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Taxonomic Characterization of Some Live-stem Inhabiting *Azteca* (Hymenoptera: Formicidae) in Costa Rica, with Special Reference to the Ants of *Cordia* (Boraginaceae) and *Triplaris* (Polygonaceae)

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Abstract.—In the morphological space defined by queen head length and head width, seven Costa Rican species or species complexes in the ant genus *Azteca* have relatively narrow, subrectangular heads (head length ≥ 1.3 times head width), and all of them share characteristic nesting behavior in live stems. These species and species complexes are taxonomically characterized, and queen and worker-based identification guides are provided. A subset of these species are common inhabitants of the specialized ant plants *Cordia alliodora* (Boraginaceae) and *Triplaris melaenodendron* (Polygonaceae). *Azteca longiceps* is an obligate inhabitant of *T. melaenodendron,* but is known only from two mid-elevation Pacific slope sites. In the Pacific lowlands *T. melaenodendron* is usually inhabited by either *A. beltii* or *Pseudomyrmex viduus,* two species that are not obligate inhabitants of particular ant plants, but instead may be found in a variety of different ant plant species. The *Azteca pittieri* complex contains the common obligate inhabitants of *Cordia alliodora.* A general description of ant community composition in *Cordia* and *Triplaris* ant plants, and discussion of 1) the adaptive significance of queen characters in *Azteca,* 2) problems of species definitions as revealed by this study, 3) possible mechanisms generating complex character distributions in the *A. pittieri* complex, and 4) the contrasting roles of regional faunas and global revisions are provided. Taxonomic changes are: *Azteca beltii* Emery 1893, **new stat.** [= *laeta* Wheeler 1942 **new syn.**, = *stolli* Forel 1912 **new syn.**]; *Azteca cordincola* Forel 1920, **new stat.**; *Azteca juruensis* Forel 1904, **new stat.**; *Azteca nigricans* Forel 1899, **new stat.**; *Azteca patruelis* Forel 1908, **new stat.**; *Azteca pittieri* Forel 1899 [= *emarginatisquamis* Forel 1920 **new syn.**]; *Azteca sapii* Forel 1912, **new stat.**

INTRODUCTION

Specialized ant-plant associations are a conspicuous feature of the tropics, and they have been a frequent subject of study in ecology and evolutionary biology (Beattie 1985, Davidson & McKey 1993, Hölldobler & Wilson 1990). Most of the conspicuous ant-plant associations involve communities of interacting species (Longino 1989a, 1991a, Ward 1991, Fiala *et al.* 1991, Davidson *et al.* 1991, Davidson & Fisher 1991, McKey 1991). Studies of these communities are hampered by a lack of basic taxonomy and natural history of the organisms involved. Lack of names and/or a confused state of names impedes effective communication of results. An inability to distinguish among species can lead to misinterpretation of field results and/or an underestimation of diversity in ant plant associations. Two ant-plant associations that have received little attention involve the plant genera *Cordia* and *Triplaris.* The last review of these associations was by Wheeler (1942), which contains a wealth of taxonomic and natural history data.

The genus *Cordia* occurs throughout the Neotropics, and two species, *C. nodosa* and *C. alliodora,* are specialized ant-plants (Wheeler 1942). Both species have pyriform cauline swellings at nodes where whorls of branches arise. These domatia are hollow and are usually inhabited by ants. *Cordia nodosa* is South American. *Cordia alliodora* is widespread in South America and also extends through Central