at repelling army ants than the auricle morphology of *C. muelleri* (Fig. 8c), this could account for stronger selection for the seemingly more effective anti-predatory body morphology in the latter species.

Another known predator of both *C. longiscapus* and possibly of *C. muelleri* is the semi-nomadic, socially parasitic, agropredatory ant species *Megalomyrmex sp. nov.* (Formicidae: Solenopsidini) (Adams et al., 2000b). Based on field and laboratory data, *Megalomyrmex sp. nov.* colonies aggressively raid *C. longiscapus* and *C. muelleri* nests, biting and stinging host-species workers. The raiders eject the resident *Cyphomyrmex* colony and then occupy and consume the fungus garden over a period of weeks or months, depending on garden size. Unfortunately, this species is known from only a few collections (5 colonies of *Megalomyrmex sp. nov.* from 344 *C. longiscapus/C. muelleri* nests collected during 1999 and 2001) (Adams et al., 2000b), and so, without more research, it is impossible to accurately assess the (possibly differential?) predation pressure exerted by this species on *C. longiscapus* and *C. muelleri.*

Perhaps the most remarkable difference between *C. longiscapus* and *C. muelleri* is that, even though these two species are quite similar biologically and even though they occur sympatrically in the same microhabitats, they consistently employ two very different, distantly related fungal cultivar species. Each of these fungal cultivars is also employed by other, distantly related attine ants that occupy different microhabitats and that are otherwise quite dissimilar biologically (Mueller et al., 1998; Green et al. 2002). Specifically, *C. longiscapus* shares a narrow group of cultivars of the "Clade 1" type (Mueller et al., 1998) with the sympatric fungus-growing ant *Apterostigma auriculatum;* molecular data indicate that in one case a cultivar clone has been transferred recently between nests of these two ant species (Mueller et al., 1998). Similarily, *C. muelleri* shares a narrow group of cultivars of the "Clade 2" type with the sympatric *C. costatus,* and multiple cultivar exchanges have occurred between these two ant species (Green et al. 2002). Both *A. auriculatum* and *C. costatus* are commonly encountered under logs and rocks on the rain forest floor (UGM, pers. obs.), a very different microhabitat from the embankments preferred by *C. longiscapus* and *C. muelleri.* Based on these microhabitat differences, we might expect cultivar exchanges between *C. longiscapus* and *A. auriculatum,* or between *C. muelleri* and *C. costatus,* to occur at very low frequencies relative to exchanges between *C. longiscapus* and *C. muelleri,* which often occur in mixed aggregations. Yet such across-microhabitat exchanges between the more distantly related attine species are well documented (Mueller et al., 1998; Green et al. 2002). In contrast, in over 400 nest collections in which cultivar species could be identified, *C. longiscapus* was invariably associated with its own Clade 1 type cultivar, and *C. muelleri* was invariably associated with its own Clade 2 type cultivar. Thus, cultivar exchanges apparently do not occur between nests of the closely related and physically more proximate *C. longiscapus* and *C. muelleri*.

This strikingly precise pattern, in which two closely related ant species consistently cultivate two distantly related fungal species, prompts the obvious question of whether a shift in an ancestral *C. "longiscapus" s.l.* population to a new cultivar may have somehow initiated the divergence of these two species. For example, under an allopatric scenario, an isolated population *of C. "longiscapus" s.l.* could have switched to and become specialized on a new fungal cultivar. Subsequent secondary contact between ant populations specialized on different cultivars could have produced hybrids that were inferior in their ability to cultivate either fungus, leading to selection for prezygotic reproductive isolation and completing the speciation process. Whatever the prezygotic isolating mechanism, it probably did not involve genitalic evolution (Eberhard 1985, 1996), because the genitalia of *C. longiscapus* and *C. muelleri* males appear to be identical (see above). A more likely mechanism might be temporal separation of mating flights, known to isolate other closely related, sympatric Attini (Mariconi 1970; Weber, 1972; Schultz et al., 1998). A scenario of behavioral isolation through differential timing of mating flights is consistent both with observed partial time-of-year differences in alate production between *C. longiscapus* and *C. muelleri* and with possible time-of-day flight-time differences implied by differences in male body pigmentation (described above). Alternatively, under a sympatric-speciation scenario, a single nest of an ancestral *C. "longiscapus" s.l.* could have switched to a new cultivar, instantaneously generating a tendency toward reproductive isolation due to an unknown, cultivar-specific mechanism such as mating pheromones or other mate-recognition factors derived from, or otherwise correlated with, fungal cultivar type. These allopatric and sympatric hypotheses generate different testable predictions. For example, under the sympatric scenario, genetic diversity should be depressed in the more recently derived species relative to the "ancestral" species, and the biogeographic distribution of the recently derived species may be nested within the larger range of the ancestral species. Testing such predictions will require comprehensive sampling across the complete ranges of *C. longiscapus* and *C. muelleri,* coupled with detailed analyses of genetic diversity using high-resolution molecular markers such as microsatellites.

As summarized in Table 2 and in our discussion of morphometrics, Colombian *C. longiscapus* workers are significantly larger than workers from Panama, with virtually no overlap in the ranges of the three measurement parameters. The two known Colombian gynes and the single known male reinforce this pattern. This correlation between biogeography and body size suggests the possibility that *C. longiscapus* may actually comprise two species: a smaller, Panamanian species and a larger, Colombian species. Contradicting this biogeographic scenario, however, is the single known Costa Rican worker specimen, which is more similar in size to the Colombian than to the Panamanian specimens (Table 2). Because the Colombian, Panamanian, and Costa Rican specimens are identical in all studied discrete morphological character states, and because allozyme profiles from Colombian specimens are unknown, no additional character data corroborate this division of *C. longiscapus* into two species based on size differences. In the absence of such data, and because the Colombian specimens are known from as few as three nest se-