



Instituto de Pesquisas e Estudos Florestais
ESALQ/USP
Av. Pádua Dias, 11 - Caixa Postal 530
13400-970 - Piracicaba SP Brasil
Tel.:(019)430-8600 Fax:(019)430-8666
E-mail: ipef@carpa.ciagri.usp.br
Home Page: www.ipef.br



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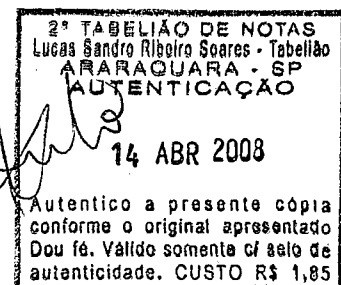
OPINION ON THE USE OF SULFLURAMIDE IN THE CONTROL OF
LEAF-CUTTING ANTS IN BRAZILIAN FOREST
PLANTATIONS

Prof. Dr. Carlos Frederico Wilcken

Coordinator

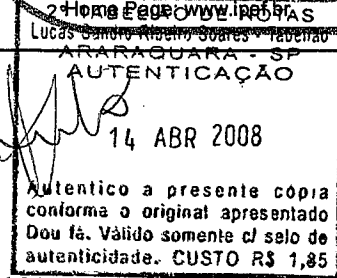
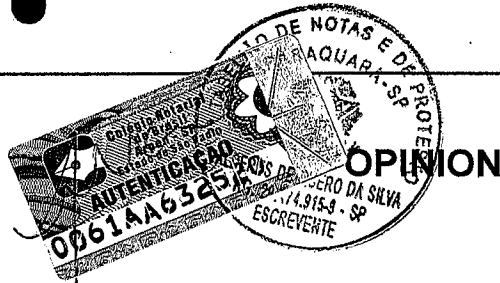
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Leaf-cutting ants, also known as saubas (*Atta* species) and *quenquens* (*Acromyrmex* species), are considered the main pest of the forest species, especially to eucalyptus and pine (*Pinus*) trees. Leaf-cutting ants may attack from new seedlings in the field to adult trees, and if they are not controlled, they may make forest plantation formation unfeasible.

Leaf-cutting ants cause considerable damages, cutting leaves and tender leaf branches, and generally causing full defoliation of seedlings and trees.

Saubas are the most important group of ants in the eucalyptus and *Pinus* forests, for they attack from newly-planted seedlings to adult trees over 20 years old, and generally the extension of damages is big, especially during the formation of the planting (up to the 1st. year). Quenquéns are considered a problem in the initial stage of the forest, defoliating new eucalyptus seedlings and stump buds, with their importance decreasing after the first year of the forest.

Literature information quotes that eucalyptus trees die after 3 consecutive defoliation caused by saubas, and that the loss of eucalyptus stumps may reach 30% in areas with an average of 200 quenquens nests per hectare. Other data shows that an adult ant nest per hectare may defoliate 86 eucalyptus trees in 1 year, consuming about 1 ton of leaves (MARICONI, 1970)

Ants may be controlled by various methods. The mechanical control, which consists in destroying the new ant's nest with mattock hoe or other tools, is viable only for small rural producers. The cultural control, through plowing and harrowing or trap (sesame) cultures are not very efficient. The natural biological control (birds, beetles and predator ants, armadillos etc.) are highly efficient for control in the flight and nest formation period, and all human attempts to manipulate this natural control (mass rearing and releasing natural enemies) have failed, that is, did not manage to increase the efficiency of the natural biological control. The microbial control with pathogenic fungi to saubas, despite presenting good results in laboratory, has also revealed itself unfeasible due mainly to the size and number of underground chambers the ants build in their nests.



Therefore, the only method man may adopt to increase the colony's mortality in the field is the chemical control.

Chemical control implies in using insecticides in different ways and formulations, aiming at eliminating the leaf-cutting ants' nests.

The ways to use chemical insecticides to control leaf-cutting ants consist in applying the product in dry powder, thermo nebulization (fogging), fluids, liquefied gases and insecticide baits. Except for the last way, the other ones use insecticides with higher toxicity for mammals, such as insecticides from the following groups: phosphates, chlorophosphates, pyrethroids and methyl bromide.

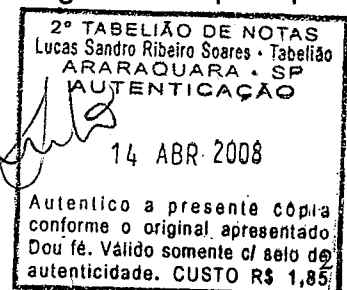
The use of insecticide baits is the best leaf-cutting ants' control method, for they are highly efficient (depending on the active ingredient), provide operational yield, may be applied systematically, and have low toxicity. Furthermore, the insecticide distribution inside the colony is performed by the ants themselves, and after 72 hours the bait is carried, approximately 70% of the colony's population is contaminated (PRETTO, 1996).

The success in the use of insecticide bait implies in some features of the active ingredient used. The insecticides used in this formulation must have ingestion and slow action. The baits contaminate first the garden workers (those that cut leaf pieces and "lick" them) during the grinding and bait incorporation process. The former contaminate themselves and the other working ants through the habit of exchanging food through the mouth (trophallaxis), as well as the cleaning process among ants ("grooming"), in which one "licks" the other and may contaminate it with the toxic active principle.

The active ingredients that have this kind of action are the dodecachlor (forbidden in Brazil since 1993), fipronil and sulfluramide.

Currently the use of insecticide baits to control leaf-cutting ants in forest companies is of approximately 100% of their areas, which makes them the most important product for proper handling.

Sulfluramide was introduced in Brazil in 1993, after its efficiency was proven in several species of leaf-cutting ants, replacing active principle dodecachlor (organo-chlorinated).



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The use of sulfluramide as active principle to manufacture insecticide baits (ready for use formulation) makes the risks virtually impossible for humans and the environment.

Sulfluramide, used as insecticide bait presents high efficiency in the control of leaf-cutting ants. Since 1958, over 7,500 chemical composites have been studied in several countries for ant control. Less than 1% of this total revealed promising in the control.

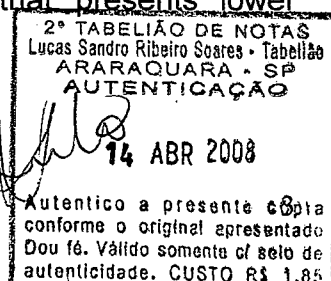
An insecticide to be used in the manufacturing of toxic baits should have its own features essential for the control's efficiency:

- Act by ingestion;
- Be odorless and non-repellant;
- Present retarded toxic action;
- Be lethal in low concentrations; and
- Paralyze cutting activities (damages caused by ants), already in few days after application.

Nowadays, sulfluramide is the main active principle recorded for controlling leaf-cutting ants as granulated bait, which combines all these features.

Sulfluramide-based baits act by ingestion rather than contact. Therefore, the carrying working ants do not perceive the active principle and end up distributing the baits through the whole colony, including the deeper whirlpool of the ant's nest.

Due to these features, over 90% of the Brazilian forest companies use the application of granulated baits as the main method to control leaf-cutting ants, which is considered by many researchers the ideal chemical control method due to the low amount of insecticide used per area unit, low active ingredient concentrations per commercial product (0.3% for baits sulfluramide and 0.003% for baits for fipronil) and the bait distribution to be performed by the ants themselves, carrying the granules to the symbiont fungi chambers, where the ant population concentrates, not leaving the product in underground tunnels. Between the two products used, the sulfluramide is the one with lower toxicity, with DL_{50} above 6,600 mg/kg for rats. Therefore is the product that presents lower intoxication risk to applicators and local fauna.



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Failure to control the pest will imply in significant environmental impacts, for an insect with polyphagous habit, leaf-cutting ants may defoliate leaves from the understorey, thus reducing the already little existing vegetal diversity and attacking the vegetation of permanent preservation areas around the plantations. Furthermore, non-controlled areas may serve as a source of infestation for farmers near the planted forest areas, thus harming their production.

Sulfloramide, as granulated bait, represents low risk to applicators and the environment, due to the low concentration of active ingredient, low amount of active ingredient per treated land unit, specificity for target pest, formulation safety because it minimizes, for example, the risk of being adrift and lower exposure to fauna period, because it is quickly carried by the ants inside the ant colonies. Besides the aforementioned advantages, sulfloramide also presents immobility on the ground, low solubility in water and is strongly attached or connected to the soil's organic matter, thus avoiding its moving to water bodies and the environment.

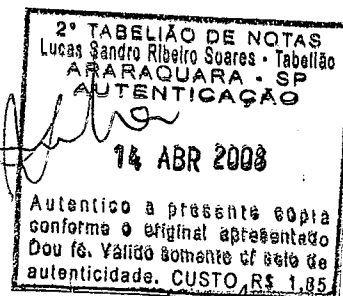
Sulfloramide presents low toxicity to mammals, birds, fish, bees and aquatic organisms, thus fitting in toxicological category IV (practically non-toxic), considering Brazilian legislation.

The granulated bait application is performed in an oriented way and is based on preliminary assessments that take the areas' infestation levels into consideration.

This action, widely used by companies in the planted forest sector in Brazil, aims at rationalizing the use of granulated bait through leaf-cutting ants' monitoring systems.

The development and application of such tool in companies may present more specific features due to regional conditions, but in general terms consist in the following actions:

- Area infestation assessment
- Bait consumption estimate.
- Qualification and periodical training of control teams.
- Recommendation regarding the way and the time to apply.
- Bait consumption and control efficiency assessment.





- Forming a database for the continuous improvement of the monitoring.

Among the precautions taken by the companies to ensure the applicators' safety regarding health list, we can list the use of individual protection equipment, as specified in the product's label, such as boots, gloves, protection masks and long-sleeves overalls. Furthermore, periodical tests that are part of the job safety rules (NR 31) are used.

The use of the procedures adopted above may be considered efficient and safe when the environmental monitoring studies that assess the risk of the granulated sulfluramide bait to the environment present results that point to the inexistence of product residues in the water, soil, fish and wild rats (blood and lipids), as well as no negative impact interfering in the fauna.

Therefore, we think that keeping the sulfluramide to control leaf-cutting ants is essential to the viability of the Brazilian forest plantations, and that the inability to use sulfluramide as the main active ingredient in insecticide baits may lead to a dangerous retrocession in the leaf-cutting ants' control, with the use of products more toxic to human beings and animals and higher environmental impact risk.

This is our opinion.

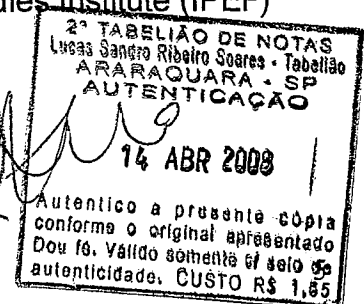
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Prof. Dr. Carlos F. Wilcken

Scientific Coordinator

Forest Protection Program (PROTEF)

Forest Research and Studies Institute (IPEF)



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