

The *Triplaria* tree (*Triplaris* spp) and *Pseudomyrmex* ants: a symbiotic relationship with risks of attack for humans

Pau-de-novato (*Triplaris* spp) e formigas *Pseudomyrmex*: uma relação simbiótica com riscos para seres humanos

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ABSTRACT

The authors report a massive attack by *Pseudomyrmex* ants on a human who touched a *Triplaria - novice tree* (*Triplaris* spp). The ants naturally live in these trees and their stings cause intense pain and discrete to moderate local inflammation. The problem is common in some Brazilian regions and can be prevented by identifying the trees.

Key-words: Ants. Trees. Venomous animals.

RESUMO

É descrito um ataque maciço de formigas do gênero *Pseudomyrmex* a um humano que tocou uma árvore-de-novato (*Triplaris* spp). As formigas vivem naturalmente nestas árvores e as picadas causam dor intensa e inflamação local. O problema é comum em certas regiões do Brasil e pode ser prevenido pela identificação das árvores.

Palavras-chaves: Formigas. Árvores. Animais peçonhentos.

One of the more interesting associations between animals and plants is the symbiosis between various tree genera and ants of the *Pseudomyrmex* and *Azteca* genera. This kind of relationship is not rare in nature: many ant species can live in hollow trunks and branches of trees, protecting the plant and using the place as secure cover¹². Numerous descriptions exist of *Azteca* genus ants living in *Cecropia* trees (trumpet trees) in South American countries, including Colombia, Costa Rica and Brazil: *the Cecropia tree and Azteca ant relationship is one of the most conspicuous of all ant-plant associations in Costa Rica. The hollow tree trunk and the production of food bodies rich in glycogen, attract the Azteca ants onto the Cecropia trees. The ants are said to protect the trees from herbivores and prevent creepers growing*². The tree-ant association is believed to be symbiotic, a variation of mutualism where two organisms from different species interact to their mutual advantage^{2 12}. The *Cecropia* provides food and shelter for the ants, while the ants protect the trees, which also receive nitrogen from ant carcasses⁸. The level to which ants provide protection is still unknown. In North and Central America, the acacia tree (*Acacia cornigera*) has colonies of stinging ants (*Pseudomyrmex ferruginea*) which occupy the

hollowed-out thorns and fiercely defend the tree against ravaging insects, browsing mammals and epiphytic vines¹.

In Brazil, groups of trees can be found that have ants living in inside them: the *embauba* (hollow tree in the Brazilian Indian language) is a popular name for the very common *Cecropia* tree. *Azteca* genus ants can be observed in this and other trees; however, the most important symbiosis is between *Pseudomyrmex* ants and the *Triplaria* tree.

Pseudomyrmex ants (novice ants) live in cavities of the trunk and branches of the *novice tree*, the *pau-de-novato* (*Triplaris* spp). The names *novice ants* and *novice tree* are associated with the fact that *only those new to the region touch these trees*, due to attacks by the ants.

Triplaris americana is the most common species of *novice tree*. It is a large, beautiful tree (10-20m high) that has a hollow trunk and branches. Its popular names are *pau-formiga* or *pau-de-formiga* (ant tree), *pau-de-novato* (novice tree), *formigueiro* (ant mound) and *taxizeiro*¹⁰.

The *novice ants* (*formigas-de-novato*, *tachi* or *taxi*) belong to the order Hymenoptera, family Formicidae and genus *Pseudomyrmex*. They vary in diameter and color, but most of them are yellow (**Figure 1, 2 and 3**). They have a thin body and large compound eyes. One characteristic of these ants is the double knot in their abdomen. Kempf⁹ proposed *Pseudomyrmex triplarinus* as the main species living in trees of the Triplaridae family.

Pseudomyrmex ants can inflict a very painful sting from venom injected by a non-barbed stinger located in their abdomen. Studies on *Pseudomyrmex triplarinus* venom have revealed 12 proteins with molecular weights of 100,000-4,200 Da and compared to

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FIGURE 1

The novice tree (*Triplaris* spp); the image on the left is the tree that was associated with the victim's injuries.



FIGURE 2.

Novice tree ants (*Pseudomyrmex triplarinus*) attack after the cutting of a branch of the tree.



FIGURE 3

A close view of the *Pseudomyrmex triplarinus*, the novice tree ant.

published data on ant, wasp and bee venoms, their whole venom has intense phospholipase activity and intermediate hemolytic activity⁷. The venom also has antiinflammatory properties with a multiprotein complex that inhibits edema and contains six pure proteins designated myrmexin I-VI. This suggests that myrmexins may represent a new class of antiinflammatory proteins¹¹.

CASE REPORT

The patient, a white 52 year-old male, was a tourist in the town of Miranda, in the Pantanal region of Mato Grosso do Sul, Midwest Brazil. During a boat trip on the Miranda River, he lifted and broke a tree branch at the edge of the river so the boat could reach the margin. Immediately a group of yellow ants viciously attacked his arm. The victim suffered nearly 50 stings that provoked instantaneous intense pain. Moderate edema could be seen at the sting penetration sites (**Figure 4**). The patient presented intense sweating, agitation and tachycardia without other arrhythmias, but arterial pressure was normal. He was given analgesic (oral dipyrone); however, this did not relieve the pain, which persisted for approximately eight hours. The next morning, no pain or local inflammatory manifestations were observed at the sting sites.



FIGURE 4

Local edematous papules and inflammation after a massive attack of novice tree ants.

DISCUSSION

Pseudomyrmex ants are venomous insects that furiously defend their hiding place. When someone touches the *Triplaris* tree, a great number of ants attack the intruder. In addition to attacking the part in contact with the tree, the ants spread over the body causing new stings and curious reactions from victims who can jump in the water or take off their clothes due to the pain and perception of crawling ants. This kind of accident is common in tourists and other strangers to such regions.

The pain is very intense with no relief from oral analgesics. The pain only fades after nearly eight hours. Due to the intensity of the pain, we suspected the establishment of marked local inflammatory manifestations, but different to other ant stings,

such as the *Solenopsis invicta* species (red fire ants), no important edema, pustules or surrounding inflammation were observed^{3 4 5}. The Ponerinae family consists of very venomous ants, such as the tocandira ants (*Paraponera clavata*)⁶, and envenomation by Ponerinae ants is severe, with excruciating pain causing instantaneous adenopathy, while provoking discrete local manifestations. The mechanism of envenomation is venom glands linked to a stinger in the abdomen, an apparatus common to venomous ants. The effects of the venom are mainly due to phospholipase activity, similar to other Hymenoptera, and manifest with intense pain and discrete to moderate edema.

In conclusion, *novice ants* (*formigas-de-novato* or *tachi*) are classified in the *Pseudomyrmex* genus.

The *Pseudomyrmex* ants viciously attack anything that touches the trees. The stings are very painful and the systemic manifestations are probably associated with the intense pain. New research is required to more fully determine the habits of the ants, potential treatments and venom composition.

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