

ANT-PLANTS IN THE PERUVIAN AMAZON

By Megan Frederickson

I study two species of ant-plants that grow in the rainforests of the Amazon Basin. These two plant species, *Cordia nodosa* and *Duroia hirsuta*, are both small trees that bear specialized



Figure 1. The swollen part of this *Duroia hirsuta* stem is an ant domatium.

structures, called domatia, to house ants (Fig. 1). The domatia are hollow, swollen portions of *C. nodosa* or *D. hirsuta* stems. Both *C. nodosa* and *D. hirsuta* produce one domatium per internode; they add domatia as they grow and lose domatia when branches die and fall off. Inside these domatia, ants tend brood, reproductives, and scale insects (Hemiptera: Sternorrhyncha: Coccoidea). Workers are often seen walking between domatia along plant stems, but brood and reproductives are rarely observed outside domatia.

Scale insects, which suck sap from the tree, provide food to the ant colony in the form of honeydew. *C. nodosa* also produces small food bodies to feed ants¹. Thus, an ant colony living in the domatia on *C. nodosa* or *D. hirsuta* receives nesting sites and food, via food bodies or scale insects, from its host plants.

In general, an individual *C. nodosa* or *D. hirsuta* tree is occupied by only one colony of ants. However, different trees in the same population are often occupied by different ant species (Fig. 2). *D. hirsuta* associates with two ant species: *Azteca depilis* and *Myrmelachista schumanni*.

C. nodosa associates with five ant species: *Azteca depilis*, *Myrmelachista schumanni*, *Allomerus octoarticulatus*, and two undescribed species also in the genus *Azteca*.

Azteca spp. and *M. schumanni* behave as mutualists, protecting

their host plants against herbivores². *M. schumanni* also provides an extra benefit; workers of this species kill heterospecific plants (potential competitors) near their host plants³. *Al.*

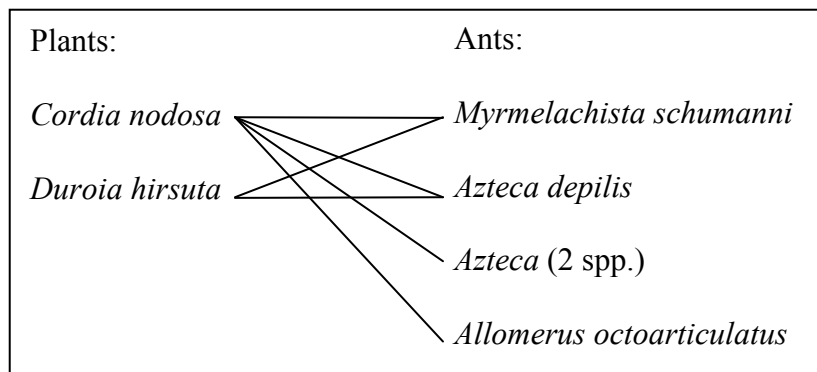


Figure 2. Plant and ant species connected by lines interact; ants nest in domatia and protect plants against herbivores.

octoarticulatus, on the other hand, behaves as a parasite. While worker *Al. octoarticulatus* ants protect *C. nodosa* leaves against herbivores, they do not protect plant stems^{2,4}. As a result, *C. nodosa* with *Al. octoarticulatus* ants are more frequently girdled by *Trachysomus* beetles than *C. nodosa* with other ant species^{2,4}. Furthermore, *Al. octoarticulatus* sterilizes *C. nodosa* by destroying flowers⁴.

Azteca spp. and *Al. octoarticulatus* colonies are monogynous, with a single colony of ants nesting in a single host tree. *M. schumanni* colonies are polygynous and inhabit large stands of host plants called ‘devil’s gardens’ (Fig. 3). *M. schumanni* workers use formic acid as an herbicide to kill plants other than their host plants, thereby creating devil’s gardens³. One devil’s garden, or host plant patch, comprises one *M. schumanni* colony. *Azteca* spp., *Al. octoarticulatus*, and *M. schumanni* all found colonies independently; queens fly to plants to colonize them. An established *M. schumanni* colony can also colonize plants by budding to occupy additional trees within a patch.



Figure 3. A devil’s garden, or nearly pure stand of ant-plants. This devil’s garden is dominated by *D. hirsuta*. In the foreground there are several hundred *D. hirsuta* trees; in the background is the diverse rainforest that surrounds the devil’s garden. Photo credit: BBC NHU.

¹ Solano PJ, Belin-Depoux M, Dejean A, 2005, *C R Biologies* 328: 642–647

² Frederickson ME, 2005, *Oecologia* 143: 387-395

³ Frederickson ME, Greene MJ, Gordon DM, 2005, *Nature* 437: 495-496

⁴ Yu DW, Pierce NE, 1998, *PRSB* 265: 375-382