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SERICOMYRMEX ANTS AS SEED PREDATORS

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Ants are important mutualists for many plant species, serving either as seed dispersal vectors or as "protectors" from herbivores, and specific morphological characteristics (e.g., elaiosomes, extrafloral nectaries, domatia) have evolved in several plant taxa to attract or to harbor ants (Beattie 1985, Bennett & Krebs 1987, Hölldobler & Wilson 1990, Huxley & Cutler 1991). However, the activities of ants may also be detrimental to plants. Leaf-cutting ants can destroy a large portion of vegetative plant parts (Cherrett 1986) and some are important seed predators (e.g., Mares & Rosenzweig 1978, Perry & Fleming 1980, Andersen 1991, Baroni Urbani 1992, Levey & Byrne 1993, Ireland & Andrew 1995, Mull & MacMahon 1997). Here we report observations of hitherto unknown seed predation by a Neotropical leaf-cutting ant, *Sericomyrmex* sp.

Ants of the genus *Sericomyrmex* belong to the fungus-growing ants (subfamily Myrmicinae, tribe Attini) and are characterized by their abundant long, soft hairs that cover the whole body giving them a silky appearance. However, unlike the closely related-true leaf-cutter ants of the genera *Atta* and *Acromyrmex*, very little is known about the ecology of the 22 described species and subspecies of this genus (Bolton 1995). The mostly 3–5-mm-long ants are not very conspicuous because they are very slow and cautious in their movements, often feigning death on the slightest disturbance. Their nests are in soil and inhabited by several hundred to one or two thousand workers (Weber 1967). The scarce observations on feeding ecology indicate that pieces of flowers (*Hibiscus*, *Mitracarpus*, *Forsythia*, *Rosa*, and *Chrysanthemum* have been observed or successfully given to laboratory colonies), soft fruits (deduced from fungus examinations in the field and use of banana, papaya, or orange by colonies in the laboratory), other "vegetal remains", woody particles, carcasses of insects, as well as insect feces are used as fungus substrate by the ants (Weber 1945, 1946, 1967, 1972). They may also cut certain fresh leaves (Weber 1972), and observations have been made on *Rosa* and *Geranium* leaves in the laboratory (Weber 1967) and young rice (*Oryza*) leaves in the field (Manfred Verhaagh, personal observation in Peruvian Amazonia). One species (*Sericomyrmex moreirai*) has even been reported to cause damage in *Eucalyptus* plantations (Pacheco *et al.* 1989a,b, Anjos *et al.* 1998). Ants of this genus are mostly encountered as individuals or in small groups, depending on the part of the fungus substrate collected by them, but group recruitment and use of temporary trails have also been observed. However, use of permanent trails to foraging areas (i.e., trunk trail foraging), as known for species of *Atta* and *Acromyrmex*, has not been reported so far in *Sericomyrmex*, with the exception of some rudimentary trails close to the nest entrance (Weber 1967).

The observations reported here were made in the course of a study on the seed dispersal ecology of *Parkia panurensis* (Fabaceae, Mimosoideae), carried out between June and September 2000 at the Estación Biológica Quebrada Blanco (EBQB) in northeastern Peruvian Amazonia (4°21'S, 73°09'W). The site is characterized by lowland tropical rainforest of the "bosque de altura" type (Encarnación 1985), and annual rainfall is around 3000 mm. For further details of the EBQB see Heymann (1995) and Knogge (1999). The study included 20.5 hours of direct

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observation and the daily monitoring of intact seeds lying on the forest floor, either below adult *P. panurensis* or away from them. During these observations, animals approaching and feeding on the seeds were recorded and sample specimen were collected.

Sericomyrmex ants were recorded on five occasions feeding on seeds of *P. panurensis* during direct observations. Furthermore, they were encountered feeding on the same seeds during the daily monitoring. They were always of the same species and occurred in numbers of 2–6 individuals. Their consumption of seed parts resulted in increasingly large holes (Fig.1), ultimately leading to the complete destruction of the seeds. No obvious transport of material away from seeds was observed. Revision of the genus *Sericomyrmex* is pending and species identification is not possible at present. Voucher specimens have been deposited at the Staatliches Museum für Naturkunde, Karlsruhe (Germany).

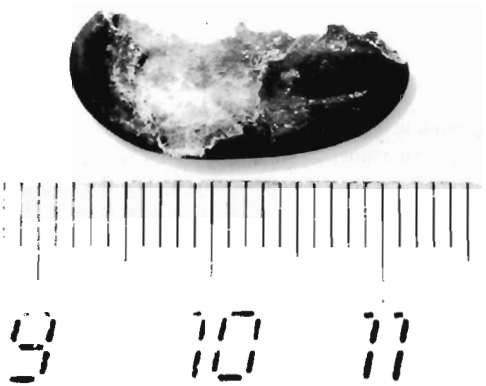

FIG. 1. Seed of *Parkia panurensis* that has been partially consumed by *Sericomyrmex* ants.

Seeds of *P. panurensis* have a size of 15–21 mm x 7.5–12 mm x 4–7 mm (length x width x height) and a weight of 0.5–1.1 g (Feldmann 2000; see also Hopkins 1986). They are covered by a thick, hard and smooth testa (Hopkins 1986). Despite being very small, the *Sericomyrmex* ants are capable of opening the hard testa and feeding on the cotyledons.

Sericomyrmex ants and other insects were responsible for only a minor fraction (4–5%) of preyed *P. panurensis* seeds, the majority being consumed by rodents (Feldmann 2000). Other insects seen feeding on *P. panurensis* seeds were a single *Brasilodontus* sp. (Tafaliscinae, Eneopteridae, Orthoptera) and possibly a *Hemigryllus* sp. (Tafaliscinae, Eneopteridae, Orthoptera).

The impact of predation by *Sericomyrmex* on *P. panurensis* seeds cannot be evaluated. While the proportion of seeds preyed upon by ants in comparison to rodents is low, their contribution to seed predation could be biologically meaningful because by virtue of their foraging strategies and foraging habitat they may encounter single seeds, often hidden in the leaf litter, that would have been overlooked by larger seed predators like spiny rats (*Proechimys* sp.).

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REFERENCES

Andersen, A.N. 1991. Seed harvesting by ants in Australia. Pp. 493–503 *in* Huxley, C.R., & D.F. Cutler (eds.). Ant-plant interactions. Oxford.

Anjos, N., dos, Della Lucia, T.M.C., & A.J. Mayhé-Nunes. 1998. Guia prático sobre formigas cortadeiras em reflorestamentos. Ponte Nova, MG.

Baroni Urbani, C. 1992. Factors effecting seed preference among Old World harvester ants of the genus *Messor*. Ecol. Ethol. Evol., Special issue 2: 73–80.

Beattie, A.J. 1985. The evolutionary ecology of ant-plant mutualisms. Cambridge.

Bennet, A., & J. Krebs. 1987. Seed dispersal by ants. Trends Ecol. Evol. 2: 291–292.

Bolton, B. 1995. A new general catalogue of the ants of the world. Cambridge, Mass.

Cherrett, J.M. 1986. History of the leaf-cutting ant problem. Pp.10–17 *in* Lofgren, C.S., & R.K. Vander Meer (eds.). Fire ants and leaf-cutting ants – biology and management. Boulder, Colorado.

Encarnación, F. 1985. Introducción a la flora y vegetación de la Amazonía peruana: estado actual de los estudios, medio natural y ensayo de una clave de determinación de las formaciones vegetales en la llanura amazónica. Candollea 40: 237–252.

Feldmann, M. 2000. Samenökologie von *Parkia* im Amazonasregenwald. Samenausbreitung durch Krallenaffen (Callitrichidae), sekundäre Ausbreitung von Samen und Samenprädation. M.Sc. Thesis, University of Göttingen.

Heymann, E.W. 1995. Sleeping habits of tamarins, *Saguinus mystax* and *Saguinus fuscicollis* (Mammalia; Primates; Callitrichidae), in north-eastern Peru. J. Zool., Lond. 237: 211–226.

Hölldobler, B., & E.O. Wilson. 1990. The ants. Berlin.

Hopkins, H.C.F. 1986. *Parkia* (Leguminosae: Mimosoideae). Flora Neotrop. 43: 1–124.

Huxley, C.R., & D.F. Cutler (eds.). 1991. Ant-plant interactions. Oxford.

Ireland, C., & M.H. Andrew. 1995. Ants remove virtually all western myall (*Acacia papyrocarpa* Benth.) seeds at Middleback, South Australia. Aust. J. Ecol. 20: 565–570.

Knogge, C. 1999. Tier-Pflanze-Interaktionen im Amazonas-Regenwald: Samenausbreitung durch die sympatrischen Tamarinarten *Saguinus mystax* und *Saguinus fuscicollis* (Callitrichinae, Primates). Münster: Schüling Verlag [Ph.D. Thesis, University of Bielefeld].

Levey, D.J., & M.M. Byrne. 1993. Complex ant-plant interactions: rain forest ants as secondary dispersers and post-dispersal seed predators. Ecology 74: 1802–1812.

Mares, M.A., & M.L. Rosenzweig. 1978. Granivory in North and South American deserts: rodents, birds and ants. Ecology 59: 235–241.

Mull, J.F., & J.A. MacMahon. 1997. Spatial variation in rates of seed removal by harvester ants (*Pogonomyrmex occidentalis*) in a shrub-steppe ecosystem. Amer. Midl. Nat. 138: 1–13.

Pacheco, P., Berti Filho, E., Caetano, F.H., & L. Coelho. 1989a. O genero *Sericomyrmex* em reflorestamentos. Pp. 1–12 *in* Vilela, E.F. (ed.) IX Encontro de Mirmecologia 1989, Universidade Federal de Vicosa: Vicosa.

Pacheco, P., Berti Filho, E., Coelho, L., Garcia, P.M.C. & C.R. Camargo. 1989b. Potencial de daño de *Sericomyrmex* sp. a mudas de eucalipto – resultados preliminares. Pp. 1–13 *in* Vilela, E. F. (ed.) IX Encontro de Mirmecologia 1989, Universidade Federal de Vicosa: Vicosa.

Perry, A.E., & T.H. Fleming 1980. Ant and rodent predation on small animal-dispersed seeds in a dry tropical forest. Brenesia 17: 11–22.

Weber, N.A. 1945. The biology of the fungus-growing ants. Part VIII. The Trinidad, B. W. I., species. Rev. de Ent. 16: 1–88.

Weber, N.A. 1946. The biology of the fungus-growing ants. Part IX. The British Guiana species. Rev. de Ent. 17: 114–172.

Weber, N.A. 1967. Growth of a colony of the fungus-growing ant *Sericomyrmex urichi* (Hymenoptera: Formicidae). Ann. Ent. Soc. Amer. 60: 1328–1329.

Weber, N.A. 1972. Gardening ants. The Attines. Philadelphia.

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