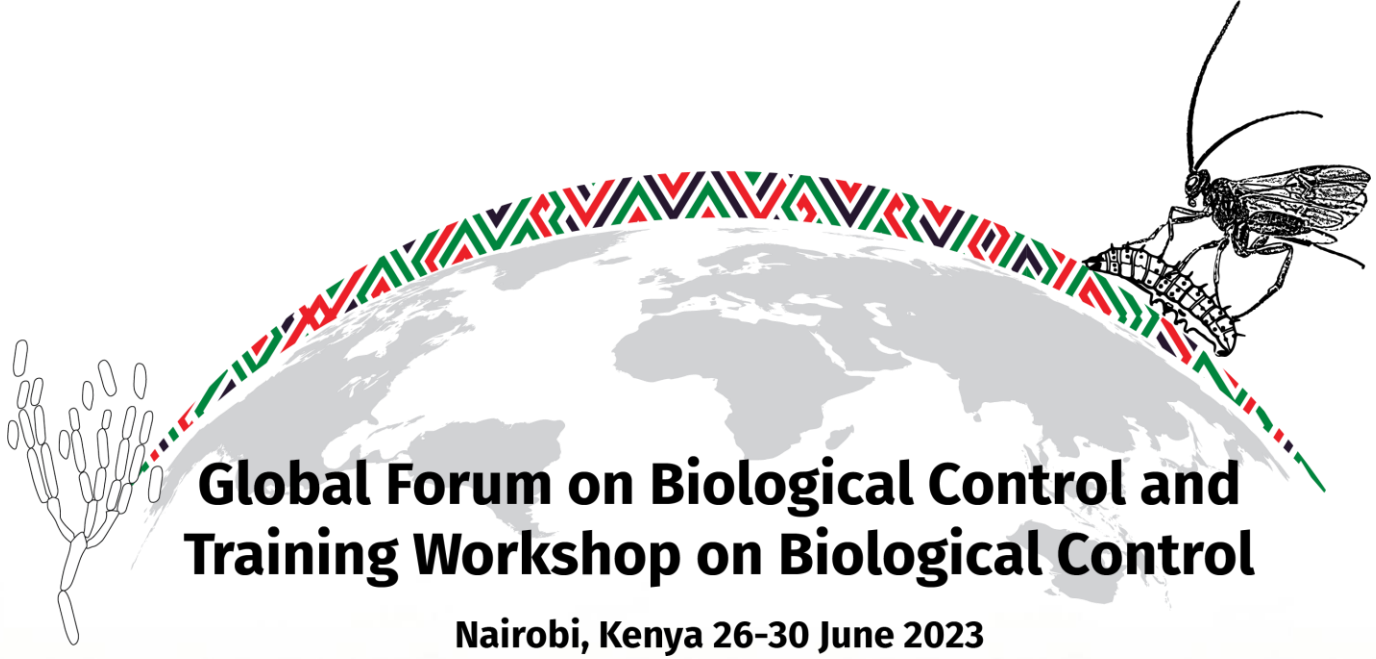

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Development and use of botanicals for fall armyworm management : case of the western highlands zone of Cameroon

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PLAN

- Introduction
- Material and methods
- Results and discussion
- Conclusions
- Recommendations

INTRODUCTION

In Cameroon. maize provides almost half of the calories consumed in both rural and urban areas. It is largely grown in the west and northwest region of the country and has increasingly become a staple food in many parts of the country. Largest share of maize production is attributed to small-scale farmers and constitute a direct source for household livelihoods

Production in Cameroon is limited by several factors. of which pests are the most important. Among pests. *Spodoptera frugiperda (Lepidoptera: Noctuidae)* has been the most important borer since 2016.

In 2016. Tindo *et al* reported its presence in 7 regions. Today it is present in all 10 regions of the country (Fotso *et al* . 2019; Djomaha & Pokam. 2022).

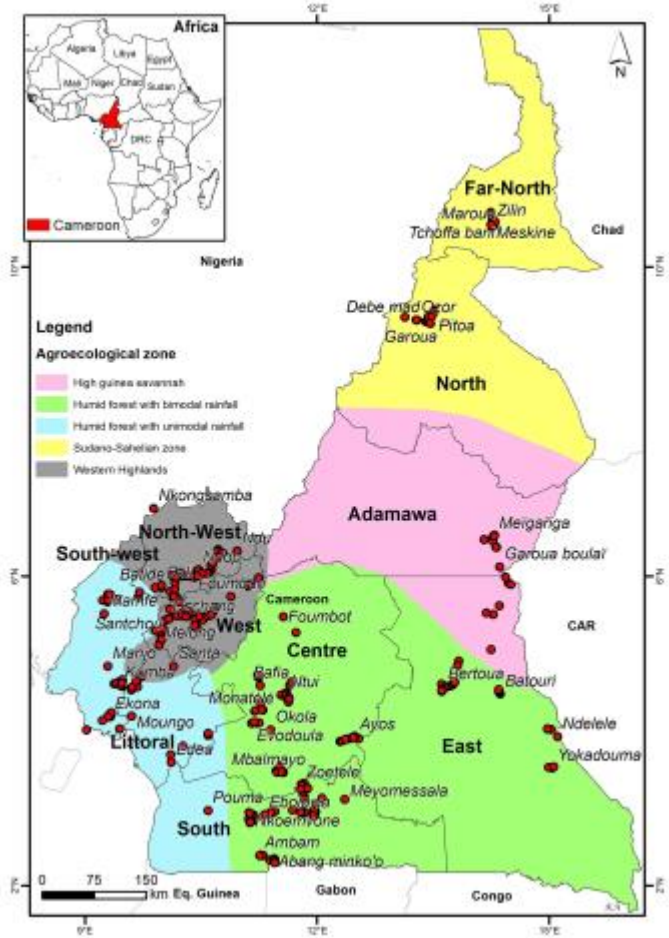


Fig 1. Sampling locations during the three rounds of surveys in the five agroecological zones of Cameroon.

INTRODUCTION

The attack rate and severity are very high. well over 50% (Djomaha & Youmbi. 2022). As usual. growers use chemical products from all over the world. with all that this causes for humans and the environment.

In 2021. the government approved the following products: emamectin benzoate. *bacillus thuringiensis* and neem. while waiting for the findings of research initiated by the government with FAO support.

It is in this context that the University of Dschang has conducted trials on the efficacy of plant extracts against FAW.

Surveys carried out by Fotso et al in 2019 revealed growers' indigenous knowledges of how to handle FAW attacks.

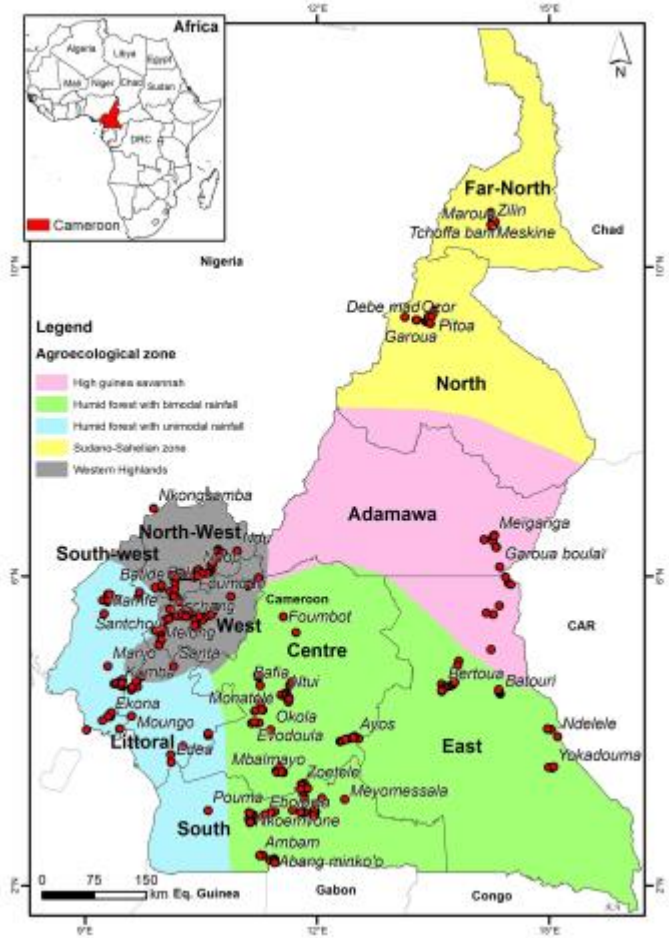


Fig 1. Sampling locations during the three rounds of surveys in the five agroecological zones of Cameroon.

INTRODUCTION

Main objective

Improving maize productivity through the use of plant extracts with an insecticidal effect against fall armyworm (CLA) in Cameroon.

Specific objectives

✓Determine the effect of treatments on the attack rate. severity and abundance of caterpillars and theirs natural enemies;

✓ Evaluate effect of treatments on yield.

MATERIAL AND METHODS

Study period: April 2022 to August 2022(Rainy season) and dry season (November 2022- Feb. 2023

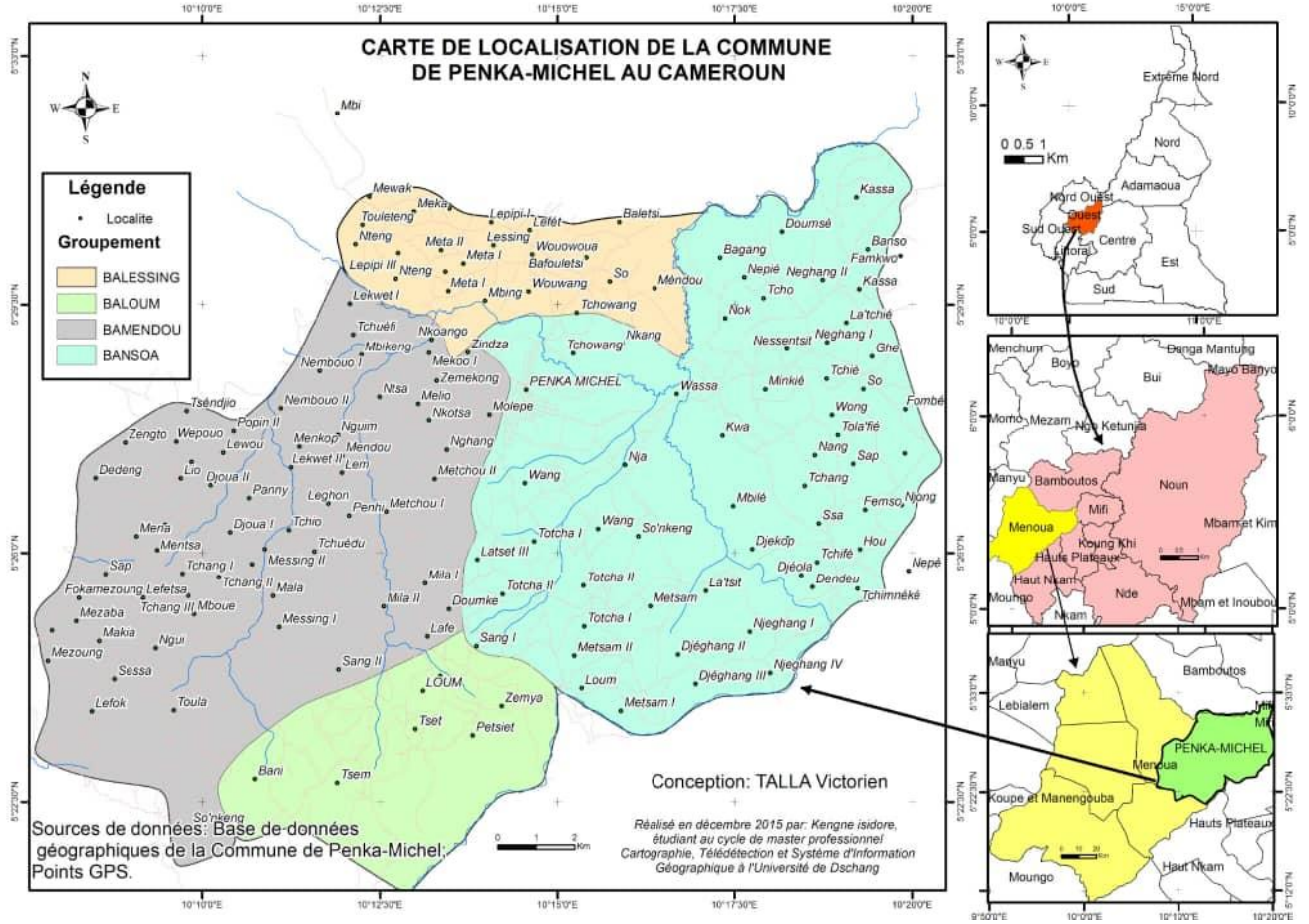


FIGURE 2: STUDY SITE : BANSOA

MATERIAL AND METHODS

Maize variety: Kassai

Botanicals

Thevetia peruviana

Pteridium aquilinum

Thitonia diversifolia

Capsicum frutescens

Chromolaena odorata

MATERIAL AND METHODS

Experimental Design

Completely randomized block design with 3 replications Distance between blocks 2mDistance between experimental units 1mDensity: between rows 80cm and on rows 50cmSize of each experimental unit: 10X15 m =150m2

Production Process

Ploughing; Sowing on April 15. 2022; Fertilization (Poultry manure 5t/ha); Weeding and Insecticide application (start 15 days after sowing and continue every two weeks).

MATERIAL AND METHODS

Preparation of botanical extracts

- ✓Collect fresh leaves. or 6 tablespoons of pepper
- ✓Measure 500g of leaves using an electronic scale
- ✓Use a wooden mortar to crush the leaves
- ✓Place crushed leaves in a 10-litre container rinsed with drinking water
- ✓Add liquid soap (5g)Leave to stand for 5 to 24 hours
- ✓Filter the solution to collect just the liquid part. using a fine sieve
- ✓Pour the liquid obtained into a 16L knapsack sprayer

In the case of pepper. the dried fruits were crushed in the mixer with 1 liter of water. The detergent was added to the mixture. which was then filtered and introduced into the knapsack sprayer holding 14 liters of water.







MATERIAL AND METHODS

Sampling began two weeks after sowing. 20 plants were sampled per treatment according to the W pattern. Assessments continued every two weeks until flowering stage.

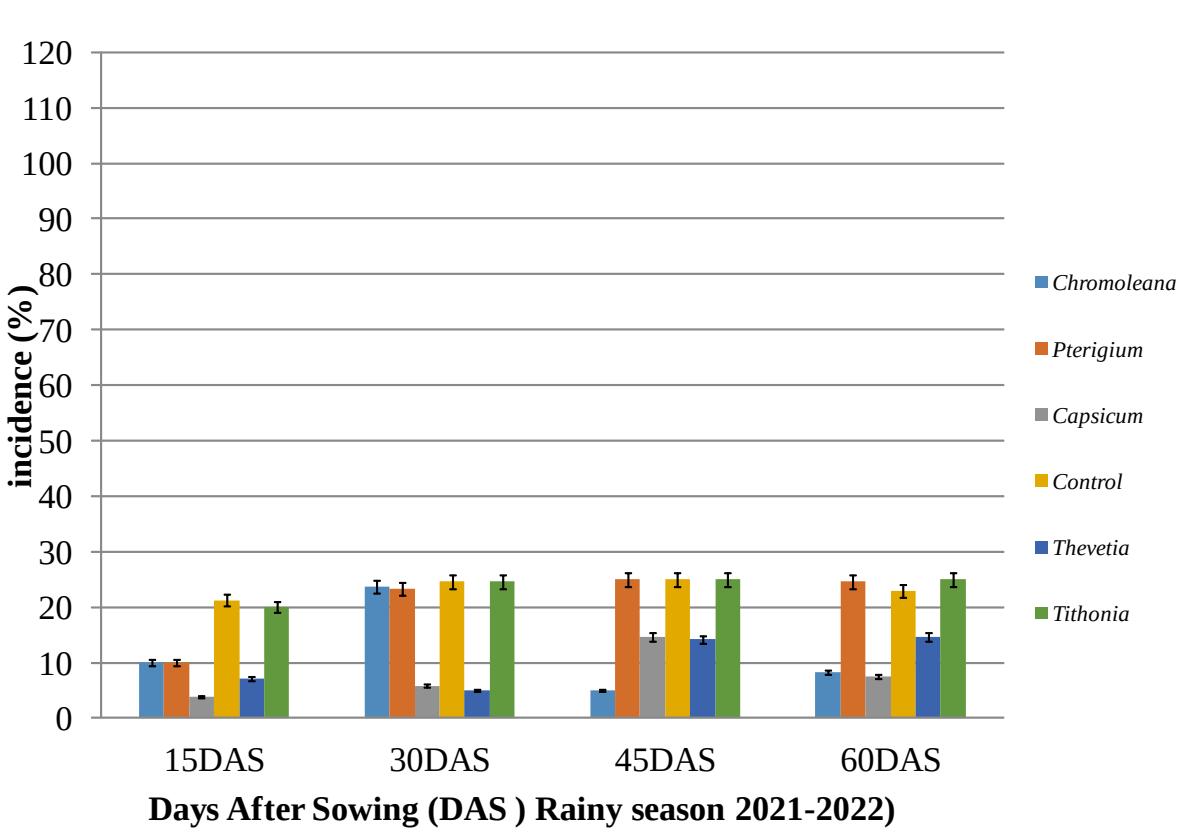
The first Field sampling was destructive; the inspected plants were cut from the ground level and dissected to record the number of *S. frugiperda*.. egg batches and any other insects present. Damage to the plant was also scored by evaluating severity of pin holes. shot-holes. lesions. tattering and dead hearts using this scale (- 0: no visible leaf damage ;- 1: pinhole damage to leaves only;- 2: pinhole and shot hole damage to leaf;- 3: small elongated lesions (5-10 mm) on 1 to 3 leaves;- 4: medium-sized lesions (10-30 mm) on 4 to 7 leaves- 5: large elongated lesions (> 30 mm) or small eaten portions on 3 to 5 leaves ;- 6: elongated lesions (> 30 mm) and large eaten portions on 3 to 5 leaves;- 7: elongated lesions (> 30cm) and 50% of leaves eaten;- 8: elongated lesions (30cm) and large portions eaten on 70% of leaves;

The variables were attack rate (incidence %). severity. abundance of caterpillars. eggs batches and other insects and. at harvest. yield (t/ha).

Data analysis

RESULTS AND DISCUSSION

Incidence



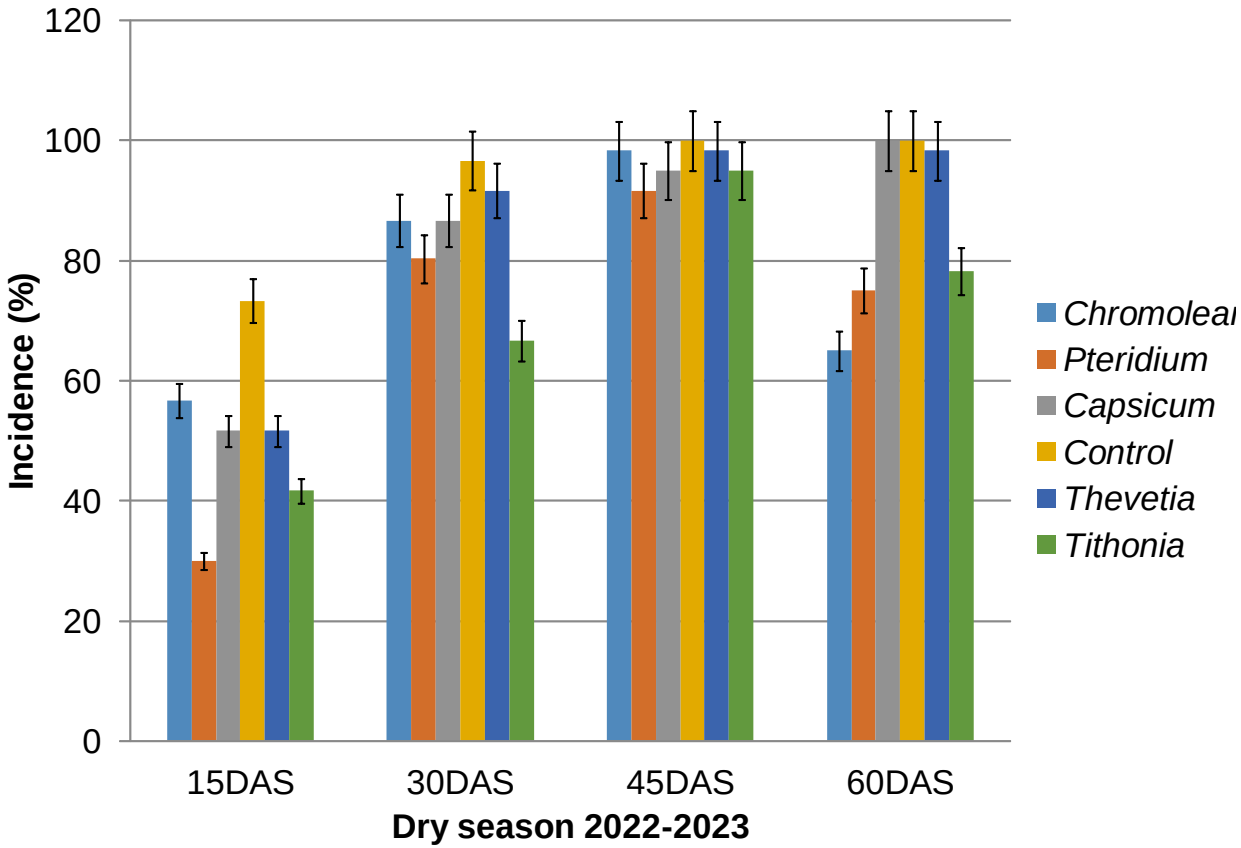


Figure 3: Effect of botanicals on FAW incidence.

RESULTS AND DISCUSSION

Severity

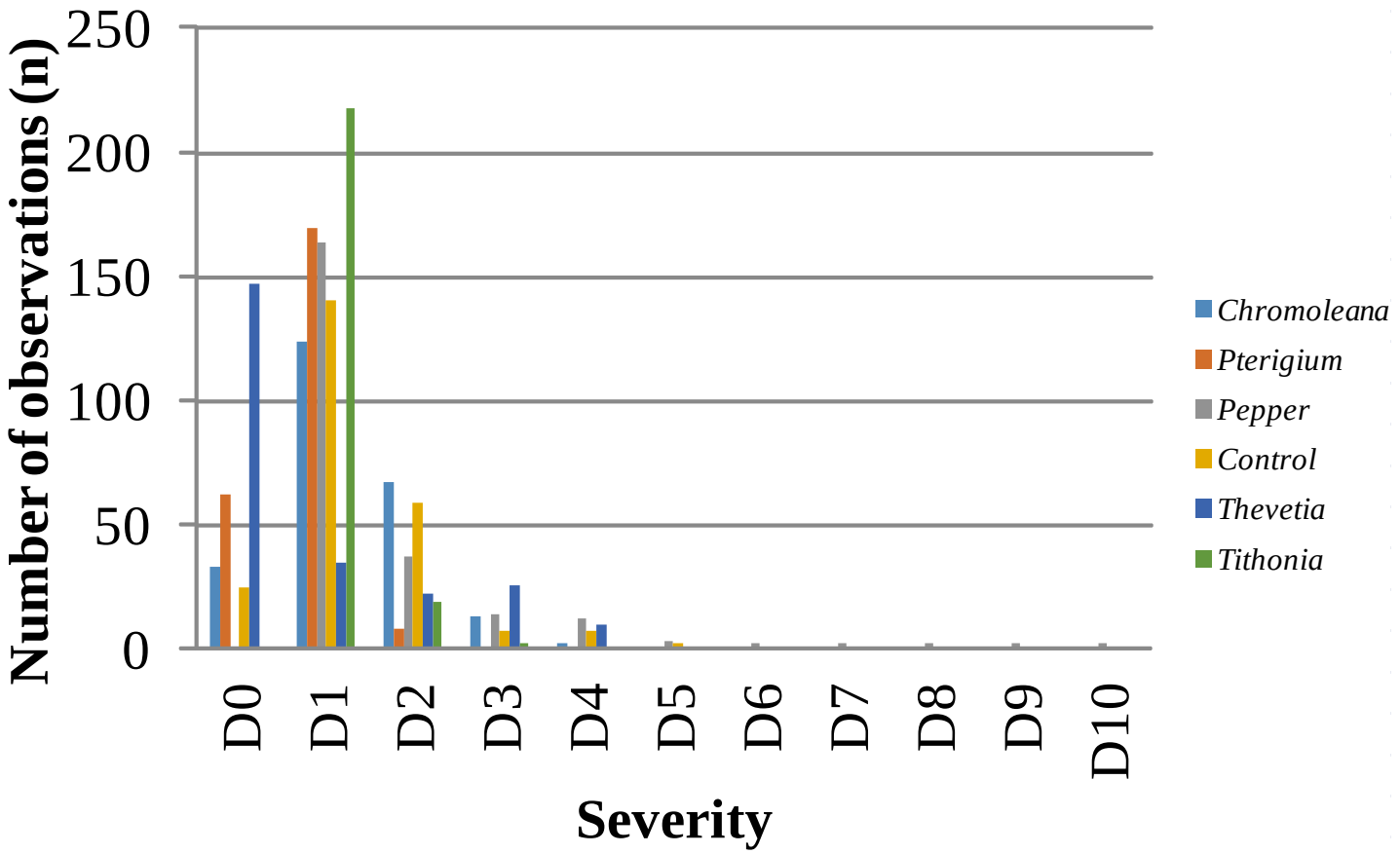


Figure 4: Severity of FAW attack per treatment.

RESULTS AND DISCUSSION

Abundance of larvae. eggs batches and naturals enemies per treatment

Tableau 1: Abundance of FAW larvae. eggs batches and natural enemies per treatments

Treatment	Mean number eggs batches	Mean number of FAW larvae	Mean number of ants	Mean number of ladybugs	Mean number of spider
Chromolean a	0.00±0.00b	0.05±0.01b	0.14±0.07a	0.01±0.01	0.03±0.01
Pteridium	0.00±0.00b	0.03±0.01b	0.00±0.00b	0.02±0.01	0.02±0.01
Capsicum	0.01±0.01b	0.07±0.02b	0.13±0.07a	0.00±0.00	0.03±0.01
Control	0.00±0.00b	0.01±0.01c	0.04±0.02b	0.00±0.00	0.02±0.01
Thevetia	0.06±0.02a	0.24±0.03a	0.13±0.05a	0.04±0.02	0.13±0.04
Tithonia	0.00±0.00b	0.09±0.02b	0.18±0.04a	0.05±0.01	0.10±0.02
F value	7.85	14.99	2.83	2.79	1.40
P value	0.0001	0.0001	0.006	0.06	0.19

numbers with the same letters are not statistically different at P=0.05

RESULTS AND DISCUSSION

Effect of treatments on yields

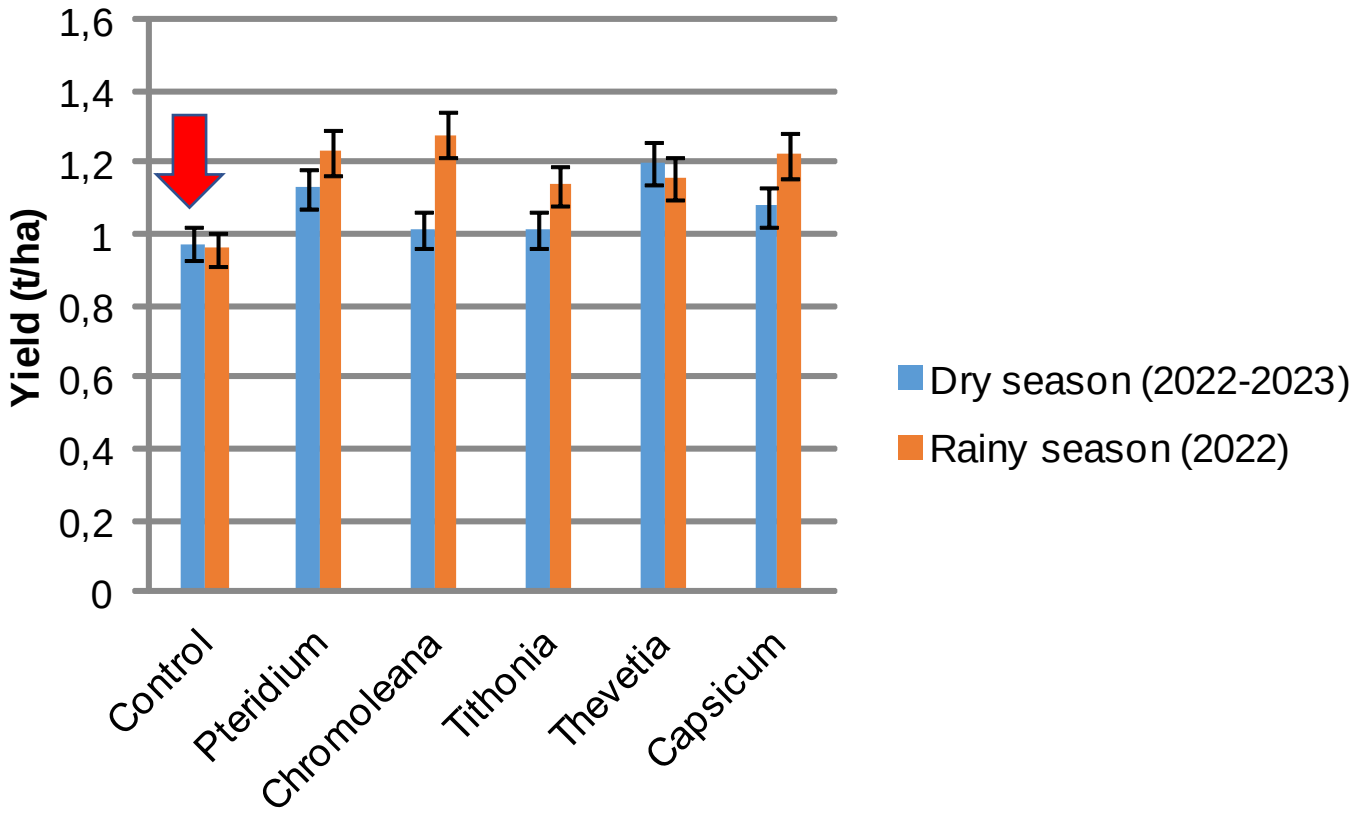


Figure 4: Mean yield (t/ha) per treatment during the dry and rainy season

CONCLUSIONS AND RECOMMENDATIONS

The aim of this work was to determine the effect of botanical extracts on FAW.
At the end of the trial, the attack rate was lower during the rainy season and very high in the dry season. For treatments the values recorded in the *Capsicum* and *Thevetia* plots were the lowest compared with the control in both seasons.

Attacks were not severe during the crop cycle in all plots in the rainy season.
The mean yield was low in the control plot compare to the botanical treatments in the dry and rainy seasons.

RECOMMENDATIONS

Thevetia and *capsicum* reduced the incidence of FAW in maize more than the other extracts, and yields were good. These extracts can be recommended to growers as part of an integrated pest management program against FAW.

Thank you

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