

THE RECENT INTRODUCTION OF THE PEST ANT *WASMANNIA AUROPUNCTATA* INTO NEW CALEDONIA*

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Abstract

The originally neotropical pest ant *Wasmannia auropunctata* has appeared in New Caledonia and is spreading and becoming a nuisance in coffee and citrus plantings, as well as domestic gardens. The ant, although minute in size, has a potent sting that is annoying to agricultural workers in plantations and gardens, and it helps raise scale insect populations to pest densities. The ant is now abundant enough in New Caledonia to pose a threat to neighbouring agricultural countries by accidental introduction through commerce. As a possible control measure in plantations and gardens, baits containing minute amounts of mirex® should be investigated.

Introduction

The Service d'Entomologie of ORSTOM recently had called to its attention the presence in New Caledonia of an ant species previously unknown in the territory: *Wasmannia auropunctata* (Roger). This species is a widespread native of the New World tropics; for an outline of its systematics and distribution, see Kempf, 1972:257-258. It has also been introduced accidentally into West Africa (Bruneau de Mire, 1969; see below), but until now there has been no record of its establishment in tropical Asia or the western Pacific. It is a pest insect that attacks man with its painful sting, in this way interfering with agricultural activities. Wherever it establishes new populations, these populations usually grow rapidly and invade human settlements and plantations, where they render harvest activities difficult. Furthermore, the disequilibria they provoke among the communities of phytophagous insects often lead to the explosion of pest populations such as those of scales, aleurodids and psyllids.

The presence of *W. auropunctata* in New Caledonia doubtless stems from a recent introduction, and we are concerned to give prompt notice, considering the potential danger this species represents for agriculture locally and in surrounding countries.

Present distribution of *W. auropunctata* in New Caledonia:

West Coast: Dumbéa (homes, gardens); Païta (homes, gardens); Port Laguerre (market gardens); La Foa (homes); Sarraméa (plantations); Fony Boya (forests).
East Coast: Canala (plantations); Monéo (homes); Poindimié (gardens).

Date of introduction: Because of its aggressiveness, arboreal foraging behaviour and general habitus, *W. auropunctata* is rather distinctive. However, it may well have been confused by the populace with other ants previously inhabiting the area. Consequently, it is difficult to pinpoint the exact date of arrival. The first samples worthy of report came from Dumbéa in 1972, and it has been found more recently (1974) on the East Coast (Monéo). E. O. Wilson collected ants intensively in the region of La Foa and Sarraméa during 1955, but he found no *Wasmannia* there at that time (pers. comm.).

Biological observations

In New Caledonia, *W. auropunctata* has been found in very diverse habitats, corresponding to those already known to be preferred by this species in other countries:

(1) In the immediate vicinity of human habitations: the ants may invade houses in search of food. There they may seriously annoy inhabitants by their stings. They are also found in large numbers on ornamental plants and shade trees in home gardens, where their presence renders clearance of scrub and care of fruit trees, plants and lawns a delicate if not dangerous activity.

(2) In coffee plantations: *W. auropunctata* has been found invading coffee

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trees, and especially the citrus trees that also grow in these areas. Here also the multiplication of the ant has become a hindrance to the culture and harvesting of coffee and citrus fruits.

(3) In wild habitats: The species has been found by a botanist in regions little-frequented by man, where it appears to be upsetting an equilibrium that until now has been little disturbed.

In tropical America, *W. auropunctata* ranges from Florida and the West Indies southward through Central and South America to northern Argentina and Bolivia. In this range it inhabits not only agricultural and man-made habitats, but also undisturbed savannah and rain forest. Primarily a species of the lowland tropics, it also occurs in wet forest up to at least 1000 m (Colombia) and in pasture up to 1100 m (Dominican Republic), as observed directly by one of us (Brown). (Workers from wet upland forest are often brown in colour, rather than the usual tawny yellow.) Within all of these habitats, the ants are locally sometimes extremely abundant, with many small nests excavated in the ground, established in rotten wood lying on the ground, made under rocks or trash, or even under the loose bark of trees.

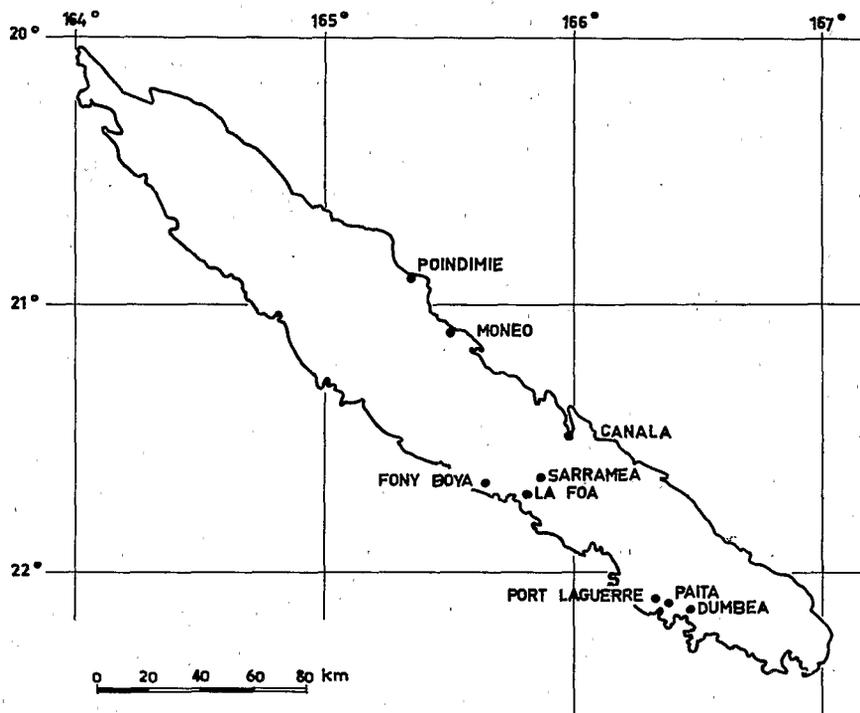


FIG.—Map to show the known localities infested with *Wasmannia auropunctata* at the time of writing.

The ants forage all over the branches and foliage of nearby trees, as well as on the ground and low herbage. They are efficient at recruiting by pheromone trails to important food sources, such as coccid colonies or large insect prey. Surprisingly bulky prey individuals can be transported back to the nest by numbers of workers acting in a more or less concerted way. The *W. auropunctata* workers are extremely voracious predators of arthropods, including some pest species, and for this reason the accidentally introduced African beachhead of the ant in Cameroun is actually being deliberately enlarged and consolidated by the people, who are transporting colonies or colony-fragments from one plantation to another to aid in the control of such pests as mirids and various Orthoptera and Coleoptera, although the ants appear to favour the presence of psyllids and scales. In capturing living prey, this ant makes liberal use of its sting, and the venom can quickly subdue most prey insects, even those much larger than the ant itself.

Nests of the ant frequently have more than one laying queen. The queens are much larger than the workers, dark brown in colour, and can show high fecundity which, coupled with the rapid development of worker brood, can lead to a very large population of the species in a relatively short time (from unpublished notes by Brown from observations made on wild and laboratory colonies). *W. auropunctata* appears to be able to hold its own against many competing ant species (M. R. Smith, 1937). E. O. Wilson showed one of us (Brown) a population on tiny Pigeon Key, in the Florida Keys, where the *Wasmannia* occupied territory on one side of the islet, while the convergently similar ant *Tetramorium simillimum* (F. Smith) held the rest against it in what appeared at the time to be a standoff.

Discussion

Judging from experiences already encountered in the Western Hemisphere, we can predict that this species will likely be a significant pest in New Caledonia, especially in plantations of coffee and citrus. Apart from market gardens, these represent the main crop production of New Caledonia. We can expect that the problems raised by *W. auropunctata* will follow certain patterns of development.

Coffee is the only export crop of New Caledonia. Coffee is planted in the shade of larger trees, and a satisfactory natural equilibrium is established between phytophagous pests and the parasites and predators of their biocoenose. Thus, the scales *Coccus viridis* (Green) and *Saissetia nigra* (Nietner) are naturally kept at a low level of population density.

The fear is that the introduction of the new organism may perturb the existing equilibrium. It is well known, in fact, that the presence of certain ants favours the increase of scale populations, sometimes because the ants actively protect the pest against the attacks of parasites and predators, and sometimes just because the coming and going of the ants disturbs certain of these useful insects (see review by Way, 1953).

Citriculture carried out on coffee plantations assures New Caledonia of a plentiful production of oranges and mandarins. The potential pest scales are the diaspidids *Lepidosaphes beckii* (Neuman) and *Unaspis citri* (Comstock). The level of the populations currently maintained is very low, allowing citriculture without the need for insecticide treatments (Fabres 1971). This is due to a biocoenotic equilibrium involving the intervention of several hymenopterous parasites and some predators. There is little doubt that problems analogous to those envisaged for coffee culture will be raised by the increasing populations of *W. auropunctata*.

Control methods for the *albayalde*, as *W. auropunctata* is called in Puerto Rico, are not well developed anywhere so far as we know. Since this species recruits very rapidly to food sources by means of pheromonal trails, baits containing minute amounts of mirex® might work well, as they have for carpenter ants, leaf-cutters, fire ants, and other formicid pest species in the New World. The success of mirex is based on its high toxicity for, but delayed action upon, arthropod targets, which allows for widespread regurgitative distribution to individuals in a colony of social insects before the foraging workers themselves die or are incapacitated.

Unfortunately, the spectacularly unwise mass production and aerial broadcasting of mirex for fire ant control in the U.S.A. has led to the inevitable human and environmental disasters that are now causing mirex to be banned there for all uses. Possibly cautious adaptation of baits containing minute amounts of mirex dissolved in oils, or in xylene plus emulsifiers (Brunhuber, 1973), would furnish good control in badly afflicted areas. Such baits should only be used in plantations and gardens, and applied sparingly under expert control.

Eventually, judging from observations made by one of us (Brown) in the New World tropics, *W. auropunctata* should naturally come into better balance with its New Caledonia environment, as competitors, prey, and potential predators and parasites adjust to its presence by natural selection and begin to affect its

population density. Probably it will spread and become common in many parts of New Caledonia, but will sooner or later assume a more modest status as a pest. In the meantime, it may cause serious trouble in many a plantation and garden, and countries close to New Caledonia should guard against its accidental importation.

The *W. auropunctata* worker is easily recognized under the stereomicroscope. It is a very small ant—only about 2 mm in outstretched length—tawny yellow to brown in colour, with the binodal (2-segmented) waist characteristic of subfamily Myrmicinae. The antennae are 11-segmented, with the 2 apical segments enlarged to form a club. The sides of the head bear conspicuous longitudinal grooves (scrobes) to receive the folded antennae, and the trunk has a sharp transverse anterior margin and paired posterior teeth. The head and trunk bear irregular, mostly longitudinal rugules and rather sparsely distributed, stout hairs.

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