

***Wasmannia auropunctata* (Roger) (Hymenoptera: Formicidae), a destructive tramp-ant, in wildlife refuges of Gabon**

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Tramp-ant species associate with humans and are dispersed by human commerce. They spread across the world concealed in plant products, packaging material, building supplies and heavy machinery such as logging and military equipment (Passera 1994; Wetterer 1998). Several tramp-ant species are known to have dramatic ecological impacts (*e.g.* Porter & Savignano 1990; Cole *et al.* 1992; Reimer 1994; Haines *et al.* 1994; Human & Gordon 1997). When these ants invade, they exterminate indigenous invertebrate fauna and transform the biological community (Bond & Slingsby 1984). One destructive tramp-ant species that has invaded Africa is the Argentine ant, *Linepithema humile* (Mayr). *Linepithema humile*, indigenous to South America, now occurs in South Africa where it has had far-ranging impacts on other species (Hattingh 1945; Anderson *et al.* 1983; Bond & Slingsby 1984; Visser *et al.* 1996). Here, we report the presence of a highly destructive tramp-ant, *Wasmannia auropunctata* (Roger) (little red fire ant) in wildlife refuges in Gabon, West Africa.

Wasmannia auropunctata is indigenous to the Neotropical Region and is widespread throughout South and Central America and the Caribbean (Kempf 1972; Brandão 1991). During the past century, *W. auropunctata* has invaded surrounding areas, including Florida, Bermuda and the Galapagos Islands (Wheeler 1929; Smith 1929; Silberglied 1972; Hilburn *et al.* 1990). In addition, *W. auropunctata* has become established in several Pacific island groups, including Wallis and Futuna, New Caledonia, the Solomon Islands (Fabres & Brown 1978; Jourdan 1997; Wetterer 1997) and, most recently, Vanuatu (G. Rapp, pers. comm.) and Hawaii (N. Reimer, pers. comm.). It is also a greenhouse pest in temperate regions, such as England and Canada (Wheeler 1929; Ayre 1977).

We know of only two previous records of *W. auropunctata* in Africa. Santschi (1914) recorded *W. auropunctata* from Libreville, Gabon (00.20N 09.30E), an identification confirmed by Wheeler

(1922). Subsequently, Bruneau de Miré (1969) reported *W. auropunctata* from the coastal region of Cameroon near Kribi (02.50N 09.50E) about 280 km north of Libreville. In this area, growers of cacao (*Theobroma cacao*) intentionally transport *W. auropunctata* colonies between plantations as a biological control agent of certain insect pests, particularly Miridae (Hemiptera). Bruneau de Miré (1969) found that in areas with *W. auropunctata*, populations of other insects were reduced, except for plant-feeding bugs (Homoptera) such as aphids, scale insects and mealybugs. The ants feed on honeydew, the sugary excretion produced by Homoptera and, in turn, protect the homopterans from attack by predators and parasites. A table in Fowler *et al.* (1994) indicated that *W. auropunctata* had also been recorded from the Congo, but the cited reference, Van der Meer Mohr (1927), contained no such report.

Biologists on the Station d'Études des Gorilles et Chimpanzés in the Lopé Reserve, central Gabon (00.10S, 11.40E) about 250 km southeast of Libreville, first noted the sting of a small red 'fire ant' in 1984 when the station was established. They assumed that the ant was an indigenous species (C. Tutin, pers. comm.). In December 1997, however, we collected specimens in Lopé, which S. Cover of Harvard University identified as *W. auropunctata*. A local inhabitant of Lopé, who worked for the first logger to exploit the region, claimed that *W. auropunctata* was unknown in the area before 1965 when logging commenced. At that time, there were no roads into the area. He maintained that the ants arrived in the packaging of food flown in from Booué and Libreville for the forestry workers.

In March 1998, we found *W. auropunctata* in Petit Loango Reserve on Gabon's southwest coast (02.40S 10.00E) about 350 km south of Libreville. We observed that one section of this *Wasmannia*-infested zone was at least 1.5 km wide, and accounts from local villagers suggested that it could have extended for 10 km or more. Villagers

in this region reported that they intentionally transported *W. auropunctata* between plantations for pest control, although the crop being protected was maize (*Zea mays*), not cacao as in Cameroon.

Most recently, in April 1999, E.J. Wickings (pers. comm.) collected *W. auropunctata* in her home at the Centre International de Recherches Medicales, Franceville (CIRMF), in southeastern Gabon (01.40S 13.30E) 500 km southeast of Libreville.

The region encompassing all known localities of *W. auropunctata* in Africa extends for more than 600 km along the western coastline and at least 400 km inland. This wide distribution of *W. auropunctata* is alarming because of the destructive potential of this ant. In areas where it invades, *W. auropunctata* can be a significant agricultural pest, both through stinging agricultural workers and through enhancing populations of Homoptera (Spencer 1941). Homopterans cause damage both through sapping plants of nutrients and by increasing the occurrence of diseases, including viral and fungal infections. In addition, *W. auropunctata* has direct negative impacts on indigenous invertebrates and vertebrates. For example, in parts of the Galapagos where it has invaded, *W. auropunctata* has been implicated in the disappearance of much of the native arthropod fauna (Silberglied 1972; Clark *et al.* 1982; Lubin 1984). On western Pacific islands, its impact on the local fauna has been similarly destructive (Fabres & Brown 1978; Jourdan 1997; Wetterer 1997). Solomon Islanders report that their dogs (*Canis domesticus*) are gradually blinded by the ants' venom and rarely live more than five years (Wetterer 1997).

We have anecdotal evidence that should be investigated further, of similar impacts on vertebrates in Gabon. House cats (*Felis catus*) at Lopé often have *W. auropunctata* in their fur, and several cats developed corneal clouding and blindness. W. Karesh, field veterinarian for Wildlife Conservation Society, found the cats' symptoms consistent with trauma, and not through communicable disease. The same symptoms developed in several cats in Franceville shortly after *W. auropunctata* was first observed.

Many exotic arthropod species have invaded

Africa (*e.g.* Braack *et al.* 1995). The threat of *W. auropunctata* in Gabon, however, is particularly significant because the country has great conservation potential. Among the counties of sub-Saharan Africa, Gabon has the highest *per capita* income (from large mineral and oil reserves) and one of the lowest population densities, and still has large natural tracts of virtually uninhabited territory. Gabonese forests, which cover 22 million hectares (85 % of the country), sustain perhaps the highest density of large mammals of any forest in Africa (White 1994).

The arrival, impact, and ecology of *W. auropunctata* in Gabon appears to have been noted by Albert Schweitzer shortly after he arrived in Lambaréné, Gabon (00.40S 10.10E), 150 km southeast of Libreville in 1913. Schweitzer (1931) wrote (in a chapter dated January to June, 1914): 'One of the worst species of ants which we have here, the sangunagenta, is also an importation, having come over in cases of goods brought from South America'. Schweitzer (1951) adds that this ant 'is now domesticated'. Although it is not certain to which ant species Schweitzer referred, *W. auropunctata* seems to be the only likely candidate. At present, Gabonese people commonly refer to *W. auropunctata* as 'tsangonawenda' (L.J.T. White, unpubl.), which appears to be close to 'sangunagenta'.

We propose that immediate surveys be made to document the distribution and ecological impact of *W. auropunctata* in Gabon, Equatorial Guinea, Cameroon, Congo, and neighboring parts of West Africa. Investigators should also evaluate how this ant is being spread and how it may be controlled. *Wasmannia auropunctata* poses a significant threat to the indigenous invertebrates and vertebrates of this region.

We thank S. Cover for identifying the ants and A. Wetterer, M. Wetterer, H. Jourdan, and J. Chazeau for comments on the manuscript. The Wildlife Conservation Society, Columbia University, Florida Atlantic University, and the Centre International de Recherches Medicales de Franceville Central African Regional Program for the Environment (USAID) are acknowledged for financial support.

REFERENCES

ANDERSON, R.H., BUYS, B. & JOHANNISMEIER, M.F. 1983. Beekeeping in South Africa. *Bulletin of the South African Department of Agriculture* **394**: 1–207.

AYRE, G.L. 1977. Exotic ants in Winnipeg. *Manitoba Entomologist* **11**: 41–44.

BOND, W. & SLINGSBY, P. 1984. Collapse of an ant-plant

- mutualism: the Argentine ant (*Iridomyrmex humilis*) and myrmecochorous proteaceae. *Ecology* **65**: 1031–1037.
- BRAACK, L.E.O., MAGGS, K.A.R., ZELLER, D.A. & HORAK, I.G. 1995. Exotic arthropods in the Kruger National Park, South Africa: modes of entry and population status. *African Entomology* **3**: 39–48.
- BRANDÃO, C.R.F. 1991. Adendos ao catálogo abreviado das formigas da região neotropical (Hymenoptera: Formicidae). *Revista Brasileira de Entomologia* **35**: 319–412.
- BRUNEAU DE MIRÉ, P. 1969. Une formi utilisée au Cameroun dans la lutte contre les mirides du cacaoyer: *Wasmannia auropunctata* Roger. *Café Cacao Thé* **13**: 209–212.
- CLARK, D.B., GUAYASAMIN, C., PAZAMINO, O., DONOSO, C. & PAEZ DE VILLACIS, Y. 1982. The tramp ant *Wasmannia auropunctata*: autecology and effects on ant diversity and distribution on Santa Cruz Island, Galapagos. *Biotropica* **14**: 196–207.
- COLE, F.R., MEDEIROS, A.C., LOOPE, L.L. & ZUEHLKE, W.W. 1992. Effects of the Argentine ant on arthropod fauna of Hawaiian high-elevation shrubland. *Ecology* **73**: 1313–1322.
- FABRES, G. & BROWN, W.L. 1978. The recent introduction of the pest ant *Wasmannia auropunctata* into New Caledonia. *Journal of the Australian Entomological Society* **17**: 139–142.
- FOWLER, H.G., SCHLINDWEIN, M.N. & MEDEIROS, M.A. 1994. Exotic ants and community simplification in Brazil: a review of the impact of exotic ants on native ant assemblages. In Williams, D.F. (Ed.) *Exotic Ants. Biology, Impact, and Control of Introduced Species*. 151–162. Westview Press, Boulder, Colorado.
- HAINES, I.H., HAINES, J.B. & CHERRETT, J.M. 1994. The impact and control of the crazy ant, *Anoplolepis longipes* (Jerd.), in the Seychelles. In: Williams, D.F. (Ed.) *Exotic Ants. Biology, Impact, and Control of Introduced Species*. 206–218. Westview Press, Boulder, Colorado.
- HATTINGH, C.C. 1945. Argentine ant versus indigenous ants. *Journal of the Entomological Society of Southern Africa* **8**: 25–34.
- HILBURN, D.J., MARSH, P.M. & SCHAUFF, M.E. 1990. Hymenoptera of Bermuda. *Florida Entomologist* **73**: 161–176.
- HUMAN, K.G. & GORDON, D.M. 1997. Effects of Argentine ants on invertebrate biodiversity in Northern California. *Conservation Biology* **11**: 1242–1248.
- JOURDAN, H. 1997. Threats on Pacific islands: the spread of the tramp ant *Wasmannia auropunctata* (Hymenoptera: Formicidae). *Pacific Conservation Biology* **3**: 61–64.
- KEMPE, W.W. 1972. Catálogo abreviado das formigas da região neotropical (Hymenoptera: Formicidae). *Studia Entomologica* **15**: 3–344.
- LUBIN, Y.D. 1984. Changes in the native fauna of the Galápagos Islands following invasion by the little red fire ant, *Wasmannia auropunctata*. *Biological Journal of the Linnean Society* **21**: 229–242.
- PASSERA, L. 1994. Characteristics of tramp species. In: Williams, D.F. (Ed.) *Exotic Ants. Biology, Impact, and Control of Introduced Species*. 23–43. Westview Press, Boulder, Colorado.
- PORTER, S.D. & SAVIGNANO, D.A. 1990. Invasion of polygyne fire ants decimates native ants and disrupts the arthropod community. *Ecology* **71**: 2095–2106.
- REIMER, N.J. 1994. Distribution and impact of alien ants in vulnerable Hawaiian ecosystems. In: Williams, D.F. (Ed.) *Exotic Ants. Biology, Impact, and Control of Introduced Species*. 11–22. Westview Press, Boulder, Colorado.
- SANTSCHI, F. 1914. Formicides de l'Afrique occidentale et australe du voyage de M. le Professeur F. Silvestri. *Bollettino del Laboratorio di Zoologia Generale e Agraria (Portici, Italia)* **8**: 309–385.
- SCHWEITZER, A. 1931. *The Primeval Forest*. John Hopkins University Press, Baltimore, Maryland.
- SCHWEITZER, A. 1951. *The Animal World of Albert Schweitzer*. Beacon Press, Boston, Massachusetts.
- SILBERGLIED, R. 1972. The little fire ant, *Wasmannia auropunctata*, a serious pest in the Galapagos Islands. *Noticias Galapagos* **19**: 13–15.
- SMITH, M.R. 1929. Two introduced ants not previously known to occur in the United States. *Journal of Economic Entomology* **22**: 241–243.
- SPENCER, H. 1941. The small fire ant *Wasmannia* in citrus groves – a preliminary report. *Florida Entomologist* **24**: 6–14.
- VAN DER MEER MOHR, J.C. 1927. Au sujet du rôle de certaines fourmis dans les plantations coloniales. *Bulletin Agricola de Congo Belge* **18**: 97–106.
- VISSER, D., WRIGHT, M.G. & GILLOMEE, J.H. 1996. The effect of the Argentine ant, *Linepithema humile* (Mayr) (Hymenoptera: Formicidae), on flower-visiting insects of *Protea nitida* Mill. (Proteaceae). *African Entomology* **4**: 285–287.
- WETTERER, J.K. 1997. Alien ants of the Pacific islands. *Aliens* **6**: 3–4.
- WETTERER, J.K. 1998. Non-indigenous ants associated with geothermal and human disturbance in Hawai'i Volcanoes National Park. *Pacific Science* **52**: 40–50.
- WHEELER, W.M. 1922. A synonymic list of the ants of the Ethiopian region. *Bulletin of the American Museum of Natural History* **45**: 711–1004.
- WHEELER, W.M. 1929. Two Neotropical ants established in the United States. *Psyche* **36**: 89–90.
- WHITE L.J.T. 1994. *Sacoglottis gabonensis* fruiting and the seasonal movement of elephants in the Lopé Reserve, Gabon. *Journal of Tropical Ecology* **10**: 121–125.