Effect of Neemazal-T and Galangal Crude Extract on Growth and Development Third Larval of *Musca domestica* l.

Kelany, I. M., A. A. Shahien, A. M. A. Mohsen and Gamila SH. M. Selem
Plant Protection Dept., Fac. Agric., Zagazig Univ., Egypt.

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Abstract: Treated 3rd instar larvae of *M. domestica* with NeemAzal-T (5%) at rate of, 0.0 (control), 50, 100 and 150 ppm and with crude ethanol of extract Galangal at rate of: 0.0 (control), 1, 2 and 3 ml/L., added to medium of rearing larval or as topical application were studied. Obtained results concerning larvae fed for 24 hrs. only or as topically applied declared that larval mortality reached to: 16.25 and 60.00% and 60.00 and 35.0% at high Neem Azal-T and Galangal crude concentration, respectively. Minimum values of pupation reached 83.75, 35.00% & 40 and 65%; deformed pupae recorded 15.00, 6.25% & 6.25 and 15% while, reduction in emerged adult was 45.00, 20.00% & 23.75 and 50.00%. Maximum values of deformed adults reached its maximum: 45.00, 20.00% & 3.75 and 25%, respectively in case of NeemAzal formulation and Galangal crude extracts of larvae fed on treated standard rearing medium and larvae topically treated. Both larval mortality and percentage of pupation were found to be concentration- dependant and the tested NeemAzal formulation clearly showed more effect than Galangal extract on the third larval instar of *M. domestica* fly. Concerning of morphological abnormalities of resulted adults were observed for all tested concentrations of Neem-Azal T. 5% and ethanol crude extract of Galangal. The obtained results also show that both tested materials inhibited and caused various malformation of emerged adults or of various immature stages. The most of deformed pupae, pupal-adults intermediate and deformed adults were the most dominant malformation types (groups) resulted from the treated 3rd larval instar.

Keywords: NeemAzal, T5% Azedirachtin, Galangal crude Extract, *M. domesticea* fly, Morphogenitic abnormalities, Malformation.

INTRODUCTION

M. domestica, L. has medical and veterinary importance owing to its significant role in transmission of pathogen diseases to man and animals. The favorable climatic conditions which prevail almost all the year and all over Egypt caused this insect hygienepest, wide distribution, dominant and comprised the most abundant (85.8 %) dipterous flies (Kelany *et al.*, 1983).

Plant extracts offer a great potential for the development of new and more safe pesticides since they are often less toxic and unstable as compound to their synthetic counter paels. Such approach in looking forward for isolation and characterization could at least give us a renewed rationecl to deal with plant natural product chemistry and thus open new avenues for controlling insects, including diptera of medical and veterinary importance (Gayar and Shazly, 1968; Amonkar and Reevers, 1970, Banji *et al.* 1990, Thangam and Kathiresan 1991 and Kelany, 2004).

There are many problems a combined the use of chemical insecticides as resistance, environmental pollution, toxicity to man and other non target organisms and subsetting nature balance. All these required the investigation of a new line for controlling insect pests medical and veterinary importance (Morsy *et al.*, 1998).

A profile of *Azadirachta indica* A. Juss (Neem) is presented with particular reference to its utilization in pest control. The practical use of neem against pests which good control has been achieved (Naqui, 1987, Rovesti and Deseo, 1990, Kelany *et al.*, 1991, Naqui *et al.*, 1995, Tabassum *et al.*, 1996, Zuber *et al.*, 1997 and Kelany, 2004).

Extract of *Alpinia officnarum* (Galangal) is very active against number of different pest species under different environments and possess insecticidal activity against insect vectors or pests (Srivastava, 1997 and Miyazawa *et al.*, 2000).

The present work focused on the potency of a Neem formulation; NeemAzal-T (Azadirachin) 5% and an ethanol crude extract of Galangal on the 3rd instar larvae of *M. domestica* when the larvae fed on treated standard larval rearing medium or as topically applied at different concentrations of both tested materials. Morphic abnormalities of pupae and adults resulting from treated 3rd instar larvae of *M. domestica* were also studied.

MATERIALS AND METHODS

This investigation was carried out under laboratory conditions of plant protection, Fac. of Agric., Zagazig Univ., Egypt.

Source and rearing technique

The mass rearing in the laboratory was achieved by collecting batches of outdoor from their nutural breeding sites in manure and were reared for several generations in the laboratory at 28 + 2 ºC, 65 % RH + 5 % and 12 hrs. illumination. The rearing technique was adopted according to the standard technique described by Busvine (1962) and Kelany *et al.* (1991).

Formulation of Neem Azal- T (5% Azadirachtin)

This formulation was produced from neem seed kernels *(Azaddirachta indica,* A. Juss.) and kindly supplied by Trifolo- M GmbH, Germany.

Ethanol crude extract of Galangal

This crude extract was produced from rhizome of *(Alpinia)* classified and belong to *officnasum* introduced from topical zones of India as medicinal plant. The ethanol extract 70% was used and described by Saleh (1995).

Method of preparing Galangal crude extract

5 gm of air dried powder of plant rhizome were used/20 ml of ethanol. The suspension was shaked handly for 15 minutes in glass flasks. After shaking, the flasks were covered tightly with aluminum foils to prevent evaporation and kept under laboratory conditions for 24 hours. After this period each flask was shaked for 5 minutes and its suspension was filtrated through whatman filter paper (24cm in diameter). The obtained filtrates were put in brown glasses completely covered with screw covers and kept in refrigator for 24 hours. In the second day the solvents were evaporated by means of a rotary evaporator. The resulted residues were dissolved by 5 ml acetone and were quantitavily transferred to small glass vials as stock solutions which wee kept in refrigerator for bioassay experiments.

Laboratory studies

As mentioned above, this study was carried out under laboratory of plant protection Dept. Fac. Agric., Zagazig Univ. Studies were carried out as follows:

1. Effect of NeemAzal-T on the third larval instar

To study the effect of NeemAzal-T, two different techniques were carried out as follows:

The first technique

Twenty maggots of *M. domestica* (3rd instar) were confined in small plastic cups (7 cm. in diameter) containing 20 gm of the standard rearing larvae of house fly (i.e. 150 gm wheat bran, 50 gm powder milk, 3gm brewers yeast and 240 ml; water) in case of treatment water solution contains: 50, 100 and 150 ppm NeemAzal-T (5%). The cups were covered with their lids which were prepared to become permeable to air. The larvae were left for 24 hrs. with the treated (the experiment were replicated 4 times). Replicates of control were also prepared as previous mentioned but the water was without NeemAzal-T. After the considered period (24 hrs) treated larvae were transfered into other cups. Containing 20 gm of the larval diet without NeemAzal-T. Yet, the whole cups of the experiment were left in the laboratory until adult emergence. Mortality (%) of the treated and control larvae were calculated and subjected to observation for development until pupation. Furthermore, larvae, pupae and emerged adults were also under daily observations. Accordingly, all resulted pupae and adults were collected and cheeked, the abnormalities in different stages were also counted.

The second technique

Formulation of NeemAzal-T was applied topically on dorsal surface of 3rd instar larvae (5 larvae/ cup) with different concentrations (50, 100 and 150 ppm of NeemAzal-T 5%) at rate of 20µ liter / larvae using automatic micropipet, after application, larvae directly put in plastic cups provided with prepared larval medium. Untreated (control) larvae groups treated with 2µ liter / larvae of the solvent only (acetone) the tested treatments were distributed also in 4 replicates / treatment. Mortality (%) of treated and control were calculated, In addition, treated and control were also subjected periodically for developing until pupation. Larvae, pupae and adults emergence were also recorded. All obtained pupae and emerged were counted and checked for abnormalities (malformations).

Effect of Galangal (crude extract of *Alpinia officinarum*) on the 3rd larvae instar

Different concentrations of ethanol crude extract of *A. officinarum* were prepared at 1,2 and 3 ml /L and was applied to the prepared standard fed medium or when topically applied.

Statistical analysis

The obtained data were analyzed by using L.S.D. test (5%) according Fisher (1950) and the means were compared according Snedecor (1957).

RESULTS AND DISCUSSION

The obtained results of this study showed the effect of both Neem-Azal-T (5 %) and Galangal crude extracts on 3rd instar larvae of *M. domestica* fed on treated standard larval rearing medium for 24 hrs. only and also as topically applied on the same aged larvae.

Effect of oral and/or topical treatment of NeemAzal-T (5%) on 3rd larval instar of *M. domestica*

Oral treatment

Larval mortality, pupation and deformed pupae (%)

As shown in Table (1) percentage of larval mortality was increased gradually with the increasing of concentration of NeemAzal-T (5%). The obtained values were 0.0 (control) 7.5, 11.25 and 16.25% with concentrations of 0.0 (control), 50, 100 and 150 ppm, respectively and differences within studied treatments were statistically significant. These results are in agreement with those reported by Shoukry (1997). In addition, results reported by Kelany *et al.* (1991) on *M. domestica* fly support the obtained results, found that 3rd instar larvae of *M. domestica* fly were affected by aqueous Neem (*A. indica*, A. Juss, seed kernel extract) as percentages of larval deformation.

The obtained data also showed that percentage of pupation was decreased gradually (from: 100, 92.5, 88.75 and 83.75 in control (0.0), 50, 100 and 150 ppm, respectively). In other words, NeemAzal-T decreased the pupal percentage produced from treated larvae as the concentration of NeemAzal-T was increased. Statistical analysis of pupation % showed significant differences. These results are in agreement with those reported by Bidmon *et al.* (1986), working on blue fly *(Calliphova vicina)* and Kelany *et al.* (1991) working on *M. domestica* found that Azadirachtin is a component of neem delayed and caused deformation in pupation of larvae when the matures larvae were treated with high doses.

The percentage of deformed pupae was increase as the concentration of NeemAzal-T (5%) was increased i.e. concentration of 150 ppm caused 15% deformed pupae as compared with control treatment with significant differences among tested treatments (concentrations). Hussein (1995) mentioned that thevetiah (*Thevetia peruvine*) oil and clove (*Eugenia aromatic*) oil caused 28.0 and 20.5 % malformation in pupa of *Parasarcophaga aegyptiaca,* respectively.

Emerged and deformed adults (%)

Percentage of emergence adults significantly varied in response to Azadirachtin concentration (Table, 1). As such, adult emergence reached its minimum (45%) in concentration of 150 ppm, while it was of the maximum (72.5%) in 0.0 (control). The other tested concentration cited between the above mentioned values. Siddig (1980) found that when wheat grains was treated with powdered neem seeds for control *Trogoderma granarium*, the effect was increased as the dose of neem was increased. Also, Hussein (1995) found that treated *P. aegyptiaca* larvae gave a decreasing adult emergence (52 %) as compared with clove treatment (64 %). Control recorded high emergence percentage (98 %) in this experiment.

Deformed adult (%) significantly affected with concentration of NeemAzal-T co-existed. As such, the maximum values (26.25%) was obtained as the concentration was 150 ppm; while, the minimum value (16.25%) was found in 50 ppm concentration. Emerged adult flies showed different scores of deformities of the whole body parts and appendajes (Figs.: b: 3.4, C: 1,2,3a, 3b,4). All these deformities could be attributed to the interference Azadirachtin with the hormonal system of larvae and pupae. The obtained herein results are in accordance with those of Wilps (1989) who mentioned that aqueous and methenobic extracts of neem seed kernel (NSKE) reduced feed intake, shortened life span, egg deposition and caused a complete loss of flying ability when adults *Phormia terraenovae,* were fed with various concentrations of neem extract. Kelany *et al.* (1991) found a different grades (scores) of deformities in emerged flies of *M. domestica*. Furthermore, Hussein (1995) mentioned that, using plant extracts of Burnof, clove, filayaa, dill and the vethia resulting abnormalities in adult stage of *Parasarcophage aegyptiaca* when one day old third instar larvae were treated.

Table(1): Effect of NeemAzal-T formulation (5% Azadirachtin)* on 3rd instar larvae and resulting pupae and adults of *Musca domestica* fed on treated standard larval rearing medium and topical application.

NeemAzal-T concentration (ppm)	Oral fed on standard larval rearing medium					Topical application				
	Larval mortality (%)	Pupation (%)	Deformed pupae (%)	Emerged adult (%)	Emerged deformed adult (%)	Larval mortality (%)	Pupation (%)	Deformed pupae (%)	Emerged adult (%)	Emerged deformed adult (%)
Control (0.0)	0	100.00	0	72.5	1.25	0	100	0	90	5
50	7.50	92.50	7.5	57.5	16.25	10	90	10	50	5
100	11.25	88.75	10.0	52.5	18.75	10	90	20	45	10
150	16.25	83.75	15.0	45.0	26.25	60	35	20	20	15
L.S.D. 5%	1.289**	0.576**	1.153**	1.162**	1.853**	1.331**	1.761**	N.S	1.513**	N.S

* NeemAzal-T was kindly supplied by trifolio Gmbll Germany, (4 replicates each 20 larvae)

Topical application

Larvae mortality, pupation and deformed pupae (%)

As shown in Table (1) the larvae mortality (%) showed concentration-dependant with the mortality percentage which was increased as concentration of neemAzal-T (5%) was increased and reached its maximum (60.0%) at 150 ppm and significant differences for the other concentrations and larval mortality were found. Such results were reported by Rovesti and Deseo (1990). In addition, Zuber *et al.* (1997) also found that NeemAzal-T application inhibit egg-laying and larvae can hardly develop of *Musca domestica.*

The same Table (1) indicated that percentage of pupation reached to 35% as the concentration was 150 ppm, while it was 100% in untreated one (control), with significant differences between concentration and pupation percentage. Furthermore, pupation (%) was also showed a positive correlation with neem concentration. Results recorded by Tabassum *et al.* (1996) supported the obtained herein results, they found that methanolic extracts of neem (N-6a derived from sun - dried seed coat and N-6b from kernels) decreases pupation with the increase of doses when the 3rd instar larvae of *M. domestica* were treated topically with these compounds.

Recorded data also declare the positive correlation between deformed pupae (%) and NeemAzal-T (5%) concentration. Deformed pupae (resulted from treated 3rd instar larvae) reached to 20% (at 100 and 150 ppm NeemAzal-T 5%) while, it was 0.0% in control. Results of Naqvi *et al.* (1995) showed the same trends, found that treated larvae of *M. domestica* with Coopex 25 Fe and Neem extract N.7; both compounds caused morphogoentic effects on various stages and including abnormal development. Tabassum *et al.* (1996) reported that, by using two different neem extracts produced larvae, pupae and adult abnormalities of *M. domestica.*

Emerged and deformed adults (%)

Recorded data in (Table, 1) show that emerged adults percentage tended to decrease (a negative correlation) as the concentration of NeemAzal-T (5%) was increased with significant differences among tested concentrations and emerged adult percentage. Tabassum *et al.* (1996) found that using of 2 different methonolic neem extracts in *M. domestica* caused a decrements of emergence compiled with the increasing in doses. However, Abd El-Hamid, (1993) reported that percentage of emerged adults was decreased with increasing the doses of *Hyoscyamus muticus* as topically

applied to early and late of 3rd instar larvae of *M. domestica.*

The obtained data also show that percentage of deformed adults tended to increase (a positive correlation) as the concentration of NeemAzal-T (5%) was increased. Such effect showed insignificant variations between all tested concentrations. The obtained results are in accordance with those of Gaaboub and Haees (1984) they found that Azadirachtin act as inhibitor for molting of face fly *(Musca autumnalis).* Furthermore, Kismali and Madanlar (1988) reported that extracts of neem showed effect against over 50 species of insect pests of agricultural, medical or veterinary importance they added that Azadirachtin has toxic effect and inhibition or disruption of feeding, growth, development and reproduction or egg maturation. Also, Rovesti and Deseo (1990) mentioned that neem and its oil extracts and derivates are used to reduce adult fecundity and egg viability against numerous insect pests.

Effect of oral and/or topical treatment of ethanol crude extract of Galangal on 3rd instar larvae of *M. domestica*

Oral treatment

Laval mortality, pupation and deformed pupae (%)

Data recorded in Table (2) clear that Galangal extract application to medium tended to increased mortality (%) and the ratio was increased as the concentration was increased (positive correlation) the highest values (60.0%) was recorded with 3ml concentration, while, the lowest values (0.0%) were noticed with control (un-treated). Results, reported by Srivastava (1997) are similar with the obtained results found that treatment with Galangal *(Alipinia galanga)* 3% to nymphs of *Drosicha mangiferae* induced 100% mortality. Also, Miyazawa *et al.* (2000) found that extract of *Alipinia oxyphylla* possess insecticide activity against larvae of *Drosophila melanogaster*, Meigen.

In addition, the obtained results indicated that Galangal crude extract significantly decreased percentage of pupation and reached 40.0% as the concentration was 3 ml /L while, in the control reached 100%, other values occupied a position between the two above mentioned pupation percentages (0.0% and 100%). All these values showed significant differences.

Similar results were recorded by Chander and Ahmed (1987) found that powered berrios (at level 15%) and their ethyl acetate extracts of *Embelia ribes* (at level 30%) reduced pupation % of *M. domestica* when added to the larval medium.

Recorded data also show that percentage of deformed pupae gradually increased as the concentration of galangal crude extract was increased which was increased from 0.0 in control and 2.5, 5 and 6.25 % in 1,2 and 3 ml/L concentration, respectively and all data recorded here were significant. Recorded results of other workers confirmed our data as Alvarez *et al.* (1996) found that effect of a lection obtained from *Ricinus communis* on a population of *M. domestica* markedly reduced significantly the pupal development.

Table (2): Effect of ethanol crude extract of *Alpinia afficinarum* on 3rd instar larvae* of *Musca domestica* fed on treated standard rearing medium for 24hrs and topical application.

NeemAzal-T concentration (ppm)	Oral fed on standard larval rearing medium					Topical application				
	Larval mortality (%)	Pupation (%)	Deformed pupae (%)	Emerged adult (%)	Emerged deformed adult (%)	Larval mortality (%)	Pupation (%)	Deformed pupae (%)	Emerged adult (%)	Emerged deformed adult (%)
Control (0.0)	0	100.00	0	72.50	1.25	0	100	0	90	5
50	41.25	58.75	2.50	25.00	1.25	10	90	5	80	30
100	45.00	55.00	5.00	25.00	2.50	10	90	5	80	30
150	60.00	40.00	6.25	23.75	3.75	35	65	15	50	25
L.S.D.5%	0.998**	1.730**	1.104*	2.183*	N.S.	1.104*	N.S.	N.S.	N.S.	N.S.

* (4 replicates each 20 larvae)

Emerged and deformed adults (%):

Galangal crude extract significantly reduced adult emergence with increase concentration (negative correlation) and showed (concentration- dependant) i.e. high concentration (3ml/L) sharply (compared with those of untreated) decreased percentage of adult emergence (23.75%) while the other concentration showed no significant effect. Saleh (1984) found that essential oil of *Artemisia monosperma* have insecticidal activities against house fly *(M. domestica).*

The obtained data (Table 2) also show that percentage of deformed adults produced as a result of galangal crude extract on 3rd larval instar tended to increase as the concentration of Galangal was increased (a positive correlation). In other words concentration-dependant showed a significant differences among tested concentrations and control. In this concern, Horn (1971) reported that treated larvae or pupae of *M. domestica* with phytoecdysones which isolated from different plants caused abnormal growth and development.

Topical application:

Larval mortality, pupation and deformed pupae (%)

As shown in Table (2) percentage of larval mortality tended to increase as the concentration of galangal crude extract was increased. The highest value (35%) was recorded with 3ml/L and the lowest larval mortality (0.0%) was obtained by control ; while, the

other values sited between the above mentioned values with a significant variations among other tested concentrations. Results of many investigators (El-Naggar, 1979) working on mosquito and house fly; (Mesbah *et al.* 1985) on house fly (Pereira and Gurudutt, 1990) on house fly found that extract of *Cleredendrom inerm* leaves and caraway oil *(Carum carvi)* leaves have an insecticidal activity, toxic effect and inhibited the development of larvae. In addition, Morsy *et al.* (2001) found that different concentrations of *Calotropis procera* latex, topically applied to the 3rd instar larvae of *M. domestica* were lethal and the lowest concentration killed and partially digested the larvae within 3 hrs.

As for, pupation % was affected by the tested concentrations of galangal crude extract and pupation % significantly decreased as the concentration was increased (negative correlation). Generally, it could be said that pupation % desendingly decreased from 100% in 0.0 concentration (control) to 90, 90 and 65.0% as the concentration increased from 1,2 and 3ml/L, respectively. Statistical analysis showed significant differences between all tested concentrations used and control. Available literature in this concern is very vague.

In addition, percentage of deformed pupae slightly affected by Galangal crude extract at different concentrations. Statistically percentage of deformed pupae was insignificant in relation to tested concentrations. This may be due to the ability of the larvae to degraded the active material to found in Galangal crude extract as the concentrations were low (1,2,3 ml/L) and from this viewpoint, it could be test more concentration.

2. Emerged and deformed adults (%):

Table (2) also show that emerged adults % tended to decrease as the concentration was increased (concentration-dependant) where the high concentration caused 50% and the lowest one was found in control (90%). Other values sited in between 50 and 90% but without significant differences.

Results of Shalaby *et al.* (1998) came the same direction by using oils of lemon, grapefruit and Navel orange as insecticidal activity against larvae and adults of *Culex pipiens* and *M. domestica.*

Concerning deformed adults (%) Galangal crude extract increased the percent of deformed adults. Recorded percentages were 5% in 0.0 (control) against 30, 30 and 25% as the concentrations were 1,2, and 3ml/L, respectively without differences among the tested concentrations. In this conection Pereira and Gurudult (1990) reported that treated 1st and 3rd inster larvae of *M. domestica* with petroleum ether extract of *Clearodnderom merme* leaves inhibited adult emergence from pupae.

3. Abnormal deforms or malforms of pupae and adults:

Treated 3rd larval instar of *M. domestica* with NeemAzal-T (5%) and ethanol crude extract of Galangal produced some malformed (abnormalities) of pupae and adults. Yet, the abnormalities of papae and adults could be grouped into 3 major categories as follows:

Deformed pupue:

Deformed pupae produced after a standard of rearing larval medium was treated with NeemAzal-T (5%) and Galangal crude extracts, then offered to 3rd larval instars of *M. domestica* could be explained and classified according to external characters as follows:

i. Elongated pupae:

Fully formed pupae, normal in all characters but elongated than normal one (Fig. B1).

ii. Rod- like pupae:

This type of malformed pupae was the most prevalent morphologic aberration observed. This almost thin and twice as long as normal pupae (Fig. B2).

iii. C-Shaped pupe:

It could be noticed that the segmented puparia show abnormal ventral arches of segments and form aberrant C- shaped puparia (Fig. B3).

Pupal- adult intermediate:

This type of deformed individual posses the external character of pupae (covered with pupal exoskeleton), but has a distinct adult head and thorax. This intermediate individuals may be elongated, pigmented twisted as shown in Fig. (b:1, 2, 3 and 4).

Deformed adults:

Morphological abnormalities in adult stage were after fed 3rd larval instar of *M. domestica* on rearing medium treated with NeemAzal-T formulation (50% Azadirachtion) and Galangal extract. These deformations of resulted adult flies appeared in the following cases:

i. Un emerged adults:

Treated larvae (3rd larval instar) with neem or Galangal extracts by two worked methods produced completely from the normal dead pupae and remain sticked to the puparia until they seen die. Adult flies sticked with the pupal exuvia to different parts of their body as follows:

a) Head only emerged from the pupal exuviae (Fig. b,1).
b) Deformed head and part of thorax emerged (Fig. b2 and 3).
c) Partially eclosed adult with deformed thorax and poorly developed wings. The abdomen failed to exuviae (Fig. b-4).

ii. Adults succeed to get loose from the pupal exuviae:

These adults possessing different forms of deformation indicating abnormal eclosion as shown in the following cases:

1. Abnormal adult fly with severely curled wings (Fig. C-1).
2. Deformed adult fly with obvious enlarged thorax and crumpled wings, one wing was more curled (Fig. C-2).
3. Deformed adult fly severely curled wings (Fig. C-3a,b)
   (3-1) wings were less curled (Fig. C.3a).
   (3-2) wings were more curled (Fig. C.3b).
4. Adults of normal appearance but had broken wing (Fig. C. 4).

As for above mentioned observations concerning malformed pupae and adults produced from treated 3rd larval instar of *M. domestic,* the obtained results and observations were supported by results of many investigators, Horn (1971) found that treatment larvae or pupae of *M. domestica* with phytoecdysones which isolated from different plants caused abnormal growth and development. In the same direction, Rovesti and Deseo (1990) and Zuber *et al.* (1997) mentioned that neem and its oil extracts and derivaties (including the Azadirachtin) are used to reduce adult fecundity and egg viability against insect pests, and used as Antifedants, repllents, ovicides and growth regulators. In addition, Naqui *et al.* (1995) mentioned that when treated 3rd instar larvae of *M. domestica* with Copex 25 Fe and neem extract (N-7). Both compounds caused morphogenetic effects on various stages, including abnormal development. In addition, Tabassum *et al.* (1996) used 2 different methanolic neem extracts, produced abnormalities in larvae, pupae and adults.

A B.1 B.2 B.3

Normal pupa **Malformed pupa**

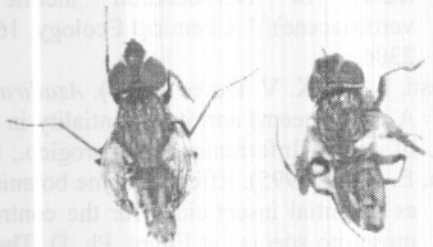
Fig. B.1- Elongate pupa, appeared almost like normal in character but longer than normal one.
Fig. B.2- Rod-like pupa, showed almost thin and twice as long as normal pupae.
Fig. B.3- C-Shaped pupa, the segmented. Puparia form aberrant C-Shaped.

b.1 b.2

Fig. b- Pupal- adult intermediate (incomplete adult exclusion).
Fig. b.1- Only head enclosed from the puparia.
Fig. b.2- Deformed head and part of thorax enclosed.

b.3 b.4

Fig. b.3- Deformed head and longer part of thorax enclosed.
Fig. b.4- Deformed head, thorax and part of abdomen enclosed.

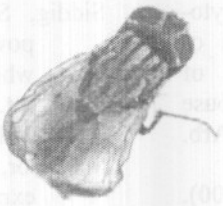


C.1

C.2

Fig. C- Deformed adult, adult completely free from pupal exuvia and has various deformities.
Fig. C.1- Deformed adult with severely curled wings.
Fig. C.2- Deformed fly with obvious enlarged thorax and crumpled wings, one wing was more curled.

C.3a



C.3b

C.4

Fig. C.3- Deformed adult with severely curled wings. (a- Wings were less curled, b- Wings were more curled.)
Fig. C.4- Adult of normal appearance but had broken wing.

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تأثير مستحضرات النيمازال-ت والمستخلص الخام للخلنجان على نمو وتطور العمر اليرقى الثالث للذبابة المنزلية *(M. domestica)*

إبراهيم محمد كيلانى- على عبدالحميد شاهين- عبدالعزيز محمود محسن-جميلة شحاته سليم
قسم وقاية النبات- كلية الزراعة- جامعة الزقازيق- مصر

أجريت هذه الدراسة لمعرفة تأثير كلاً من مستحضر النيمازال -ت (٥% ازاد يراختين) والمستخلص الإيثانولى للخلنجان كل على حدة على بعض النواحى البيولوجية للذبابة المنزلية وذلك على العمر اليرقى الثالث ، ولقد تم إختبار تأثيرهما بطريقتين الأولى بإضافة التركيز المستخدم (النيم: صفر كنترول، ٥٠، ١٠٠ ، ١٥٠ جزء فى المليون ، أما الخلنجان فاستخدم بتركيز (صفر كنترول، ١, ٢, ٣ مل لتر) إلى المادة القياسية لتربية يرقات الذبابة المنزلية (١٥٠جم من القمح + ٥٠ جم لبن بودرة + ٣ جم خميرة خبز جافة + ٢٤٠ سم٣ ماء) ، وفى الطريقة الثانية تم استخدام المعاملة الموضحة Topical application على حلقات الصدر بمعدل ٢٠ ميكروليتر لكل يرقة وذلك للطور اليرقى الثالث بالتركيزات السالفة الذكر.

ولقد أوضحت النتائج المتحصل عليها مايلى:

بلغت نسبة الموت اليرقى ١٦,٢٥ ، ٦٠% ، ٦٠ ، ٣٥% وكانت أقل قيم لنسبة التعذر هى ٨٣,٧٥% ، ٣٥% ، ٤٠، ٦٥% ، كما كانت نسبة العذارى المشوهة ١٥، ٦,٢٥% ، ٦,٢٥، ١٥% ، كما بلغ النقص فى نسبة خروج الحشرات الكاملة إلى ٤٥، ٢٠% ، ٢٣,٧٥ ، ٥٠% كما بلغ الحد الأقصى لقيم الحشرات الكاملة المشوة على ٤٥، ٢٠٠% ، ٣,٧٥، ٢٥% وذلك على التوالى فى مستخلص النيم الخلنجان لليرقات التى تتغذى على المادة القياسية لتربية يرقات الذبابة المنزلية والمعاملة الموضعية ليرقات الذباب.

كما أوضحت النتائج المتحصل عليها أن نسبة الموت اليرقى ونسبة التعذر (%) ذات علاقة موجبة بالتركيز فى كلاً من المستخلصين ، وكذلك أوضحت هذه النتائج أن مستخلص النيم أكثر تأثيراً (سمية) من مستخلص الخلنجان على الذبابة المنزلية وذلك فى التركيزات المختلفة.

فيما يتعلق بالتشوهات Malformations المورفولوجية ، فقد تم حصرها وذلك فى اطوار العذارى والحشرات الكاملة المعاملة والتى عومل فيها الطور اليرقى بالمستخلصين (النيم والخلنجان) وسبب ذلك حدوث العديد من التشوهات فى العذارى والحشرات الكاملة الناتجة خاصة فى التركيزات المرتفعة، وأمكن حصر هذه الأطوار المشوهة ووضعها فى ثلاث مجاميع تقسيمية تعتمد على الشكل الظاهرى للطور كما يلى (أ) عذارى مشوهة (ب) أطوار وسطية بين الحشرة الكاملة والعذراء (ج) حشرات مشوهة كاملة التطور.