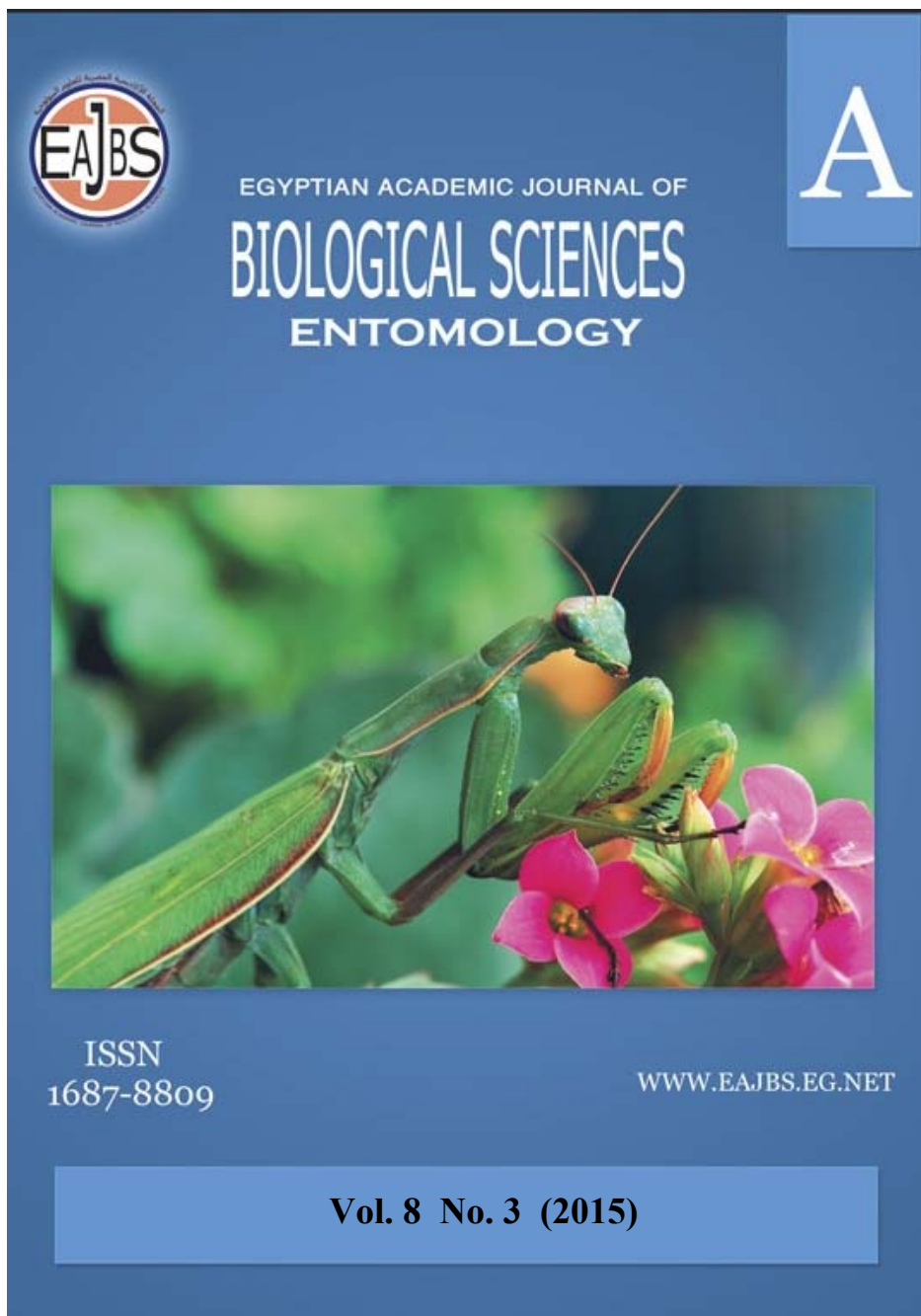
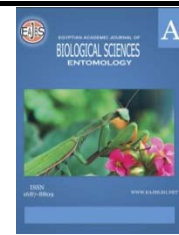


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Citation: *Egypt. Acad. J. Biol. Sci. (A. Entomology) Vol.8 (3)pp. 157-1163(2015)*



Effect of Some Compounds Against Pupae of *Spodoptera littoralis* (boisd.) With Some Depths and Ages

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ARTICLE INFO

Article History

Received: 23/11/2015

Accepted: 25/12/2015

Keywords:

Naoumil 90% SP,
Diflorate 25%WP,
Match 5% EC, Extreme
36% Sc and Pyrethrum
5%EC

Spodoptera littoralis
(Boisd)

ABSTRACT

The effect of some compounds Naoumil 90% SP, Diflorate 25%WP, Match 5% EC, Extreme 36% Sc and Pyrethrum 5%EC were tested against immersing newly-formed, 3 days and 6-day-old pupae of the cotton pest *Spodoptera littoralis* (Boisd) in sand-soil at a depth of 5, 10 and 15 cm in the laboratory at 25±1°C and 70±5% RH.

Data revealed the compounds on pupae of *Spodoptera littoralis* (Boisd) after newly formed with depth 10 cm, results indicated that Pyrethrum 5% EC (Pyrethrins) 100%; Diflorate 25%WP (Diflubenzuron) & Naoumil 90% SP (Methomyl) gave 80%; Extreme 36% Sc (Methoxyfenzide + Spinetoram) 60% malformation and Match 5% (Lufenuron) Zero% respectively compared with control at depth of 10 cm. While at depth of 15 cm, obtained results indicated that : Pyrethrum 5% EC (Pyrethrins) 100% malformation of adults emergence. While Diflorate 25%WP (Diflubenzuron) exhibited 80% malformation ; Extreme 36% Sc (Methoxyfenzide + Spinetoram) 20% and Naoumil 90% SP (Methomyl) & Match 5% (Lufenuron) zero% after one day treatments respectively compared with control.

It is concluded that treated sandy-soil with some compounds such as (Methomyl, Diflubenzuron, Lufenuron and Pyrethrins), before cultivation an effective integrated pest management method to control *S. littoralis* in Egypt.

INTRODUCTION

The Egyptian cotton leaf worm *Spodoptera littoralis* (Boisd), (Lepidoptera, Noctuidae) is a highly polyphagous of many cultivated plants. It's a particular concern to vegetable, fruit and ornamental industries Napis, (2010). A female moth lays masses of eggs on the underside of young leaves. Eggs are then coated with scales from the female's abdomen. After egg hatch, caterpillars feed on leaves and also may feed on stems, buds, flowers and fruits Venette *et al.* (2010). Pupation occurs just below the soil surface in a clay cocoon, pupa. Seven generations per year have been observed Witzgall *et al.* (2011). Economic significance to cotton worm the moth is considered a devastating pest in its native range. The plant host range, cotton worm, if introduced into cotton worm, can potentially disrupt production and marketing of many agricultural and ornamental crops. Venette *et al.* (2010).

This investigation aims, therefore, towards adding some new contributions to the knowledge on the aforementioned aspects. Points considered are the effect of immersion in the sandy-soil treatments against pupae of the cotton leaf worm *S.littoralis* (Boisd.).

MATERIAL AND METHODS

The stock culture of the Egyptian cotton leaf worm *Spodoptera littoralis* (Boisd) was maintained for under the laboratory condition 25 ± 1 C & $70 \pm 5\%$ R.H. Egg masses deposited by females of the stock culture were collected daily and the hatched larvae were fed on castor leaves (*Ricinus communis* L.) and adults were fed on 10 % sucrose solution.

To study the effect of immersing newly-formed, 3 days and 6-day-old pupae of the cotton leaf worm *S. littoralis* in sandy-soil at a depth of 5, 10 and 15 cm of *S.littoralis*. Ten newly pupae of the third generation were set for each replicate and three replications were set for each treatment and three replicates with water as control.

Chemical compounds tested:-

- 1- Naoumil 90% SP (Methomyl) it was applicate at rate 150 gm/ 100 L water.
- 2- Diflorate 25%WP (Diflubenzuron) it was applicate at rate 70 gm/ 100 L water.
- 3- Pyrethrum 5%EC (Pyrethrins) it was applicated at rate 110 ml/ 100 L water.
- 4- Extreme 36% Sc (Methoxyfenzide + Spinetoram) it was applicate at rate 62.5 ml / 100 L water.
- 5- Match 5% EC (Lufenuron) it was applicate at rate 40 ml/ 100 L water.

Survival pupae kept until adult emerged, recording rates of moths emergence (%) and rates of malformation (%), after treatments of three days.

Statistical analysis:

The mortality was corrected using Abbott's formula (1925):

$$\text{Corrected \%} = 100 \times 1 - \left(\frac{n \text{ in T after treatment}}{n \text{ in Co after treatment}} \right)$$

n = insect population

T = population in treated plot after treat.

Co = population in control plot after treat.

RESULTS AND DISCUSSION

Obtained data in Table (1) & Fig. (1) showed that the percentage of malformed pupae resulted from treatment compounds with three depth and age of newly formed pupae. Results indicated that: Match 5%EC (Lufenuron) & Naoumil 90% SP (Methomyl) & Diflorate 25%WP (Diflubenzuron) were 100%; Pyrethrum 5 % EC (Pyrethrins) was 60% and Extreme 36% Sc (Methoxyfenzide + Spinetoram) 20% respectively compared with control at depth of 5 cm.

At other depth of 10 cm, results indicated that: Pyrethrum 100% ; Diflorate & Naoumil gave 80% ; Extreme 60% malformation and Match Zero%, respectively, compared with control at depth of 10 cm. While at depth of 15 cm, obtained results indicated that : Pyrethrum 100% malformation of adults emergence. While Diflorate exhibited 80% malformation; Extreme 20% and Naoumil & Match zero%, respectively, compared with control.

Table 1: Effect of some treatments and different degree on adults emergence from newly formed pupae of the cotton leaf worm, *Spodoptera littoralis* (Boisd.) under laboratory conditions.

Treatment	Rat/100L Water	No. of pupae Treatment	At a depth of 5 cm		At a depth of 10 cm		At a depth of 15 cm	
			No. of adults Emergence from pupae treatment (%)	Malfor-Mation (%)	No. of Adults Emergence from pupae treatment (%)	Malfor-Mation (%)	No. of Adults Emergence from pupae treatment (%)	Malfor-Mation (%)
Naoumil 90% SP (Methomyl)	150 gm	40	0.0 (0.0)	40.0 (100)	0.0 (0.0)	32.0 (80.0)	0.0 (0.0)	0.0 (0.0)
Diflorate 25%WP (Diflubenzuron)	70 gm	40	0.0 (0.0)	40.0 (100)	0.0 (0.0)	32.0 (80.0)	0.0 (0.0)	32.0 (80.0)
Pyrethrum5%EC (Pyrethrins)	150 gm	40	0.0 (0.0)	24.0 (60.0)	0.0 (0.0)	40.0 (100)	0.0 (0.0)	40.0 (100)
Extreme 36% Sc (Methoxyfenzide + Spinetoram)	62.5 ml	40	0.0 (0.0)	8.0 (20.0)	0.0 (0.0)	24.0 (60.0)	0.0 (0.0)	8.0 (20.0)
Match 5%EC (Lufenuron)	40 ml	40	0.0 (0.0)	40.0 (100)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Control		40	38		39		37	

% is given in brackets.

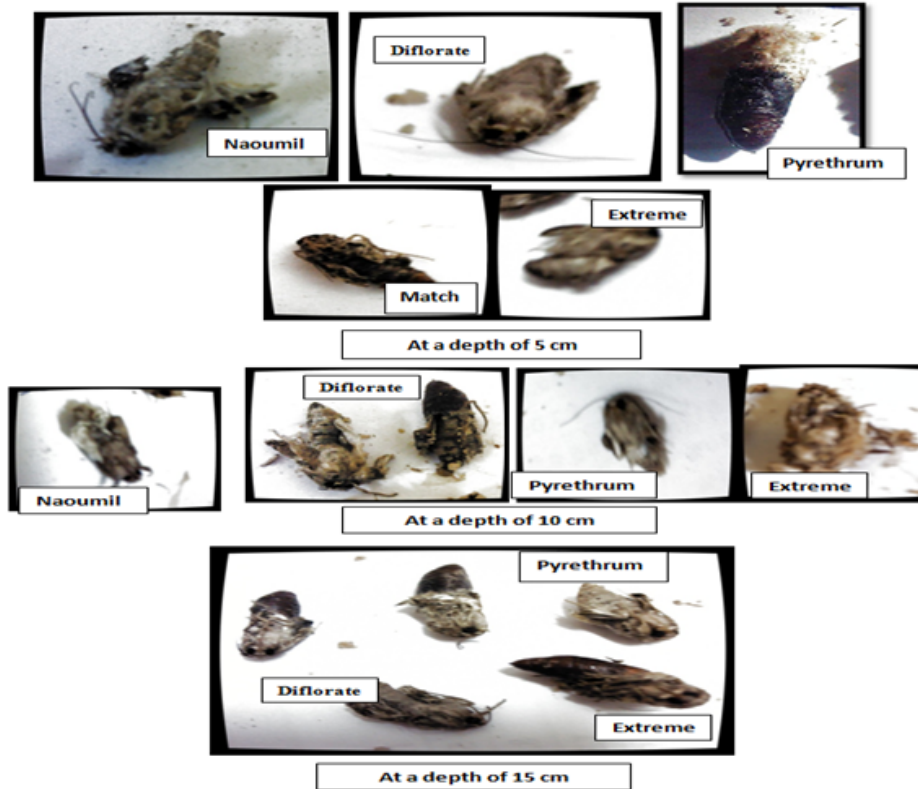


Fig. 1: Malformation in adults of *S. littoralis* emergence from newly formed pupae due to treatment.

As show in in Table (2) & Fig. (2) the percentages of malformed pupae resulted from treatment compounds and three depth and age 3 days .Obtained results indicated that: Match & Diflorate were 80%; while Pyrethrum exhibited 60% malformation; On the other hand, Extreme was 40% and Naoumil gave 37.5% respectively compared with control at depth of 5 cm.

At other depth of 10 cm, results indicated that: Naoumil & Match 75%; Extreme give 60%; Diflorate was 40% and Pyrethrum was 35% respectively compared with control.

While at depth of 15 cm, results indicated that: Match 100% ; while Diflorate 75%; Pyrethrum & Extreme 20% and Naoumil 17.5% respectively compared with control.

Table 2: Effect of some treatments and different degree on adults emergence on pupae with the age of 3 days of the cotton leaf worm, *Spodoptera littoralis* (Boisd.) under laboratory conditions.

Treatment	Rat/ 100L Water	No. of pupae Treatment	At a depth of 5 cm		At a depth of 10 cm		At a depth of 15 cm	
			No. of adults emergence from pupae treatment (%)	Malfor- Mation (%)	No. Of adults emergence from pupae treatment (%)	Malfor- Mation (%)	No. of adults emergence from pupae treatment (%)	Malfor- Mation (%)
Naoumil 90% SP (Methomyl)	150 gm	40	4.0 (10.0)	15.0 (37.5)	2.0 (5.0)	30.0 (75.0)	1.0 (2.5)	7.0 (17.5)
Diflorate 25%WP (Diflubenzuron)	70 gm	40	6.0 (15.0)	32.0 (80.0)	0.0 (0.0)	16.0 (40.0)	2.0 (5.0)	30.0 (75.0)
Pyrethrum5%EC (Pyrethrins)	150 gm	40	4.0 (10.0)	24.0 (60.0)	2.0 (5.0)	14.0 (35.0)	0.0 (0.0)	8.0 (20.0)
Extreme 36% Sc (Methoxyfenzide + Spinetoram)	62.5 ml	40	0.0 (0.0)	16.0 (40.0)	0.0 (0.0)	24.0 (60.0)	0.0 (0.0)	8.0 (20.0)
Match 5%EC (Lufenuron)	40 ml	40	3.0 (7.5)	32.0 (80.0)	1.0 (2.5)	30.0 (75.0)	0.0 (0.0)	40.0 (100.0)
Control		40	40		38		37	

% is given in brackets.

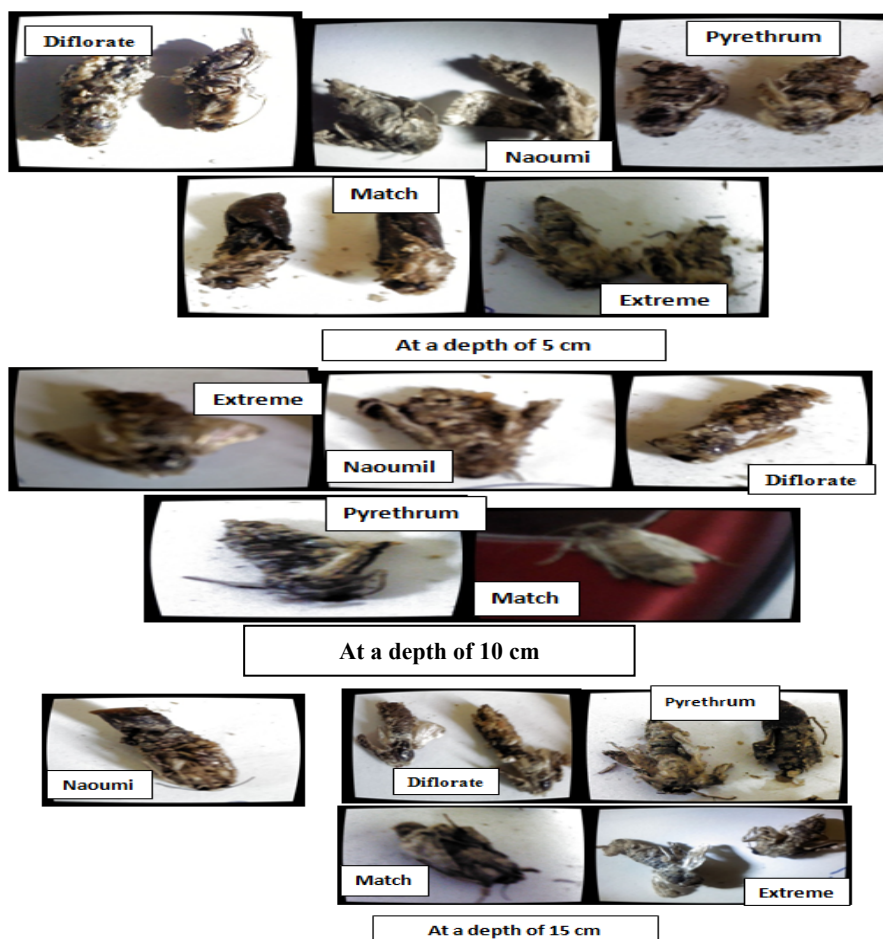


Fig. 2: Malformation in adult of *S. littoralis* emergence from pupae with the age of 3 days due to treatment.

The obtained data in Table (3) & Fig. (3) showed that the percentages of malformed pupae resulted from treatment compounds and three depth. Results indicated that: Naoumil 100%; Match 82.5%; Pyrethrum 80%; Diflorate 77.5% and Extreme 20% respectively, compared with control at depth of 5 cm.

Table 3: Effect of some treatments and different degree on adults emergence on pupa with the age of 6 days of the cotton leaf worm, *Spodoptera littoralis* (Boisd) under laboratory conditions.

Treatment	Rat/100L Water	No. of Pupae treatment	At a depth of 5 cm		At a depth of 10 cm		At a depth of 15 cm	
			No. of adults emergence from pupae treatment (%)	Malformation (%)	No. of adults emergence from pupae treatment (%)	Malformation (%)	No. of adults emergence from pupae treatment (%)	Malformation (%)
Naomil 90% SP (Methomyl)	150 gm	40	0.0 (0.0)	40 (100)	2.0 (5.0)	14 (35)	5.0 (12.5)	2.0 (5.0)
Diflorate 25% WP (Diflubenzuron)	70 gm	40	6.0 (15.0)	31.0 (77.5)	2.0 (5.0)	34.0 (85.0)	5.0 (12.5)	30.0 (75.0)
Pyrethrum 5% (Pyrethrins)	150 gm	40	3.0 (7.5)	32.0 (80.0)	2.0 (5.0)	30.0 (75)	0.0 (0.0)	30.0 (75)
Extreme 36% Sc (Methoxyfenzide + Spinetoram)	62.5 ml	40	0.0 (0.0)	8.0 (20.0)	0.0 (0.0)	2.0 (5.0)	0.0 (0.0)	8.0 (20.0)
Match5% EC (Lufenuron)	40 ml	40	1.0 (2.5)	33.0 (82.5)	1.0 (2.5)	24.0 (60.0)	2.0 (5.0)	40.0 (100)
Control		40	40		38		39	

% is given in brackets.

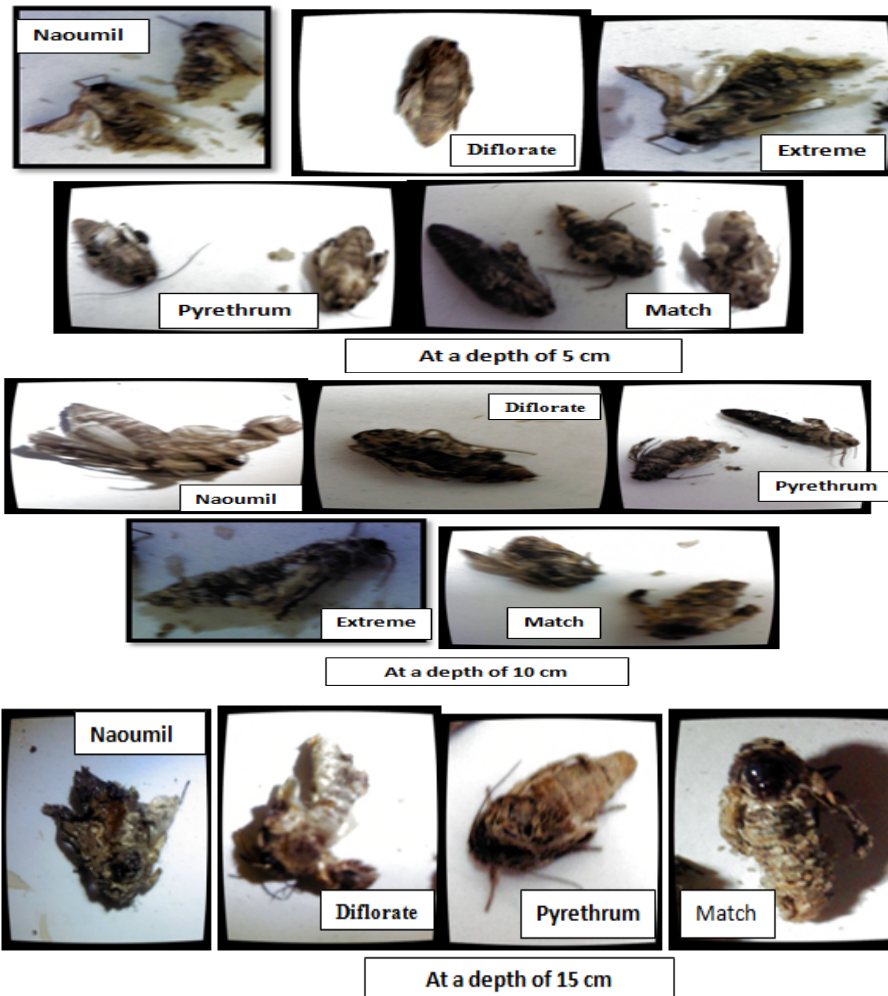


Fig. 3: Malformation in adult of *S. littoralis* emergence from pupae with the age of 6 days due to treatment.

While at depth of 10 cm, results indicated that : Diflorate 85%; Pyrethrum 75%; Match 60%; Naoumil 35% and Extreme 5% , respectively, compared with control.

At other depth of 15 cm, results indicated that: Match 100%; Pyrethrum & Diflorate were 75%; Extreme 20% and 5%, respectively, compared with control.

Data revealed the compounds on pupae of *Spodoptera littoralis* after newly formed with depth 5 cm with (Naoumil & Diflorate) and (Match & Pyrethrum) with depth 10cm and 15cm. These results were in agreement with Afifi (1990) and Ismail and Nader (2014).

The results indicated the tested compounds against pupae of *S. littoralis* after 3 day-old with depth 15 cm with Match agreement with Samuel *et al.* (2004), while data revealed the tested compounds against pupae of *S. littoralis* after 6 day-old with depth 5 cm with Naoumil and Match with depth 15cm agreement with Mandour *et al.* (2008) and Napis (2010).

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ARABIC SUMMERY

تأثير بعض المركبات على عذارى دودة ورق القطن مع بعض الأعماق والأعمار

مها صبرى الغنام وهشام صالح شعلان
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تأثير بعض المركبات (نيوميل 90%- ديفلوريت 25%- بايريرثرم 5%- اكستريم 36%- ماتش 5%) على عمر العذارى حديثة التكوين و عمر 3 و 6 يوم لعذارى دودة ورق القطن فى التربة (رملية طينية) المعاملة بهذه المركبات على عمق 5سم و10سم و15 سم فى المعمل على درجة حرارة 25 ± 1 و رطوبة 70 ± 5 % وأوضحت النتائج ان العذارى لدودة ورق القطن حديثة التكوين التى غمرت فى الرمل المعامل بالنيوميل والديفلوريت والماتش اعطت 100 % تشوه الفراشات الناتجة بعد 3 ايام من المعاملة. والبايريرثرم عند عمق 10 سم و15 سم اعطت النتائج 35 و20% نسبة تشوه للفراشات الناتجة بعد يوم من المعاملة وذلك بالنسبة للعذارى ذات عمر 3 يوم وكان الماتش على عمق 15 سم 100% بنسبة تشوه للفراشات الناتجة عند نفس العمر. وكذلك بالنسبة للعذارى ذات عمر 6 يوم على عمق 15 سم كان الماتش 100 % نسبة تشوه اما على عمق 5سم كان النيوميل 100 % نسبة تشوه بعد 3 ايام من المعاملة. وعموما نوصى باجراء عملية الري(الرية الكدابة) مع استخدام احد هذه المركبات مثل (ميثوميل والديفلوريت والماتش والبايريرثرم) قبل الزراعة وهذا له تأثير فى المكافحة المتكاملة لدودة ورق القطن.