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IMPACT OF INTERCROPPING ON THE POPULATION DENSITY OF *HELICOVERPA ARMIGERA* HUBNER (LEPIDOPTERA: NOCTUIDAE) AND PRODUCTIVITY OF COTTON (*GOSSYPIUM HIRSUTUM* L.)



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Introdução

- In Mozambique, *Helicoverpa armigera* is one of the most important pests that can destroy or reduce what is sometimes the farmer's only source of income.
- Recently, IPM based control methods are available to minimize reliance on pesticides and emphasizes the contribution of other control methods.
- Intercropping of cotton with other crops (sorghum, pigeon pea and crotalaria) can provide a biological diversity, which keeps the insect population density in equilibrium and facilitate the natural control of insect pest.

Hypothesis

- **Hypothesis**
  - ✓ Intercropping of cotton with sorghum, pigeon pea and crotalaria affects the population density of *H. armigera* and natural enemies.

Objective

- Evaluate the combined effect of intercropping (cotton with sorghum, pigeon pea and crotalaria) and pest management strategies (insecticides) on *H. armigera* population levels in cotton.

Material & methods

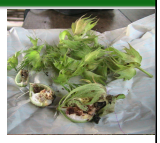
- Field experiment
  - ✓ Morrumbala (Lipembe experimental station).
  - ✓ Growing season 2006-2007.
- Experimental design
  - ✓ RCBD, Split plot, 4 replications.
    - ✓ Main plot: cropping system.
    - ✓ Subplot: chemical control (economic threshold).

Material & methods

- Treatments
  1. Sole cotton (control)
  2. Cotton/ Sorghum
  3. Cotton/ Pigeonpea
  4. Cotton/ Crotalaria

- Subplot
  - ✓ 8 rows 10 m long for cotton (0.90m X 0.30m and 1plant/hole)
  - ✓ 2 rows of each other crop (0.90m X recommendation)
  - ✓ Area: 80 % for cotton and 20% for other crop

Material & methods



- ❖ Evatuation
  - ✓ Monitoring weekly for *H. armigera*
  - ✓ Main natural enemies
  - ✓ Productivity of seed cotton yield
- ❖ Data analysis
  - ✓ Anova

Results

Tabela 1. Effect cropping system and insecticide on population density of *H. armigera* per 10 plants.

Effect of cropping system*		Effect of insecticide*	
Sole cotton	4,346 a	Unsprayed	5,091a
Cotton /Peageonpea	3,673 b	Sprayed	1,957 b
Cotton/Sorghum	3,043 c		
Cotton /Crotalaria	2,623 c		
CV= 24,3			

* Means followed by the same letter are not significant different by the test of Scott & Knott ($p < 0,05$).

Results

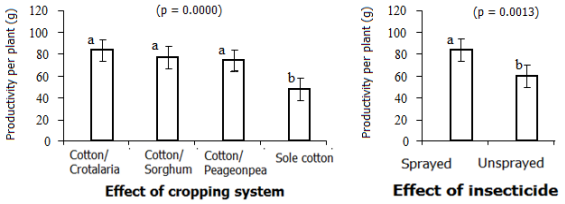
Table 2: Effect cropping system and insecticide on population density of natural enemies per 10 plants.

	Syrphidae	Crysopidae	Spiders
Cropping system			
Sole cotton	0,537 b	0,283 b	0,654 b
Cotton/ Peageonpea	0,981 a	0,388 b	0,801 a
Cotton/ Sorghum	1,019 a	0,503 a	0,841 a
Cotton/ Crotalaria	1,029 a	0,541 a	0,888 a
Insecticide			
Unsprayed	8,072 a	0,549 a	0,934 a
Sprayed	3,226 b	0,457 b	0,608 b
CV	39,4	18,1	18,9

* Means followed by the same letter are not significant different by the test of Scott & Knott ($p < 0.05$).

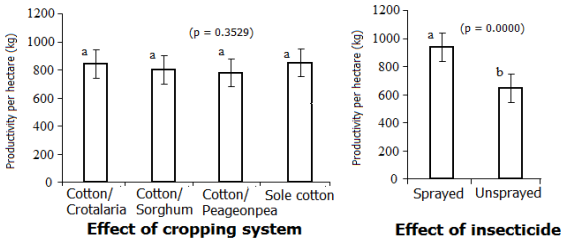
Results

Figure 1: Effect of cropping system and insecticide on seed cotton yield per plant (g).



Results

Figure 2: Effect of cropping system and insecticide on seed cotton yield per hectare (kg).



Results

Table 3. Correlations: Plant stand, plant high, harvested bolls and larvae of *H. armigera* with vs cotton seed yield per hectare

Variables	Correlation (r)	p < 0.05
Plant stand vs cotton yield	0.2537	0.08006*
Plant high vs cotton yield	0.3728	0.0178**
Harvested bolls vs cotton yield	0.8817	0.0000***
Larvae of *H. armigera* vs cotton yield	- 0.7118	0.0000***

* Significant at 10% probability
** Significant at 5% probability
*** Significant at 1% probability
ns no significant 5% de probabilidade

Conclusions

- ✓ The population densities of *H. armigera* were higher in the cotton sole crop than in all cotton intercropped systems.
- ✓ However, the natural enemies were more abundant in the cotton intercropped with other crops.
- ✓ Cotton intercropping with sorghum, pigeon pea or crotalaria showed that no significantly diffences in yield per hectare if compare with cotton sole crop.

Conclusions

- ✓ The population of *H. armigera* and the natural enemies were significantly higher in the unsprayed plots when compared to the plots treated according to the economic thresholds.
- ✓ The intercropping of cotton and use of decision-making pest control system is an alternative way for sustainable crop production for the farmers. It can contribute for food security, family income and enable the preservation of the environment.

Acknowledgments