A NEW TYPE OF TRAP FOR CAPTURING *ORYCTES RHINOCEROS (SCARABAEIDAE, DYNASTINAE)*, THE MAIN PEST IN YOUNG OIL PALM AND COCONUT PLANTINGS

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Abstract

Oryctes rhinoceros (Scarabaeidae, Dynastinae) trapping is possible with the pheromone (ethyl 4-methyloctanoate) as the attractant. This article describes a new type of trap that functions without insecticides or water, and can remain in place for several months without any particular maintenance so long as the attractant does not run out. As it is 2 m tall, it offers the advantage of having the silhouette of a palm stem, which is visually attractive to this insect.

Keywords: Oryctes rhinoceros, *trapping, oil palm, coconut, new trap.*

Introduction

Young oil palm and coconut plantings are highly susceptible to *Oryctes rhinoceros* (Scarabaeidae, Dynastinae) attacks. Pest populations are large in replantings because the insect benefits from old rotting stems to breed (Samsudin at al., 1991; Kamarudin et Wahit, 1997). Biological control with entomopathogens (*Baculovirus oryctes*, *Metharizium anisopliae*) is not immediately effective and the only possible protection is to eliminate adults, either by insecticide treatments, or by manual collection.

Trapping with the pheromone ethyl 4-methyloctanoate (Hallet et al. 1995; Morin et al. 1996) leads to substantial captures. Several types of traps have already been tested in Malaysia (Ho Cheng Tuck, 1996).

In Indonesia, *Oryctes rhinoceros* trapping is carried out using a trap consisting of a plastic bucket with apertures in the lid (IOPRI trap). This trap is either hung 2.5 m from the ground, or placed on the ground, depending on the trials involved.

This article describes the results obtained with a new type of trap (CCRI-PVC trap) and compares them to captures with the IOPRI trap.

Material and methods

Traps:

- IOPRI trap: The trap used is a 30-litre bucket with 4 apertures (3 x 12 cm) in the lid.
- New CCRI-PVC trap: This trap consists of a PVC tube 2 m tall and 16 cm in diameter (Figure 1) tested in Papua New Guinea by the Cocoa and Coconut Research Institute (CCRI) to

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capture *Scapanes australis* (Col. Dynastinae). It has two side apertures (20 x 10 cm) in its upper section. The top is open, whilst the base rests in a recipient with holes for rainwater drain-off.

Attractants. Two types of attractants have been studied:

Pheromone alone: type D2 ethyl 4-methyloctanoate dispenser, used in an earlier trial (Purba *et al.*, 2000), diffusing 23 mg per day in the field,
The pheromone (same D2 dispenser) plus ten litres of 4-week-old EFB (Empty Fruit Bunches from oil palm).

Experimental design: 10 randomized blocks over 4 periods of 5 days. The traps were installed under young oil palms planted in 1999 (Laras estate, North Sumatra, Indonesia) at a density of 1 trap for 2 hectares.

The traps were inspected at the end of each 5-day period for 4 weeks. The data were analysed in a factorial trial with 2 factors and 2 levels, to compare the trap effect and the attractant effect. Another analysis consisted in comparing the captures of the 4 traps as independent treatments over each of the 4 periods (ANOVA with Newman-Keuls tests at 5% using STATITCF software).

Results

Figure 2 shows average weekly captures per trap. The CCRI-PVC trap caught twice as many insects as the standard IOPRI trap, irrespective of the attractant.
Figure 3 shows the significant effects of the trap type on the one hand, and the attractant on the other (EFB effect).
Figure 4 shows average weekly captures per trap over the 4 successive trapping periods.

Discussion

The CCRI-PVC traps caught significantly more insects than the IOPRI traps. This result can be attributed to the general appearance of the trap, with its height of 2 m, which consequently gave it the appearance of an old palm stem. Indeed, several authors have reported that dead coconut palms or oil palms, in isolation and rotting where they stand, are more attractive than felled palms. They are favourable breeding sites. The other advantage of this trap is that the captured insects are kept in the bottom of the trap, in which the limited space available prevents them from escaping.

Lastly, the trap functions without insecticide or water and can remain in place several months without any particular maintenance so long as the attractant does not run out. So this trap is well adapted to be used by coconut palm small holder.

The attractiveness of EFB in the field cannot be denied and has been studied in several earlier trials (Sudhartho et.al., 2001). Their role as a synergist with the pheromone is significant. Decomposing EFB are used because they are available in large quantities, easy to use and uniform. Their decomposition and state can be monitored and known from the EFB leaving the mill. However other decomposing wood or old stem palm could tested. The synergistic effect of the rotting material when used in trapping with the pheromone of the insect had already been reported by Alfiler (1999). That author used old coconut wood and found that captures increased two to three-fold. Although the degree of wood decomposition was not specified, the volumes used were larger than in our trial.

The synergistic role of old stems of coconut palms or various other palms with the pheromone can be explained by the fact that *O. rhinoceros* specifically seeks these rotting host plants for mating and development.

Conclusion

The CCRI-PVC trap is a worthwhile innovation for trapping palm pests, especially *O. rhinoceros*. Improvements are being studied with a view to reducing the diameter of the PVC tube already tested, so as to reduce costs. Pending the development of a synergistic synthetic attractant, EFB several weeks old (or other decomposing palm material if tested) can be used.

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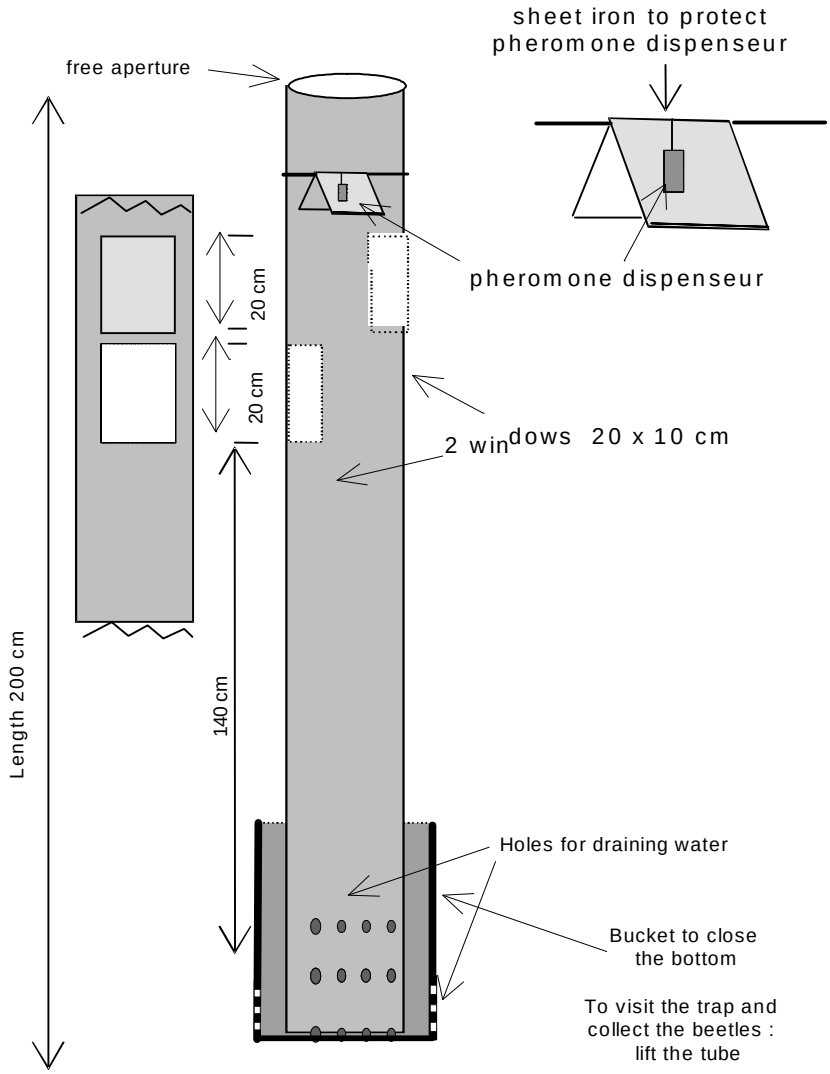
Large PVC tube (dia=16cm, H =2m with 2 apertures in the upper section



Possible variation with a common PVC tube (diam. about 10 cm) and longer 2.5 cm

Figure 1 : PVC tube trap : (CCRI-PNG Type)

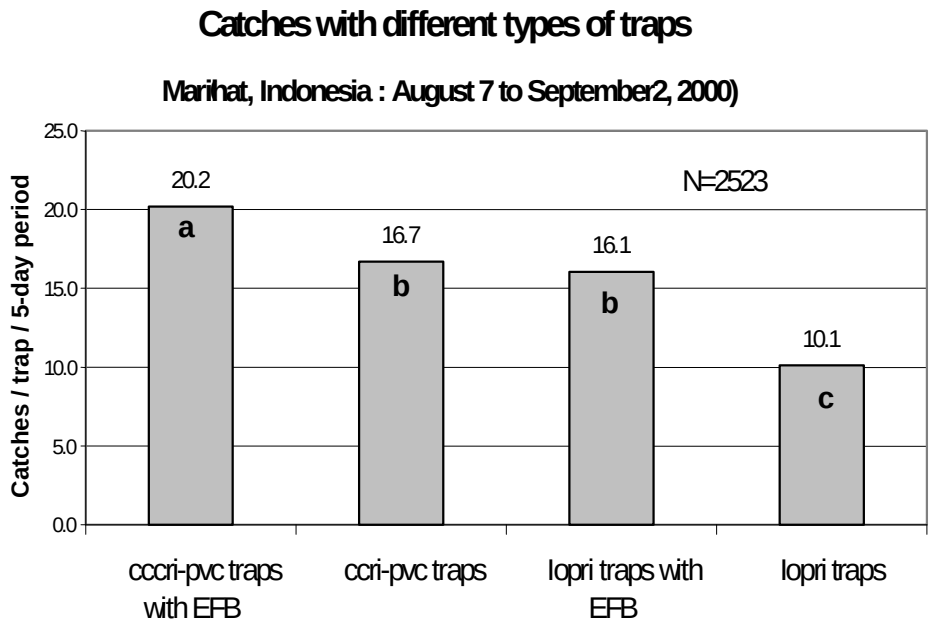
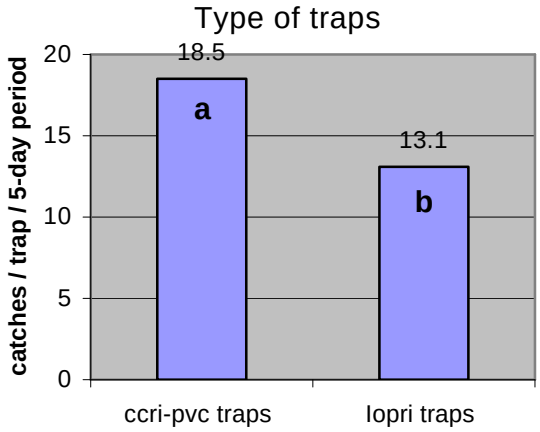


Figure 2: Mean catches following the 4 types.
Means with the same letters are not different. Trap had a significant effect on the captures: ANOVA for treatment effects: with 2 factors (period and traps). For trap, a high effect: F=14.70, *P*<0.001. For period, F = 6.10,
P< 0.001.

A total 2523 beetles were caught in four 5-day periods in 10 blocks.



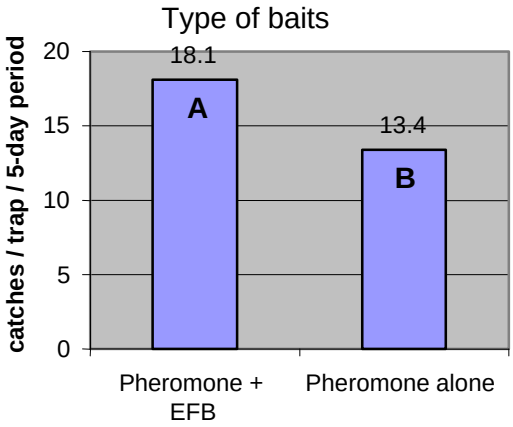


Figure 3: Effect of type of trap and type of bait.
Means with different letter are significantly different. ANOVA with 3 factors and 10 blocks : traps: F=24.18,* P<*0.001 ; baits F=18,7,* P<*0.001 and periods F=6.10,* P<*0.001.

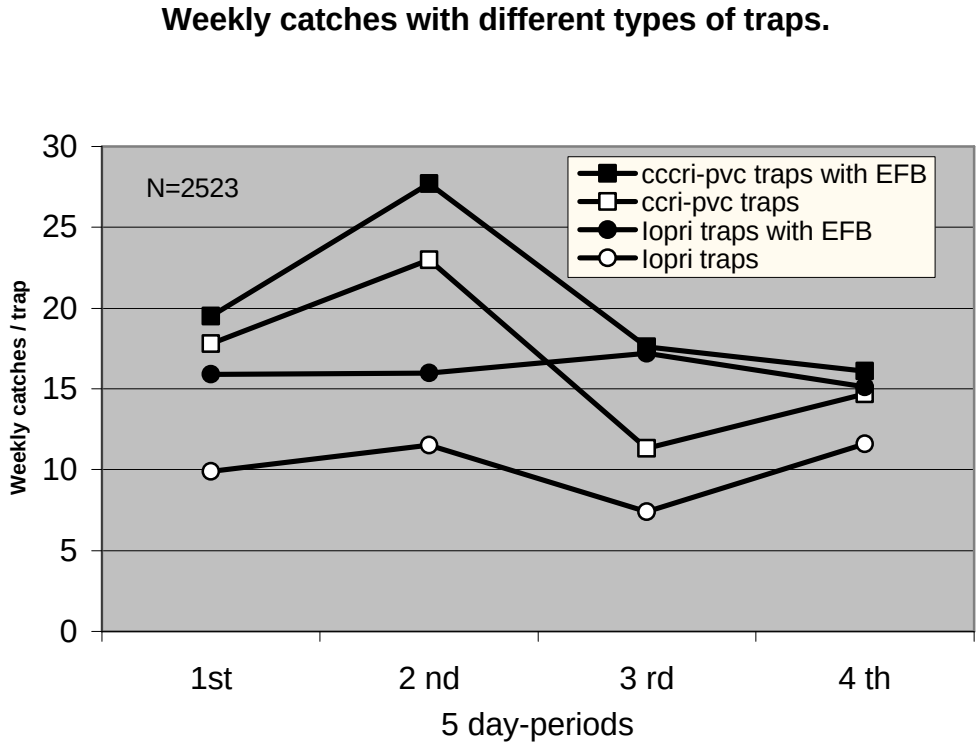


Figure 4 : Mean catches per trap and per 5day-period.

A total of 2523 beetles were from August 7 to September 2, 2000, in Laras plantation, Indonesia.