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Laboratory for Supporting the Defense of Cultures (LADC)

efficacy of the insecticide PACHA 30 EC (Acetamiprid 15 g/l Lambdacyhalothrin 15 g/l) against *APATE terebrans* , the cashew borer in Benin

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Introduction (1/5)

- The cashew nut industry is now an important sector for the African continent, accounting for more than 55% of the world's cashew nuts . It constitutes one of the most important cash crops for the economies of producing countries. (Ruf et al., 2019).

- In Benin, it is the second export crop after cotton and actively contributes to the emergence of the country's economy (Tonon et al., 2018).

- also contributes to environmental restoration because the installation of large cashew plantations effectively contributes to the fight against soil degradation and deforestation (Adeigbe et al., 2015; Ruf et al., 2019)

Introduction (2/5)

- Unfortunately, the production yield of the tree, varying between 300 and 500 kg/ha compared to 1200 kg/ha in the experimental stations of West Africa, remains low (Djaha et al., 2010)

- This low yield of the tree is linked to agronomic, edaphic and especially phytosanitary constraints (Tonon et al., 2017). Phytosanitary constraints are related to diseases and especially to pests (Agboton et al., 2017)

- In Benin , more than 162 insect species have been known to infest cashew trees (Agboton et al., 2014). The most damaging are bugs, leaf miners and stem borers (Agboton et al., 2014).

Introduction (3/5)

- The latter represented by *Apaté terebrans* is one of the most serious pests in forests in Africa (Schabel , 2006). It is mainly present in plantations in central and northern Benin (Agboton et al ., 2014).

- Its adult measures approximately 21 to 32 mm in length with a black or dark brown body. Its damage is manifested by numerous galleries oriented from the bottom to the top on the trunks and branches of the cashew tree (De souza et al., 2009).

- On hanging branches, galleries are always dug on the underside (Agboton et al., 2014) .

Introduction (4/5)

Introduction (5/5)

- The tree reacts by producing gum resin to close the galleries dug by the insect, which stops the flow of sap, causing the weakening of the entire tree (Yéo et al., 2019).

- Under the effect of a more or less violent gust of wind, the severely attacked branches break or even the entire plant can fall or it dies standing up within a period of about two years (Yéo et al., 2019). This can cause yield losses of around 70 to 100% in cashew trees.

Despite the extent of the damage caused by this insect, the methods developed and implemented to date remain physical and do not effectively control it. To limit the damage caused by this harmful insect, chemical control remains the most suitable control method.

OBJECTIVE (1/1)

Perspective that this study

biological efficacy of the insecticide PACHA 30 EC against *APARE terebrans , the* ancardium borer in Central Benin

- To determine the effect of the insecticide PACHA 30 EC on *APARE terebrans* damage in the cashew plantations
- Determine the effective concentration of the insecticide PACHA 30 on *APARE terebrans* damage in the cashew plantations .

Materials and methods (1/9)

- **Study environment and conduct of the experiment**

The experiments were conducted in cashew plantations from October to December 2022 in a rural environment in Papané (Site a: 08°50'849'N and 002°36'032''E) and in Tchatchou (Site b: 09° 08'143'N and 002°36'063''E) in the commune of Tchaourou , located in the department of Borgou .

type climate / a rainy season of six to seven months and a dry season of five to six months. Average annual rainfall /1100 and 1200 mm. The average annual temperature / 25 and 30.26°C (Kounouho , 2015).

Materials and methods (2/9)

- **Study environment and conduct of the experiment**

The phytosanitary product tested is PACHA 30 EC. It is a synthetic binary insecticide composed of Acetamiprid 15 g/l and Lambdacyhalothrin 15 g/l. The reference insecticide used was SAUVEUR 62 EC (Lambdacyhalothrin 32 g/l and Acetamiprid 30 g/l)

Insecticides were applied twice within 14 days at both sites in the evenings, during calm weather/handheld backpack sprayers, at maintained pressure.

Materials and methods (3/9)

- **C onducting the experiment**

Three liters of broth was prepared according to the different doses of the products /plant . In this volume of broth, 10 mil / each gallery located on the trunk and branches of each tree using a syringe .

Each gallery was closed with cotton after treatment in order to keep the smell of the product more concentrated in the holes and facilitate the counting of new holes dug by *A. terebrans* at the next collection.

Materials and methods (4/9)

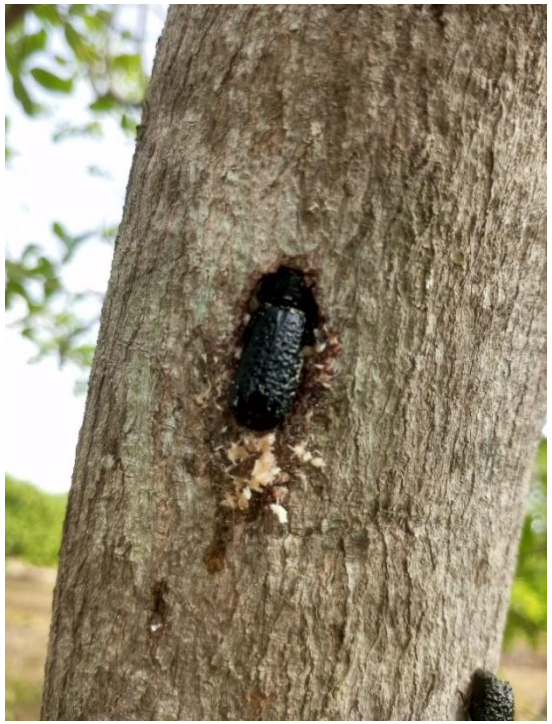
- **C onducting the experiment**

The rest of the broth is used to treat the entire plant (trunk, branches especially).

The galleries of the control trees were not treated, but were also closed with cotton at each data collection.

Observations were made on one plant attacked by *A. terebrans* per plot unit on the two sites for three months.

Materials and methods (5/9)



Materials and methods (6/9)

- **C onducting the experiment**

The experimental design was that of Fisher (complete randomized blocks) with five treatments repeated four times .

The different treatments were as follows: i- Untreated control tree (T0); ii- Tree treated with SAUVEUR 62 EC at a dose of 0.5 l/ha (T1); iii- Tree treated with PACHA 30 EC at a dose of 0.75 l/ha (T2);

iv- Tree treated with PACHA 30 EC at a dose of 1 l/ha (T3) and v- Tree treated with PACHA 30 EC at a dose of 1.5 l/ha (T4).

Materials and methods (7/9)

- **C onducting the experiment**

To distinguish them from each other, the trees in each block and treatment (plot) were marked with poplin banners of different colors.

The colors black, blue, green, yellow and red were assigned to treatments T0, T1, T2, T3 respectively and T4
The colors: pink, purple, orange and white were used to mark blocks 1, 2, 3 and 4 respectively.

Materials and methods (8/9)

- **C onducting the experiment**

Data collected

The data were collected fortnightly and concerned the new galleries dug by *A. terebrans .*

After the count, all the new galleries were closed with cotton, which allowed us to easily count the new galleries dug during the next fifteen days.

analysis of data

Negative binomial regression analysis was applied to the number of galleries dug by *A. terebrans* .

Materials and methods (9/9)

- **C onducting the experiment**

analysis of data

Graphs were constructed to illustrate the results of the statistical analyses.

All analyses were performed in the R statistical environment version 4.0.2 (R Core Team, 2020).

Results (1/2)

Effect of the insecticide PACHA 30 EC on *APATE terebrans*

Table 1. Effect of phytosanitary product and time on the number of galleries dug by *Apate Terebrans* on cashew plants *:* results of negative binomial regressions

Sources of variation	ddl	Papané site (a)		Tchatchou(b) website	
		F	Pr (>F)	F	Pr (>F)
PP	4	59,2735	<0.001	26.9846	<0.001
Time	5	42,1616	<0.001	112.3848	<0.001
PP × Time	20	5,1822	<0.001	4.9558	<0.001

Note: PP = phytosanitary products

Results (2/2)

Effect of the insecticide PACHA 30 EC on *APATE terebrans*

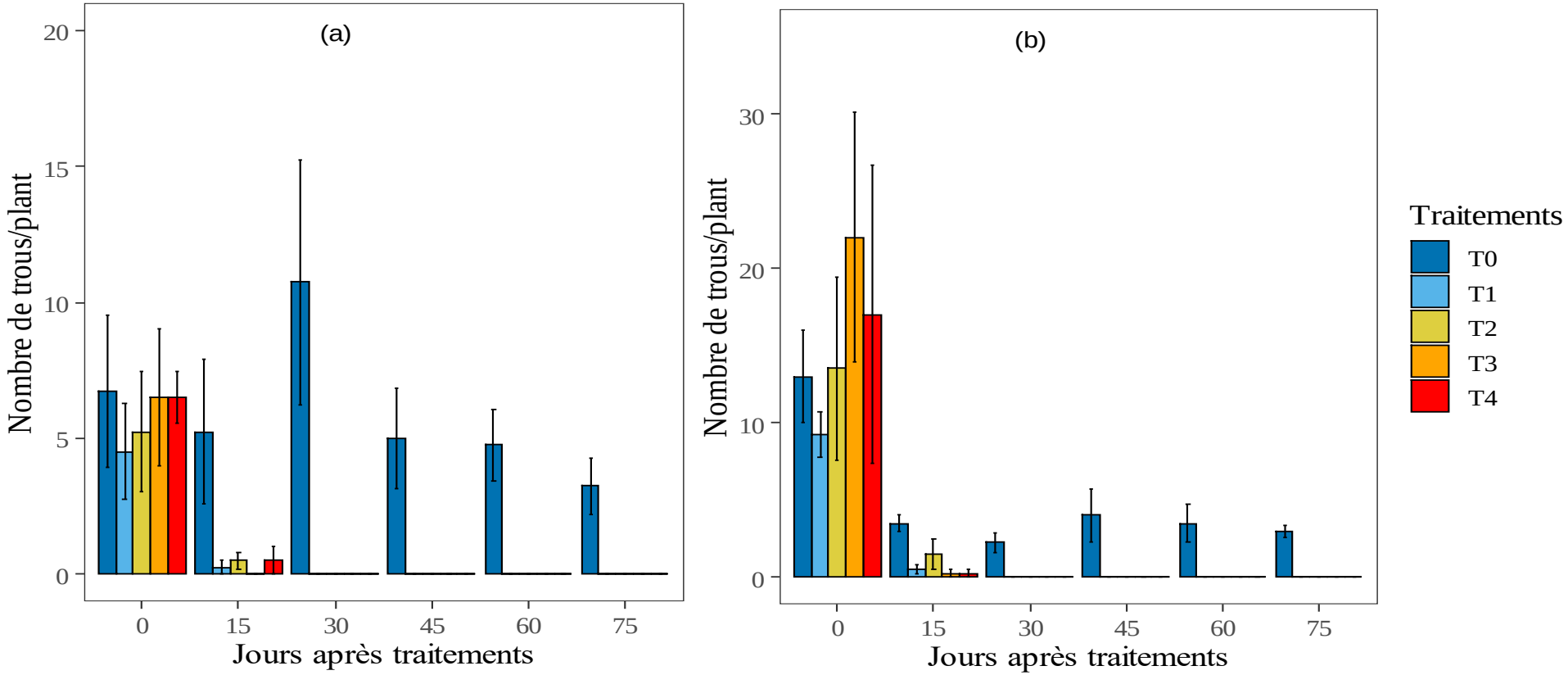


Figure 1. Variation in the number of galleries following the different treatments of phytosanitary products and the time at: (a) Papané and (b) Tchatchou

Legend: T0: Untreated control tree; T1: Tree treated with SAUVEUR 62 EC at a dose of 0.5 l/ha; T2: Tree treated with PACHA 30 EC at a dose of 0.75 l/ha; T3: Tree treated with PACHA 30 EC at a dose of 1 l/ha; T4: Tree treated with PACHA 30 EC SAUVEUR 62 EC at a dose of 1.5 l/ha.

Conclusion 1/1

The results of the study showed that the insecticide PACHA 30 EC (Acetamiprid 15 g/l + Lambdacyhalothrin 15 g/l) tested at doses of 0.75 l/ha, 1 l/ha and 1.75 l/ha completely controlled the damage of *A. terebrans* on treated trees .

This will allow the trees to give a better production yield.

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