A NOCTURNAL RAID OF *Nomamyrmex* ARMY ANTS[1] ON *Atta* LEAF-CUTTING ANTS[1] IN TAMAULIPAS, MEXICO

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Neotropical army ants (Hymenoptera: Formicidae, Ecitoninae), as a group are primarily predators of immature stages of ants, termites and some wasps (Rettenmeyer 1963, Schneirla 1971). Different species of army ants have marked preferences for attacking specific ant taxa (subfamilies or genera) (Rettenmeyer et al.1982, Franks and Bossert 1983, Franks and Norris 1987), displaying variable prey preference among all major subfamilies of ants with the exception of the Ecitoninae itself (Rettenmeyer 1963, Schneirla 1971, Rettenmeyer et al.1982, Gotwald 1995). However, predation by army ants on the often massive colonies of leaf-cutting ants, *Atta* and *Acromyrmex* (Hymenoptera: Formicidae, Myrmicinae, Attini) has very rarely been reported. *Atta* spp. and army ants in the genus *Eciton* usually avoid confrontation and ignore each other (Rettenmeyer 1963); *Neivamyrmex* army ants have even been reported as inquilines in the nest cavities of *Atta* (Schneirla 1971). On the other hand, the few observations on foraging by the uncommon, robust, heavily sclerotized ecitonine *Nomamyrmex esenbecki* (Westwood) suggest that these army ants seem to be rather specialized predators of the brood of species of *Atta* and *Acromyrmex*, and particularly of *Atta* spp. (Swartz 1998). All reports of prey of *N. esenbecki* mention leaf-cutting ants, and it appears that all reports of army ant raids on *Atta* and *Acromyrmex* nests involve *N. esenbecki* (Borgmeier 1955; Mariconi 1970; Rettenmeyer 1963; Rettenmeyer et al. 1982; Swartz 1998, and references therein; J. Longino, personal communication). In Costa Rica, *N. esenbecki* was the only army ant observed to attack mature *Atta* colonies (J. Longino, personal communication). Eighty to ninety percent of the diet of *N. esenbecki* consists of ant larvae and pupae (Rettenmeyer 1963). Working in the Panamanian rainforest of Barro Colorado, Schneirla (1971) reported that *N. esenbecki* is a subterranean species also capable of surface activity, raiding in those dense forests both day and night.

Here we describe a new distribution record for *N. esenbecki* and for its raids on *Atta*, namely, a nocturnal surface raid on an *Atta mexicana* (Smith) colony in Northeastern Mexico. This army ant raid took place at the northeastern fringe of the Neotropical zone, extending the known occurrence of *Nomamyrmex* raids on leaf-cutting ants more than 1,000 km to the north, from Jalisco, Mexico. It occurred in a disturbed subtropical habitat, on a clearing inside a village. Most reports of *Nomamyrmex* surface raids against *Atta* are from tropical rain forests in Central and South America. The previous northernmost raid observed, in a subtropical area (Jalisco), was subterranean (Rettenmeyer et al.1982).

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The locality of the raid is the town of Buenavista, in the municipality of Soto La Marina, Tamaulipas, Mexico (27°47' northern latitude; 90°12' western longitude; 20 meters altitude above sea level), about 200 km south of the United States border. Weather, in the classification of Koppen and modified by Garcia (INEGI 1983), is BS (h') KW (e): extremely variable, mean annual temperature 23° C; annual precipitation: 800-1000 mm in the summer. Natural vegetation is very disturbed in the village; native plants reflect the boundary of low tropical thorn forest and low deciduous tropical forest; native trees and shrubs are ebony (*Phitecellobium flexicaule* (Benth.) Coult), cornezuelo (*Acacia cornigera* (L.) Willd.), huisache (*Acacia farnesiana* (L.) Willd.), brasil (*Condalia sp.*), coma (*Bumelia* sp.), and *Randia* spp.

The raid occurred in a lawn of blue grass, *Poa pratensis* L., on sandy soil. The *A. mexicana* colony was under a small orange tree (2.5 m canopy diameter) at least 20 m from other tree or bush cover, inside a farmer's garden located in the town. The colony was small (mound less than 1 m^2) and had two entrance holes on the mound. From the mound and workers' size, this *Atta* nest was probably about two years old. *Nomamyrmex* workers were carrying *Atta* larvae and possibly pupae out from this small *Atta* colony. A column of polymorphic *Nomamyrmex* workers (up to 11 mm long) in a single line, were exiting one of the nest holes of the *Atta* mound at 21:00h on 15 June 2000. They were very swift runners; this made their capture at night difficult. The army ants were very photophobic and when illuminated by the flashlight within a meter from an entrance hole, immediately retreated back into the *Atta* nest, and exiting from the hole was interrupted. About twenty to thirty seconds after turning the light off, the ants resumed their activity and left the exit hole. Approximately one in every ten *Nomamyrmex* workers carried one ant larva, which were later identified as *Atta mexicana* by Dr. Ted Schultz, Smithsonian Institution; the *Nomamyrmex* could have been carrying their own larvae in addition to those of *Atta*. No aggressiveness was observed from the few *Atta* workers present on the mound; these workers stood still or slowly walked around the nest openings. Only minors and media *Atta* workers (no majors nor soldiers) were observed. The exodus of *Nomamyrmex* from the *Atta* nest continued for at least 3h, until midnight (24:00h) when observation was suspended. Rettenmeyer (1963) described similar swift column raids. The army ants left the *Atta* nest at a steady rate of no less than one worker every two seconds; therefore, this *Nomamyrmex* colony had at least 5400 workers.

Historically, *N. esenbecki* has been collected in the USA, from southern Texas (Rettenmeyer 1963), including Cameron county, in the Lower Rio Grande Valley (LRGV); *Atta texana* (Buckley) has been reported from adjacent counties in the Valley (O'Keefe et al. 2000). Currently, most of the LRGV supports very intensive agriculture and pesticide use (Howe et al. 1986). *Atta texana* has pest status there and possibly forages almost exclusively in human-disturbed areas since native vegetation cover in the LRGV has disappeared in more than 95% (Howe et al. 1986; TAMU 2001). Mature *Nomamyrmex* colonies are huge (Swartz 1998); estimates are > 700,000 workers (Rettenmeyer 1963). Such species of army ants are unable to survive in extensively disturbed areas (Swartz 1998). The recent association of *Atta* with man and the extirpation of natural habitats in the LRGV could imply that *Nomamyrmex* is being eliminated from the United States if not already extinct there.

As most *Atta* species of the Neotropical region, *A. mexicana* colonies are common in both natural and disturbed areas (Holldobler and Wilson 1990), including Tamaulipas where this raid occurred. Topics deserving further study are the adaptation and current status of *Nomamyrmex* in disturbed, subtropical areas, and more specifically its biology at the northern edge of its distribution; the impact of army ants as a mortality factor of young and mature *Atta* colonies; and the architectural, chemical and behavioral defenses of *Atta* ants against raids by these army ants.

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