

## *Acromyrmex octospinosus*

### Introduction

*Acromyrmex octospinosus* (Reich), is one of 24 known *Acromyrmex* leaf-cutting ants species. As is characteristic of all attines, *Acromyrmex* are fungus-growers and eaters, harvesting live vegetation for use as fungal substrate. Howse and Bradshaw (1977) observed that the genus has a very wide-ranging distribution and habit, occurring in rain forest, desert and the Andes.

<b>Identity</b>	Fowler 1988
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Authority	: Reich
Classification	
Kingdom	: Animalia
Phylum	: Arthropoda
Class	: Insecta
Tribe	: Attini
Order	: Hymenoptera
Suborder	: Apocrita
Super family	: Vespoidea
Family	: Formicidae
Genus	: <i>Acromyrmex</i>
Species	: <i>octospinosus</i>
Synonyms	: <i>Atta octospinosa</i> (Emery, 1894), <i>Acromyrmex octospinosa pallida</i> (Crawly, 1921), <i>Atta guentheri</i> (Forel, 1893).
Common names	: Leaf-cutting ants, bachacs, bachaco sabanero, zompopo, sauva de matta, hormiga arriera, parasol ants, hormiga cortadora and fourmi-man
Role	: Pest

The species was first described as *Formica octospinosa* by Reich in 1793. It was later revised and named *Acromyrmex octospinosus* by Mann in 1916.

Fowler (1988) in the nomenclatural history of the genus *Acromyrmex* observed that it had been previously placed in four distinct genera: (*Formica* (L.,) 1758); *Atta* (Fabricius, 1804); *Myrmica* (Latreille, 1818); and *Oecodoma* (Latreille, 1818). *Acromyrmex* was described by Mayr and interpreted as a sub-genus of *Atta*. Emery subsequently elevated it to the rank of genus. The genus is divided into two sub-genera, *Acromyrmex* and *Moellerius*. Fifteen *Acromyrmex* species of the sub-genus *Acromyrmex* and seven of the *Moellerius* sub-genus are described. Taxa of *Mollerius* are usually found in open habitats and are generally harvesters of grasses whilst *Acromyrmex* harvest trees and shrubs.

## Signs & Symptoms

*Acromyrmex octospinosus* cuts rounded pieces of leaves from a variety of plant species. In contrast to the *Atta* species which nest only in soil, this species nests in several habitats including under fallen tree trunks, under stones, walls and in soil.

## Morphology

The ant displays polymorphism in size and colour. There is size variation between and within castes. The male and female reproductives are about 1.27 cm in length, about twice the size of workers.

In the worker caste, unlike those of the *Atta* spp., there are no soldiers, and the workers are generally smaller. Like the *Atta* species, *Acromyrmex* species also display polymorphism within the worker caste, with minima, media and maxima forms. The colour of the species varies from brown to almost black (Fig. 1). A line drawing of the distinctive head capsule of the ant (adult worker) is provided in fig. 2.



**Fig 1: Leaf cutting ants (*Acromyrmex*) on branch**

## Dispersal

The species is dispersed during the period when new colonies are founded. This event occurs when the sexual forms become mature, acquire wings and leave parent nests, and mate in the air. By this means the species is able to colonize new areas thereby expanding its range.

## Biology & Ecology

*Acromyrmex octospinosus* is a leaf-cutter and fungus grower and eater. The cut leaves are used to culture the fungus in specialized underground chambers.

Each colony consists of a queen, sexual forms (males and females) and workers. Winged males and females leave the parent colony at the onset of the rainy season. They mate in the air (one female may copulate with several males either from the same or different nests) and the inseminated female (queen) stores the sperm for the rest of her life (possibly 20 years).

After mating she sheds her wings and proceeds to make a nest by digging into the soil. At the end of the tunnel that she excavates, she makes a small chamber in which she spits out the piece of fungus that she would have brought from the nest.

Peregrine (1975) stated that before workers are produced, the young queen periodically leaves the nest and searches for fresh leaves in the immediate vicinity. When the cut leaves are taken back to the nest they are chewed into a sticky green pulp, which is added as

substrate to the developing fungus. During this period also, the queen tends to the fungus garden. She also lays eggs, some of which are infertile and fused together in masses and are used as food for herself and larvae when they first hatch. As more eggs are laid and the number of workers increases, they begin to forage and tend to the fungus garden. At the same time they also begin the expansion of the nest by excavating deeper tunnels and having more fungus gardens.

Nests of *Acromyrmex* species never reach the sizes attained by *Atta* species. Lewis (1975) reported that mounds in Trinidad reached a maximum size of 17 holes about three years after foundation, and may have a population of about 14,000 individuals.

## **Management**

The management of *A. octospinosus* is similar to that of other leaf-cutting ants.

Management of the ants revolve around three strategies:

- a) Protecting plants against damage by the ants by using physical barriers,
- b) Finding nests and destroying them by physical or chemicals means, and
- c) Exploiting the ants' behaviour of collecting materials and fetching them into their nests.

Tree crops and ornamentals may be protected against attack by the ants by placing physical barriers around individual plants. These barriers may be in the form of grease, metal or PVC bands.

### **Chemical control**

Chemicals, in all its various forms e.g. liquids, dusts, vapour or smoke, were first used for managing the ants by applying them directly to nests. In the 1930s Carbon bisulphide, a highly flammable, very volatile liquid, whose vapour explodes when ignited, was used in Guyana to destroy nests. Fogging of nests with various contact poisons is still practised.

The use of poisoned baits in the early 1970s proved successful in managing the pest without having to locate their nests. Baits using Aldrin and Mirex, two highly persistent chemicals, have now been replaced by products using less persistent chemicals e.g. Sulfuramide and Fipronil. In order to elicit a fast pick up response, attractive matrices, e.g. dried citrus pulp, are used, or known attractants e.g., soya oil, are added to the matrix to improve the bait's overall attractiveness. Baiting has proved to be successful from two perspectives; it is an effective and efficient method and is not labour intensive as earlier strategies.

### **Biological control**

Machado *et al.*, (1988) reported that inoculation of *Acromyrmex* with *Beauveria bassiana* and *Monilia anisopliae* resulted in ants abandoning their colonies and also in a reduction of foraging activity. Infection of hosts occurred through the germination of spores on the cuticle of the insects, followed by penetration of the germination tube into the haemocoel where hyphae develop until death of the insects.

The Institute of Plant Health Research (INISAV), Cuba, developed MB - 1, a strain of *B. bassiana*, which is reported to give 90% control of *A. insularis* 72 hours after treatment. Activity of treated nests ceased 30 days after inoculation.

### **Natural Enemies**

Founding queens are highly susceptible to attack by predators. They are extremely vulnerable at this stage since they have no known means of defense against these attacks. Major natural enemies are digging predators and entomopathogens; the latter are a critical mortality factor since there are no workers to groom the queen at this stage. Peregrine (1975) reported that mites, springtails, nematodes and phorid flies are to be found in the nests.

He further observed that the common giant toad, *Bufo marinus*, feeds on baobabs and many other ant species in Trinidad. Other animals associated with the species are the silky anteater, *Tamandua longicauda*, and the legless lizard, *Amphisbaena*.

### Host Notes

Major hosts of this species are cassava, citrus, cocoa, coffee, mango, cotton, sugarcane, cucurbits, avocado, sweet potato and yam.

### Pest Significance & Phytosanitary Risk

*A. octospinosus* is well adapted for its role as an agricultural pest, since like other leaf-cutting, fungus growing and eating ants, it has the ability to attack many plant species, attains high population densities, and queens have remarkable longevity (10-20 years).

In Trinidad, *A. octospinosus* and *A. cephalotes* are the only two leaf-cutting ant species, and both have highly significant pest status in that country.

Cherrett in 1968 noted that *A. octospinosus* had recently spread to Curaçao and Guadeloupe and appeared to be increasing its range.

### Inspection Procedures for the pest

One possible means by which the pest may gain entry into a new country is through the importation of soil from infested countries. Such soil must, at the very least, contain a queen and fungus.

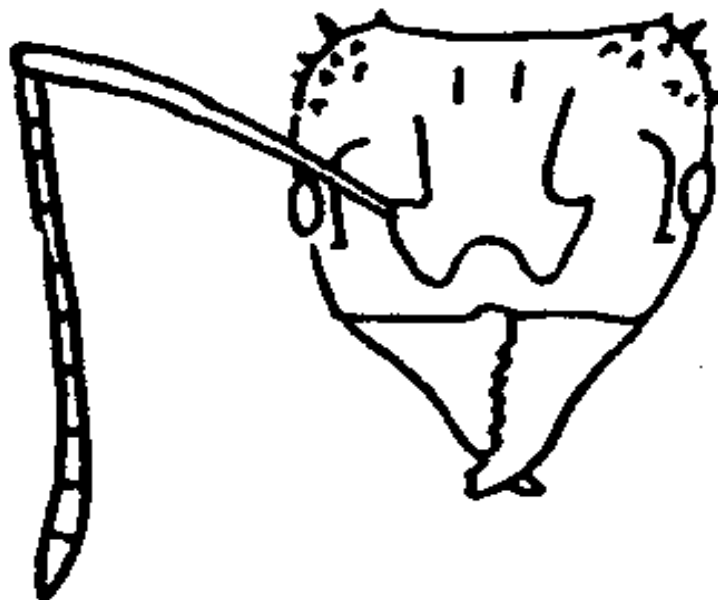
### Distribution

The species has been reported in French Guiana, Suriname, Guyana, Trinidad and Tobago, Guadeloupe, Curaçao, Venezuela, Brazil and Cuba. Wheeler (1937) recorded the pest in Guyana, however, it has not been observed since.

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**Fig. 2:** Head capsule of *Acromyrmex octospinosus*