpubl. obs.).

SPECIES EXCLUDED FROM THE *A. ALFARI* GROUP

Azteca lucida Forel NEW STATUS

Azteca alfaroi race *lucida* Forel, 1899:113; syntype workers: Guatemala, Pantaleon, 1700' (Champion) [MHNG] (examined).

The syntype workers have standing hairs on the tibiae, and the major workers have large, subquadrate, nearly glabrous heads, completely unlike the heads of major workers in the *A. alfari* group. In the description, Forel states that *A. lucida* was collected from *Cecropia*, but the labels I observed on the syntypes contain no biological data. The syntypes may or may not have been collected from a *Cecropia*, but there is no evidence that this species is an obligate inhabitant.

DISCUSSION

Recent taxonomic studies of ants are revealing the frequent occurrence of broadly sympatric sibling species (e.g. Trager, 1984; Ward, 1985). Some may view this as a simple swing of the pendulum from lumpers to splitters, but this form of splitting is fundamentally different from that of Forel, Wheeler, and others. The uncontrolled proliferation of