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Mass Trapping of *Rhynchophorus phoenicis* Fabricius and *Temnoschoita quadripustulata* Gyllenhall on Oil Palm Trunks at Okomu, Edo state, Nigeria.

IRORERE, M.O * ; AISAGBONHI, C.I.* * ; HAVARD, T.J.R* and ENOBAKHARE, D.A. * * *

* *Okomu Oil Palm Company, Okomu, Benin City.*
** *Entomology Division, Nigerian Institute For Oil Palm Research (NIFOR), P.M.B. 1030, Benin City.*
E-Mail: Nifor @ infoweb.abs.net
*** *Department of Crop Science, University of Benin, Benin City.*

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ABSTRACT

Cross - cut oil palm stumps were set up in each of eleven, 25 - ha, oil palm fields at Okomu, from November 1998 to January 1999. Each field had 10 traps, 5 of which was a set of traps and a set of controls. The mean number + S.E of adults ***Temnoschoita quadripustulata*** trapped were 445.07 + 57.03 in Nov.1998; 481.02 + 45.63 Dec.1998; and 205.98 + 50.62 in Jan.1999. For *Rhynchophorus phoenicis* the numbers were 11.09 + 1.32 in Nov.1998; 11.29 + 1.24 in Dec. 1998; and 1.22 + 0.43 in Jan. 1999. No weevil was captured in the control trap. Trap captures of ***T.quadripustulata*** were significantly higher (P=0.05) than those of ***R.phoenicis***. Traps became less efficient with time as palm sap waned off.

INTRODUCTION

Rhynchophorus species are destructive pests of commercial and ornamental palms in the tropics (Hill, 1983). ***R.phoenicis***, tunnels into the trunks of coconut palms, stops growth and even kills them (Saraiva,1939). It occurs in tropical Africa, Iraq, and tropical Americas (Lepesme, 1947). It attcks oil and coconut palms (Wattanapongsiri, 1966). The cycle from egg to adult covers about 60 days, of which 26 are spent as a larva (Lever 1969).

Rhynchophorus palmarum has been implicated as the primary vector of the red ring nematode, *Bursaphelenchus cocophilus* (Cobb 1922; Tidman 1951; Hagley 1963; Griffith 1967, 1968; Oehlschlager ***et al.,*** 1993). Chinchilla, (1988) estimated up to 15 % losses, due to the attack of this pest, in both oil and coconut palms in commercial plantations in the tropical Americas. There is a correlation between the rate of red ring infection in oil palm plantations and seasonal variations in oil palm weevil populations (Hagley, 1963; Blair, 1970 a,b; Griffith, 1978; Schuiling and Van Dinther, 1981) and with the population of nematode - infected weevils (Chinchilla et al,, 1990, Morales and Chinchilla, 1990). Larvae of *Rhynchophorus* species also cause significant primary damage in palms (Griffith 1987). These weevils attack healthy coconut palms but for oil palm, mechanical injury or rot attracts them to the feeding or oviposition site (Chinchilla 1988). Injury to the palm often occurs during routine harvesting (every 8 - 10 days), pruning operations or broken branch caused by strong wind. In oil palm other mechanisms of infection such as via nematode carrying knives during pruning or transmission via contaminated soil (Fenwick 1968) are considered insignificant in comparison to inoculation by the weevil (Schuiling and Van Dinther 1981, Chinchilla 1988). Symptoms do not become evident until 2 - 3 months after infection and nematicidal treatments at this point have proved fruitless in oil palm (Chinchilla 1988).

In Nigeria, there exists related diseases, the lethal declining disease (Awka wilt) of coconut palms and the Lethal bud rot of oil palms. There are also current investigations being undertaken to determine the relationship between these diseases and incidence of insects in Nigeria, with an aim of determining the insect vectors involved.

Species of another genus, *Temnoschoita* are often found damaging the oil palm throughout Africa. In Nigeria, they have been found more commonly associated with nursery seedlings raised under shades (Hartley; 1988). The females lay their eggs on cuts and wounds on the leaf petioles of young palms. The young larvae tunnel through both dead and living tissue towards the heart of the palm, or in the case of older palms, they move into the inflorescence and cause rotting. The damage inflicted on palms is sometimes severe and young palms may be killed through penetration of the crown and growing point (Hartley, 1988).

Other weevils, like *Diocalandra taitensis* Guerin and *D. frumenti* have also been recorded attacking all parts of the coconut palm; damaging roots, leaves, and fruit stalks, leading to premature shedding of nuts (Doane, 1909; Zacher, 1913; Herms, 1926; Lever 1969).

Treatment of host palms (Fenwick, 1967) with insecticide and removal of red ring - diseased trees, coupled with trapping using wire baskets filled with insecticide - laden palm trunk have been considered appropriate phytosanitation practise (Griffith 1969; Moura, 1990, 1991). Oehlschlager *et al.*,1993, developed an efficient method for field trapping adults *R. palmarum* and *R.phoenicis* using the newly isolated major component of the male produced aggregation pheromone, 6 - methyl - 2 (E) - hepten - 4 -ol. This method is however expensive for the resource poor farmer (at $3 US Dollar per unit of pheromone).

In tropical Americas the American palm weevil, *Rhynchophorus palmarum* (L.) causes extensive damage to commercial coconuts, date and oil palm as a vector of the red ring nematode, *Bursaphelenchus cocophilus* Cobb. We thus considered it necessary to trap these weevils in our oil palm plantations in Nigeria, by exploring a cheaper method, affordable to the Resource poor farmer, (felled oil palm trunk).

MATERIALS AND METHODS

Ten cross - cut surfaces of oil palm stumps, 60cm above base level, were used as traps. (Plate 1). Twenty palm rows seperated one trap from the next. Eleven fields were used. Each field of 25 hectares contained a set of traps and contols.

Insects were collected from these traps by a team of 4 workers between 5.30a.m - 6.30 a.m daily, before sunrise, i.e. to prevent insects taking off in flight. The workers examined traps located in 2 - 3 fields daily. The numbers of insects collected were recorded for three months, November, 1998, December, 1998 and January 1999.

Statistical Analysis: Data collated were analysed using Mstatc Programme (T -Test Function) to find if there was any statistical difference in the mean numbers of the insects recorded.

RESULTS AND DISCUSSION

Trap recoveries of adult *Temnoschoita quadripustulata* and *Rhynchophorus phoenicis:*

The mean numbers of adult *T.quadripustulata* and *R.phoenicis* (+ their standard deviations) recovered per field in the month of November 1998 are presented in table 1. The adults were attracted to the palm exudate from the cross cut surface in each trap while none was recovered from the control sets (insecticide treated surfaces where palm exudate had previously been allowed to wane off.

Table 2 similarly indicates the mean numbers of adult *T.quadripustulata and R.phoenicis* recovered per field in the month of December 1998, while Table 3 presents the mean numbers of adult *T.quadripustulata* recovered in January 1999. There was a significant decrease in the mean numbers of adults recovered in the month of January 1999 when compared with recoveries in the months of November and December 1998 ($P < 0.05$). The quantity of palm sap waned off in the month of January 1999 and thus attracted less numbers of insects.

There were significantly ($P<0.05$) more *T.quadripustulata* (Plate 2) per trap than *R.phoenicis* throughout the period of trapping. Plate 3 shows larvae of *R.phoenicis* attracted to trap surface. The reasons why more *T.quadripustulata* were more in trap captures than *R.phoenicis* may be ascribed to their natural habits. The whole cycle from egg to emergence of adult from the cocoon occupies 2 - 3 months, (4-6 generations/year) in *T.quadripustulata,* and 3 - 6 months, (2-4 generations/year) in *R.phoenicis,* (Lever, 1969). This explains why the former weevil was more in trap captures than the latter.

Plate 1 and 2

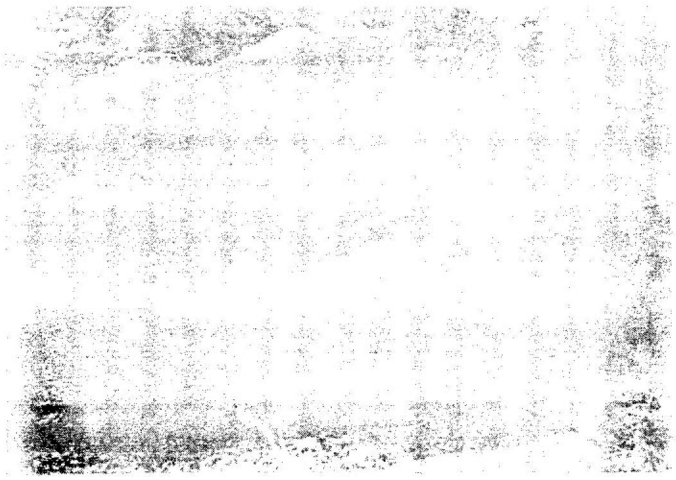

Plate 1 : Cross-cut Surface of an Oil-palm Stump which served asTrap (Adults: *Rhynchophorus phoenicis* indicated).

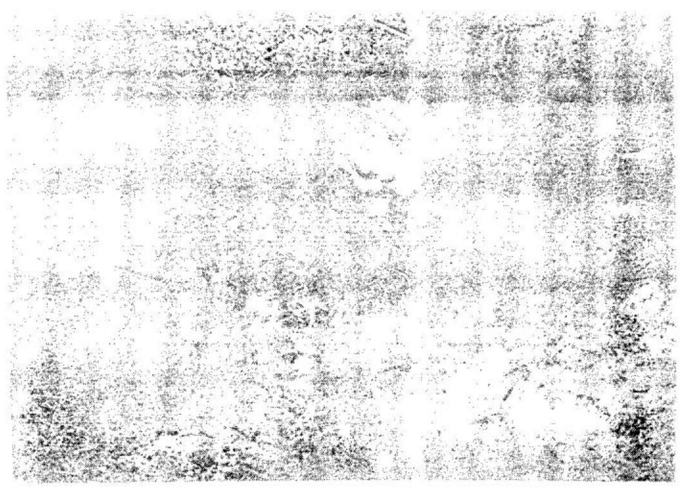

Plate 2 : Adult *Temnoschoita quadripustulata* on trap surface.

Table 1. Comparison of trap captures/Field of *T.quadripustulata* and *R.phoenicis* in November 1998 (Each field consisted of 5 traps)

Field	Mean number + S.D of *T.quadripustulata*	Mean number + S.D of *R.phoenicis*
D 5.1	311.20 + 81.50 (36.45)	6.80 + 1.48 (0.66)
D 5.2	314.40 + 150.41 (67.27)	10.20 + 1.30 (0.58)
D 5.3	438.00 + 59.71 (26.71)	16.60 + 3.51 (1.57)
D 5.4	612.80 + 159.60 (71.37)	8.80 + 2.95 (1.32)
D 6.1	493.00 + 66.55 (29.76)	10.40 + 2.30 (1.03)
D 6.2	534.40 + 142.47 (63.72)	9.80 + 4.09 (1.83)
D 6.3	443.80 + 234.34 (104.81)	9.80 + 3.57 (1.59)
D 6.4	485.60 + 160.95 (71.98)	11.00 + 4.06 (1.82)
D 7.1	443.80 + 134.06 (59.95)	13.20 + 3.27 (1.46)
D 7.2	454.80 + 107.68 (48.15)	16.20 + 5.17 (2.31)
D 7.3	364.00 + 105.54 (47.21)	9.20 + 2.28 (1.02)
Mean + s.e	**445.07 + 57.03**	**11.05 + 1.32**

Figures in bracket = standard errors

Table 2. Comparison of Trap captures/Field of *T.quadripustulata* and *R.phoenicis* in December 1998 (Each field consisted of five set of traps)

Field	Mean No. + S.D. of *T.quadripustulata*	Mean No. + S.D. of *R.phoenicis*
D 5.1	311.40 + 122.96 (54.99)	6.80 + 1.10 (0.50)
D 5.2	483.80 + 60.69 (27.14)	12.20 + 2.39 (1.07)
D 5.3	565.20 + 99.24 (44.38)	17.60 + 5.20 (2.34)
D 5.4	765.80 + 195.69 (87.51)	11.60 + 2.61 (1.17)
D 6.1	609.40 + 21.84 (9.77)	11.40 + 2.70 (1.21)
D 6.2	649.60 + 193.90 (86.71)	11.40 + 2.19 (0.98)
D 6.3	513.80 + 101.32 (45.31)	11.00 + 2.37 (1.00)
D 6.4	484.80 + 60.43 (27.03)	13.20 + 3.03 (1.36)
D 7.1	528.40 + 164.06 (73.37)	8.80 + 2.86 (1.28)
D 7.2	469.80 + 47.41 (21.20)	16.20 + 4.15 (1.86)
D 7.3	379.00 +54.93 (24.56)	9.20 + 1.92 (0.86)
Mean + s.e	**524.06 + 45.63**	**11.76 + 1.24**

Figures in bracket = standard errors.

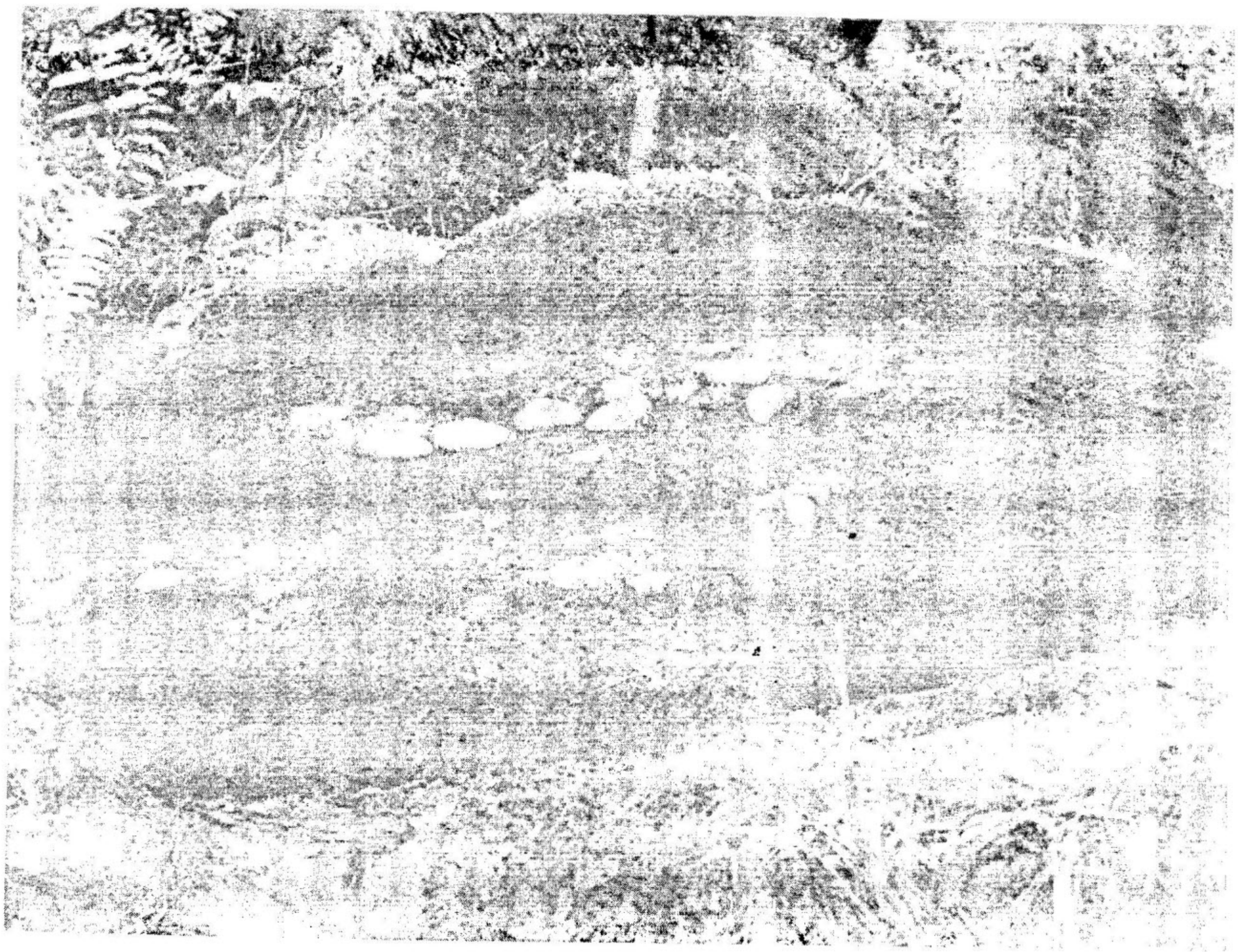

Plate 3 : Larvae of *Rhynchophorus phoenicis* on trap surface.

Results obtained here indicate that this method of trapping weevils will reduce the numbers of adults attacking palms in the plantation.

Although there is no evidence in oil palm that red ring - diseased oil palms are more attractive to ***R.phoenicis*** than healthy oil palms (Chinchilla ***et al.***, 1990), it has long been known that weevils are attracted to trunks of both oil and coconut palm.

Where oil palm trunks or coconut palm trunks are blown down by rain storms, or diseased trees need to be eliminated, or entire fields clear felled, as during a replanting operation, traps could thus be constructed. This will help to trap and reduce the numbers of endemic weevil populations in the plantations.

Aisagbonhi and Oehlschlager (1999) used pheromone baited bucket traps to assess the populations and mass trap ***R.phoenicis*** in an oil palm plantation in Nigeria. Results from present investigation and previous results by Aisagbonhi and Oehlschlager (1999); suggest mass trapping integrating the use of sawn palm trunks and pheromone baited traps, will help to reduce the incidence of palm weevils in Nigeria.

The relationship between incidence of these weevils and central spear rot or bud rot and their vector implications for *Fusarium* wilt, Awka wilt or other lethal diseases of palms in Nigeria needs to be investigated.

Table 3. Comparison of Mean number of Trap captures/Field of *T.quadripustulata* and *R.phoenicis* in January 1999(Each field consisted of 5 traps).

Field	Mean no. + S.D. of *T.quadripustulata*	Mean no. + S.D. of *R.phoenicis*
D 5.1	0.00 + 0.00	0.00 + 0.00
D 5.2	830.80 + 322.56 (144.25)	4.00 + 2.50 (1.14)
D 5.3	750.00 + 608.98 (272.34)	4.20 + 3.49 (1.56)
D 5.4	218.40 + 52.68 (23.56)	1.20 + 0.45 (0.20)
D 6.1	137.00 + 88.49 (39.58)	2.60 + 2.61 (1.17)
D 6.2	161.60 + 104.29 (46.64)	0.40 + 0.55 (0.25)
D 6.3	70.00 + 26.20 (11.72)	1.00 + 1.00 (0.45)
D 6.4	41.00 + 18.67 (8.35)	0.00 + 0.00
D 7.1	(27.00 + 9.41) (4.21)	0.00 + 0.00
D 7.2	15.00 + 6.60 (2.95)	0.00 + 0.00
D 7.3	15.00 + 7.25 (3.24)	0.00 + 0.00
Mean + s.e	**205.98 + 50.62**	**1.22 + 0.43**

Figures in bracket = standard errors.

	Nov.1998	Dec. 1998	Jan. 1999	
Temnoschoita quadripustulata	445.07	481.02	205.98	
Rhynchophorus phoenicis	11.09	10.29	1.22	
F - value	854.39	1607.07	33226.31	
T - value	15.98	13.61	2.28	Significant F

Significant T

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