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EVALUATION METHODS FOR RED PALM WEEVIL CONTROL IN EGYPT DURING (1992-2010)

M.K. ABBAS
Plant Protection Research Institute, ARC. DOKKI, Giza, Egypt
mohamed.kmal55@yahoo.com

ABSTRACT

The present work include tree survey that playing as a parameter to evaluate the real situation and gave more information for control action and insect distribution. Cut off infested trees should be carried out under certain condition, avoiding tree dragging or spread of any of its contents outside. Tree cut into longitudinal parts (4 pieces) and then each piece into sections (small pieces), finally complete coverage with kerosene and insecticides should be applied before being buried deeply (1.5 m.) in the soil. In case of sever infestations injection by a mixture of kerosene and insecticides are sufficient for control. Burning the infested tree give no results, even by fuel or napalm. Better results could be obtained by spraying during two months November and March (tops peaks). Treat the remains of tree (root) after cut off, by saturating the root by mixture of kerosene and insecticides (it represents a hidden source of infestation). Getting red of all unknown and neglected tree is necessary. Chemical application by injection gave more than 85% positive results and recovery for the trees. Fumigates can apply only when trees are severely infested. Pheromone traps system gave no more than 30% infestation reduction to the flying weevil. All biotical agents did no gave noticeable result.

Key-words: red palm weevil, infestation, control agents, injection.

RESUME

Ce travail comprend la surveillance des arbres qui permet d'évaluer la situation réelle et donne des informations pour sur la distribution des insectes et pour les actions de lutte. L'abattage des arbres infestés peut être réalisé sous certaines conditions en évitant de déplacer les arbres et sans que leur contenu se répande. L'arbre est coupé longitudinalement en quatre parties ensuite réduite en petits morceaux qui seront totalement recouverts de pétrole et d'insecticide avant d'être enfouis profondément dans le sol (1,5 m). En cas d'infestation sévère l'injection d'un mélange de pétrole et d'insecticide permet un contrôle. Le brûlage des arbres infestés ne donne pas de résultat même avec du fuel et du napalm. De meilleurs résultats ont pu être atteint par deux pulvérisation en novembre et mars (pics principaux). Il faut traiter les restes d'arbres après abattage (racines) qui psont une source d'infestation cachée en saturant les racines de mélange de pétrole et d'insecticide. Il faut se débarrasser des arbres inconnus et négligés. L'application d'insecticides par injection a donné plus de 85 % de résultats positifs et permis de sauver des arbres. La fumigation ne peut être appliquée que sur des arbres sévèrement infesté. Le piégeage par phéromone ne pas réduit de plus de 30 % l'infestation. Aucun agent biologique n'a donné d'effet notable.

Mots-clés : Charançon Rouge du Palmier, infestation, moyens de lutte, injection.

INTRODUCTION

The date palm, *Phoenix dactylifera* L. (Palmace) is the most common and widely cultivated in the arid regions of the Middle East and North Africa. In many areas, date palm fruit has provided the stable carbohydrate food of local people since long time age**.**

The total number of date palm trees recorded in the ancient life reached about 109 million which yielded 4.2 million metric tons. Arab countries however, contain 78.3% of the total world date palm trees which demonstrate 75% of the production (Abdel-Megeed *et al.* 2004). Based on the Agricultural statistics issued by Ministry of Agriculture and Land Reclamation (2002), the number of female date palm trees revealed about 10.229.630 million planted in 70132 feddan. The total production/ton at 2001 reached about 1.113.270 metric ton (estimated yield/tree = 108.83 kg) harbored 26.5% of the world production (Abdel-Megeed *et al.* 2004).

Recently date palm insect pests in general and the red palm weevil, *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: Curculionidae) in particular are widely accepted as being the most destructive factors of date, coconut and oil palms throughout South and Southeast Asia (Wattanapongsiri 1966). Nowadays, the date palm crop in Eastern Arab countries is under threat. Red palm weevil was probably introduced to the Middle East on infested ornamental palm from India or Pakistan. Red palm weevil was firstly discovered attacking palm in the Arabian peninsula especially United Emirates at 1986 and progressively spread to Gulf states and crossed the red sea into North Africa as the latest record since 1992 in Egypt. It is found over a wide geographical area in Asia, involving many different Agro ecosystems. The related species is highly polyphagous with number of known hosts exceeding more than ten different palm species (Murphy and Briscoe 1999).

MATERIALS AND METHODS

I-Trunk base

Treated ten trunk base with different of following chemicals dissolved in kerosene: Cidial (phenthoate, 3ml/1 liter), Dursban (chlorpyrifos, 3 ml/1 liter), followed by Basudin (diazinon, 3 ml/1 liter). Ten date palm trees highly infestation buried at a distance 1,5 m and are holes and puts out chemicals+ kerosene.

II-Ecogical studied

R. ferrugineus inhabit large scale palm date belt extended all over Ismailia and Skarkia Governorates, thus covering an area of 450,000 Fadden in which date palm trees were extensively distributed. The experimental area was chosen at Kasassin district (Abo-Nagii) extended for two successive years (20081-2009). A number of 9 pheromone-baited traps were installed as nine ones in each block approximately in area of 50 acres. Pheromone traps were distributed as one trap/Fadden density.

III-Injection palm

Heavily infested palms were treated by injection with the insecticides of chlorpyrifos, Diazinon, Bio pesticides contain *M. anisopliae* and aluminum phosphide 57% (Phostoxin). Three rates of each compound 3.0/litre (10 palms as replicates /rate) were used. Phostoxin was used as 6-10 tables / palms. The chemical treatment was carried out in the following steps: 1- Definition of heavily infested date palms showing obvious infestation symptoms 2- Making holes inside date palm trunk around the infested places.3- Injection of infested date palms with different rates of either liquid or fumigant insecticides 4- Placing a small piece of dry date palm fibers in the opening of the holes 5- Stopping the opening of the holes by a paste of cement and gypsum. All treated date palms were inspected after 21 and 30 days from treatment to assess the potency of tested insecticides that determined as a percentage of date palm recovery according to the disappearance of the most obvious infestation symptoms i.e., dryness of yellowish brown viscous liquid in the infested places of

palm trunk.

RESULTS AND DISCUSSION

I-Trunk base

Treated Trunk base with different of following chemicals dissolved in kerosene: Cidial (phenthoate, 3ml/1 liter), Dursban (chlorpyrifos, 3 ml/1 liter), followed by Basudin (diazinon, 3 ml/1 liter) and palm highly infestation buried at a distance 1,5 m and are holes and puts out chemicals+ kerosene cause mortality 100% of different stage on *R. ferrugineus.*

II-Ecogical studied

Data tabulated in Table (1) and graphically illustrated in Figures (2 and 3) show the monthly changes in the number of red palm weevil during the tested period from January to December in 2008 and 2009 seasons.

The weevil were first observed in traps with relatively few numbers in January during the first (5±2 individual / traps) and second (2.75 ± 1 individual / traps) seasons. Then the number of captured adults increased gradually after that forming two peaks in both years. In the first year (2008), the first peak occurred in March, the average number of *R. ferrugineus* adults per one traps was (19.5 ± 3.5 individual / traps) .The second peak occurred in October with the mean number of 17.5± 2.5 individual / traps.

In the second year (2009), seasonal prevalence of *R. ferrugineus* population had approximately similar trend of abundance as in the first year recording two periods of activity with two peaks (figure 3). The first period of activity started from January till June and the first peak of abundance was during March (15.5 ± 5.5 individual / traps). The second period was observed from to August to December with the highest abundance represented by 15.5 ± 3 adults/ traps . Data obtained proved that the reliable number of captured red palm weevil occurred during warm periods which extended from March until November.

While, there was scarcely distributed individuals during winter months. The highest level of occurrence expressed as adults caught in aggregating pheromone traps during early spring months i.e. March, April, and May .These results in general agree with the findings of Maralidhoron *et al.* (2000), and Vidyasager *et al*. (2000), , who found that in India the highest population density of the red palm weevil was observed in May (29.6/trap), March (16/trap) and December (4.6/trap). Abbas (2000and 2005) in Egypt estimated four overlapping generations of red palm weevil adults per year. Vidyasager *et al*. (2000) in Saudi Arabia found that, the peak of the red palm weevil adult populations trapped was immediately after winter season during the months of April and May. A much smaller second peak was observed during October and November months just before winter. (Gunnawardena and Bandarage, 1995; El Garhy,1996). El Ezaby *et al*. (1998) reported maximum catches in March and April.

The relation between captured RPW adults by aggregation pheromone trap and infestation of trees

As shown in Table (1) adults captured in trap decreased during second season of proximately 15% and total number of palm infestation was decreased compared with previous year. The obtained illustrated that the infestation in palm trees had positive response to the increase of RPW adults in aggregation pheromone traps during the two years of study (2008 and 2009), however “r” values were 0.2268 and 0.2728,during the first and second seasons .Therefore, monitoring have to be carried out for sampling adult population and mass trapping of *R. ferrugineus* used during this period, thus giving high reduction in the weevil population size reaching about

70% (Oehlschlager, 2004). Hallett *et al.* (1993) it is worth to mention that this mass trapping is successful only when combined with good sanitation and chemical control. It allows to reduce the weevil population and to reduce number of flying adults.

III-Injection palm

The effectiveness of certain liquid (chlorpyrifos ,Diazinon, Bio pesticides contain M anisopliae and aluminum phosphide 57% (Phostoxin).) on *R. ferrugineus* was assessed after 21and 30 days from treatment under field conditions and the obtained results were tabulated in Table (2). The chemical pesticides more effective on red palm weevil compared bio pesticides low effective .no different results between 21 and 30days expected bio pesticides .

The obtained results are in agreement with those recorded by Naeem *et al*. (1992), Saleh and Gouhar (1993), Saleh *et al*. (1996), Azam and Razvi (2001), Hernandez-Marante *et al*. (2003) and El-Sebay (2004).

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Table (1): Monthly total numbers of *R. ferrugineus* adults (male and females) caught by pheromone traps at Gize Gornorate, during 2008-2009.
Totaux mensuels d'adultes *de R. ferrugineus* (mâles et femelles) pris par des pièges à phéromone dans le gouvernorat de Gize en 2008 et 2009.

Date	Season 2008				Season 2009			
	No of male	No of Female	Total of adult	No of palm infest.	No of male	No of Female	T. of adult	No of palm infest
January	7	13	20	1	5	6	11	2
February	12	25	37	7	15	23	38	1
March	25	53	78	4	30	34	62	2
April	19	25	44	1	12	29	41	0
May	12	41	53	0	17	30	47	2
June	9	21	30	2	7	16	23	1
July	10	27	37	3	10	19	29	2
August	11	20	31	4	12	14	26	1
September	14	26	40	2	10	18	28	3
October	24	46	70	3	23	38	61	2
November	21	33	54	2	25	32	57	1
December	7	11	18	0	7	12	20	0
Total	171	341	512	29	168	276	444	17

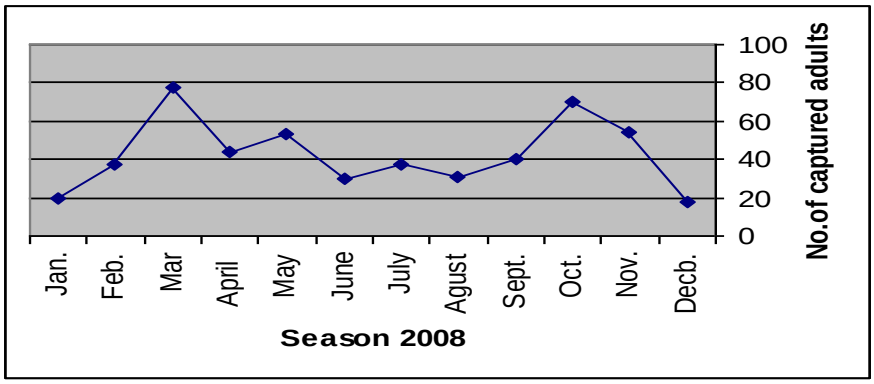

Fig. (1): Monthly total numbers of *R. ferrugineus* adults attracted to aggregation pheromone traps (bioassay every week with new mixture every two months) during 2008
Totaux mensuels d'adultes *de R. ferrugineus* pris par des pièges à phéromone d'agrégation (essai hebdomadaire avec nouveau mélange tous les deux mois) en 2008.

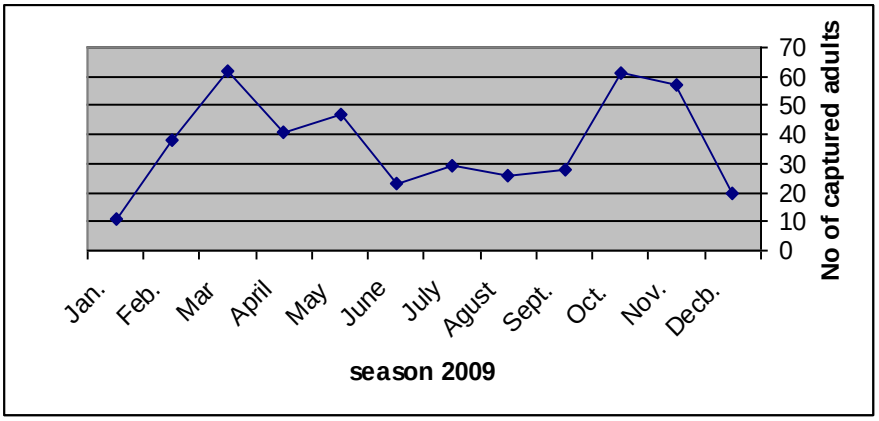

Fig. (2): Monthly total numbers of *R. ferrugineus* adults attracted to aggregation pheromone trap (bioassay every week with new mixture every two months) during 2009.

Totaux mensuels d'adultes *de R. ferrugineus* pris par des pièges à phéromone d'agrégation (essai hebdomadaire avec nouveau mélange tous les deux mois) en 2009.

Table (2): Percentages of palm recovery due to injection with different pesticides on the red palm weevil, *R. ferrugineus,* after 21 and 30 days from treatment under field conditions.

Pourcentages de guérison de palmiers après injection de différents pesticides contre le charançon Rouge du palmier, *R. ferrugineus,* après 21 et 30 jours après traitement en conditions naturelles.

Insecticides	**Percentages of palm recovery after treatment with different rates by**	
	21 days	**30 days**
Chlorpyrifos	**100**	**90**
Diazinon	**80**	**80**
aluminum phosphide 57% (Phostoxin).	**80**	**80**
Bio pesticides contain *M .anisopliae*	**40**	**60**