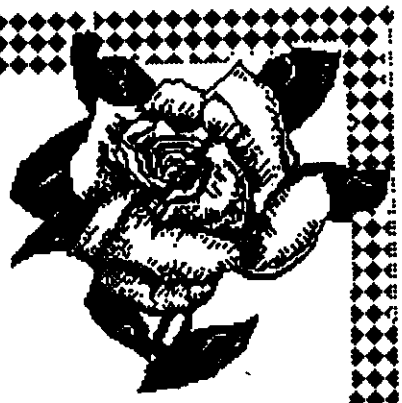
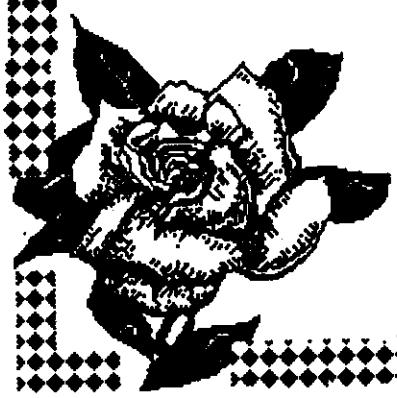


RESULTS



IV - EXPERIMENTAL RESULTS

A- TOXICOLOGICAL STUDIES

a - EFFECT OF *HYOSCYAMUS MUTICUS* EXTRACTS ON SOME DEVELOPMENTAL STAGES OF *MUSCA DOMESTICA*

Different doses (20,40,60,80 and 100 µg/insect) of water and alcoholic extracts of *Hyoscyamus muticus* were topically applied to early 3rd , late 3rd larval instars and adult stage of *Musca domestica.*

1- Effect of water extract of *H. muticus on early* 3rd larval instar:-

The effect of water extract of *H. muticus* on the biological activity of the early 3 rd larval instar of *Musca domestica* was illustrated in table (2).

The water extract of *H. muticus* causes considerably high percentage of larval mortality after 24, 48 and 72 hours of application compared with controls. Total larval mortality was found to be time and dosage-dependant. It increases with the increase of time and dose to reach a maximum value of 81.33% at dose of 100 µg/larvae after 72 hours (Figure 5).

Results ☞

Pupal mortality was also dosage-dependant, it increases with the increase of dose. It reached 17.33% with the highest dose (100 µg/larvae) compared with 1.33% in control (Figure 5). It is also clear from table (2) that a relatively small ratio of deformed pupae was occured as a result of application of this extract. There was no relationship between the increasing in dose and the percent of deformed pupae. No adults were emerged from malformed pupae and no malformed pupae were found in control.

Mean larval duration of the treated larvae was found to be dosage-dependant. It decreases with the increase of dose to reach 3.18 days at the highest dose compared with that in control groups which was 3.66 days (Figure 5). This means that the extract affected the development of the early 3 rd larval instar by shortning their larval duration. The decrease in mean larval duration was statistically analyzed and it was found to be nonsignificant at doses of 20 and 40µg /larvae, highly significant at doses of 60 and 80 µg/larvae and was of very high significance at the highest dose (100 µg/larvae). From the above results it is obvious that water extract of *H. muticus* somehow accelerates the development of the early 3 rd larval instar.

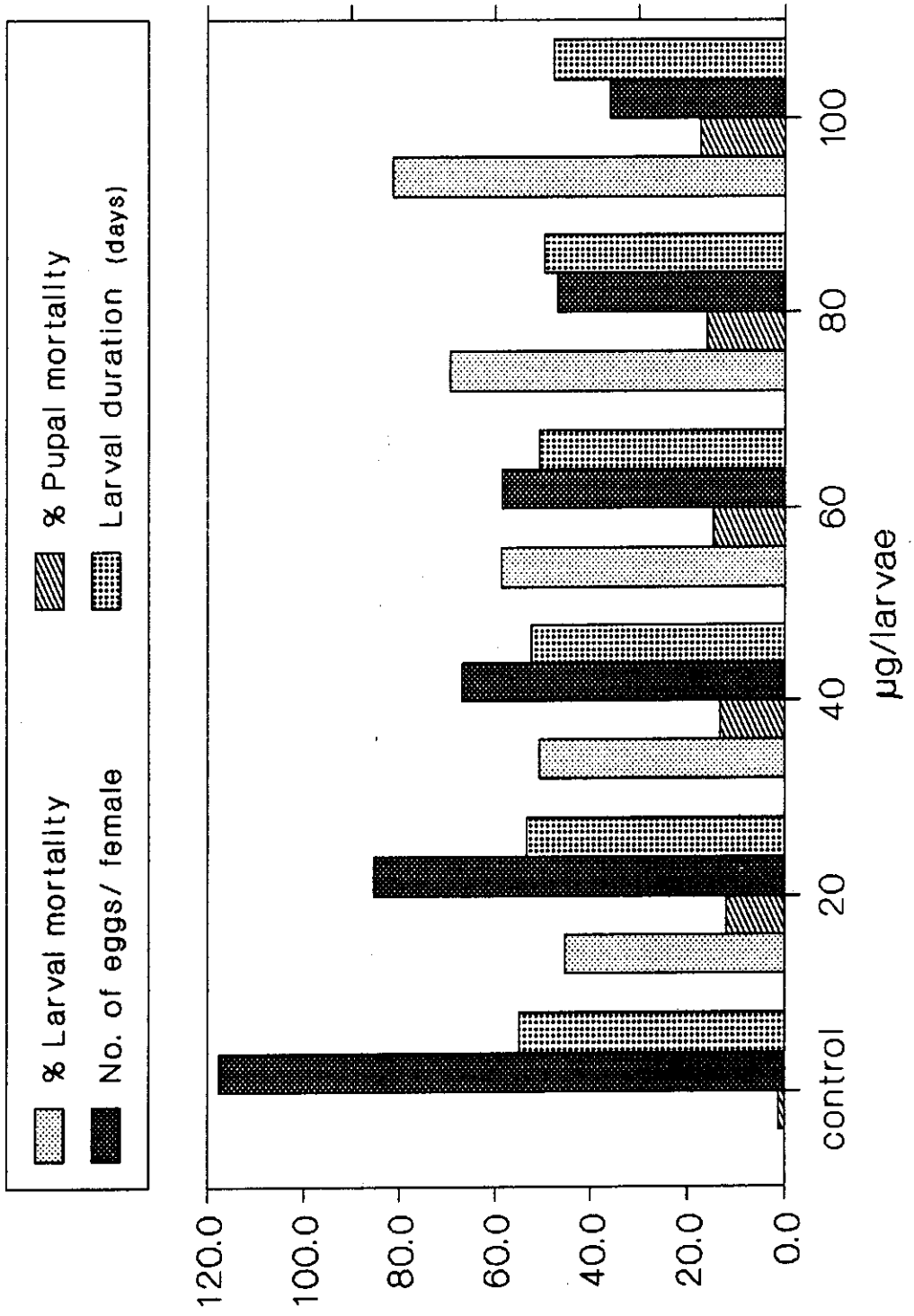
On the other hand, the extract had no significant effect on the mean pupal duration. It somewhat decreased than controls, but with nonsignificantvalues.

Table (2) : Effect of water extract of *Hyoscyamus muticus* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	29.33	32.00	34.66	46.66	56.00
% Corrected larval mortality after 48h.	0.00	42.67	46.66	52.00	61.33	73.33
% Corrected larval mortality after 72h.	0.00	45.33	50.66	58.66	69.33	81.33
% pupal mortality	1.33	12.00	13.33	14.66	16.00	17.33
% Deformed pupae	0.00	10.66	12.00	10.66	10.66	12.00
Larval duration in days ± S.E.	3.66 ± 0.05	3.56 ± 0.07	3.49 ± 0.07	3.38 ± 0.07**	3.31 ± 0.09**	3.18 ± 0.01***
Pupal duration in days ± S.E.	4.30 ± 0.04	4.23 ± 0.10	4.22 ± 0.08	4.18 ± 0.25	4.06 ± 0.20	3.99 ± 0.27
% Adult emergence	98.66	42.66	36.00	26.66	14.66	1.33
% Deformed adults	0.00	5.33	4.00	2.66	4.00	0.00
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	85.32 ± 0.20***	66.83 ± 0.50***	58.50 ± 0.24***	46.90 ± 0.20***	36.02 ± 0.24***

Without star : nonsignificant * : significant ** : highly significant *** : very highly singificant

Figure (5): Effect of water extract of *Hyoscyamus muticus* on the development of early 3rd larval instar of *Musca domestica* .



It is obvious from table (2) that the percent of adult emergence in case of treated larvae was found to be dosage-related. It decreases with the increase in dose to reach a very low percent (1.33%) at the highest dose (100µg/larvae) compared with untreated counterparts which was 98.66% . The extract has a low effect in producing deformed adults. The survival of deformed adults was extremely short and does not exceed 24 hours.

The normal adults emerged in the case of treated larvae were checked for their reproductive capability. The extract had no effect on mating. Files were observed to mate after 2 days of eclosion. On the other hand, the extract had a very highly significant effect on reducing the number of eggs laid per female (Fecundity) at all doses used. As shown in table (2) and figure (5), the reduction in fecundity appeared to be dosage-dependant. It decreases with the increase of dose. It reached 36.02 eggs per female at a dose of 100 µg/larvae compred with controls which was 117.61 eggs per female. The extract had no marked effect on the hatchability of these eggs.

2 - Effect of alcoholic extract of *H. muticus* on early 3 rd larval instar :-

The alcoholic extract of *H. muticus* was topically applied on the dorsal surface (form the head to the end of the abdomen) of early 3 rd larval instar.

Results obtained from exposure of early 3rd larval instar of *M. domestica* to different doses of alcoholic extract of *H. muticus*, are presented in table 3 and graphically illustrated in figure (6).

The percentage of corrected larval mortality recorded 72 hours after application was in striking pattern of dosage-dependant mortality. It was consistently higher at the higher doses applied. It reached 77.14% at the highest dose (100 µg/larvae).

Pupal mortality was also dosage-dependant . It increases with the increase of dose to reach 17.33% at the highest dose. It is clear from table (3) that a relatively small ratio of deformed pupae was occured at the higher doses only (60,80,and 100 µg/Larvae). Its percent was not dosage-dependant. Failure of adult emergence from the deformed pupae was occurred.

Data revealed that, alcoholic extract of *H. muticus* some how accelerates the develpment of early 3 rd larval instar by shortning their larval duration. Mean larval duration of the treated larvae was dosage-related. It decreases with the increase of dose. It reached 2.87 days at the highest dose (100 µg/larvae) compared with untreated counterparts which was 3.5 days (Figure 6), This decrease was nonsignificant at a dose of 20 µg/larvae, significant at a dose of 40 µg/larvae, highly singnifcant at a dose of 60 µg/larvae while it was very highly significant at doses of 80 and 100 µg/larvae.

Results ☞

On the other hand, mean pupal duration was found to be not significantly affected by the alcoholic extract. It somewhat decreases than control but with nonsignificantvalues.

It is obvious form table (3) that, there are a direct relationship between increasing in dose applied and decreasing in the percentage of adult emergence. It reached a very low percent of 4% after application of the highest dose (100µg/larvae). The percentage of deformed adults was relatively low and not dosage-dependant. Deformed adults were not survived.

Very highly significant differences were found between the number of eggs laid by female treated as early 3rd larval instar and those of controls.

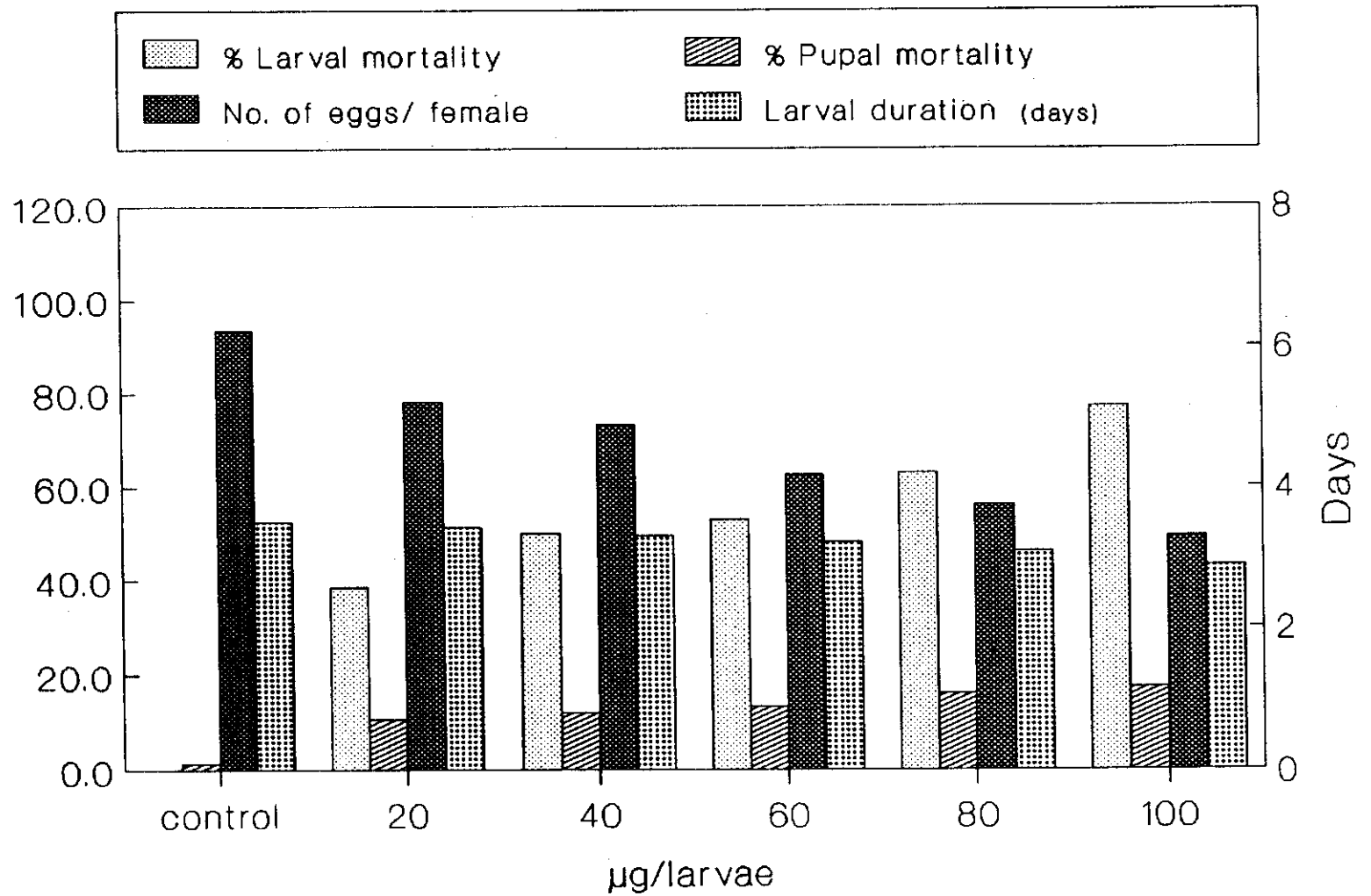
The control groups laying twice as many eggs as flies treated as larvae with the highest dose (100 µg/larvae). As shown in table (3) and figure (6), the reduction in fecundity appeared to be dosage-dependant. It decreases with the increase of dose to reach 49.31 eggs at the highest dose (100µg/larvae) compared with controls which was 93.6 eggs per female. This means that, the alcoholic extract of *H.muticus* affects the fecundity of normal emerged adults, but does not affect the mating behaviour of these flies and the hatchability of their eggs.

Table (3) : Effect of alcoholic extract of *Hyoscyamus muticus* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	28.57	37.14	37.14	45.71	64.28
% Correcrted larval mortality after 48h.	0.00	38.57	47.50	52.85	57.13	77.14
% Corrected larval mortality after 72h.	0.00	38.57	49.99	52.85	62.85	77.14
% pupal mortality	1.33	10.66	12.00	13.33	16.00	17.33
% Deformed pupae	0.00	0.00	0.00	5.33	1.33	2.66
Larval duration in days ± S.E.	3.50 ± 0.05	3.42 ± 0.13	3.30 ± 0.13*	3.21 ± 0.10**	3.08 ± 0.10***	2.87 ± 0.12***
Pupal duration in days ± S.E.	4.47 ± 0.01	4.44 ± 0.08	4.42 ± 0.08	4.41 ± 0.08	4.41 ± 0.07	4.41 ± 0.10
% Adult emergence	92.00	46.66	34.66	21.33	14.66	4.00
% Deformed adults	0.00	0.00	0.00	5.33	2.66	1.33
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.27	78.17 ± 0.26***	73.18 ± 0.10***	62.40 ± 0.10***	56.02 ± 0.10***	49.31 ± 0.06***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (6): Effect of alcoholic extract of *Hyoscyamus muticus* on the development of early 3 rd larval instar of *Musca domestica* .



Results obtained suggested that both water and alcoholic extracts of *H.muticus* proved to be highly effective against early 3rd larval instar and the greater part of mortality was noticed in the larval stages.

3-Effect of water extract of *H.muticus* on late 3rd larval instar:-

The water extract of *H.muticus* was topically applied on the dorsal surface of late 3rd larval instar (4 days old) with different doses of 20,40,60,80 and 100 µg/larvae.

Table (4) summarizes the effect of water extract of *H.muticus* on the biological activity of late 3rd larval instar of *M. domestica* .

The percentage of larval mortality varied according to doses applied. It increases with the increase of dose and the period following the treatment. It reached a maximum value of 18.67% at the highest dose (100 µg/larvae) . It is clear that late 3rd larval instar was slightly affected by this extract.

Data revealed that the bulk of mortality was found during the pupal stage. Its percent was dosage-dependant. It increases with the increase of dose to reach 20% at a dose of 100 µg/larvae (Figure 7).

The degree of abnormalities produced as a result of application of this extract was not dosage-dependant (table 4). Complete inhibition of adult emergence from these abnormal pupae was noticed.

Time required to complete larval development after alcoholic extract application was in striking pattern of duration dosage-dependant. It decreases from 2.47days at control to reach its minimum value of 1.74 day after treatement by the highest dose (100µg/larvae) (Figure 7). This means that the extract accelerates the development of late 3rd larval instar by shortning their larval duration. Statistical analysis of the data revealed that this decrease was singnificant at doses of 20,40 and 60 µg/larvae, highly significant at a dose of 80 µg/larvae and of very high significance at a dose of 100 µg/larvae.

On the other hand, the mean pupal duration in the treated larvae was found to be not affected by the extract. It somewhat decreases than controls but with nonsignificant values.

It is obvious from table (4) that, the percentage of adult emergence in the case of treated larvae was increased with the increase of dose. It was 56% at the highest dose (100 µg/larvae) compared with controls which was 98.66%. The percentage of abnormal adults produced as a result of application of the extract was greater than that produced by the application of the same extract on early 3rd larval instar. All deformed adults survived for a very short time (24 hours after emergence).

Treatement with the extract had no effect on mating behaviour of normal emerged flies developing from larval treatment. These flies

Table (4) : Effect of water extract of *Hyoscyamus muticus* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	4.00	6.66	8.00	9.33	13.33
% Corrected larval mortality after 48h.	0.00	6.66	9.33	10.66	14.66	18.67
% pupal mortality	1.33	12.00	17.33	20.00	22.66	25.33
% Deformed pupae	0.00	12.00	9.33	12.00	5.33	5.33
Larval duration in days ± S.E.	2.47 ± 0.05	2.04 ± 0.10*	1.97 ± 0.12*	1.86 ± 0.13*	1.81 ± 0.11**	1.74 ± 0.11***
Pupal duration in days ± S.E.	4.50 ± 0.05	4.49 ± 0.05	4.49 ± 0.06	4.40 ± 0.06	4.40 ± 0.06	4.40 ± 0.07
% Adult emergence	98.66	81.33	73.33	69.33	62.66	56.00
% Deformed adults	0.00	17.33	14.66	13.33	14.66	13.33
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	97.68 ± 0.26***	87.61 ± 0.24***	72.76 ± 0.03***	60.18 ± 0.08***	36.30 ± 0.27***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

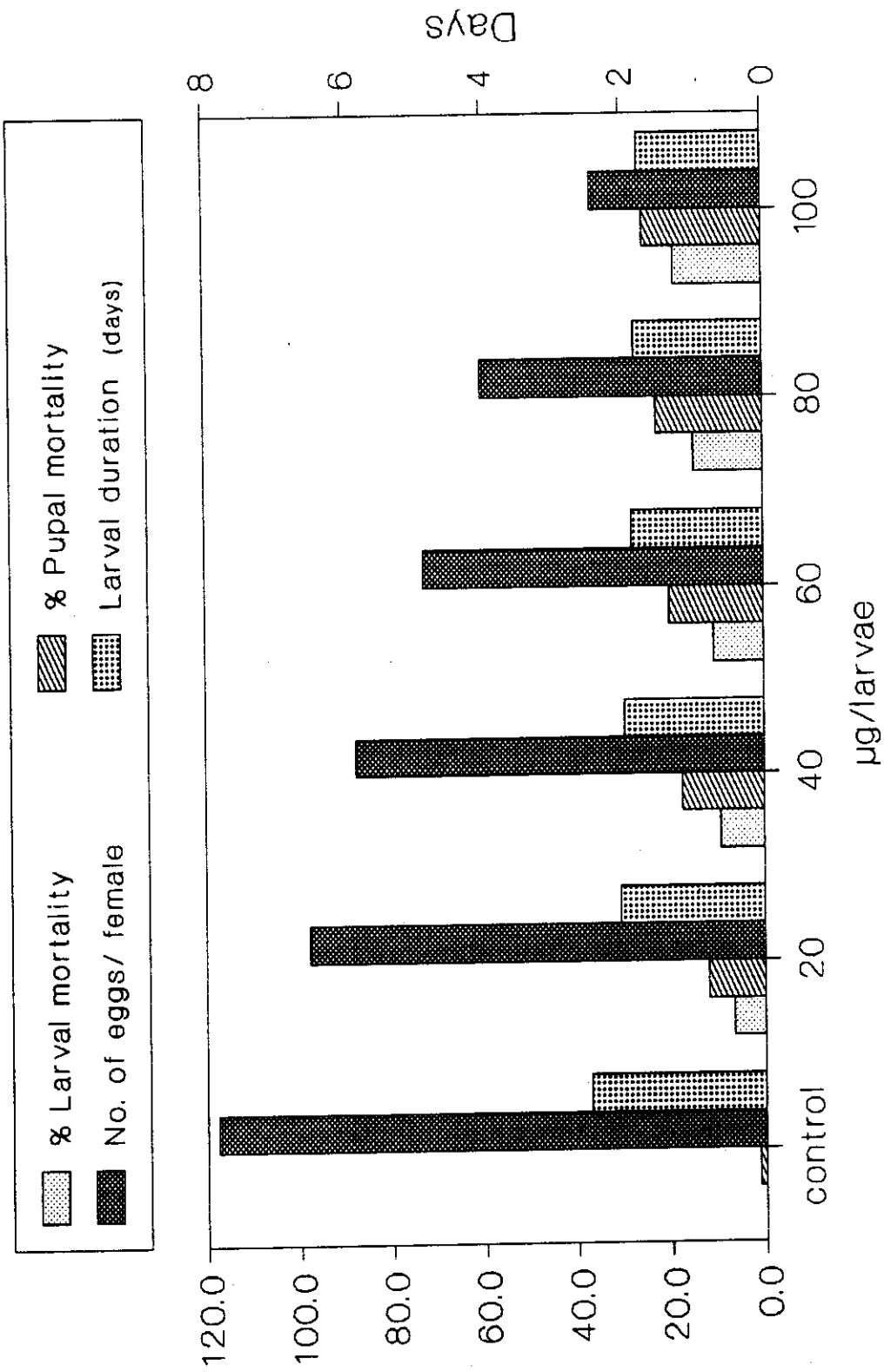


Figure (7): Effect of water extract of *Hyoscyamus muticus* on the development of late 3rd larval instar of *Musca domestica* .

were observed to mate as early 2 days after eclosion. On the other hand, treatment with the extract had a very highly significant effect on reducing the number of eggs laid per female (Fecundity) at all doses used. Data in table (4) and figure (7) revealed a striking pattern of fecundity dosage-dependant. It decreases with the increase of dose to reach 36.3 eggs per female compared with 117.61 eggs per female for controls. The extract had no marked effect on the hatchability of these eggs.

4- Effect of alcoholic extract of *H. muticus* on late 3rd larval instar:-

The alcoholic extract of *H. muticus* was topically applied with different doses (20,40,60, 80 and 100 µg/larvae) on the dorsal surface of late 3rd larval instar.

Results obtained from treatment of late 3rd larval instar with a series of doses of alcoholic extract of *H. muticus* are presented in table (5) and shown graphically in figure (8).

The alcoholic extract of *H.muticus* causes a low percent of larval mortality after 48 hours of application. Our results clearly show that, there was a direct relationship between the increasing in dose applied and magnitude of larval mortality. It reached 9.33% at the highest dose (100 µg/larvae) (Figure 8). This indicates that the late 3rd larval instar was slightly affected by this extract.

As a matter of fact, pupal mortality was also dosage-dependant. It increases with the increase of dose. It reached 22.66% at the highest dose (100 µg/larvae) (Figure 8). The degree of abnormalities produced as a result of application of this extract was not dosage-dependant. Failure of adult emergence from these deformed pupae was occurred.

Treatment with this extract accelerates the development of late 3rd larval instar by shortning their larval duration. This shortage was dosage-dependant. It decreases from 2.49 days in control to reach 1.91 day after treatment with the highest dose (100 µg/larvae).

This decrease in larval duration was nonsignificantat doses of 20 and 40 µg/larvae and very highly singnificant at doses of 60, 80 and 100 µg/larvae .

On the other hand, the extract had no significant effect on the mean pupal duration. It somewhat decreases than controls but with nonsignificant values (Table 5).

Adult emergence percent in the case of treated late 3rd larval instar was found to be dosage-related i.e, higher doses excert more inhibition of adult emergence. It was 62.66% at the highest dose (100 µg/larvae) compared with controls which was 98.66%. The percentage of abnormal adults, which produced as a result of treatment with this extract, is greater than that produced from application of the same

extract on early 3rd larval instar. This percent was not dosage-dependant (Table 5). Deformed adults were not survived more than 24 hours after emergence.

The extract had a very highly significant effect on reducing the fecundity of the female which resulting from treated late 3rd larval instar. This reduction was dosage-dependant. It decreases by the increase of dose to reach 30.23 eggs per female at the highest dose compared with controls which was 93.6 eggs per female. Daily observation revealed that the extract had no marked effect on the mating behaviour of these flies, and had no effect on the hatchability of their eggs.

From the above results it is clear that all doses of water and alcoholic extracts of *H. muticus* , when applied against late 3 rd larval instar, cause higher pupal mortality than larval mortality.

5- Effect of *H. muticus* extract on the biological aspects of adult stage :-

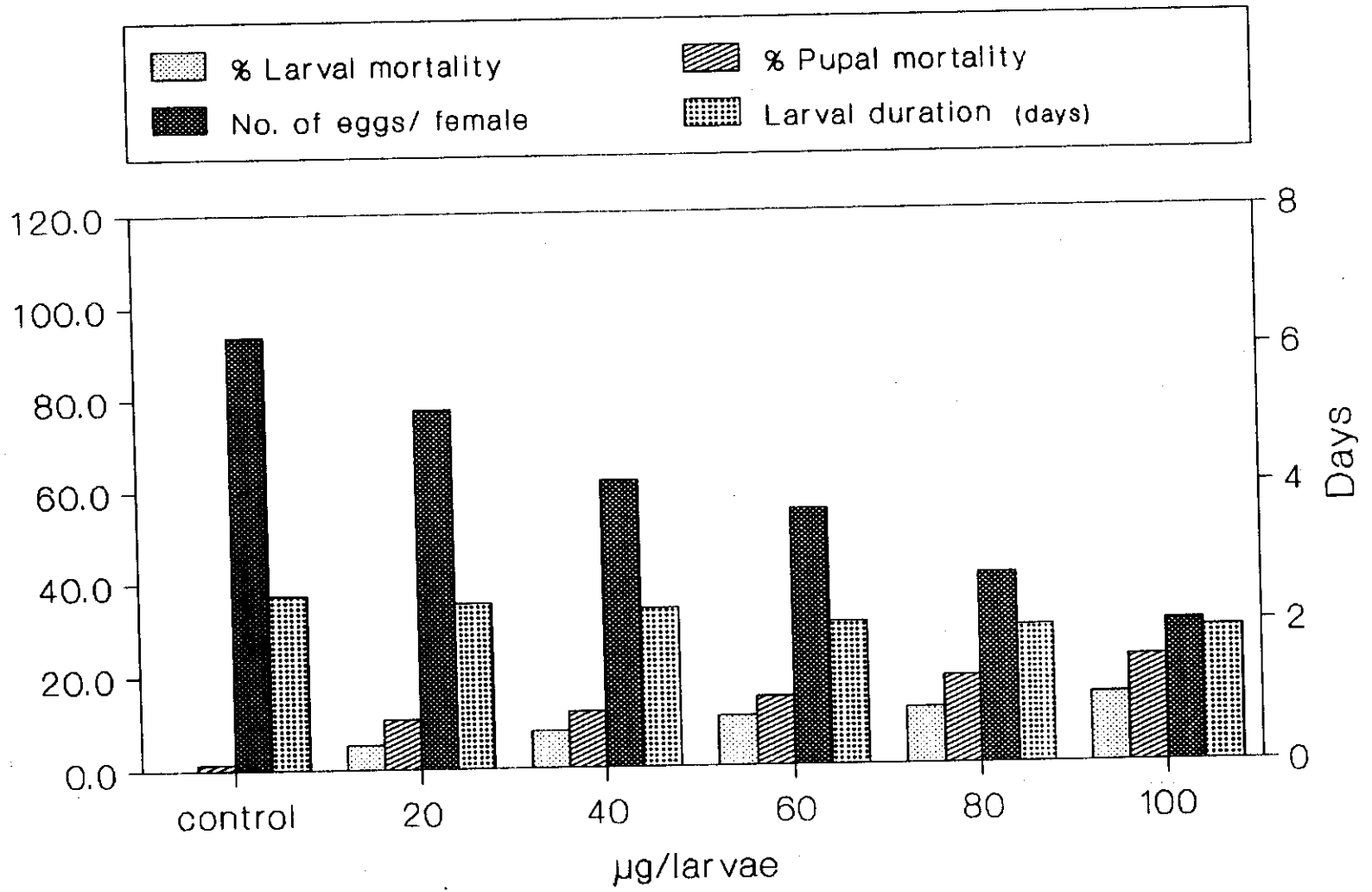
Only water extract was topically applied on the newly emerged adult stage of *M.domestica* , on the abdominal sternites, with different doses of 20,40,60,80 and 100 µg/larvae. Table (6) illutstrated the Effect of water extract of *H.muticus* on the biological activity of the adult stage of *M.domestica* .

Table (5) : Effect of alcoholic extract of *Hyoscyamus muticus* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	4.00	5.33	6.66	8.00	9.33
% Corrected larval mortality after 48h.	0.00	5.33	8.00	10.66	12.00	14.66
% pupal mortality	1.33	10.66	12.00	14.66	18.66	22.66
% Deformed pupae	0.00	12.00	12.00	10.66	6.66	4.00
Larval duration in days ± S.E.	2.49 ± 0.05	2.36 ± 0.10	2.26 ± 0.13	$2.03 \pm 0.04^{***}$	$1.95 \pm 0.04^{***}$	$1.91 \pm 0.10^{***}$
Pupal duration in days ± S.E.	4.28 ± 0.06	4.28 ± 0.06	4.27 ± 0.07	4.27 ± 0.06	4.21 ± 0.06	4.15 ± 0.04
% Adult emergence	98.66	84.00	80.00	74.66	70.66	62.66
% Deformed adults	0.00	17.33	16.00	17.33	13.33	12.00
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.07	$77.35 \pm 0.10^{***}$	$61.71 \pm 0.03^{***}$	$55.00 \pm 0.47^{***}$	$40.60 \pm 0.09^{***}$	$30.23 \pm 0.09^{***}$

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (8): Effect of alcoholic extract of *Hyoscyamus muticus* on the development of late 3 rd larval instar of *Musca domestica* .



reduction in fecundity appeared dependant at all doses applied. It reached 39.14 eggs at a dose of 100 µg/insect compared with untreated counterparts which was 117.6 eggs per female. The extract had no effect on the hatchability of these eggs.

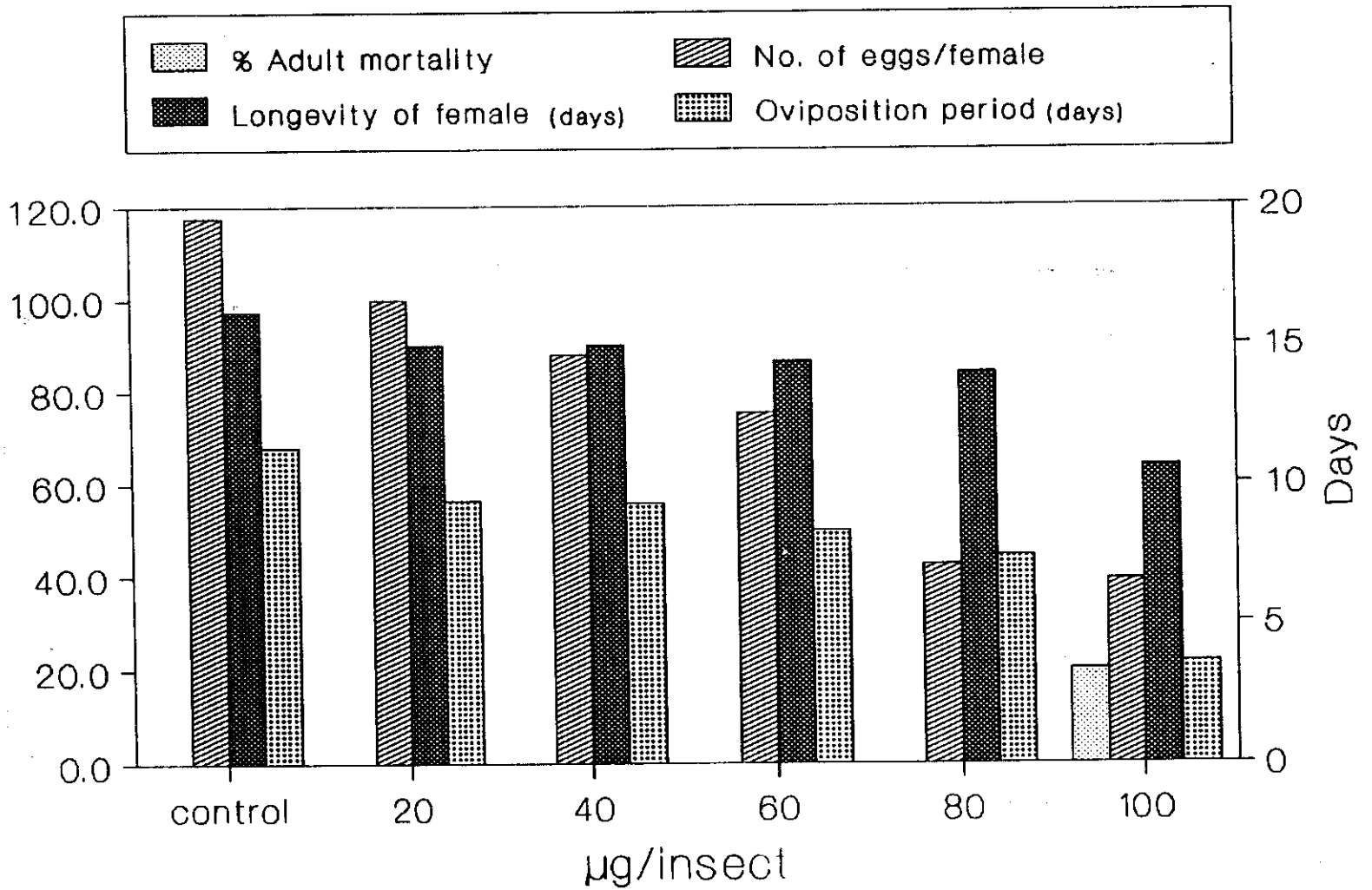
In conclusion, it is clear that both water and alcoholic exctracts of *H. muticus* were more effective on early 3rd larval instar than on late 3rd larval instar of *M.domestica* . The effect of the extract on the adult stage was relatively low. From all the above mentioned results, it is clear that early 3rd larval instar of *M. domestica* was the most susceptible stage for the extracts of *H. muticus*. Adult emergence percent was 1.33% and 4% in the case of treatment of early 3 rd larval instar with water and alcoholic extract by the highest dose, while it was 56% and 62.66% in the case of treatment of late 3rd larval instar with the above mentioned extracts, respectively.

Table (6) : Effect of water extract of *Hyoscyamus muticus* on some biological aspects of adult stage of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected adult mortality after 4 days	0.00	0.00	0.00	0.00	0.00	20.00
Longevity of male in days ± S.E.	15.80 ± 0.75	15.80 ± 0.91	15.60 ± 0.87	15.60 ± 1.37	14.20 ± 0.94	12.40 ± 1.29*
Longevity of female in days ± S.E.	16.20 ± 0.78	15.00 ± 0.75	15.00 ± 0.75	14.40 ± 0.93	14.00 ± 0.61	10.60 ± 0.44*
Pre-oviposition period in days ± S.E.	4.00 ± 0.27	5.00 ± 0.27*	5.00 ± 0.27*	6.00 ± 0.47*	6.00 ± 0.47*	7.00 ± 0.47**
Oviposition period in days ± S.E.	11.30 ± 0.47	9.40 ± 0.47*	9.30 ± 0.47*	8.30 ± 0.27**	7.40 ± 0.47***	3.60 ± 0.27***
Post - oviposition period in days ± S.E.	1.00 ± 0.27	1.00 ± 0.27	1.00 ± 0.20	1.00 ± 0.27	1.00 ± 0.47	1.00 ± 0.27
No.of ovipositional times	7.00 ± 0.27	6.00 ± 0.29*	6.00 ± 0.27*	5.00 ± 0.20**	4.00 ± 0.27***	4.00 ± 0.28***
Mean No. of eggs laid per female	117.60 ± 0.11	99.80 ± 0.12***	87.90 ± 0.09***	75.11 ± 0.35***	42.51 ± 0.47***	39.14 ± 0.35***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (9): Effect of water extract of *Hyoscyamus muticus* on some biological aspects of adult stage of *Musca domestica.*



b- EFFECT OF *DATURA STRAMONIUM* EXTRACTS ON SOME DEVELOPMENTAL STAGES OF *MUSCA DOMESTICA*

1- Effect of water extract on early 3rd larval instar :

Larval mortality percent recorded at 72 hours after application was dosage-dependant. It was consistently higher at the highest dose applied. It reached 58.66% at the dose of 100 µg/larvae. (Figure 10).

Pupal mortality was also dosage-dependant. It increases with the increase of dose to reach 18.66% at the highest dose (100 µg/larvae) (Figure 10). It is clear from table (7) that a relatively small ratio of deformed pupae was occured at the higher doses only (60,80 and 100 µg/larvae). The percentage of deformed pupae was not dosage-dependant. Failure of adult emergence from these deformed pupae was noticed.

The mean larval duration seemed to be dose-dependant. It decreases with the increase of dose applied. It was 3.29 days in the case of the highest dose applied compared with that in control groups which was 3.66 days (Figure 10). This means that the extract affected the development of early 3rd larval instar by shortning their larval duration. Statistical analysis of the data revealed that the mean larval duration was nonsignificantat a dose of 20 µg/larvae, significant at a dose of 40 µg/larvae, while it was highly significant at doses of 60 and

80 µg/larvae and of very high significance at the highest dose (100 µg/larvae) . From the above results, it is obvious that water extract of *D. stramonium* somehow accelerates the development of early 3rd larval instar.

On the other hand, it was found that the extract had no marked effect on the mean pupal duration. It was 4.19 days at the highest dose of application (100 µg/larvae) compared with that of controls which was 4.3 days. Statistical analysis of the data revealed that this decrease was nonsignificant.

It is obvious from table (7) that the percentage of adult emergence, in the case of treated larvae, was found to be dosage-dependant. It decreases with the increase in dose to reach 22.66% at the highest dose (100 µg/larvae). The extract has a low effect in producing malformed adults after application on early 3rd larval instar. Its percent was not dosage-dependant. All deformed adults survived for a very short time (24 hours after emergence).

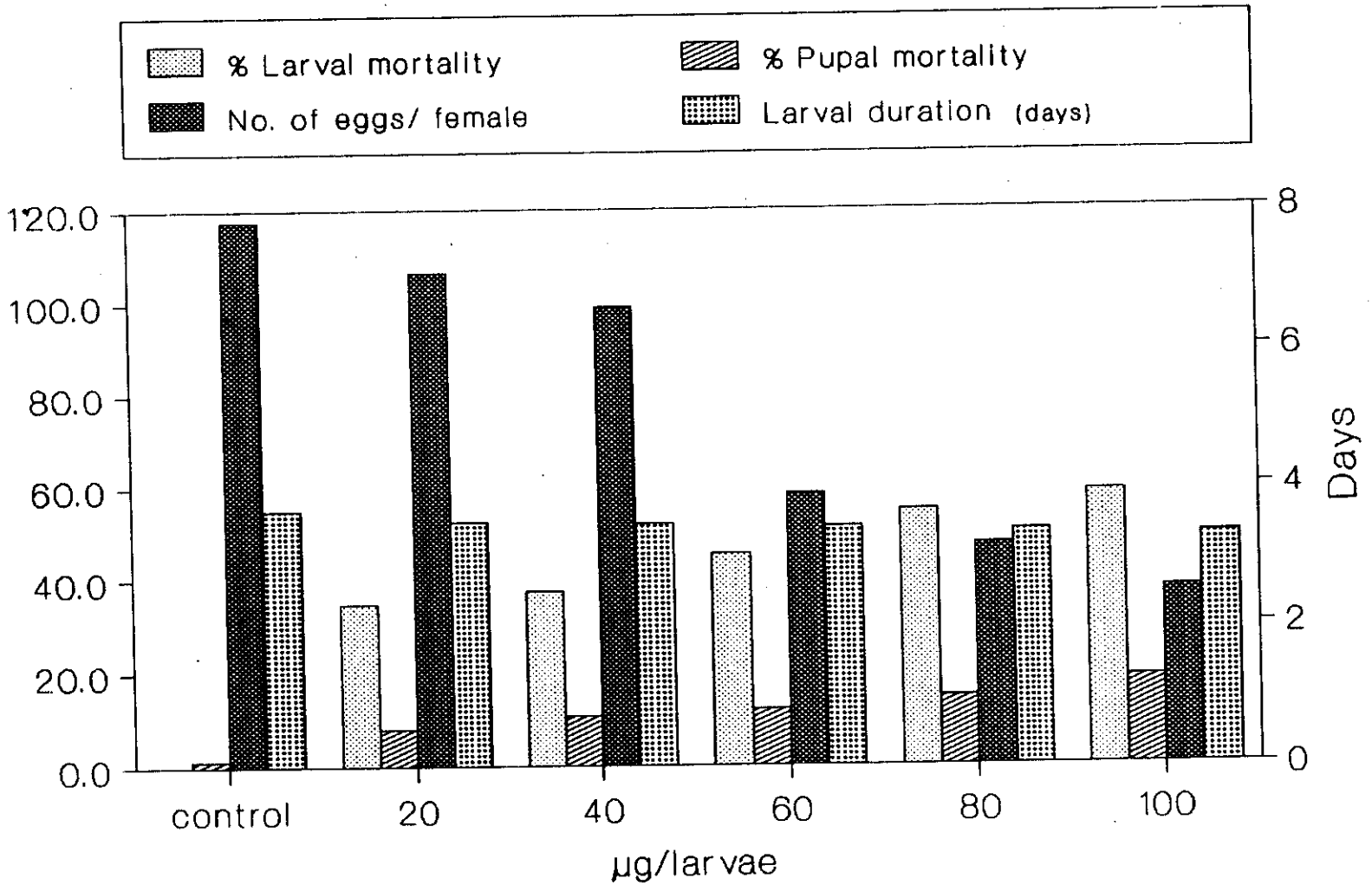
The water extract of *D. stramonium* had no effect on mating behaviour of the adults that emerged in the case of treated larvae. But had a very highly significant effect on reducing the number of eggs laid per female (Fecundity) at all doses used. As shown in table (7) and figure (10), the reduction in fecundity appeared to be dosage-dependant, it decreases with the increase of dose to reach 37.75 eggs at

Table (7) : Effect of water extract of *Datura stramonium* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	25.33	28.00	34.66	40.00	48.00
% Corrected larval mortality after 48h.	0.00	32.00	33.35	41.33	49.33	51.33
% Corrected larval mortality after 72h.	0.00	34.67	37.33	45.33	54.66	58.66
% pupal mortality	1.33	8.00	10.66	12.00	14.66	18.66
% Deformed pupae	0.00	0.00	0.00	2.66	5.33	4.00
Larval duration in days ± S.E.	3.66 ± 0.05	3.49 ± 0.10	3.46 ± 0.10*	3.41 ± 0.10**	3.35 ± 0.13**	3.29 ± 0.14***
Pupal duration in days ± S.E.	4.30 ± 0.04	4.28 ± 0.06	4.18 ± 0.07	4.18 ± 0.10	4.19 ± 0.10	4.19 ± 0.10
% Adult emergence	98.66	57.33	52.00	42.66	30.66	22.66
% Deformed adults	0.00	8.00	4.00	5.33	5.33	6.66
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	106.60 ± 0.47***	98.92 ± 0.10***	58.32 ± 0.47***	47.44 ± 0.27***	37.75 ± 0.38***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (10): Effect of water extract of *Datura stramonium* on the development of early 3rd larval instar of *Musca domestica* .



the highest dose (100 µg/larvae) compared with controls which was 117.61 eggs per female. The extract had no marked effect on the hatchability of the resulting eggs.

2- Effect of alcoholic extract of *D. stramonium* on early 3rd larval instar :-

Treatment with alcoholic extract of *D.stramonium* induces high percentage of larval mortality after 24, 48 and 72 hours of application (Table 8). It reached 57.14% after 72 hours from treatment by the highest dose (100 µg/larvae). Our data clearly show that there is a direct relationship between dose and the percentage of corrected larval mortality. The higher the doses, the greater the percentage of larval mortality (Figure 11).

Pupal mortality was dosage-dependant. It increases with the increase of dose. It reached 16% at the highest dose (100 µg/larvae) (Figure 11). The percentage of malformed pupae was not dosage-related. It was 5.33, 5.33, 4, 6.66 and 6.66% at doses of 20,40,60,80 and 100 µg/larvae respectively. No adults were emerged from malformed pupae and no deformed pupae were noticed in controls.

Data revealed that, the alcoholic extract of *D.stramonium* accelerates the development of the early 3rd larval instar by shortning their larval duration. Mean larval duration of the treated larvae was found to be desage-dependant. It decreases with the increase of dose. It

reached 2.94 days at the highest dose (100 µg/larvae) compared with untreated counterparts which was 3.5 days (Figure 11). After statistical analysis of the data, it was found that the mean larval duration was nonsignificant at a dose of 20 µg/larvae, highly significant at 40 µg/larvae and of very high significance at doses of 60, 80 and 100 µg/larvae.

Mean pupal duration was found to be not significantly affected by the alcoholic extract. It somewhat decreases than controls but with nonsignificant values.

It is obvious form table (8) that there are a direct relationship between increasing in dose applied and decreasing in the percentage of adult emergence. It was 24% at the highest dose (100 µg/larvae). The percentage of deformed adults was not dosage-dependant. It was 8,4,4,4, and 5.33% at doses of ; 20,40,60,80 and 100 µg/larvae respectively. Deformed adults were not survived and no deformed adults were found in controls.

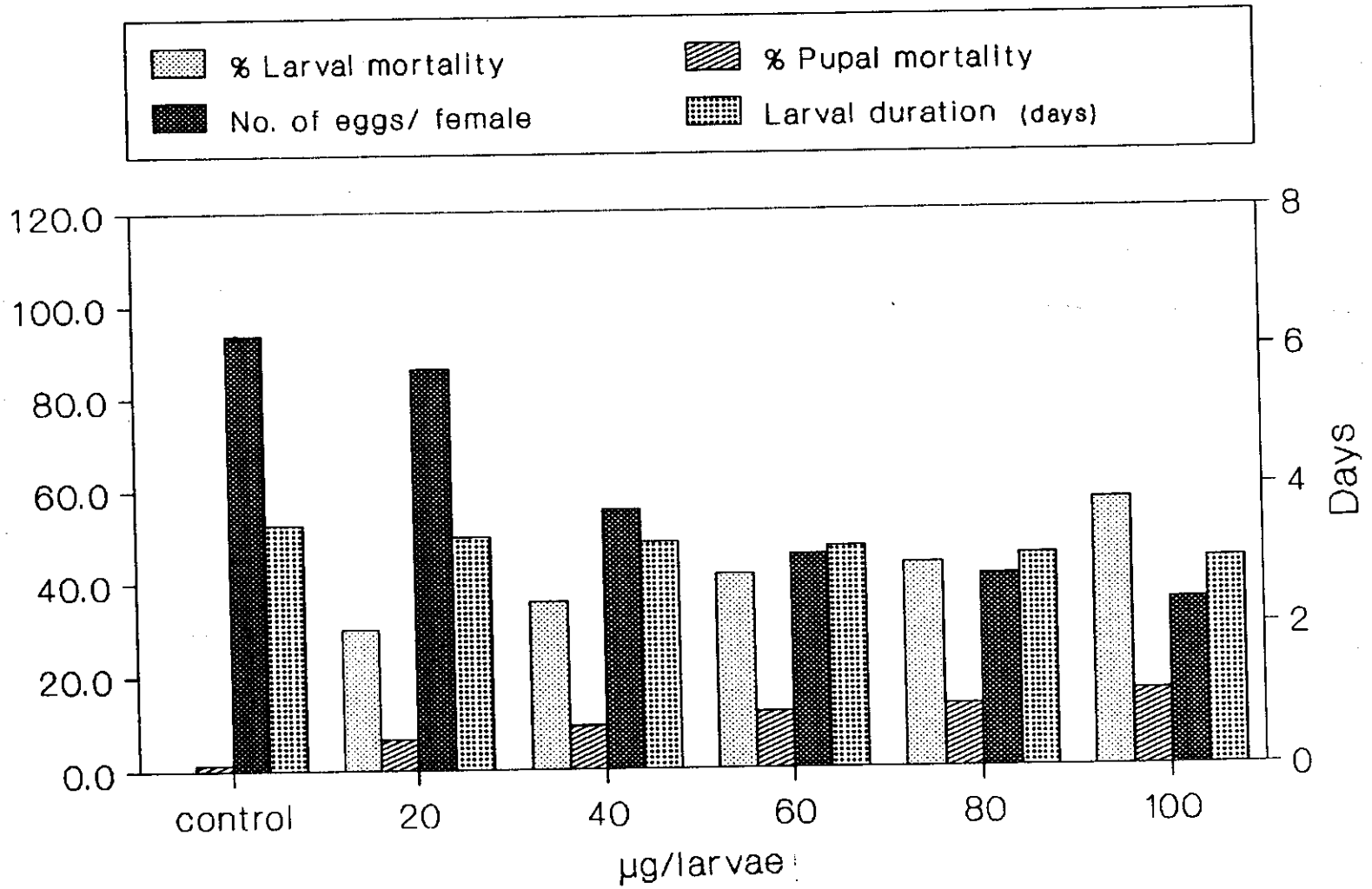
Treatment with this extract had no effect on mating behaviour of the adults treated as early 3 rd larval instar. Flies were observed to mate as early as 2 days after eclosion. While treatment of this extract had a very highly significant effect on reduicng the fecundity of the emerged females at all doses used. As shown in table (8) and figure (11) the reduction in fecundity appeared to be dosage - dependant. It

Table (8) : Effect of alcoholic extract of *Datura stramonium* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	17.08	22.86	28.57	35.72	38.57
% Corrected larval mortality after 48h.	0.00	27.14	35.72	41.43	50.00	57.14
% Corrected larval mortality after 72h.	0.00	30.01	35.72	41.43	50.00	57.14
% pupal mortality	1.33	6.66	9.32	11.99	13.33	16.00
% Deformed pupae	0.00	5.33	5.33	4.00	6.66	6.66
Larval duration in days ± S.E.	3.50 ± 0.05	3.32 ± 0.10	3.23 ± 0.10**	3.15 ± 0.10***	3.02 ± 0.06***	2.94 ± 0.06***
Pupal duration in days ± S.E.	4.47 ± 0.01	4.42 ± 0.07	4.41 ± 0.09	4.39 ± 0.07	4.39 ± 0.05	4.39 ± 0.05
% Adult emergence	92.00	56.00	50.66	42.66	33.33	24.00
% Deformed adults	0.00	8.00	4.00	4.00	4.00	5.3 3
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.27	86.20 ± 0.20***	55.38 ± 0.27***	45.60 ± 0.10***	40.95 ± 0.27***	35.36 ± 0.20***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (11): Effect of alcoholic extract of *Datura stramonium* on the development of early 3 rd larval instar of *Musca domestica* .



reached 35.36 eggs per female. The extract had no marked effect on the hatchability of the deposited eggs.

From the above results it is clear that, the bulk of the mortality was among the larval stage when both water and alcoholic extract of *D.stramonium* were applied against early 3rd larval instar of *M.domestica.*

3- Effect of water extract of *D. stramonium* on late 3rd larval instar :-

The percentage of larval mortality varies according to dose applied. It increases with the increase of dose. It also increases by increasing the period following the treatment (after 24 and 48 hours). It reached 20% after 48 hours from application of the highest dose (100 µg/larvae) (Figure 12). From this result, it is clear that late 3rd larval instar was slightly affected by this extract.

Pupal mortality was also dosage-dependant. It increases with the increase of dose. It reached 20% at the highest dose (100 µg/larvae). The degree of abnormalities produced as a result of application of this extract was not dasage-dependant (Table 9). Complete inhibition of adult emergence from these abnormal pupae was noticed.

Time required to complete larval development after alcoholic extract application was decrease by increasing of dose applied. It

reached 1.73 days at the highest dose (100 µg/larvae) compared with the check which was 2.47 days (Figure 12). This means that the extract accelerates the development of the late 3rd larval instar by shortning their larval duration. Statistical analysis of the data revealed that this decrease was nonsignificantat a dose of 20 µg/larvae and very highly significant at doses of 40,60,80 and 100 µg/larvae.

On the other hand, the mean pupal duration was not affected by the extract. It somewhat decreases than controls at all doses used but with nonsignificant values.

The effect of this extract on the percentage of adult emergence in the case of treated larvae was found to be dosage-dependant, i.e. higher dose produces more inhibition of adult emergence. It reached 60% at the highest dose (100 µg/larvae). The percentage of abnormal adults produced as a result of extract application against late 3rd larval instar was greater than that produced by the application of the same extract on early 3rd larval instar. As shown in table (9), its percent was not dosage-dependant. All deformed adults survived for very short time (24 hours after emergence).

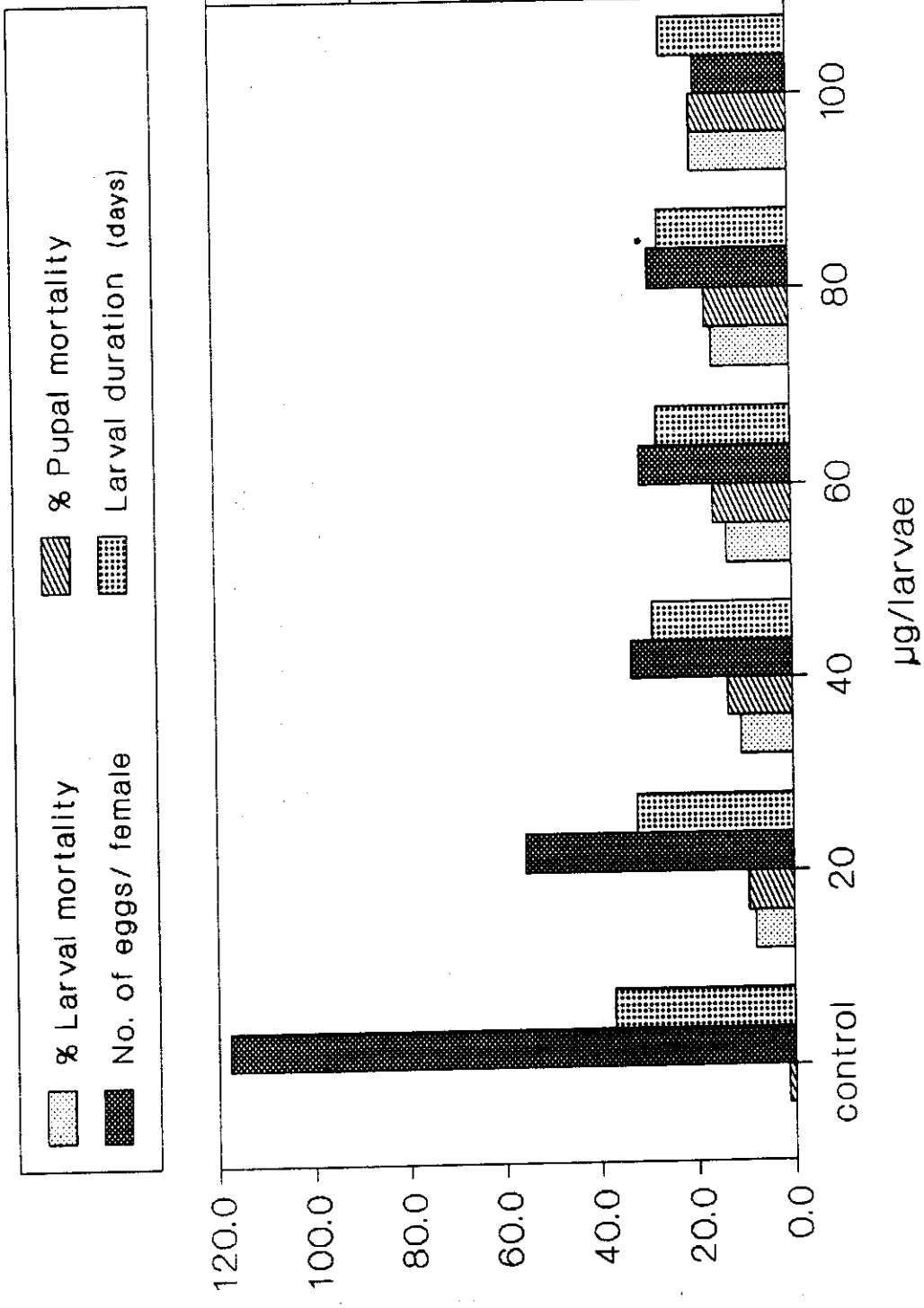
Treatment with the extract had no effect on mating behaviour of normal emerged flies produced from larval treatment. Flies were observed to mate as early 2 as days after eclosion. While the extract had a very highy significant effect on reducing the number of eggs laid

Table (9) : Effect of water extract of *Datura stramonium* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	5.33	9.33	10.66	12.00	13.33
% Corrected larval mortality after 48h.	0.00	8.00	10.66	13.33	16.00	20.00
% pupal mortality	1.33	9.33	13.33	16.00	17.33	20.00
% Deformed pupae	0.00	9.33	12.00	8.00	10.66	12.00
Larval duration in days ± S.E.	2.47 ± 0.05	2.14 ± 0.14	1.92 ± 0.10***	1.84 ± 0.12***	1.79 ± 0.10***	1.73 ± 0.11***
Pupal duration in days ± S.E.	4.50 ± 0.05	4.50 ± 0.04	4.50 ± 0.08	4.50 ± 0.10	4.44 ± 0.08	4.44 ± 0.09
% Adult emergence	98.66	81.33	76.00	70.00	66.66	60.00
% Deformed adults	0.00	17.33	16.00	13.33	12.00	14.66
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	55.47 ± 0.19***	33.20 ± 0.25***	31.29 ± 0.30***	29.00 ± 0.27***	19.11 ± 0.08***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (12): Effect of water extract of *Datura stramonium* on the development of late 3rd larval instar of *Musca domestica* .



per female (Fecundity) at all doses used. As shown in table (9) and figure (12), the reduction in fecundity appeared to be dosage-dependant. It reached 19.11 eggs per female at a dose of 100 µg/larvae compared with controls which was 117.61 eggs/female. The extract had no effect on the hatchability of these eggs.

4- Effect of alcoholic extract of *D. stramonium* on early thrid larval instar :-

At the doses tested to calculate the percent of larval mortality after 24 and 48 hours from application, it was found that population was not highly affected by this extract. It reached 17.33% at the highest dose (100 µg/larvae). Total larval mortality after 48 hours of application was found to be dosage-dependant (Figure 13). It increases by the increasing of dose applied.

Data revealed that, the bulk of mortality was in the pupal stage. The percentage of pupal mortality was dosage-dependant. It increases with the increase of dose to reach 20% at a dose of 100 µg/larvae (Figure 13). The percentage of deformed pupae appeared after treatment of late 3rd larval instar with the extract was not dosage-dependant. It was; 8, 5.33, 8, 10.66 and 10.66 at doses of ; 20,40,60,80 and 100 µg/larvae respectively. All deformed pupae failed to emerge adults.

The mean larval duration of the treated larvae was found to be dosage-dependant. It decreased from 2.49 days in the control groups to 1.84 day after application of the highest dose (100 µg/larvae). (Figure 13). This means that the extract accelerates the development of late 3rd larval instar by shortning their larval duration. Statistical analysis of the data revealed that this decrease in the larval duration was nonsignificant at a dose of 20µg/larvae, significant at a dose of 40µg/larvae and of very high significance at doses of ; 60,80 and 100 µg/larvae.

On the other hand, the extract had no significant effect on the mean pupal duration.

Adult emergence percent in the case of treated larvae was found to be dosage-related. It decreases with the increase of dose. It reached 62.66% at a dose of 100 µg/larvae. The percentage of abnormal adults produced as a results of application of this extract on late 3rd larval instar was not dosage-dependant (Table 10). Deformed adults were not survived more than 24 hours after emergence.

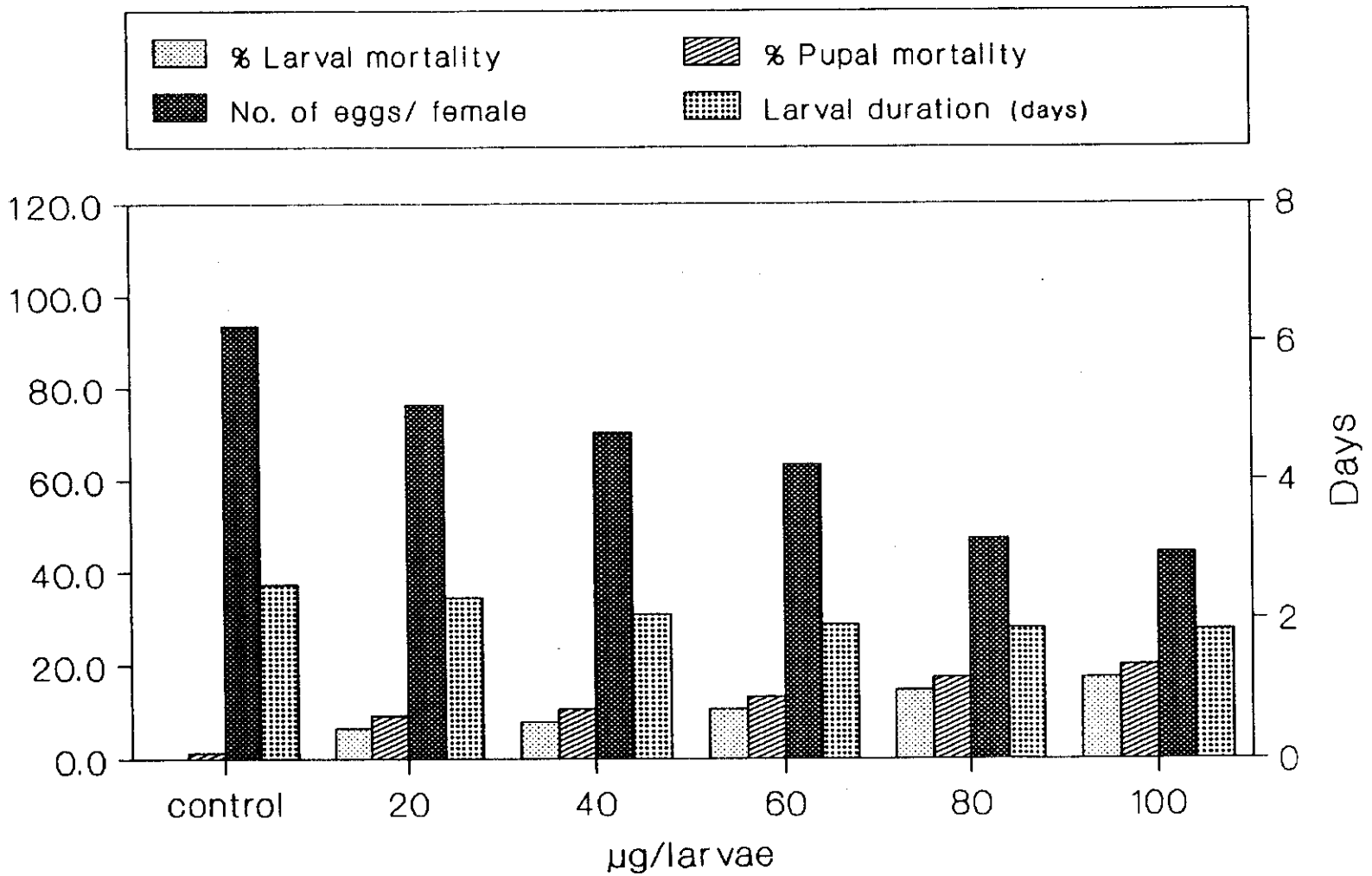
The alcoholic extract of *D.stramonium* had a very highly significant effect on reducing the fecundity of the females which resulting from the treated late 3rd larval instar. Reduction in fecundity was found to be dosage-dependant. It decreases with the increase of dose to reach 44.22 eggs per female at a dose of 100 µg/larvae

Table (10) : Effect of alcoholic extract of *Datura stramonium* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	4.00	5.33	6.66	12.00	14.66
% Corrected larval mortality after 48h.	0.00	6.66	8.00	10.66	14.66	17.33
% pupal mortality	1.33	9.33	10.66	13.33	17.33	20.00
% Deformed pupae	0.00	8.00	5.33	8.00	10.66	10.66
Larval duration in days ± S.E.	2.49 ± 0.05	2.30 ± 0.10	2.06 ± 0.10*	1.92 ± 0.09***	1.86 ± 0.05***	1.84 ± 0.05***
Pupal duration in days ± S.E.	4.28 ± 0.06	4.27 ± 0.07	4.27 ± 0.08	4.25 ± 0.05	4.22 ± 0.05	4.22 ± 0.03
% Adult emergence	98.66	84.00	81.33	76.00	68.00	62.66
% Deformed adults	0.00	17.33	16.00	13.33	16.00	10.66
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.07	76.42 ± 0.17***	70.26 ± 0.10***	63.40 ± 0.10***	47.17 ± 0.13***	44.22 ± 0.03***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (13): Effect of alcoholic extract of *Datura stramonium* on the development of late 3 rd larval instar of *Musca domestica*.



compared with controls which was 93.6 eggs per female. Daily observation revealed that this reduction in fecundity was not due to lack of mating. These flies were observed to mate after 2 days of eclosion. The data also indicates that there was no marked effect of *D.stramonium* extract on hatchability of the deposited eggs.

The fore mentioned results revealed that the bulk of mortality was during the pupal stage, when late 3 rd larval instar of *M.domestica* was treated with both water and alcoholic extracts of *D. stramonium*.

5- Effect of water extract of *D. stramorium* on the biological aspects of adult stage :

As shown in table (11), it is clear that there is a direct relationship between adult mortality percent in the first four days of application and dose applied. It increases gradually with the increase of dose to reach 50% at the highest dose (100 µg/insect).

Longevity of female was shorter than that of male and both decrease with the increase of dose. It reached 3.2 and 6.5 days at 100 µg/insect respectively, compared with controls which were 16.2 and 15.8 days respectively. This decrease in the longevity of both sexes was very highly significant at higher doses of 60, 80 and 100 µg/insect.

Pre-oviposition period was prolonged as a result of treatment with this extract. It reached 5.32 days at the highest dose (100 µg/insect) compared with controls which was 4 days. This prolongation was

found to be significant at doses of 60, 80 and 100 µg/insect. On the other hand, treatment with this extract shortened the oviposition period to reach 1 day at a dose of 100 µg/insect compared with control which was 11 days (Figure 14). The decrease of oviposition period was highly significant at a dose of 20 µg/insect and of very high signifincance at all other used doses. Both per-oviposition period and oviposition period was dosage-dependant. It is obvious from the data shown in table (11) that the water extract of *D. stramonium* had no marked effect on the post-oviposition peirod.

Number of ovipositional times was proved to decrease as a result of the treatment with this extract. It was 3.36 days only at the highest dose, while it was 7 times in controls (Table 11). This decrease was highly significant at a doses of 20,40 and 60 µg/insect, while it was of very high significance at doses of 80 and 100 µg/insect.

Very highly significant differences between the number of eggs laid by treated female (Fecundity) and the number of eggs laid by untreated female were apparent. The latter laying twice as many eggs as flies treated with the highest dose. As shown in table (11) and figure (14), the reduction in fecundity appeared to be dosage-dependant. It decreases with the increase of dose. It reached 55.9 eggs per female at the highest dose (100 µg/insect), while it was 117.6 eggs per untreated female. It is also proved that this extract had no marked effect on the hatchability of the deposited eggs.

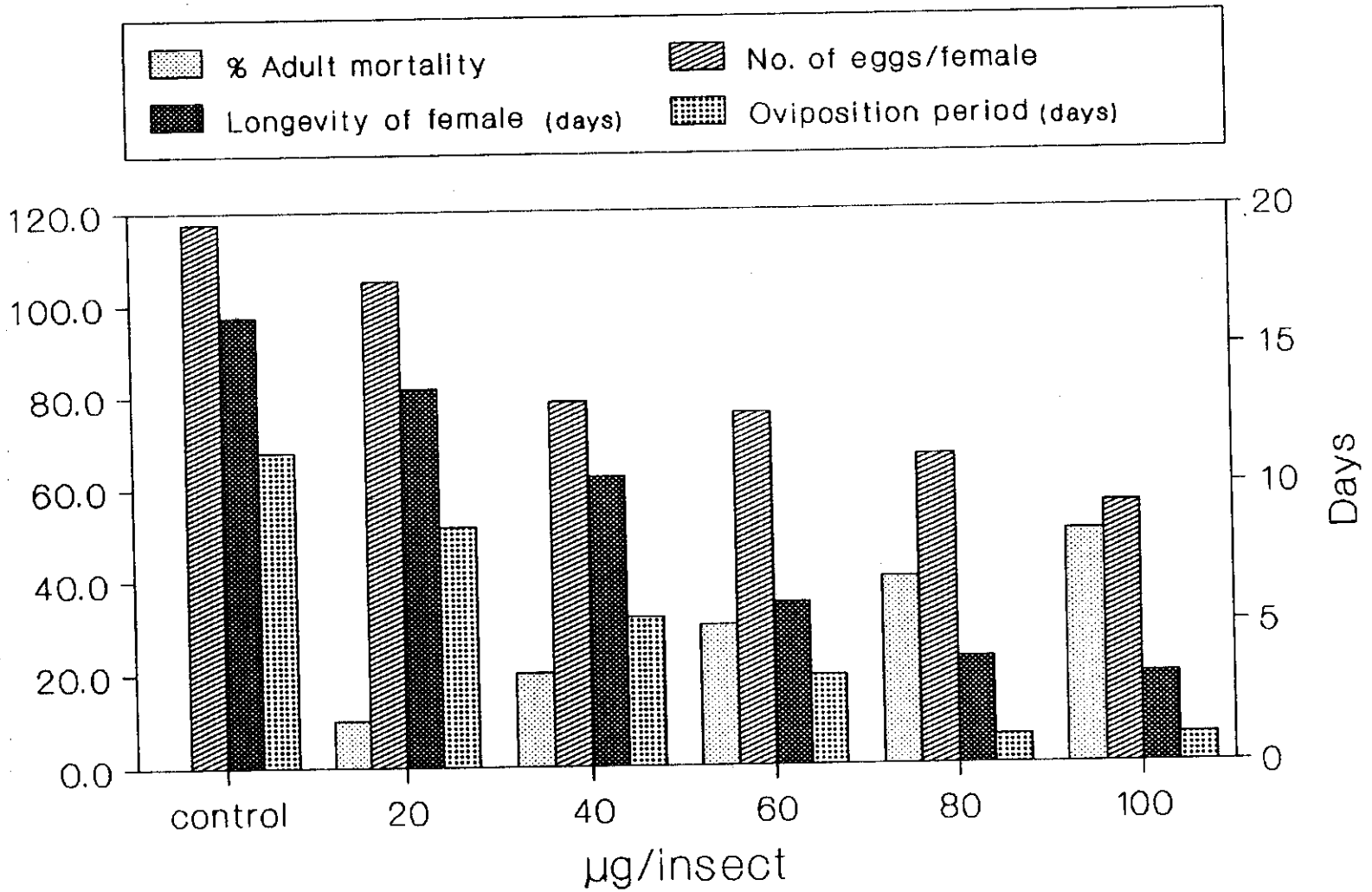
In conclusion, both water and alcoholic extracts of *D.stramonium* were more effective on early 3rd larval instar of *M.domestica* than on late 3rd larval instar. Adult emergence percent in case of water and alcoholic extracts on early 3rd larval instar was 22.66 and 24% respectively at the highest dose. While it was 60 and 62.66% respectively in case of late 3rd larval instar. The effect of water extract on adult stage was considerable. The percent of adult mortality was 50% at the highest dose. Therefore, it is clear that early 3rd larval instar was the most susceptible stage for *D. stramonium* extracts.

Table (11) : Effect of water extract of *Datura stramonium* on some biological aspects of adult stage of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected Adult mortality after 4 days	0.00	10.00	20.00	30.00	40.00	50.00
Longevity of male in days ± S.E.	15.80 ± 0.91	13.80 ± 1.65	13.00 ± 1.62	12.20 ± 0.25***	6.70 ± 0.35***	6.50 ± 0.79***
Longevity of female in days ± S.E.	16.20 ± 0.78	13.06 ± 0.95*	10.40 ± 1.52**	5.80 ± 0.36***	3.80 ± 1.47***	3.20 ± 0.85***
Pre-oviposition period in days ± S.E.	4.00 ± 0.27	4.00 ± 0.29	5.00 ± 0.47	5.00 ± 0.27*	5.00 ± 0.10*	5.32 ± 0.15*
Oviposition period in days ± S.E.	11.30 ± 0.47	8.60 ± 0.47**	5.30 ± 0.27***	3.20 ± 0.47***	1.00 ± 0.27***	1.00 ± 0.47***
Post - oviposition period in days ± S.E.	1.00 ± 0.27	1.30 ± 0.47	1.60 ± 0.27	1.00 ± 0.27	0.00	0.00
No.of ovipositional times	7.00 ± 0.27	4.60 ± 0.47**	4.60 ± 0.47**	4.30 ± 0.43**	4.80 ± 0.27***	4.36 ± 0.47***
Mean No. of eggs laid per female	117.60 ± 0.11	105.07 ± 0.26***	78.59 ± 0.35***	75.96 ± 0.47***	66.57 ± 0.12***	55.90 ± 0.07***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (14): Effect of water extract of *Datura stramonium* on some biological aspects of adult stage of *Musca domestica*.



c- EFFECT OF *CALOTROPIS PROCERA* EXTRACTS ON SOME DEVELOPMENTAL STAGES OF*MUSCA DOMESTICA*

1- Effect of water extract of *C. procera* on early 3rd larval instar:-

After 24, 48 and 72 hours of application, the water extract of *C. procera* causes a considerable percentage of larval mortality . Total larval mortality after 72 hours of application was found to be dosage-dependant. It increases with the increase of dose. It reached a maximum value of 30.66% at a dose of 100 µg/larvae (Figure 15) .

Pupal mortatilty was also dosage-dependant. It increases with the increase of dose to reach 45.33% at the highest dose (100 µg/larvae). It is clear that the major part of mortality was during the pupal stage. It is also obvious from table (12) that, relatively small ratio of deformed pupae were noticed as a result of application of this extract. The percentage of malformed pupae was not dosage-dependant. No adults were emerged from malformed pupae and no malformed pupae were found in controls.

From table (12) we can conclude that, mean larval duration of the treated larvae was found to be dose-related. The highest dose causes the shorter larval duration. It was 3.18 days at the highest dose (100 µg/larvae) compared with that in control groups which was 3.66 days (Figure 15). This means that the extract accelerates the development of

early 3rd larval instar by shortning their larval duration. It is clear that this decrease was nonsignificant at doses of 20 and 40 µg/larvae , significant at a dose of 60 µg/larvae , highly significant at a dose of 80 µg/larvae and of very high significance at 100 µg/larvae .

It is clear from table (12) that there is a direct relationship between dose applied and adult emergence percent in the case of treated larvae. The latter decreases with the increase of dose. It was 24% at the highest dose of application (100 µg/larvae). This extract causes some degree of abnormalities in the emerged adults. It's percent was not dosage-dependant. The survival of deformed adults was extremely short and does not exceed 24 hours.

The normal adults emerged in the case of treated larvae were checked for their reproductive capability. The extract had no effect on mating behaviour, flies were observed to mate after 2 days of eclosion. The treatment by the extract had a very highly significant effect on reducing the number of eggs laid per female (Fecundity) at all doses used. As summarized in table (12) and represented in figure (15), the reduction in fecundity appeared to be dosage-dependant. It reached 61.08 eggs at the highest dose compared with untreated counterparts which was 117.61 eggs per female. The extract had no marked effect on the hatchability of the deposited eggs.

Table (12) : Effect of water extract of *Calotropis procera* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	2.66	6.66	12.00	14.66	17.33
% Corrected larval mortality after 48h.	0.00	5.32	12.00	18.66	17.33	28.00
% Corrected larval mortality after 72h.	0.00	10.66	17.33	21.33	24.00	30.66
% pupal mortality	1.33	24.00	26.66	30.66	37.33	45.33
% Deformed pupae	0.00	2.66	8.00	5.33	9.33	9.33
Larval duration in days ± S.E.	3.66 ± 0.05	3.56 ± 0.06	3.46 ± 0.06	3.42 ± 0.07*	3.28 ± 0.06**	3.18 ± 0.07***
Pupal duration in days ± S.E.	4.30 ± 0.04	4.20 ± 0.04	4.19 ± 0.26	4.03 ± 0.29	4.03 ± 0.29	4.01 ± 0.17
% Adult emergence	98.66	65.33	56.00	46.66	36.00	7.24
% Deformed adults	0.00	9.33	9.33	4.00	5.33	5.33
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	104.00± 0.03***	95.84 ± 0.24***	77.49 ± 0.29***	75.36 ± 0.24***	61.08 ± 0.03***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

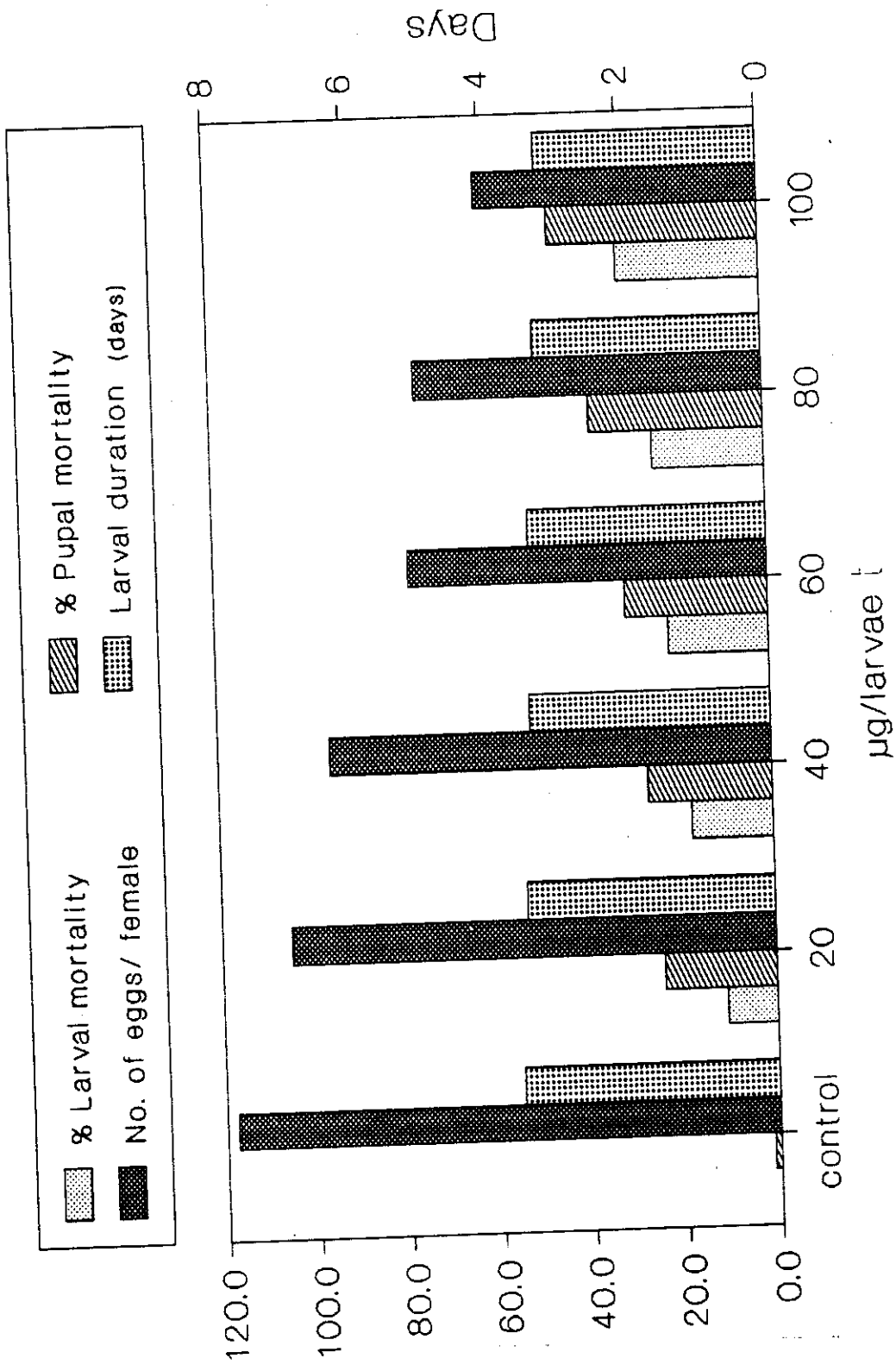


Figure (15): Effect of water extract of *Calotropis procera* on the development of early 3rd larval instar of *Musca domestica*.

2 - Effect of alcoholic extract of *C. procera* on early 3rd larval instar : -

The alcoholic extract of *C.procera* causes considerable percent of corrected larval mortality after 72 hours of application. Our results clearly show that there was a direct relationship between the increasing of dose applied and magnitude of corrected larval mortaltiy. It reached 41.42% at the highest dose (100 µg/larvae) (Firgure 16).

As a matter of fact, pupal mortality was also dosage-dependant. It increases with the increase of dose. It reached 21.33 at 100 µg/larvae . It is clear that the bulk of mortality was in the larval stage in contrast to the water extract. The percentage of deformed pupae, which produced as a result of the alcoholic extract treatment was not dosage-dependant. Failure of adult emergence from deformed pupae was noticed.

Time required to complete larval development after extract application decreases with the increase of dose. It reached 2.92 days at the highest dose (100 µg/larvae) compared with that in control groups which was 3.5 days. This denotes that the extract accelerates the development of early 3rd larval instar by shortning their larval duration. Statisticall analysis of the data revealed that, the decrease in mean larval duration was nonsignificant at a dose of 20 µg/larvae, highly significant at a dose of 40 µg/larvae and of very high significance at 60,80 and 100 µg/larvae .

The mean pupal duration was not significantly affected by the alcoholic extract of *C. procera.*

As represented in table (13), the percent of adult emergence in the case of treated larvae was dosage-dependant, i.e, higher dose causes more inhibition of adult emergence. It was 33.33% at the highest dose of 100 µg/larvae compared with untreated counterparts which was 92%. The percentage of deformed adults was not dosage-dependant. Deformed adults were not survived.

Very highly significant differences were found betweeen the number of eggs laid by female (Fecundity) treated as early third larval instar and those of controls, although these flies were observed to mate after 2 days from eclosion. As represented in table (13) and figure (16), the reduction in fecundity appeared to be dosage-dependant. It decreases with the increase of the extract dose to reach 49.31 eggs at 100 µg/larvae compared with control which was 93.6 eggs per female. This indicates that, this extract affected the fecundity of even normal adults emerged, but had no effect on the hatchability of their eggs.

In conclusion, larval mortality was found to be slighlty higher than pupal mortality when alcoholic extract of *C. procera* was applied on early 3rd larval instar of *M.domestica,* while the reverse was occured in the case of water extract.

Table (13) : Effect of alcoholic extract of *Calotropis procera* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	10.01	15.72	22.86	28.57	34.28
% Corrected larval mortality after 48h.	0.00	21.43	25.71	32.86	32.86	39.99
% Corrected larval mortality after 72h.	0.00	22.85	28.57	32.85	38.57	41.42
% pupal mortality	1.33	13.33	17.32	18.66	19.99	21.33
% Deformed pupae	0.00	9.33	6.66	4.00	6.66	8.00
Larval duration in days ± S.E.	3.50 ± 0.05	3.36 ± 0.10	3.26 ± 0.10**	3.21 ± 0.06***	3.03 ± 0.03***	2.92 ± 0.03***
Pupal duration in days ± S.E.	4.47 ± 0.01	4.47 ± 0.04	4.47 ± 0.07	4.42 ± 0.08	4.42 ± 0.09	4.47 ± 0.09
% Adult emergence	92.00	58.66	49.33	44.00	37.33	33.33
% Deformed adults	0.00	9.33	8.00	4.00	5.33	5.33
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.27	85.20 ± 0.09***	80.70 ± 0.23***	67.52 ± 0.30***	55.01 ± 0.27***	28.15 ± 0.09***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

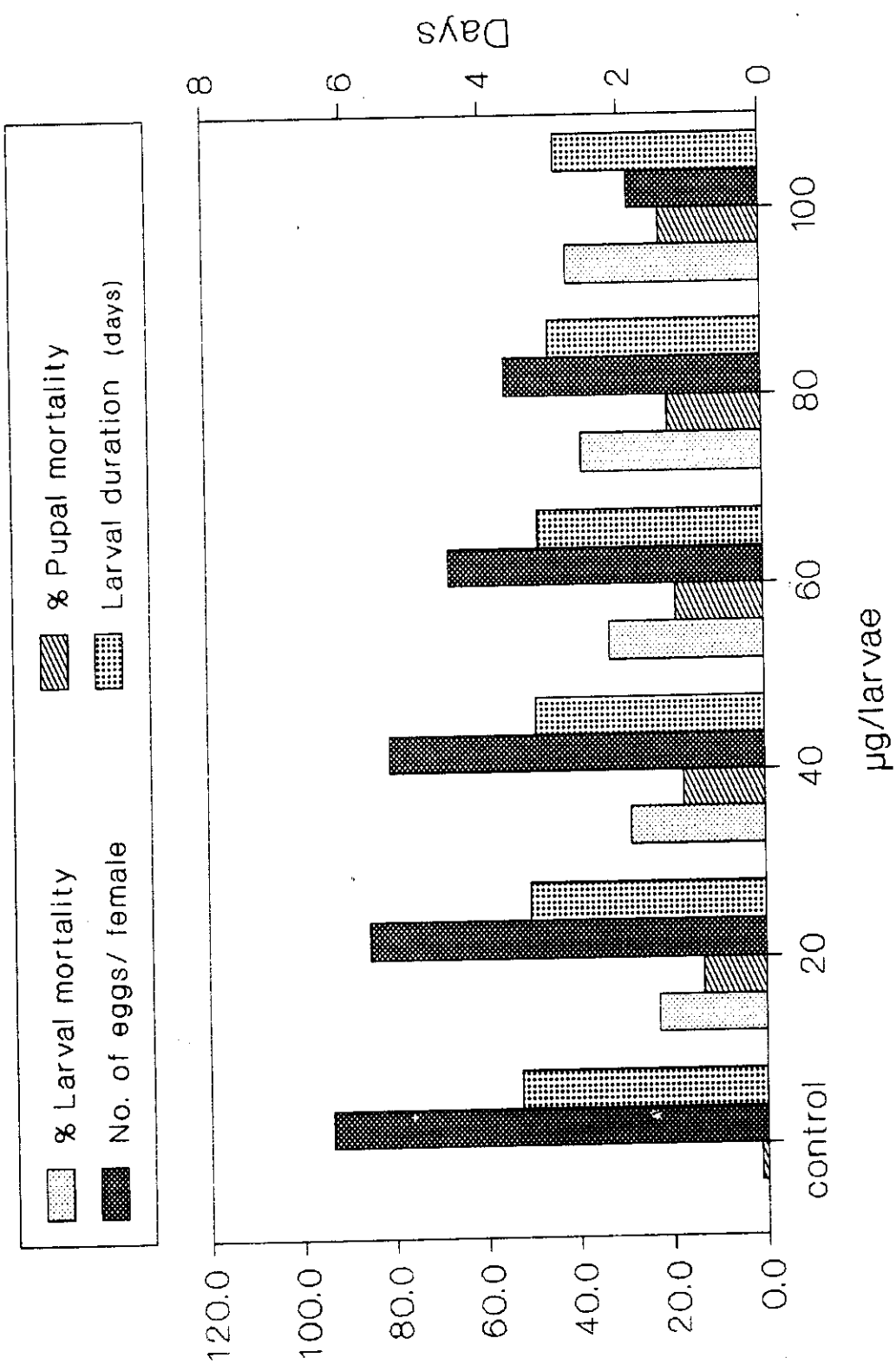


Figure (16): Effect of alcoholic extract of *Calotropis procera* on the development of early 3 rd larval instar of *Musca domestica*

3- Effect of water extract of *C. procera* on late 3rd larval instar :-

The percentage of larval mortality varied according to doses applied. It increases with the increase of dose and by increasing of the period folowing the treatment (after 24 and 48 hours) . It reached a maximum value of 13.33% at the highest dose (100 µg/larvae) (Figure 17).

Table (14) showed that, the percentage of pupal mortality was also dosage-related. It increases with the increase of dose to reach 40% after treatment with the highest dose (100 µg/larvae). It is clear that the bulk of mortality was during the pupal stage. The degree of abnormalities produced as a result of extract application was not dosage-dependant. Failure of adults emergence from these abnormal pupae was noticed.

Time required to complete larval development after extract application was found to decrease by increasing of dose applied. It reached its minimum value of 1.85 day after the application of the highest dose of the extract (100 µg/larvae) (Figure 17). This means that the extract affected the development of late 3rd larval instar by shortning their larval duration. This shortage in the mean larval duration was nonsignificantat doses of 20 and 40 µg/larvae, significant at a dose of 60 µg/larvae and of very high significance at doses of 80 and 100 µg/larvae .

On the other hand, the extract had no significant effect on the mean pupal duration. It somewhat decreases than controls but with nonsignificant values. (Table 14).

Adult emergence percent in the case of treated larvae was found to decrease with the increase of dose applied to reach 46.66% at highest dose (100 µg/larvae) compared with controls which was 98.66%. The abnormal adults percent, produced as a result of application of the extract against late 3rd larval instar, was greater than that produced by the the same extract in case of early 3 rd larval instar. This percent was not dosage-dependant. Deformed adults survived for a very short time (24 hours after emergence).

The water extract of *C. procera* had no effect on the mating behaviour of the normal emerged adults developing from the treated late 3rd larval instar, but had a very higly significant effect on the female fecundity. The fecundity was found to increase with the increase of dose applied (Figure 17). It reached to its minimum value of 23.6 eggs per female at 100 µg/larvae compared with controls which was 117.61 eggs per female. The extract had no marked effect on the hatchability of the deposited eggs.

Table (14) : Effect of water extract of *Calotropis procera* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	2.66	4.00	5.33	8.00	9.33
% Corrected larval mortality after 48h.	0.00	5.33	6.67	8.00	10.67	13.33
% pupal mortality	1.33	14.66	17.33	22.66	29.33	40.00
% Deformed pupae	0.00	13.33	12.00	13.33	10.67	13.00
Larval duration in days ± S.E.	2.47 ± 0.05	2.31 ± 0.08	2.21 ± 0.16	2.14 ± 0.13*	2.01 ± 0.10***	1.85 ± 0.14***
Pupal duration in days ± S.E.	4.50 ± 0.05	4.42 ± 0.04	4.40 ± 0.06	4.42 ± 0.07	4.42 ± 0.09	4.40 ± 0.13
% Adult emergence	98.66	80.00	76.00	69.33	60.00	46.66
% Deformed adults	0.00	20.00	14.66	21.33	14.66	17.33
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	72.00 ± 0.47***	50.93 ± 0.25***	37.23 ± 0.09***	37.45 ± 0.20***	23.60 ± 0.27***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

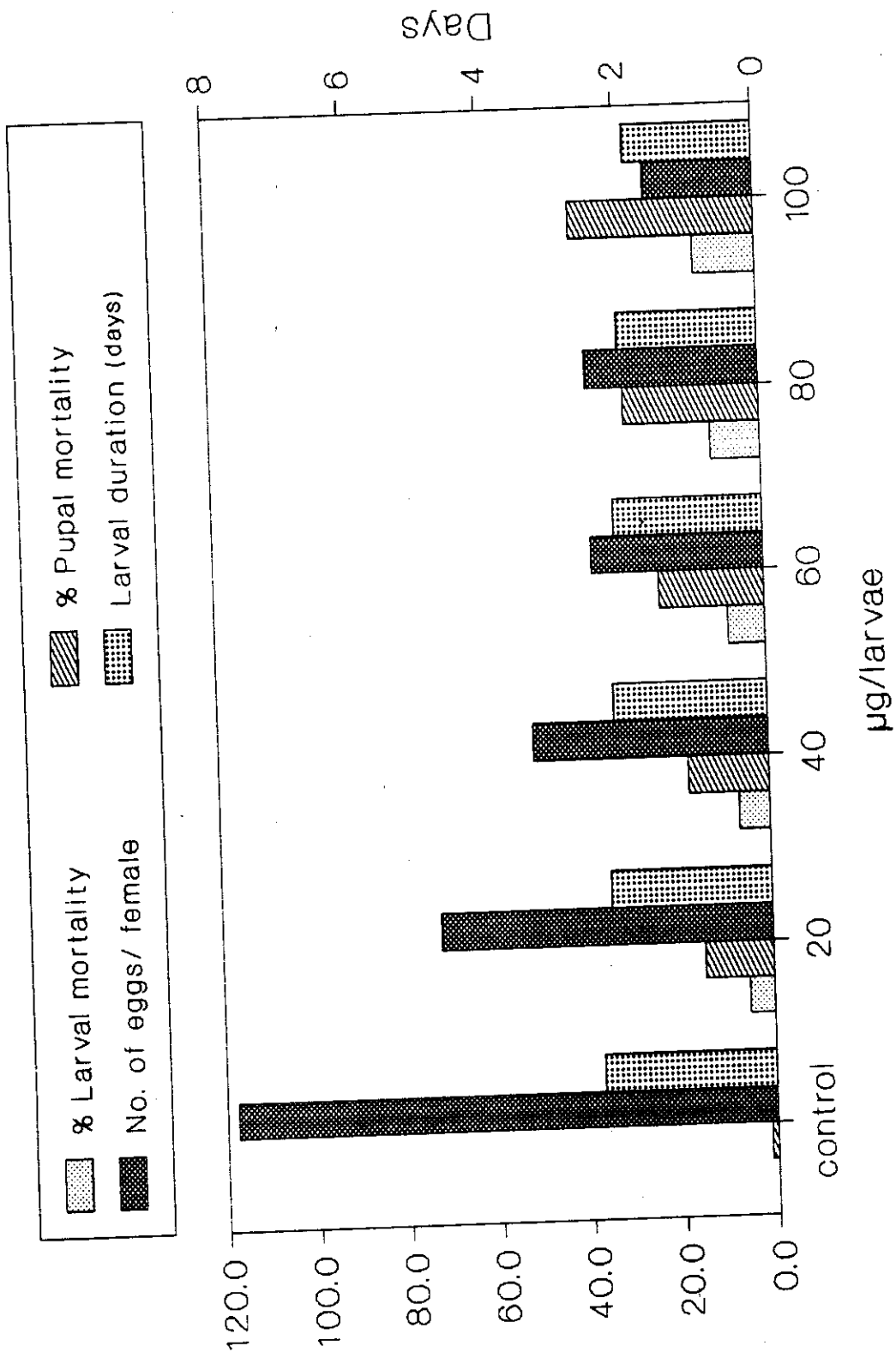


Figure (17): Effect of water extract of *Calotropis procera* on the development of late 3 rd larval instar of *Musca domestica* .

4- Effect of alcoholic extract of *C. procera* on late 3rd larval instar :

Larval mortality after 24 and 48 hours of application was not highly affected by the extract. The percentage of total larval mortality after 48 hours was found to be dosage and time dependant. It increases with the increase of dose and time to reach 16% at the highest dose (100 µg/larvae after 48 hours (Figure 18).

Pupal mortality was in relation with dose applied. The highest dose causes considerbly high percent of pupal mortality. It was 26.66% at the highest dose (100 µg/larvae) Figure (18). It is clear that the major part of mortality was during the pupal stage. The degree of pupal abnormalities produced as a result of extract application was not dosage -dependant. All deformed pupae failed to emerge adults.

Treatment with this extract accelerates the development of the late 3rd larval instar by shortning their larval duration. Mean larval duration seemed to be dose-related. In the case of the highest dose applied (100 µg/larvae) it was 1.98 day compared with untreated counterparts which was 2.49 days. This decrease in the larval duration was nonsignificant at doses of 20 and 40 µg/larvae , significant at dose of 60 µg/larvae and of very high significance at doses of 80 and 100 µg/larvae.

On the other hand, the mean pupal duration was found to be not affected by this extract, i.e., no significant differences were found

between the mean duration of the treated and untreated pupae, developing from the treated larvae.

It is clear form table (15) that, the alcoholic extract of *C.procera* causes a considrable effect on inhibition of the adult emergence in the case of treated larvae. The adult emergence percent was dosage-dependant. It decreases from 98.66% in the controls to 37.33% after treatment with the highest dose (100 µg/larvae). The percent of deformed adults which produced as a result of extract treatment was not dosage-dependant. The survival of deformed adults was extremely short and does not exceed 24 hours.

The extract had a very highly significant effect on reducing the fecundity of the females which resulting from the treated late 3rd larval instar. Reduction in fecundity was in relationship with dose applied. It decreases with the increase of dose. It reached 17.33 eggs per female at the highest dose (100 µg/larvae), compared with control fecundity which was 93.6 eggs per female (Figure 18). Our data indicates that, the extract had no marked effect on the hatchability of the deposited eggs.

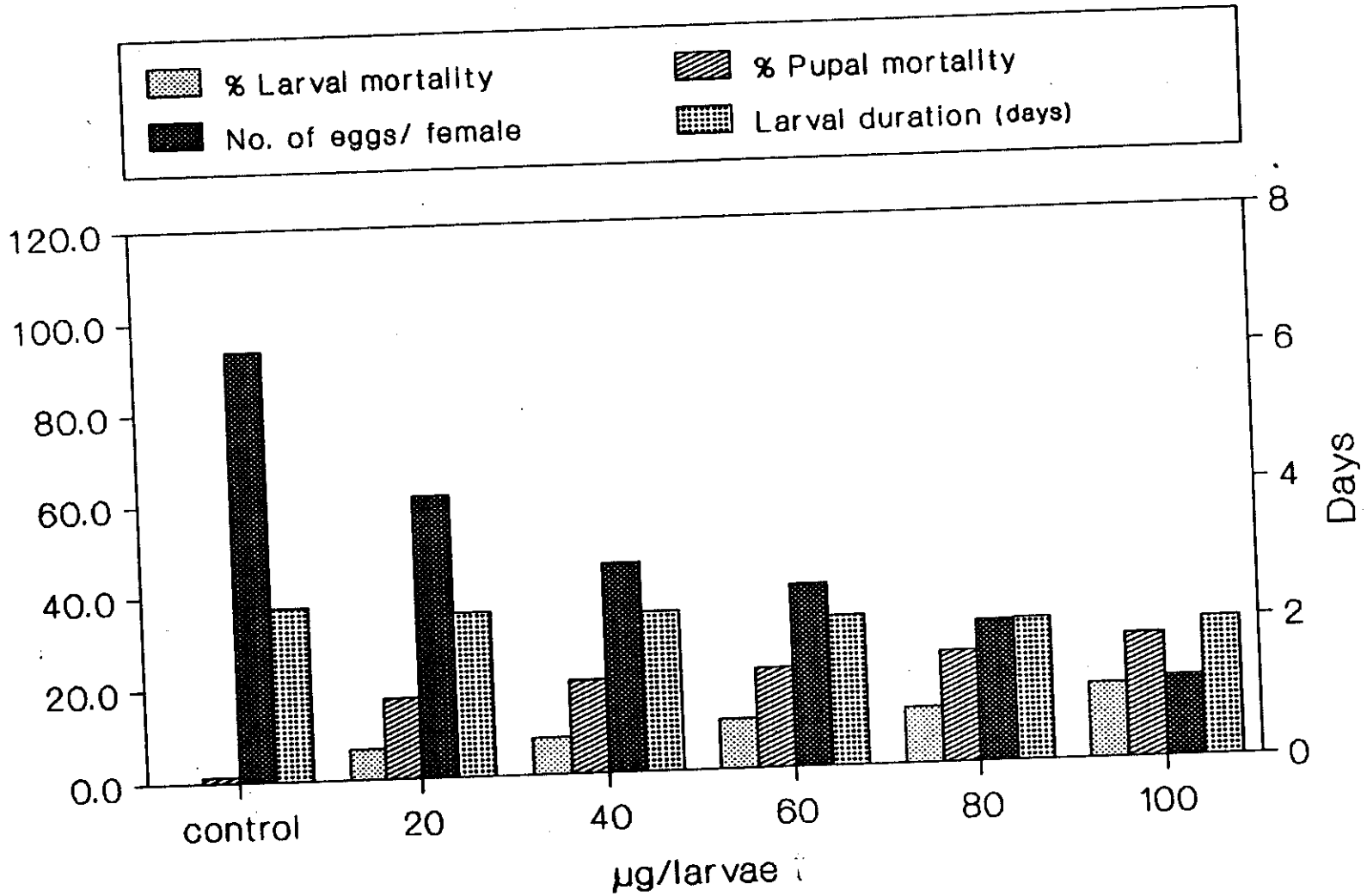
It is clear from the fore-mentioned results that, both water and alcoholic extracts of *C.procera*, when applied by all doses, on late 3rd larval instar, the bulk of mortality was amonge the pupae.

Table (15) : Effect of alcoholic extract of *Calotropis procera* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	4.00	5.33	6.66	8.00	9.33
% Corrected larval mortality after 48h.	0.00	6.66	8.00	10.66	12.00	16.00
% pupal mortality	1.33	17.33	20.00	21.33	24.00	26.66
% Deformed pupae	0.00	13.33	13.00	12.00	10.66	13.33
Larval duration in days ± S.E.	2.49 ± 0.05	2.36 ± 0.10	2.29 ± 0.10	2.15 ± 0.06*	2.04 ± 0.06***	1.98 ± 0.06***
Pupal duration in days ± S.E.	4.28 ± 0.06	4.28 ± 0.03	2.27 ± 0.05	4.27 ± 0.05	4.26 ± 0.06	4.23 ± 0.08
% Adult emergence	98.66	76.00	72.00	68.00	64.00	57.33
% Deformed adults	0.00	14.66	10.66	13.33	12.00	8.00
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.07	61.18 ± 0.28***	45.18 ± 0.07***	39.25 ± 0.02***	30.42 ± 0.02***	17.33 ± 0.27***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (18): Effect of alcoholic extract of *Calotropis procera* on the development of late 3rd larval instar of *Musca domestica* .



5- Effect of water extract of *C. procera* on the biological aspects of adult stage :-

Adult mortality percent recorded after four days from application was in striking pattern of dosage-dependant mortality. It was consistently higher at higher dose applied. It reached 40% at the highest dose (100 µg/larvae) (Figure 19). It is also clear from table (16) that, longevity of female was shorter than that of male. Both female and male longevity were decreased than controls. Longevity of the both sexs were dosage-dependant. It reached 6 and 9.6 days respectively at a dose of 100 µg/insect. This decrease in female as well as male longevity was very highly significant at doses of 80 and 100 µg/insect.

Treatment with the extract significantly prolonged the pre-oviposition period. It reached to 7.2 days after treatment with the highest dose (100 µg/insect) , compared with that of controls which was 4 days only.

The extract causes very highly significant effect in shortning of the oviposition period. This period decreases with the increase of dose. It reached 0.66 day at the highest dose (100 µg/insect), compared with that of control which was 11 days (Figure 15). The extract had no marked effect on the post-oviposition period.

Number of ovipositional times was found to be dosage-related. It was 2 times only at a dose of 100µg/insect compared with that of

controls which was 7 times. This decrease was very highly significant at all doses used except at a dose of 20 µg/insect, where it was nonsignificant .

The extract had no effect on the mating of the treated flies. These flies were observed to mate after 2 or 3 days after treatment. On the other hand, the extract had a very highly significant effect on reducing the number of eggs laid per female (Fecundity) at all doses used. The reduction in fecundity appeared to be dosage-dependant. It decreases with the increase of dose to reach 23.75 eggs after treatment by the highest dose (100 µg/insect) , while it was 117.61 eggs per female in controls. The extract proved to have no effect on the hatchability of these eggs.

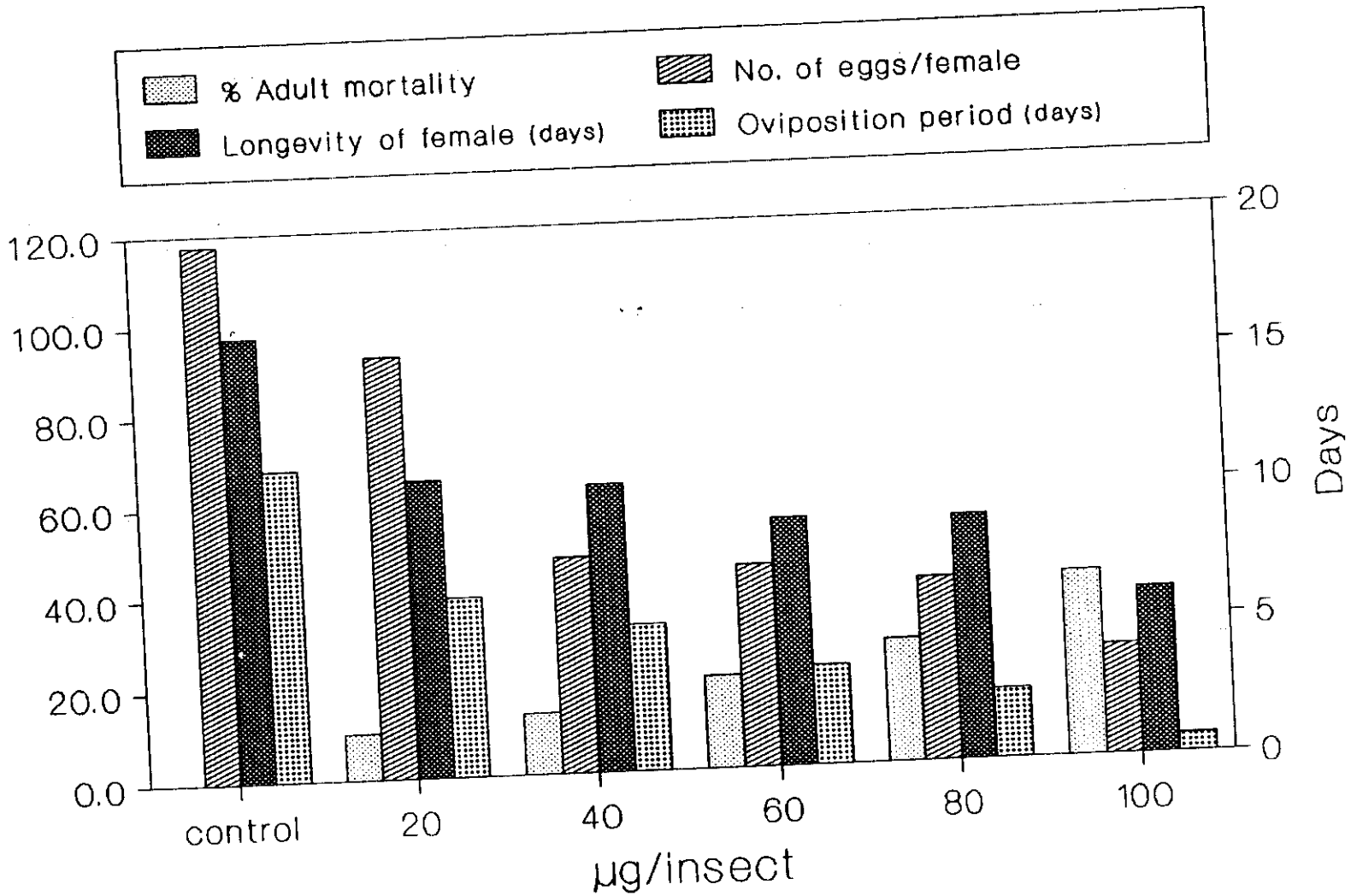
In conclusion, both water and alcoholic extracts of *C. procera* were more effective on early 3rd larval instar of *M.domestica* than on late 3rd larval instar. Adult emergence percent in case of water and alcoholic extracts on early third larval instar was 24% and 33.33% respectively at the highest dose, while it was 46.66% and 57.33% respectively in case of late 3 rd larval instar. The effect of water extract on adult stage was considerable. The percentage of adult mortality was 50% at the highest dose. Therefore, it is clear that early 3rd larval instar was the most susceptible stage for *C. procera* extracts.

Table (16) : Effect of water extract of *Calotropis procera* on some biological aspects of adult stage of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected Adult mortality after 4 days	0.00	10.00	13.33	20.00	26.67	40.00
Longevity of male in days ± S.E.	15.80 ± 0.91	13.50 ± 1.49 *	12.53 ± 1.63*	11.90 ± 1.01*	10.53 ± 1.35***	9.60 ± 1.49***
Longevity of female in days ± S.E.	16.20 ± 0.78	10.80 ± 0.90**	10.47 ± 1.44**	9.00 ± 1.40 **	8.87 ± 1.42***	6.00 ± 1.50***
Pre-oviposition period in days ± S.E.	4.00 ± 0.27	5.00 ± 0.27*	5.30 ± 0.27*	6.30 ± 0.27*	6.10 ± 0.27**	7.20 ± 0.27***
Oviposition period in days ± S.E.	11.30 ± 0.47	6.50 ± 0.47**	5.30 ± 0.27***	3.60 ± 0.47***	2.50 ± 0.47***	0.66 ± 0.47***
Post - oviposition period in days ± S.E.	1.00 ± 0.27	1.00 ± 0.27	1.00 ± 0.47	1.00 ± 0.27	1.00 ± 0.27	0.00
No.of ovipositional times	7.00 ± 0.27	6.00 ± 0.27	3.00 ± 0.47***	2.00 ± 0.27***	2.00 ± 0.29***	2.00 ± 0.27***
Mean No. of eggs laid per female	117.60 ± 0.11	92.35 ± 0.22***	46.94 ± 0.07***	43.95 ± 0.05***	39.73 ± 0.35***	23.75 ± 0.27***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (19): Effect of water extract of *Calotropis procera* on some biological aspects of adult stage *of Musca domestica.*



d-EFFECT OF *ZYGOPHILLUM ALBUM* EXTRACTS ON SOME DEVELOPMENTAL STAGES OF *MUSCA DOMESTICA*

1- Effect of water extract of *Z.album on* early 3rd larval Instar :-

The water extract of *Z. album* causes considerable percentage of larval mortality compared with control. It was found to be dosage-dependant. It increases with the increase of doses and time. It reached a maximum value of 40% at the highest dose (100 µg/larvae) after 72 hours from application (Figure 20).

Pupal mortality was found in relationship with dose applied. The highest dose causes considerably high percentage of pupal mortality. It reached 17.33% at the highest dose (100µg/larvae) (Figure 20). As a result of extract treatment, a relatively low percent of deformed pupae were occurred. Its percent was not dosage-dependant. All deformed pupae failed to emerge adult (Table 17).

The extract affected the development of the early 3rd larval instar by shortning their larval duration. The mean larval duration seemed to be dose-related. It decreases with the increase of dose. It reached its minimum value of 3.32 days compared with untreated counterparts which was 3.66 days. Statistical analysis of the data revealed that, it was nonsignificant at doses of 20 and 40 µg/larvae, significant at 60µg/larvae, highly significant at doses of 80 and 100 µg/larvae.

On the other hand, the mean pupal duration was not markedly affected, i.e, no significant difference was found between the mean pupal duration of the treated and untreated pupae in the case of treated larvae.

Adult emergence percent in the case of treated larvae was decreased with the increase of dose of treatment. It decreases from 98.66% in control groups to 42.66% at the highest dose (100 µg/larvae). On the other hand, deformed adults percent was not dosage-dependant. It was; 6.66, 6.66, 4, 5.33 and 5.33% at doses of 20, 40,60, 80 and 100 µg/larvae. The survival of deformed adults was extremely short and does not exceed 24 hours.

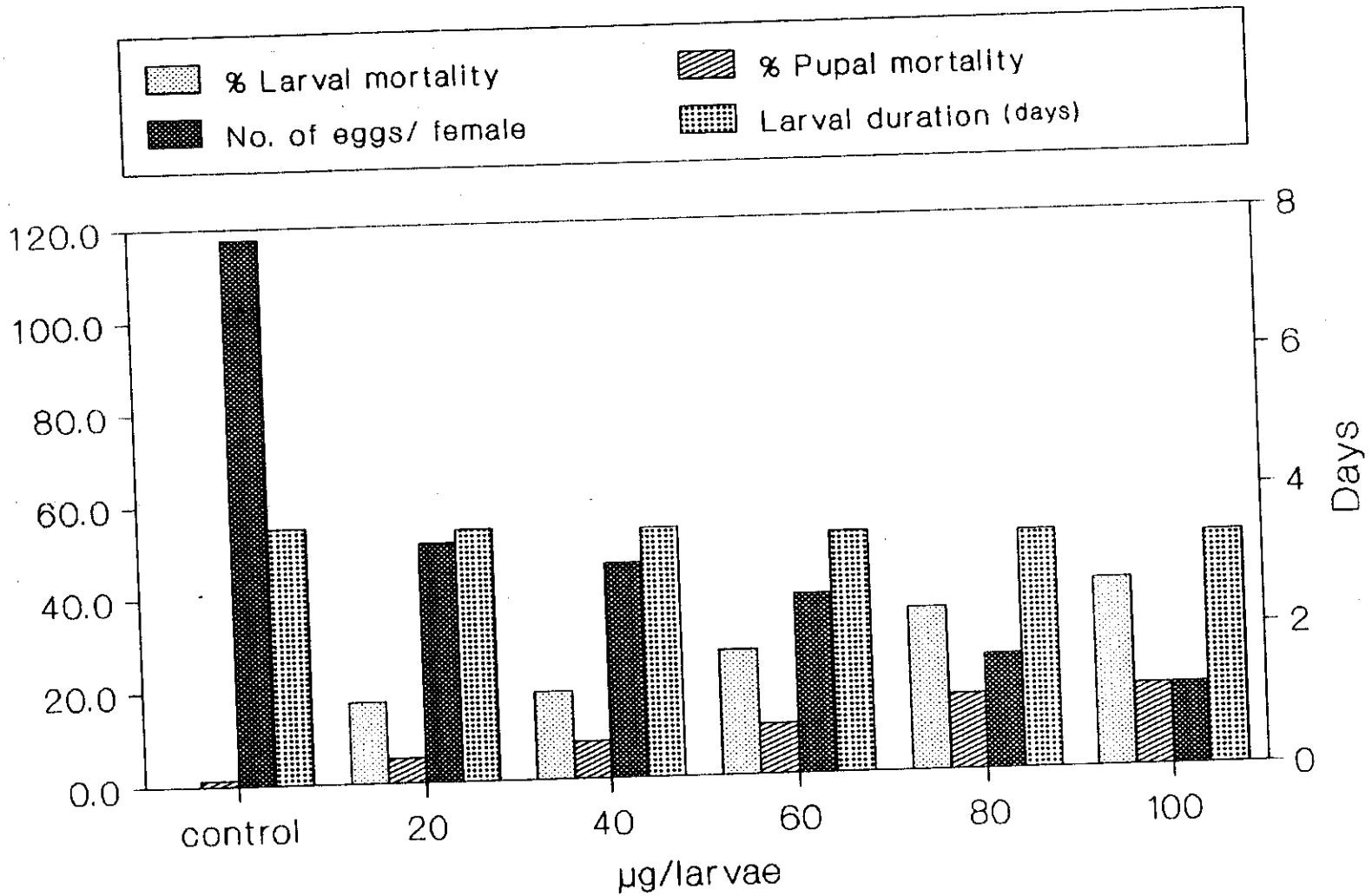
Treatment with the extract had a very highly significant effect on reducing the fecundity of females which resulting from the treated larvae . Reduction in fecundity was in relationship with the dose applied. It decreases with the increase of dose. It reached 17.34 eggs per female at the highest dose (100 µg/larvae) compared with control fecundity which was 117.61 eggs per female. Daily observation revealed that, this reduction in fecundity was not due to lack in mating. These flies observed to mate after 2 days from eclosion. Data also denotes that, the extract had no effect on the hatchability of the deposited eggs.

Table (17) : Effect of water extract of *Zygophillum album* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	8.00	10.66	17.33	24.00	32.00
% Corrected larval mortality after 48h.	0.00	13.33	16.00	25.33	29.33	34.66
% Corrected larval mortality after 72h.	0.00	17.33	18.66	26.67	34.66	40.00
% pupal mortality	1.33	5.33	8.00	10.66	16.00	17.33
% Deformed pupae	0.00	0.00	0.00	4.00	6.66	4.00
Larval duration in days ± S.E.	3.66 ± 0.05	3.60 ± 0.09	3.56 ± 0.06	3.44 ± 0.08*	3.39 ± 0.08**	3.32 ± 0.06**
Pupal duration in days ± S.E.	4.30 ± 0.04	4.18 ± 0.17	4.17 ± 0.16	4.19 ± 0.18	4.14 ± 0.14	4.14 ± 0.24
% Adult emergence	98.66	77.33	73.33	62.66	49.33	42.66
% Deformed adults	0.00	6.66	6.66	4.00	5.33	5.33
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	51.08 ± 0.32***	45.85 ± 0.40***	38.23 ± 0.05***	24.42 ± 0.15***	17.34 ± 0.10***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (20): Effect of water extract of *Zygophillum album* on the development of early 3 rd larval instar of *Musca domestica*



2- Effect of alcoholic extract of *Z. ablum* on early 3rd larval instar :-

The percentage of larval mortality varied according to dose applied. It increases with the increase of dose applied and time following treatment (after 24,48 and 72 hours). Total corrected larval mortality after 72 hours was 41.34% at the highest dose (100 µg/larvae).

Data shown in table (18) indicates that, there was a direct relationship between dose applied and magnitude of pupal mortality. It increases to reach 18.66% after treatment with the highest dose (100 µg/larvae) . Some deformed pupae were produced as a result of extract treatment. Its percent was not dosage-related. Complete inhibition of adult emergence from these deformed pupae was occurred.

Time required to complete larval development after extract application decreases with the increase of dose. It reached its minimum value of 2.98 days after treatment with the highest dose (100 µg/larvae), comapred with that of controls which was 3.5 days. This decrease was nonsignificant at doses of 20 and 40 µg/larvae and of very high significance at all other doses used. This means that, the extract accelerates the development of early 3 rd larval instar by shortning their larval duration.

On the other hand, the extract had no significant effect on the mean pupal duration. It somewhat decreases than controls but with nonsignificant values.

The percentage of adult emergence, in the case of treated larvae, was found to be dosage-related, i.e., the highest dose excerts more inhibition of adult emergence. It was 36% at the highest dose (100 µg/larvae) while it was 92% in untreated counterparts. The percentage of deformed adults was not dosage-dependant. Deformed adults were not survived.

Very highly significant difference between the number of eggs laid by female, treated as early 3rd instar, and those of controls. The latter laid more than three times as many eggs as flies treated as larvae with the highest dose. As shown in table (18) and figure (21) the reduction in fecundity appeared to be dosage-dependant. It decreases with the increase of dose. It reached 26.37 eggs per female compared with 93.6 eggs per female in controls. On the other hand, the extract did not affect the mating of the emerged flies, they observed to mate after 2 days from eclosion. The extract had no marked effect on the hatchability of their eggs.

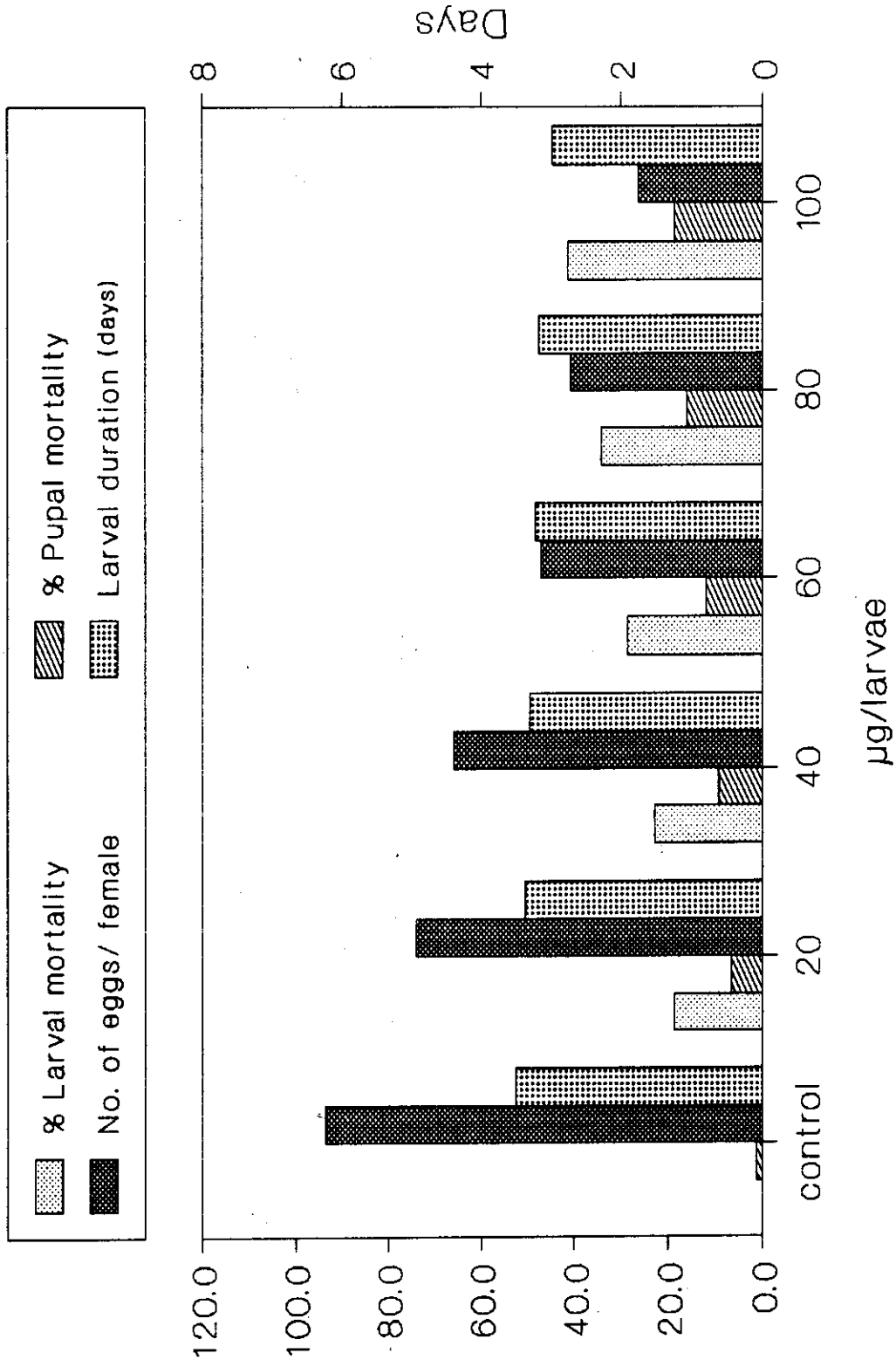
Form the previous results it is obvious that, both water and alcoholic extract of *Z. album* when applied against early 3rd larval instar,the major part of mortality was during the larval stage.

Table (18) : Effect of alcoholic extract of *Zygophillum album* on the development of early 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	8.57	11.43	18.58	28.57	38.57
% Corrected larval mortality after 48h.	0.00	18.57	22.86	28.57	34.29	41.43
% Corrected larval mortality after 72h.	0.00	18.57	22.86	28.57	34.29	41.43
% pupal mortality	1.33	6.66	9.33	12.00	15.99	18.66
% Deformed pupae	0.00	2.66	6.66	5.33	4.00	6.66
Larval duration in days ± S.E.	3.50 ± 0.05	3.37 ± 0.10	3.30 ± 0.10	3.22 ± 0.08***	3.17 ± 0.08***	2.98 ± 0.09***
Pupal duration in days ± S.E.	4.47 ± 0.01	4.41 ± 0.26	4.41 ± 0.26	4.41 ± 0.25	4.38 ± 0.24	4.38 ± 0.25
% Adult emergence	92.00	69.33	62.66	54.66	45.33	36.00
% Deformed adults	0.00	5.33	4.00	4.00	4.00	5.33
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.27	74.03 ± 0.24***	65.94 ± 0.40***	47.16 ± 0.07***	40.84 ± 0.10***	26.37 ± 0.20***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (21): Effect of alcoholic extract of *Zygophillum album* on the development of early 3 rd larval instar of *Musca domestica* .



3 - Effect of water extract *Z. album* on late 3rd larval instar :-

The extract had a very low effect on larval mortality. The highest dose (100 µg/larvae) causes larval mortality percent not exceeding about 8%. As shown in table (19) and figure (22), the percentage of larval mortality increases by increase of dose and time following application (after 24 and 48 hours).

On the other hand, the major part of mortality was during the pupal stage. It increases with the increasing of dose to reach 21.33% after treatment with the highest dose (100 µg/larvae) (Figure 22). The extract causes a considerable percent of pupal abnormalities which was not dosage-dependant. Failure of adults emergence from these deformed pupae was occurred.

The mean larval duration of the treated larvae with water extract was in striking pattern of dosage-dependant duration. It decreases with the increase of dose to reach 2.1 days at the highest dose (100 µg/larvae), compared with that of controls which was 2.47 days (Figure 22). This means that, the water extract of *Z. album* accelerates the development of late 3rd larval instar by shortning their larval duration. This decrease was found to be significant only at doses of 80 and 100 µg/larvae.

Mean pupal duration was found to be not significantly affected by this extract. It somewhat decreases than controls but with nonsignificant values.

The percentage of adult emergence, in the case of treated larvae, was found to be dosage-dependant. The highest dose causes relatively low percent of adult emergence. It was 70.67% at a dose of 100 µg/larvae compared with that of controls which was 98.66%. The percentage of deformed adults produced as a result of extract application was greater than that produced by the application of the same extract on early 3rd larval instar. Its percent was not dosage-dependant. All deformed adults survived for a very short time (24 hours after emergence).

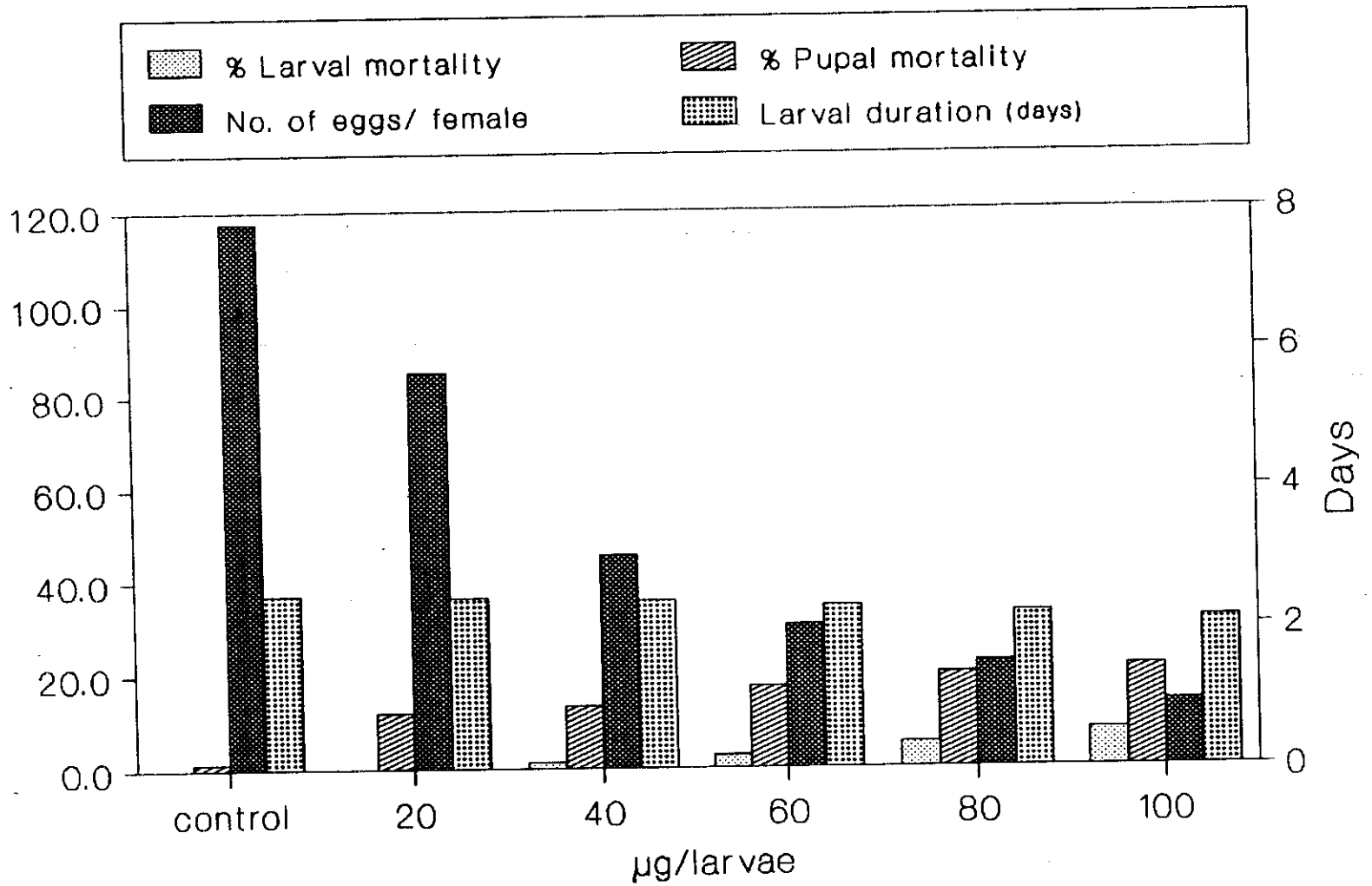
Treatment with the extract had no effect on mating of normal adults emerged from larval treatment. Flies were observed to mate after 2 days from eclosion. On the other hand, the extract had a very highly significant effect on reducing the number of eggs laid per female (fecundity) at all doses used. Data in table (19) and figure (22) revealed a striking pattern of dosage-dependant fecundity. It decreases with the increase of dose to reach 13.93 eggs per female at the highest dose (100 µg/larvae) compared with that of controls which was 117.61 eggs per female.

Table (19): Effect of water extract of *Zygophillum album* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	0.00	1.33	2.66	4.00	5.33
% Corrected larval mortality after 48h.	0.00	0.00	1.33	2.66	5.33	8.00
% pupal mortality	1.33	12.00	13.33	17.33	20.00	21.33
% Deformed pupae	0.00	10.66	12.00	6.66	12.00	13.33
Larval duration in days ± S.E.	2.47 ± 0.05	2.43 ± 0.08	2.38 ± 0.07	2.30 ± 0.08	2.20 ± 0.08*	2.10 ± 0.14*
Pupal duration in days ± S.E.	4.50 ± 0.05	4.44 ± 0.07	4.44 ± 0.03	4.42 ± 0.09	4.42 ± 0.09	4.41 ± 0.06
% Adult emergence	98.66	88.00	85.33	78.66	74.67	70.67
% Deformed adults	0.00	16.00	17.33	16.00	12.00	13.33
Mean No. of eggs laid per female ± S.E.	117.61 ± 0.25	85.20 ± 0.25***	45.56 ± 0.20***	30.47 ± 0.20***	22.51 ± 0.20***	13.93 ± 0.23***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (22): Effect of water extract of *Zygophillum album* on the development of late 3 rd larval instar of *Musca domestica* .



4- Effect of alcoholic extract of *Z. album on* late 3rd larval instar:-

At the dose tested to calculate the percentage of larval mortality after 24 and 48hours from application. It was found that, population was not highly affected by this extract, most larvae were pupated. This percentage was increased with the increase of dose. It reached 16% at the highest dose (100 µg/larvae). (Figure 23).

Our data revealed that, the bulk of mortality was in the pupal stage. The percentage of pupal mortality was dosage-dependant. It increases with the increase of dose to reach 22.66% after treatment by the highest dose (100 µg/larvae) (Figure 23). The malformed pupae formed from the treatment of late 3rd larval instar, with this extract, was not dosage-dependant. It was; 5.33, 8,8, 5.33 and 6.66% at doses of ; 20,40,60, 80 and 100 µg/larvae, repectively. All deformed pupae failed to emerge adults.

Time required to complete larval development after extract application was found to be dosage-related. It decreases from 2.49 days in control groups to 2.05 days after treatment by the highest dose (100 µg/larvae) (Figure 23). This means that, the extract accelerates the development of late 3rd larval instar by shortning their larval duration. This decrease was significant at doses of 80 and 100 µg/larvae only.

On the other hand, the extract had no effect on the mean pupal duration, i.e, no significant differences were found between the mean

pupal duration of the treated pupae developing from treated larvae and untreated one.

It is clear from table (20) that, the percentage of adult emergence decreases by increasing of the dose. It reached 61.33% at a dose of 100 µg/larvae compared with 98.66% in controls. A considerable percent of deformed adults were produced as a result of extract treatment. Its percent was not dosage-dependant. All deformed adults survived for a very short time (24 hours after emergence).

Treatment with the extract had a very highly significant effect on reducing the number of eggs laid per female (Fecundity) at all doses used. As shown in figure (23), the reduction in fecundity decreases with the increase of dose. It reached its minimum value of 30.85 eggs per female after treatment with the highest dose (100 µg/larvae), while it was 93.6 eggs per female in controls. The extract had no marked effect on the hatchability of the deposited eggs.

In conclusion, it is clear that, all doses of water and alcoholic extracts of *Z. album*, when applied against late 3rd larval instar, pupal mortality was found to be higher than larval mortality, i.e, the bulk of mortality was during the pupal stage.

Table (20) : Effect of alcoholic extract of *Zygophillum album* on the development of late 3rd larval instar of *Musca domestica*.

Treatment / Observations	Control	Alcoholic extract doses				
	1 µL of ethyl alcohol	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected larval mortality after 24h.	0.00	2.66	5.33	6.66	8.00	10.66
% Corrected larval mortality after 48h.	0.00	5.33	8.00	9.33	12.00	16.00
% pupal mortality	1.33	5.33	8.00	14.66	18.66	22.66
% Deformed pupae	0.00	5.33	8.00	8.00	5.33	6.66
Larval duration in days ± S.E.	2.49 ± 0.05	2.40 ± 0.13	2.32 ± 0.13	2.23 ± 0.06	2.15 ± 0.08*	2.05 ± 0.08**
Pupal duration in days ± S.E.	4.28 ± 0.06	4.26 ± 0.05	4.24 ± 0.06	4.25 ± 0.06	4.21 ± 0.07	4.16 ± 0.07
% Adult emergence	98.66	89.33	84.00	76.00	69.33	61.33
% Deformed adults	0.00	14.66	14.66	12.00	14.66	10.66
Mean No. of eggs laid per female ± S.E.	93.60 ± 0.07	65.50 ± 0.20***	59.50 ± 0.20***	50.00 ± 0.10***	41.60 ± 0.14***	30.85 ± 0.03***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

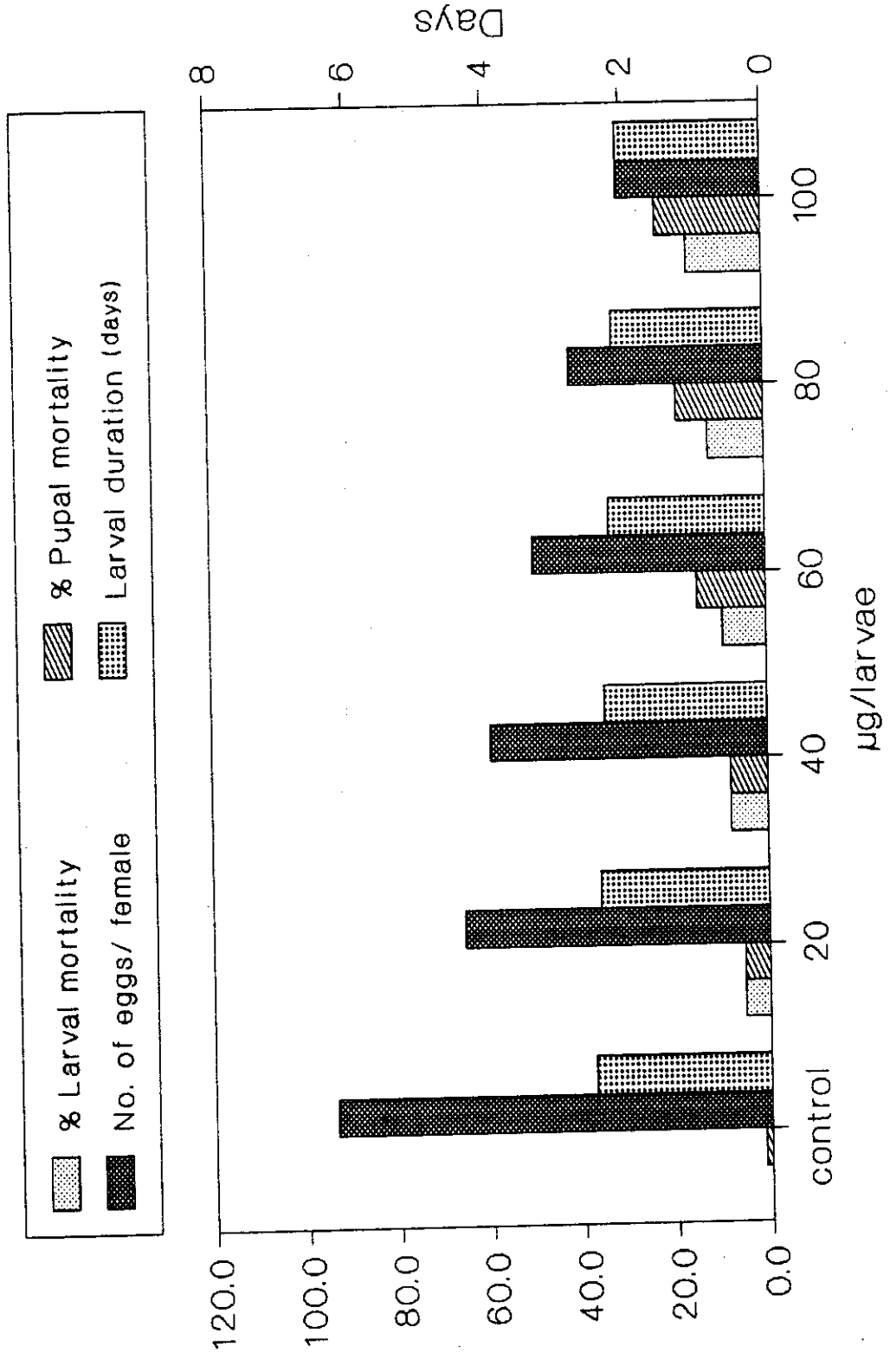


Figure (23): Effect of alcoholic extract of *Zygophillum album* on the development of late 3 rd larval instar of *Musca domestica* .

5- Effect of water extract of *Z. album* on some biological aspects of adult stage :-

The percentage of adult mortality in the first four days after application was varied according to dose applied. It increases with the increase of dose to reach 50% at the highest dose (100 µg/insect) (Figure 20).

As shown in table (21) it is clear that, the longevity of females was shorter than that of males and both were decreased with the increase of dose. It was 6.2 and 9.2 day for both sexs respectively at 100 µg/insect. This decrease in the logevity of both sexs was very highly siginificant at higher doses; 60,80 and 100 µg/insect.

Pre-oviposition period was significantly prolonged as a result of treatment with this extract. It reached 7 days after treatment by the highest dose (100 µg/insect), compared with that of controls which was 4 days. This prolongation was significant at doses of 40 and 60 µg/insect and of very highly significance at doses of 80 and 100 µg/insect. On the other hand, the extract proved to shortned the oviposition period. It reached to its minimum value of 0.66 day after treatment by the highest dose (100 µg/insect) compared with that of controls which was 11 days (Figure 24). This shortage of oviposition period was very highly significant at all doses used. The extract had no marked effect on the post-oviposition period. As represented in table (21), it was found that, the number of ovipositional times was

decreased as a result of extract treatment. It decreases from 7 times at controls to 1.3 times after treatment by the highest dose (100 µg/insect). This decrease was highly significant at a dose of 20 µg/insect and of very high significance at all other doses.

The extract had a very higly significant effect on reducing the fecundity of treated females. Reduction in fecundity was in relationship with the dose applied. It decreases with the increase of dose. It reached 18.99 eggs per female after application of the highest dose (100 µg/insect) compared with controls fecundity which was 117.6 eggs/female. Daily observation revealed that, the extract had no effect on the mating of the treated flies and had no marked effect on the hatchability of their eggs.

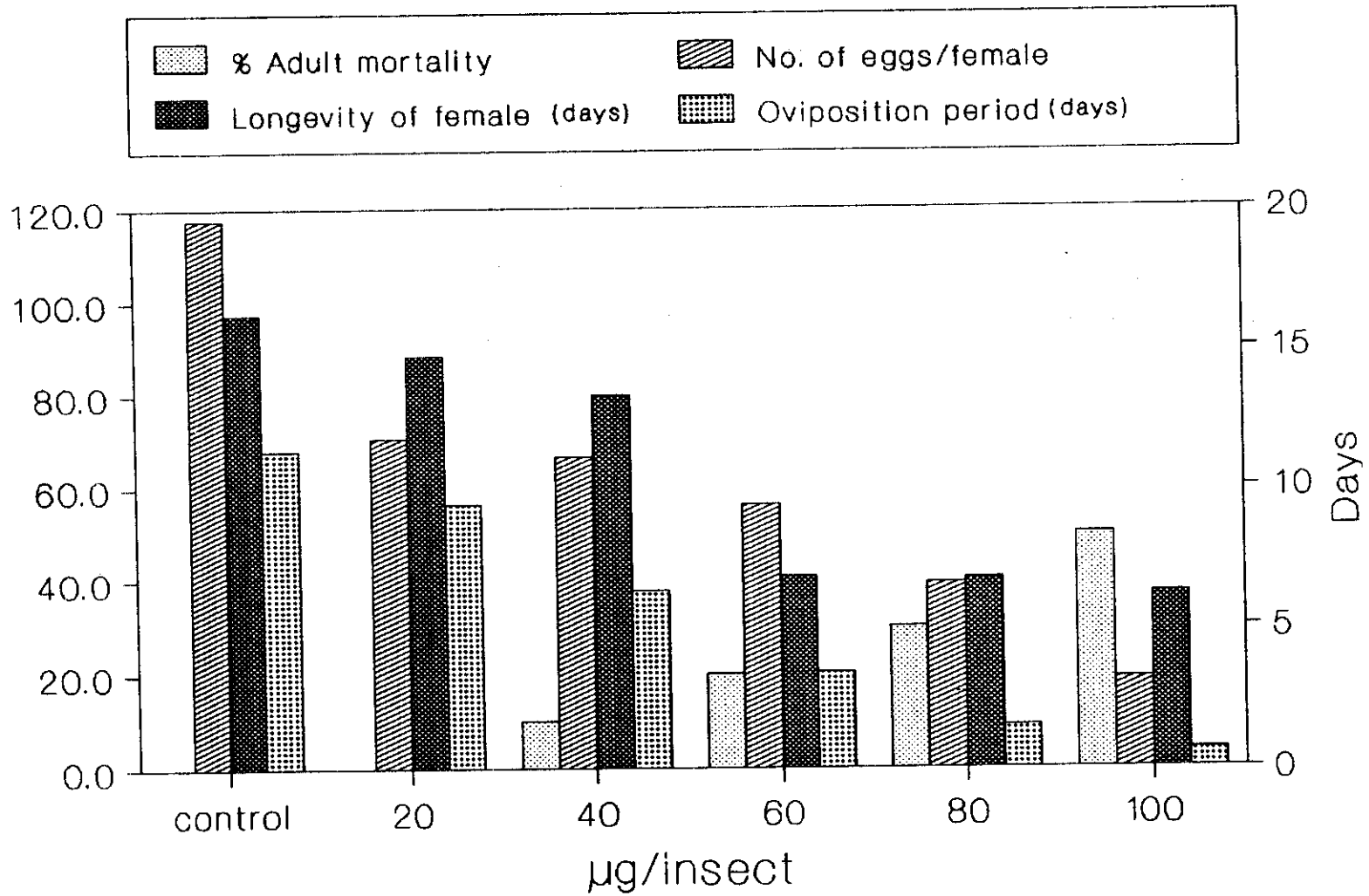
In conclusion, it is clear that both water and alcoholic extract of *Z. album* were more effective against early 3rd larval instar than late 3rd larval instar of *M. domestica*. Adult emergence percent in case of water and alcoholic extracts on early 3rd larval instar was 42% and 36% respectively at the highest dose, while it was 70.67% and 61.33% respectively in case of late 3rd larvae instar. The effect of water extract on adult stage was satisfactory considerable. Therefore, it is clear that early 3rd larval instar can be considred as the most susceptible stage for the extracts of *Z. album*.

Table (21) : Effect of water extract of *Zygophillum album* on some biological aspects of adult stage of *Musca domestica*.

Treatment / Observations	Control	Water extract doses				
	1 µL of dist. water	20 µg/insect	40 µg/insect	60 µg/insect	80 µg/insect	100 µg/insect
% Corrected adult mortality after 4 days	0.00	0.00	10.00	20.00	30.00	50.00
Longevity of male in days ± S.E.	15.80 ± 0.91	16.20 ± 0.81	13.90 ± 1.71	14.80 ± 1.04***	9.47 ± 1.47***	9.20 ± 1.66***
Longevity of female in days ± S.E.	16.20 ± 0.78	14.73 ± 0.96	13.30 ± 1.17	6.80 ± 1.53	6.73 ± 0.96***	6.20 ± 0.62***
Pre-oviposition period in days ± S.E.	4.00 ± 0.27	5.00 ± 0.47	6.10 ± 0.27**	6.50 ± 0.27**	7.00 ± 0.47***	7.00 ± 0.27***
Oviposition period in days ± S.E.	11.30 ± 0.47	9.40 ± 0.47***	6.30 ± 0.47***	3.40 ± 0.27***	1.50 ± 0.27***	0.66 ± 0.13***
Post - oviposition period in days ± S.E.	1.00 ± 0.27	1.00 ± 0.47	1.00 ± 0.41	1.00 ± 0.45	0.00	0.00
No.of ovipositional times	7.00 ± 0.27	4.20 ± 0.47**	3.00 ± 0.47***	3.60 ± 0.27***	1.30 ± 0.47***	1.30 ± 0.33***
Mean No. of eggs laid per female	117.60 ± 0.11	70.51 ± 0.11***	66.46 ± 0.05***	56.23 ± 0.12***	39.25 ± 0.09***	18.99 ± 0.52***

Without star : nonsignificant * : significant ** : highly significant *** : very highly significant

Figure (24): Effect of water extract of *Zygophillum album* on some biological aspects of adult stage of *Musca domestica*.



e- COMPARATIVE STUDY OF THE WATER AND ALCOHOLIC EXTRACTS OF THE FOUR USED PLANTS

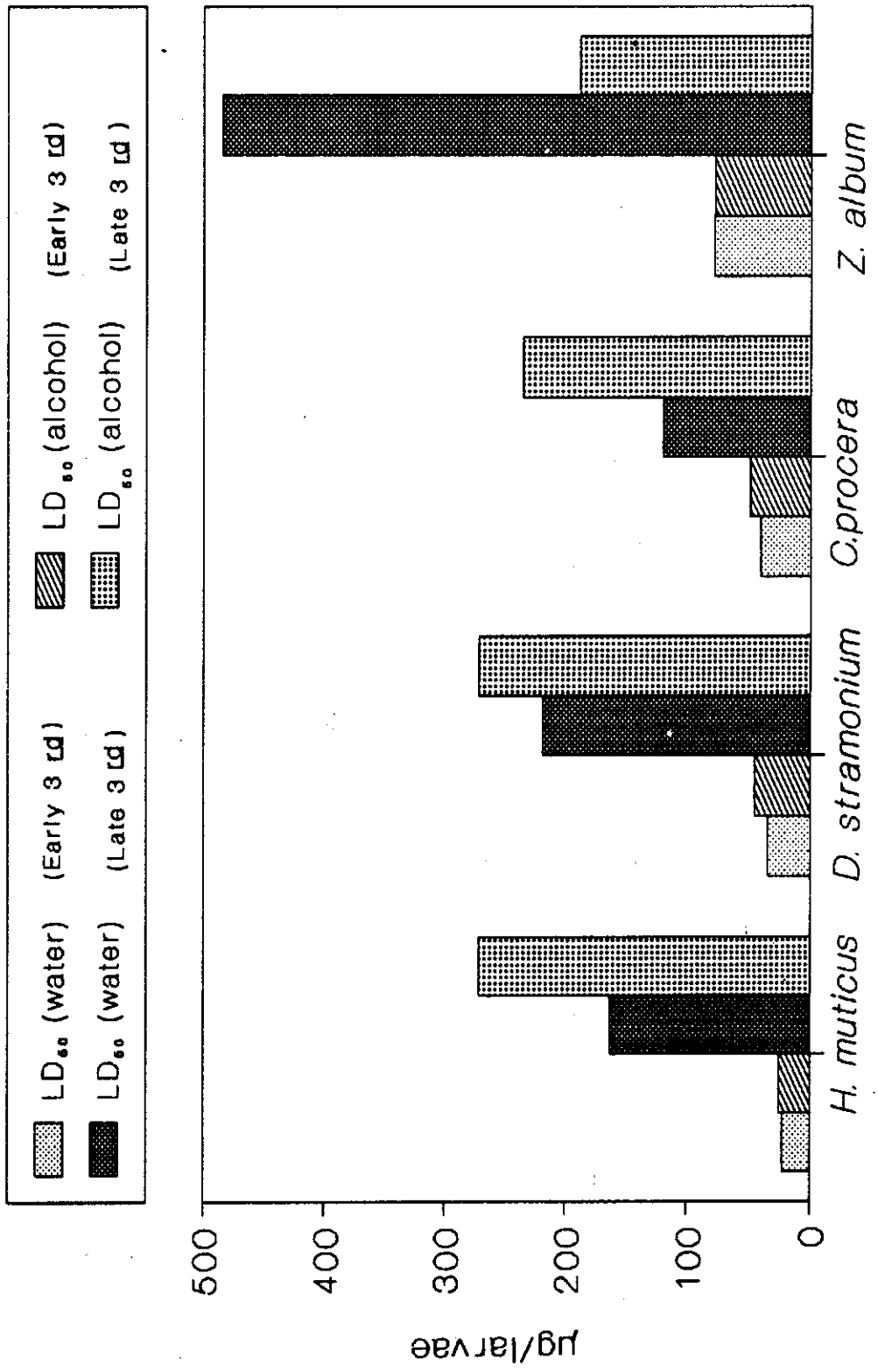
Comparison between the water and alcoholic extracts of the four used plants; *H. muticus*, *D.stramonium*, *C.procera* and *Z. album* were based on; LD50 of total mortality of treated immature stages, larval and pupal mortality percentage and percentage of reduction in fecundity after treatment of early and late 3rd larval instars of *M. domestica* with the highest dose (100 µg/larvae) of all the used extracts.

It is obvious from table (22) and figure (25) that the water extract of *H.muticus* was found to cause the highest percentage of larval mortaltiy (81.33%) after treatment of early 3rd larval instar, while the water extract of *C.procera* caused the highest percentages of pupal mortality in both early and late 3rd larval instars (45.33% and 40% respectively). It is also clear from table (22) that the water extract of *H. muticus* was the most effective extract in causing total mortality (% larval mortality + % pupal mortality) with lowest value of LD_{50} (22.6 µg/larvae) followed by the water extracts of *D. stramonium* and *C. procera* with LD_{50} values of 34.40 and 40.10 µg/larvae respectively. Water extract of *Z. album* was less effective in this respect with high value of LD50 (78.40 µg/larvae), i.e., *H.muticus* > *D.stramonium* > *C. procera* > *Z.album*. It is obvious from table (22) that, water extracts of *H.muticus*, *C.procera* and *D.stramonium* were more effective in

Table (22) : Comparative study of the effect of water and alcoholic extracts of the four used plants on immature stages of *Musca domestica*.

Plant Name	Solvent used in extraction	Early 3rd larval instar			Late 3rd larval instar		
		% Larval mortality	% Pupal mortality	LD_{50} (µg/larvae)	% Larval mortality	% Pupal mortality	LD_{50} (µg/Larvae)
Hyoscyamus muticus	Distelled water	81.33	17.33	22.60	18.67	25.33	163.30
	Ethyle alcohol	77.14	17.33	25.30	14.66	22.66	271.20
Datura stramonium	Distelled water	58.66	18.66	34.40	20.00	20.00	218.90
	Ethyle alcohol	57.14	16.00	44.70	17.33	20.00	271.00
Calotropis procera	Distelled water	30.66	45.33	40.10	13.33	40.00	120.00
	Ethyle alcohol	41.42	21.33	49.00	16.00	26.66	235.00
Zygophillum album	Distelled water	40.00	17.33	78.40	8.00	21.33	448.90
	Ethyle alcohol	41.43	18.66	78.00	16.00	22.66	187.90

Figure (25): Comparative study of the effect of water and alcoholic extracts of the four used plants on immature stages of *Musca domestica*.



causing higher percentage of total mortality in both early and late 3rd larval instars of *M.domestica* than that caused by alcoholic extracts.

As shown in table (23) and figure (26) it is clear that water extract of *Z.album* causes the highest percent of reducing fecundity in the females that treated as late and early 3rd larval instars. The water extracts of *H.muticus, D.stramonium* and *Z. album* were also found to be more effective in reducing fecundity of the females that treated as late and early 3rd larval instars than that caused by alcoholic extracts treatment.

On comparing the effectivness of the water extracts of the four used plants when applied topically against the adult stage of *M.domestica,* it is clear that water extracts of *D.stramonium* and *Z.album* caused the highest percent of adult mortality (50%).

It is clear from table (24) and figure (27) that the water extract of *D.stramonium* causes the highest reduction in females longevity (80.24%). On the other hand, the water extracts of *C.procera* and *Z. album* causes the highest reduction in oviposition period. It was 94.15% after treatment by the highest dose.

The water extracts of the four used plants were arranged according to the percent of reduction in fecundity. It was found that the water extract of *Z. album* was the most effective one in reducing the fecundity (83.84%) followed by *C.procera* and then *H. muticus,* it

was 79.80% and 66.69% respectively. *D.stramonium* extract caused the lowest percent in reduction of fecundity (52.42%), i.e, *Z. album* > *C. procera* > *H. muticus* > *D. stramonium* .

The present results denote that the water extracts of the four used plants are generally more effective than their alcoholic extracts. Even the water extract of *Z.album* which causes the lowest percent of total mortality after application on early and late 3rd larval instars was proved to cause the highest percent of adult mortality and higher percent of reduction in fecundity after treatment of adult stage and immature stages. The use of water extracts of the four used plants aganist the larval and adult stages of *M.domestica* is highly recommended.

Table (23) : Comparative study of the effect of water and alcoholic extracts of the four used plants on reducing fecundity of insects resulting from the treatment of immature stages of *Musca domestica*.

Plant Name	Solvent used in extraction	% Reduction in fecundity	
		Early 3rd larval instar	Late 3rd larval instar
Hyoscyamus muticus	Distelled water	69.37	69.98
	Ethyle alcohol	47.58	67.87
Calotropis procera	Distelled water	48.06	79.93
	Ethyle alcohol	70.08	81.58
Datura stramonium	Distelled water	67.90	83.75
	Ethyle alcohol	62.41	53.73
Zygophillum album	Distelled water	85.25	88.15
	Ethyle alcohol	71.76	67.21

Figure (26): Comparative study of the effect of water and alcoholic extracts of the four used plants on reducing fecundity of insects resulting from the treatment of immature stages of *Musca domestica.*

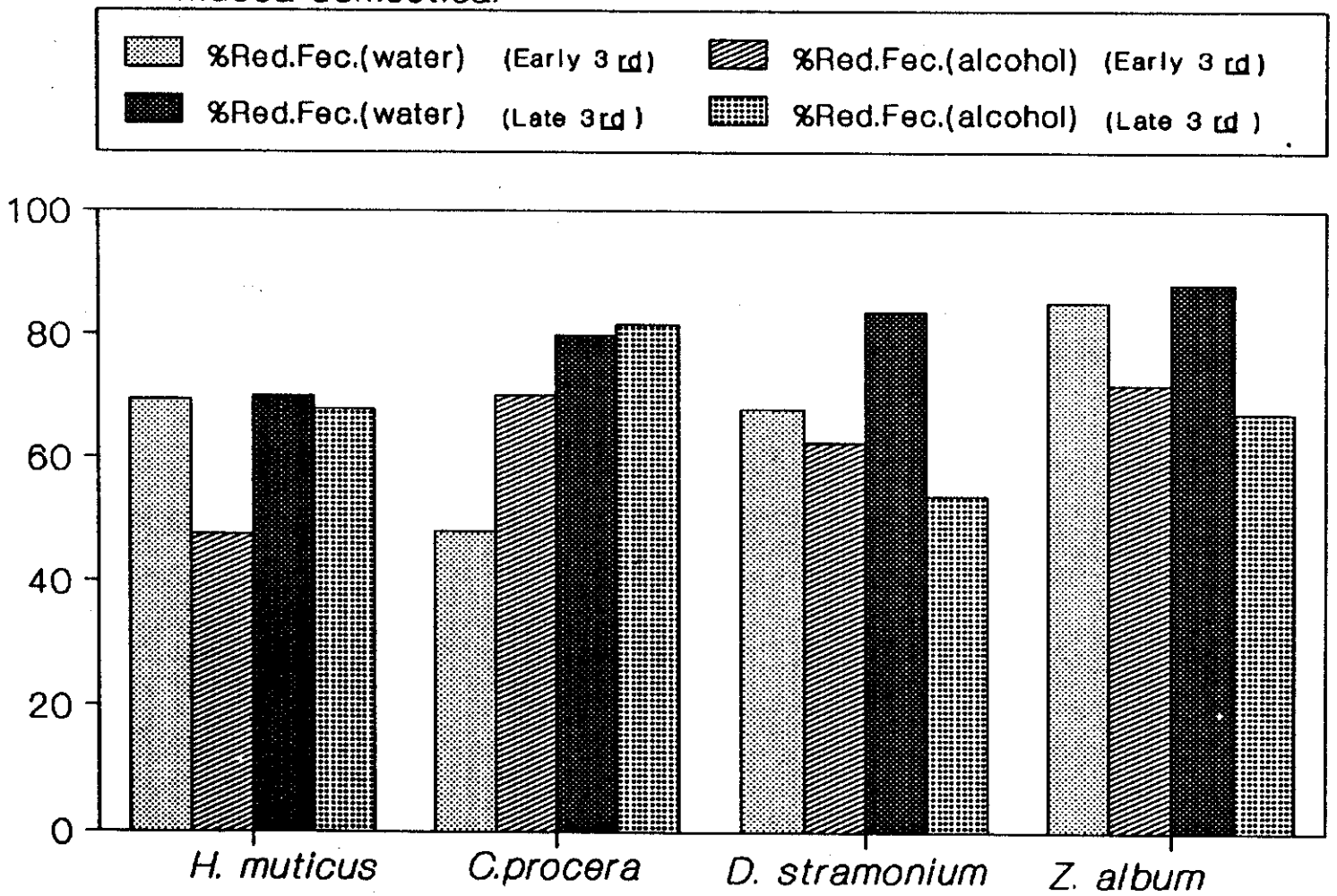
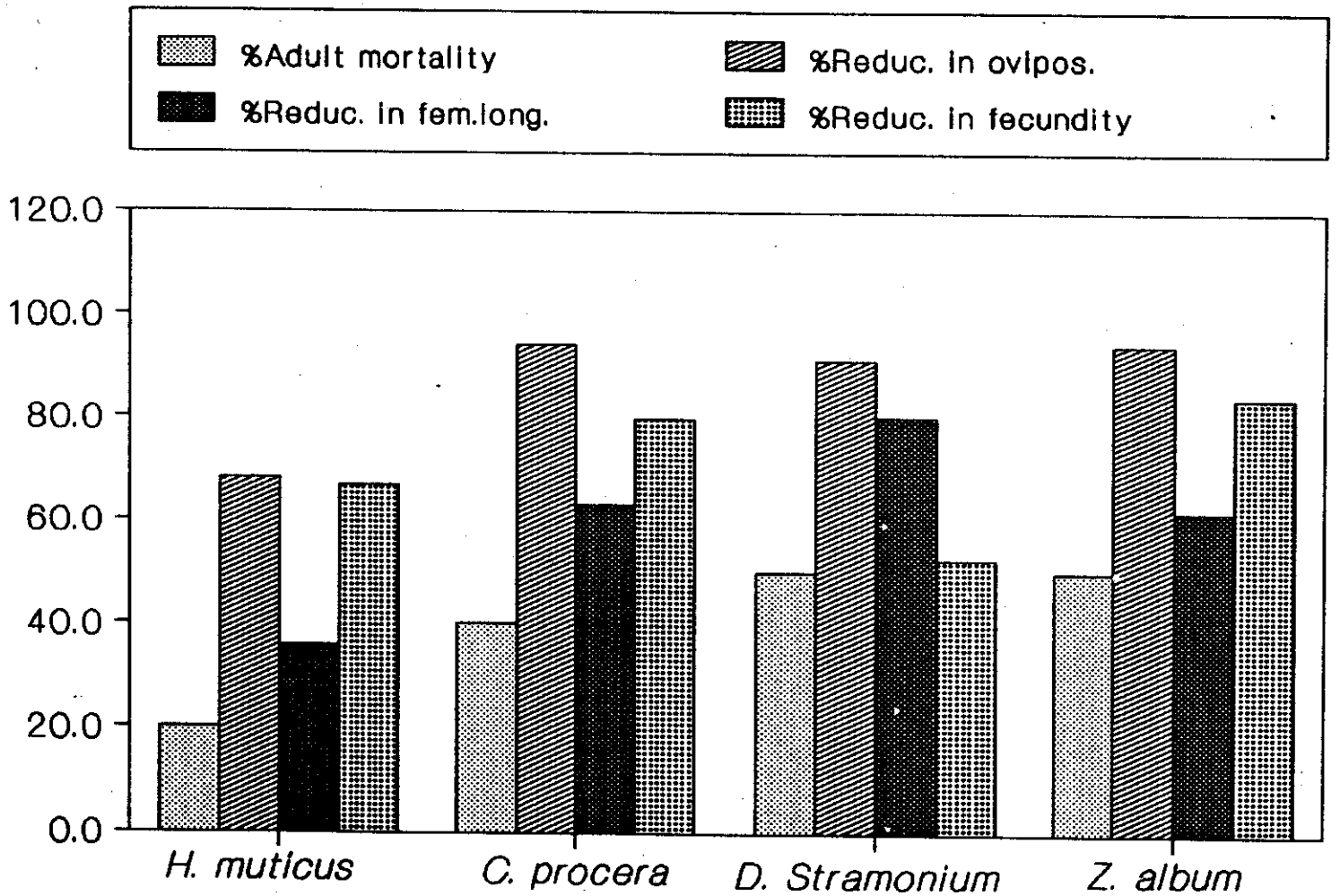


Table (24) : Comparative study of the effect of water extracts of the four used plants on adult stage of *Musca domestica*.

Plant Name	% Adult mortality in 4 days	% Reduction oviposition period	% Reduction female longevity	% Reduction in fecundity
Hyoscyamus muticus	20.00	68.14	35.80	66.69
Calotropis procera	40.00	94.15	62.96	79.80
Datura stramonium	50.00	91.15	80.24	52.42
Zygophillum album	50.00	94.15	61.72	83.84

Figure (27): Comparative study of the effect of water extracts of the four used plants on adult stages of *Musca domestica.*



B-MORPHOGENETIC ABNORMALITIES

The developmental events of larvae, pupae and adult flies, which were found dead .after treatment of late and early 3rd larval instar of *Musca domestica* with both water and alcoholic extracts of C.procera; *H.muticus*, *D. stramonium* and *Z. ablum*, could be grouped into five major categories as follow :

1- Deformed larvae :-

Larvae died without showing any transformation to pupae, i.e before reaching the prepupal stage they were normal dead larvae. They resutled 24 and 48 hours after topical treatment of early 3rd larval instar with all the used extracts (Figure 28 A). While larvae that died 72 hours after topical treatment of early 3rd larval instar and after 24, 48 hours from the treatment of late 3rd larval instar were pigmented larvae. These larvae may be pigmented with patches of brown pigment on their bodies (Figure 28 B & C), pigmented with a diffuse brownish coloring spread on their bodies (Figure 28 D), pigmented with two different pigments, black and brown (i.e, part of the body was found to be black in colour and the other was found to be brown in colour) (Figure 28 E), or larvae pigmented with black pigment (Figure 28 G & H). In some cases, pigmented larvae may be somewhat distended (Figure 28 F).

2- Larval-pupal intermediate :-

They were produced after treatment of early and late 3rd, larval instars with all the used extracts. There are two different types of these deformed individuals :-

A- Larval-pupal intermediate has a cuticle contains pupal parts with parts of still persisting last larval skin. These individuals failed to complete the pupal period and soon died (Figure 29 A ,B, & C).

B- indivduals completely covered with pupal exuvia but all the external characters are larvae. It has the same length and feature of late 3rd larval instar (Figure 30 A & B).

3- Deformed pupae :-

Different forms of deformed pupae were produced after treatment of both early and late 3rd larval instars of *M.domestica* with both water and alcoholic extracts of all the four used plants as follow:-

i- Pigmented pupae :-

Pupa with normal appearance, but pigmented with dark pigment. (Figure 31 B). This pupa falied to emerge adult.

ii- Small pupae :-

Some pupae were small in size when compared with normal one. They have normal appearance and this pupae failed to emerge adult (Figure 32).

iii- Constricted pupae :-

Fully formed pupae with conspicuous constrictions in their puparia, so that they failed to give adult stage (Figure 33 A & B)

iv- C-shaped pupae :-

It could be noticed that the segmented puparia show abnormal ventral arches of segments and form aberrant C-shaped puparia. Different shapes of C-shaped and twisted pupae were showed in figure (34 A,B,C & D).

v- Rode-like pupae :-

This types of malformed pupae was the most prevalent morphogenetic aberration observed. This almost thin and twice as long as normal pupae (Figure 35 A).

vi- Pupae with protuberance denoting anterior segments :-

In some of the deformed pupae, the anterior segments which bear the cephalopharyngeal apparatus in the larval stage, were visible, unlike normal pupae in which these anterior segments become irreversibly retracted (Figure 35B).

vii- Elongated pupae :-

Fully formed pupae, normal in all character but elongated than normal one (Figure 36 A & B).

4- Pupal-adult intermediate :-

This type of deformed individual posses the external character of pupae (covered with pupal exoskeleton), but has a distinct adult head or distinct adult head and thorax. This intermediate individuals may be elongated, pigmented twisted or twisted as shown in figure (37 A, B & C).

5- Deformed adults :-

Morphological abnormalities in adult stage were revealed after treatment of early and late 3rd larval instars of *M.domestica* with all the used extracts. These deformations appeared in the following cases :

i- Adult that cannot emerge completely from the normal dead pupae and remain attached in the puparia untill they soon die. These abonrmal looking flies attached with the pupal exuvia to different parts of their body as follow :

a- Head only eclosed from the pupal exuvia (Figure 38 A).

b- Deformed head and part of thorax eclosed (Figure 38 B).

c- Partially eclosed adult with deformed thorax and poorly developed wings. The abdomen failed to exuviat (Figure 38 C).

d- Head, legs, thorax and wing, exuviated. The eclosed thorax is deformed and wings are compresed shriveled (Figure 38 D).

e- Head, thorax, one wing, legs of one side only and part of a abdomen exuviated, but the remainder of the adult still retained within pupal exuvia (Figure 39A).

f- Pigmented thorax and crumpled wings and stiff legs are exuviated only. Abdomen and part of wings are sitll retain in the pupal exuvia (Figure 39 B)

g- All the fly eclosed, except wing and mid leg of one side failed to wriggle out the pupal exuvia (Figure 39 C).

h-Adults were completely free from the pupal exoskeleton except for the still-attached tarsi (Figure 40 A & B).

i - Adult was completely free from pupal exuvia, but the last abdominal segment still retained within the pupal exuvia (Figure 40 C).

ii- Adults succeed to get loose form the pupal exuvia. These adults possessing different forms of deformation indicating abnormal eclosion as shown in the following cases :

a- Abnormal fly with crumpled in complete bent wings (Figure 41 B).

b- Abnormal fly with deformed thorax and abdomen (Figure 42 A).

c- Deformed fly with deformed thorax and compresed twisted wings (Figure 42 B).

d- Malformed fly with obvious enlarged thorax and reduced abdomen (Figure 43 A & B).

e- Deformed fly with cruled thorax, stiff legs, slightly short abdomen and crumpled wings (Figure 44 A).

f- Deformed fly with flattened abdomen and abnormal characteristic wings

g- Abnormal fly with pigmented thorax and crumpled wings glued on their abdomen.

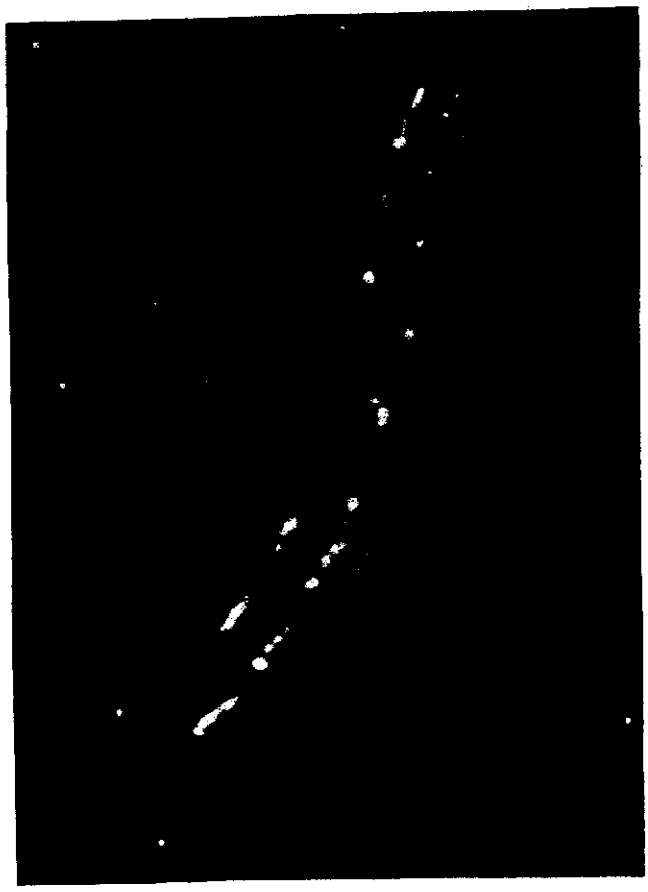
h - Abnormal fly with pigmented melanized thorax (Figure 45)

i - Abnormal fly with deformed disordered extended legs and shriveled legs (Figure 46 A).

j - Malformed fly with abnormal elongated abdomen (Figure 46 C).

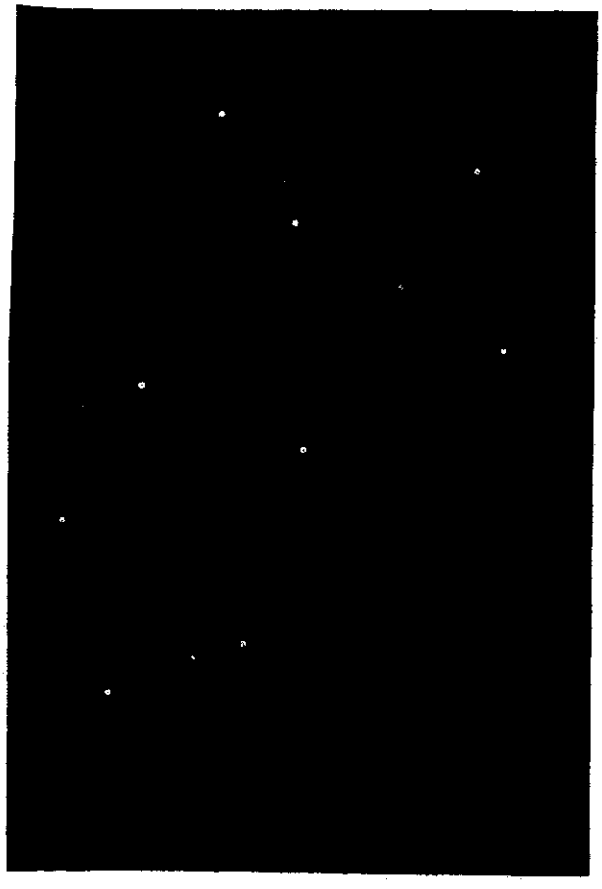
k - Adult of normal appearance, but had broken wing or had slightly crucled one wing (Figure 47 A & B).

It should be mentioned that all flies possessing one or more of the above mentioned a bnormalities did not seem capable of mating; none were able to fly and died after short period (24 hours after emergnce).



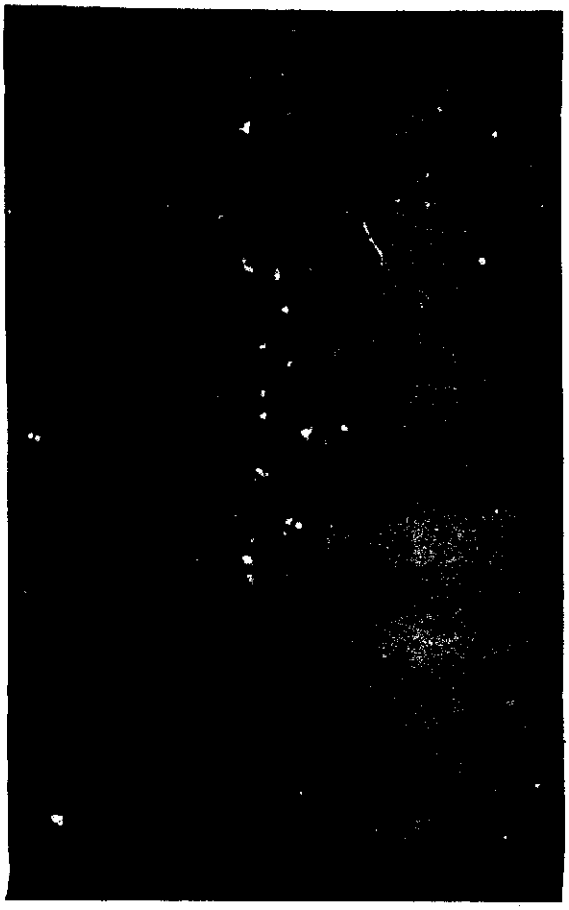
A

B



C

Figure (28) : Deformed larvae. **A-** Normal dead larvae **B-** Larvae of normal size with batches of brown pigment . **C-** C-shaped larvae pigmented with brown pigement. (X= 25).

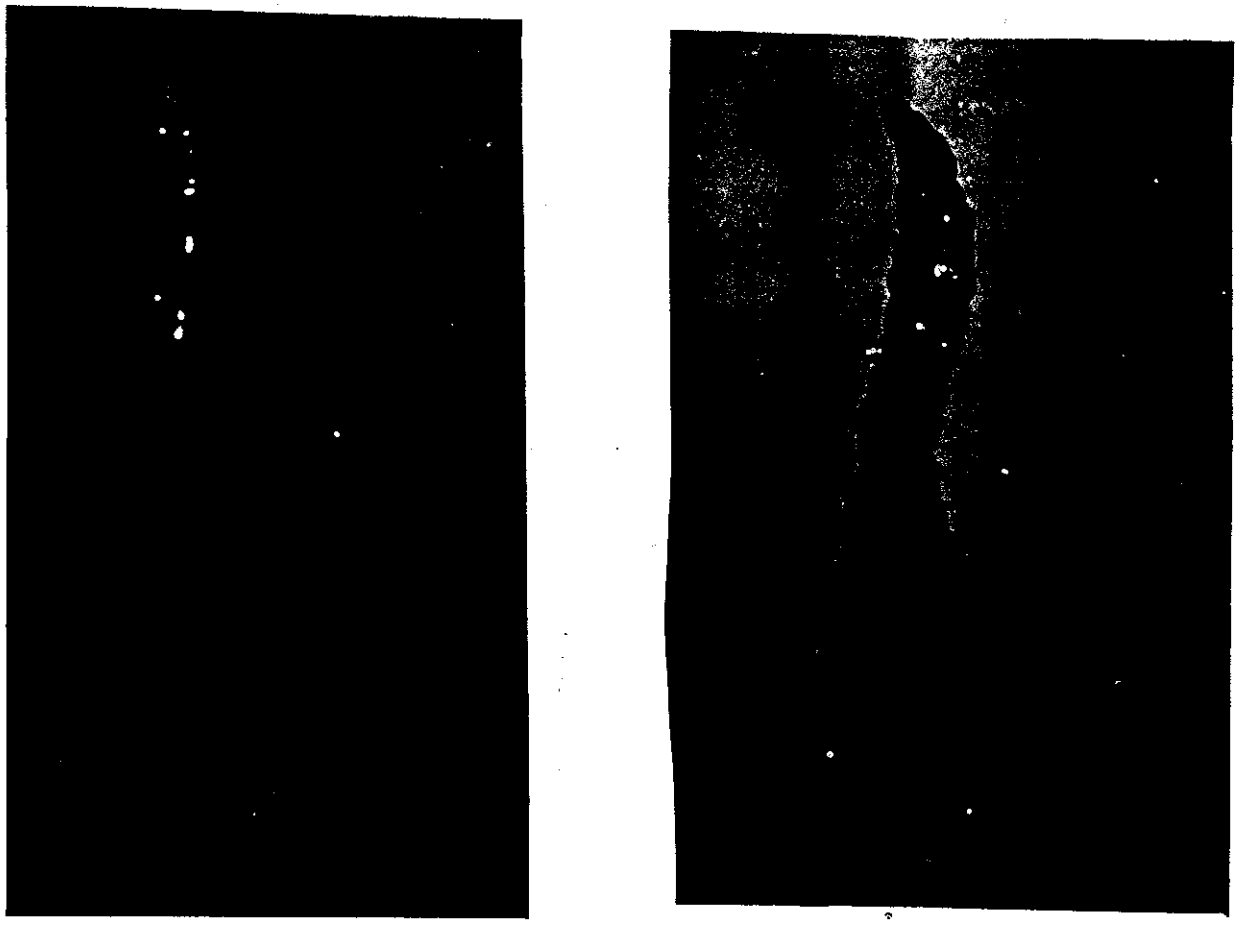


D

E

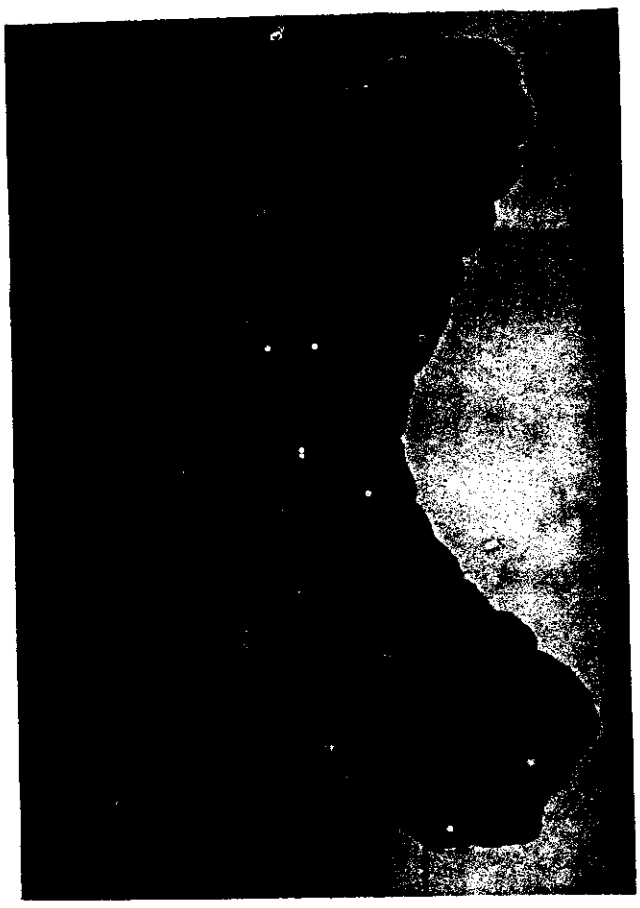
F

Figure (28) : Deformed larvae . **D-** Larvae of normal size with diffuse brownish coloring spread all over the body. **E-** Larvae of normal size but part of their body pigmented with black pigment while the other part pigmented with brown pigment.
F- Distended larvae somewhat pigmented with patches of brown and black pigment . (X= 25).



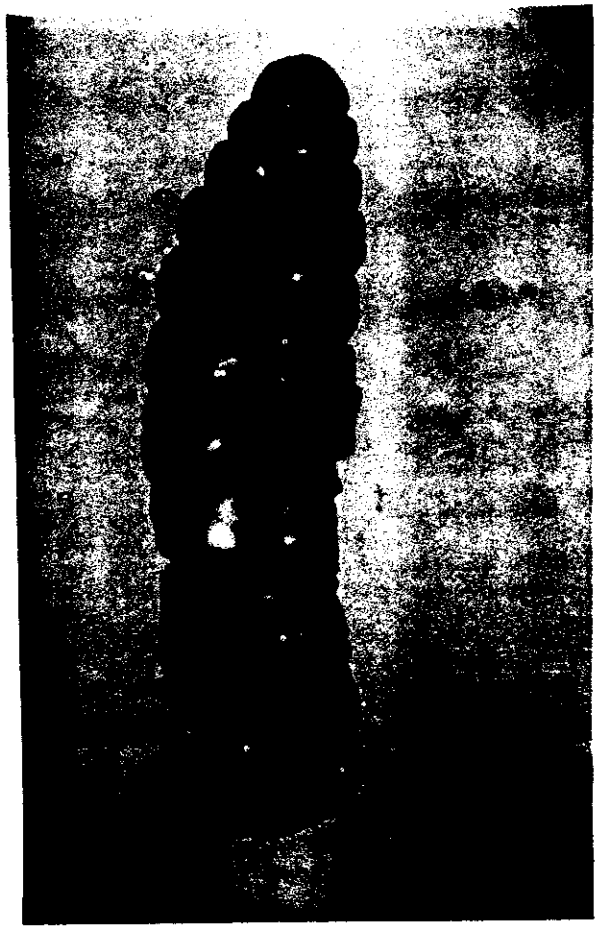
G H

Figure (28) : Deformed Larvae. **G-** Burned larvae with normal size and condensed black pigment. **H-** Burned shrinkage larvae pigmented with black pigment. (X = 25)



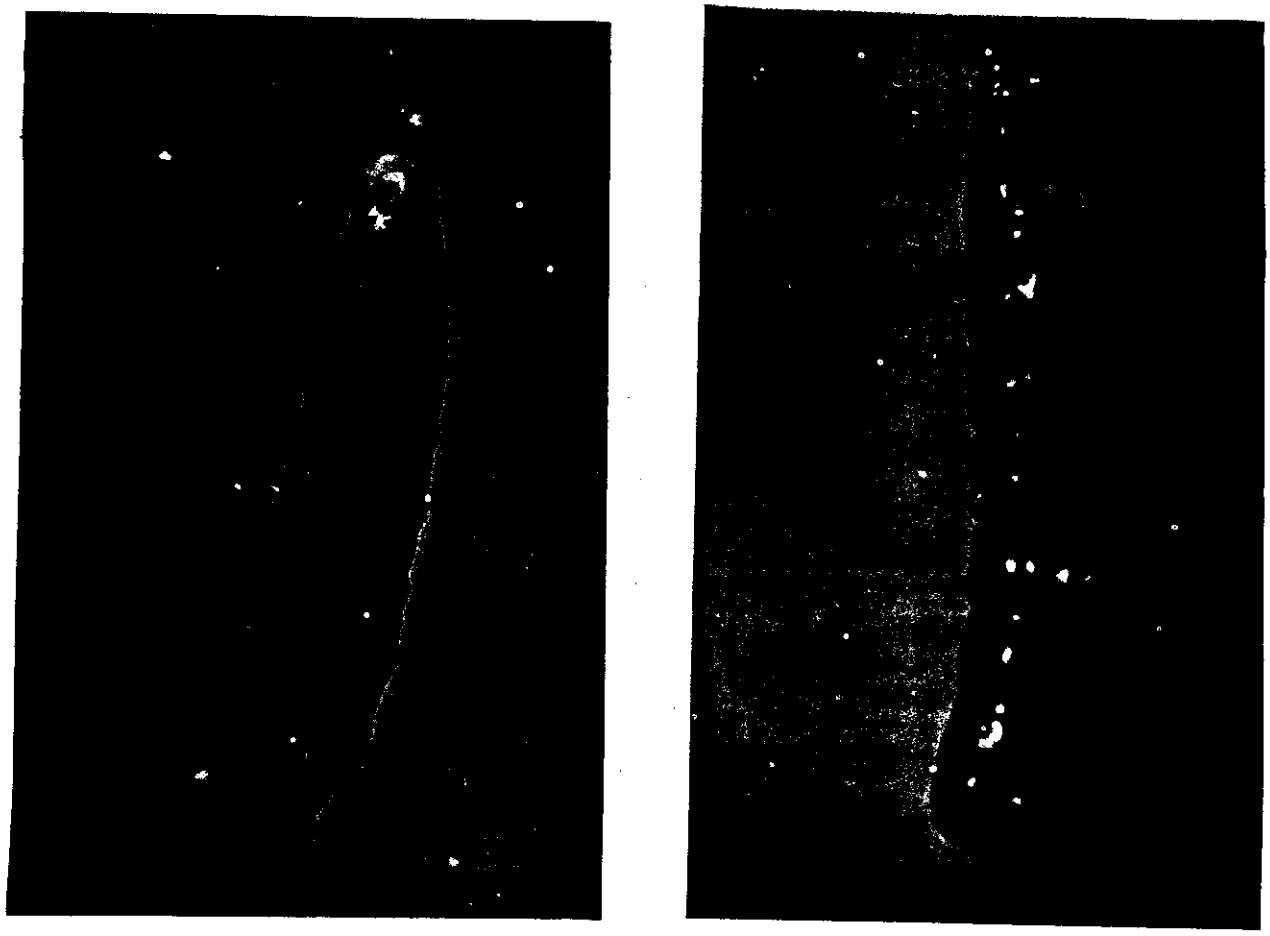
A

B



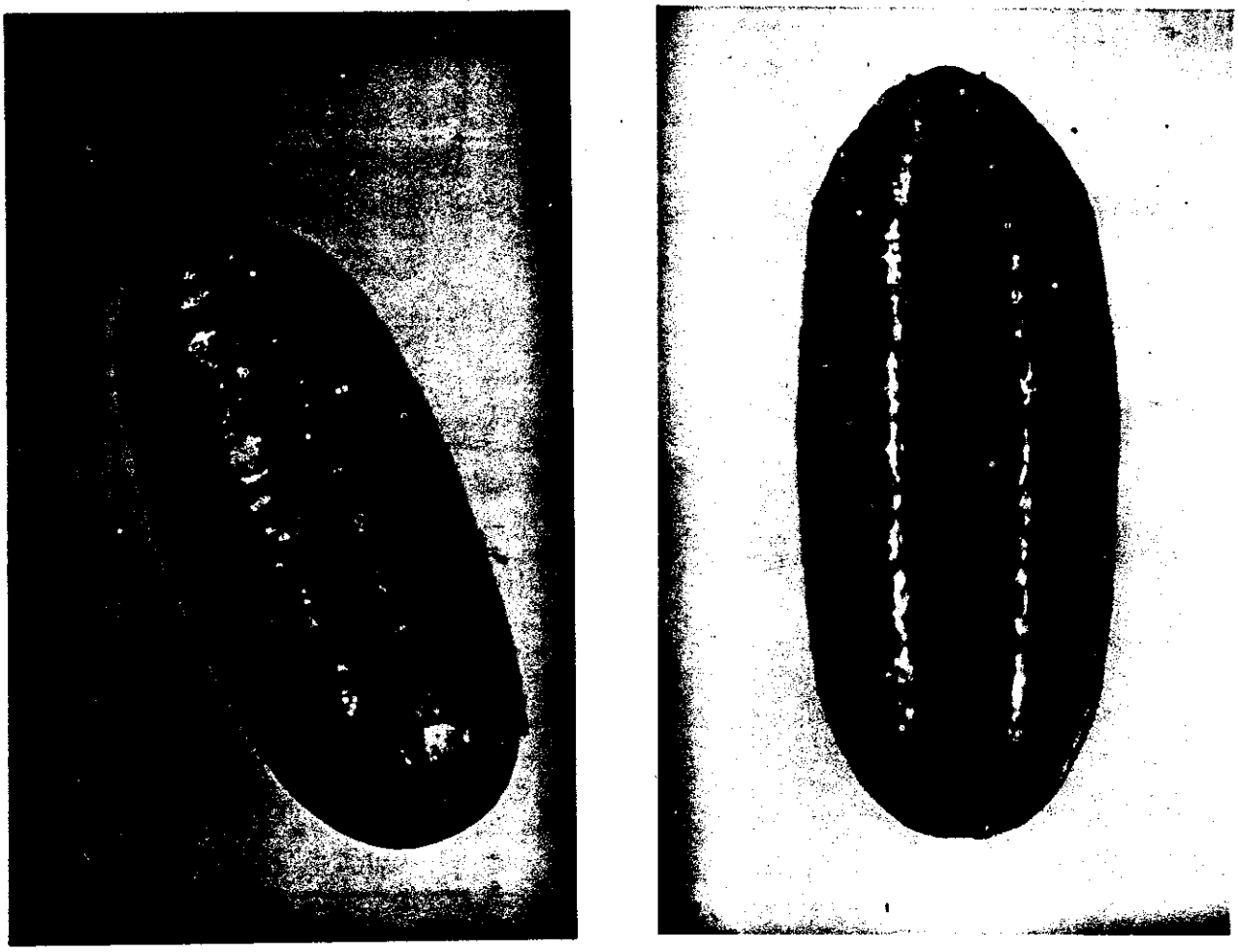
C

Figure (29) : Larval-Pupal Intermediate. **A-** C-shaped larval-pupal intermediate, the cuticle of these abnormal individuals contains part which still persisiting a last larval instar skin. **B-** elongated larval-pupal intermediates with normal colour , it has a larviform puparia and inter-segmented larval cuticle.
C- Pigmented elongated larval pupal intermediates with inter-segmented larval cuticle. (X=25).



A B

Figure (30): Larval-Pupal Intermediate. **A-** Larviform larval- pupal intermediates , it has the same length and feature of late 3rd larval instar but covered completely with the pupal exuvia. **B-** Larviform larval-Pupal intermediate but partially pigmented with black pigment . (X = 25)



A

B

Figure (31) : Deformed Pupae. **A-** Normal pupae. **B-** Pupae with normal appearance, but pigmented with dark black pigment. (X= 25) .

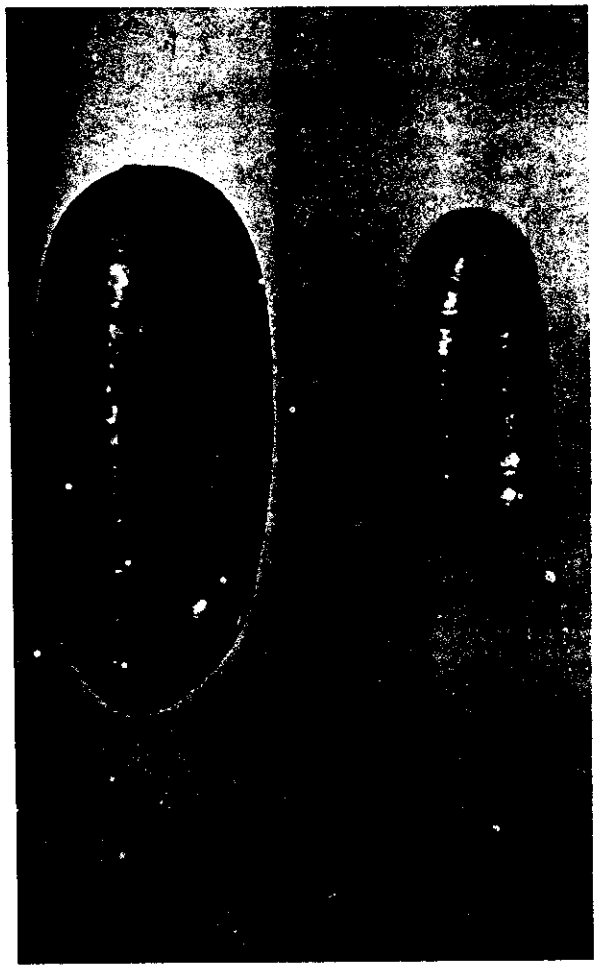
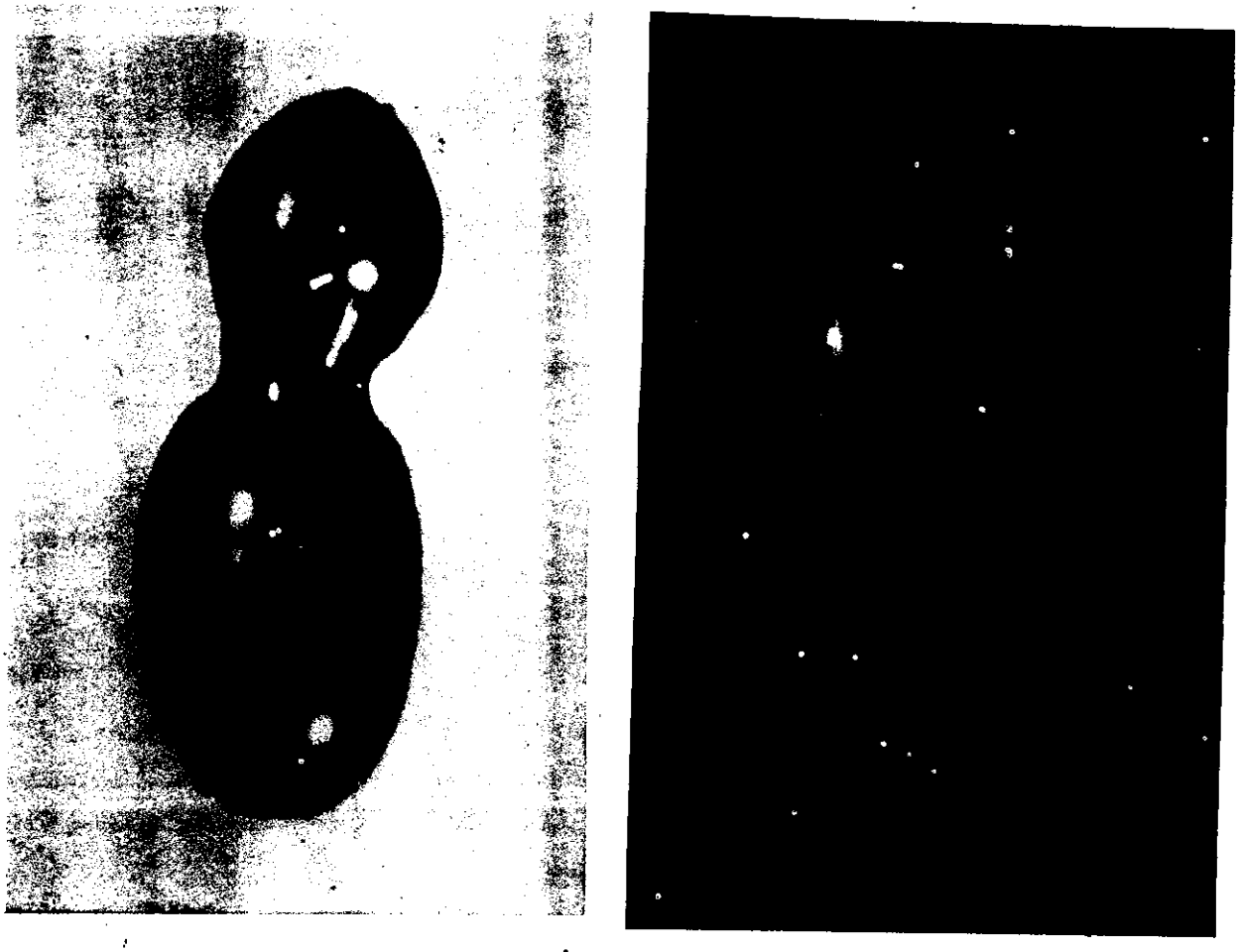
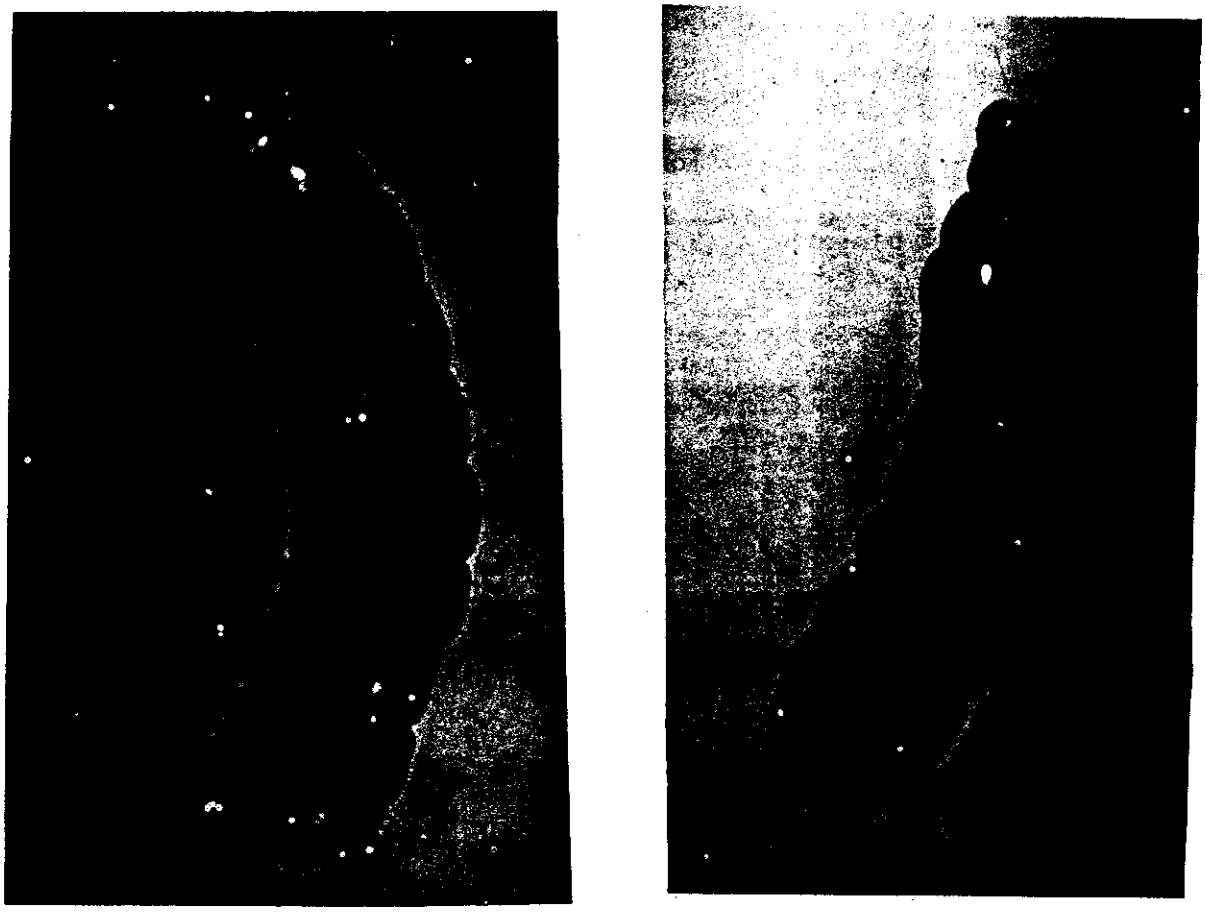


Figure (32) : Deformed Pupae . Small pupae compared with normal one, it has normal appearance but have relatively small size. (X = 20) .



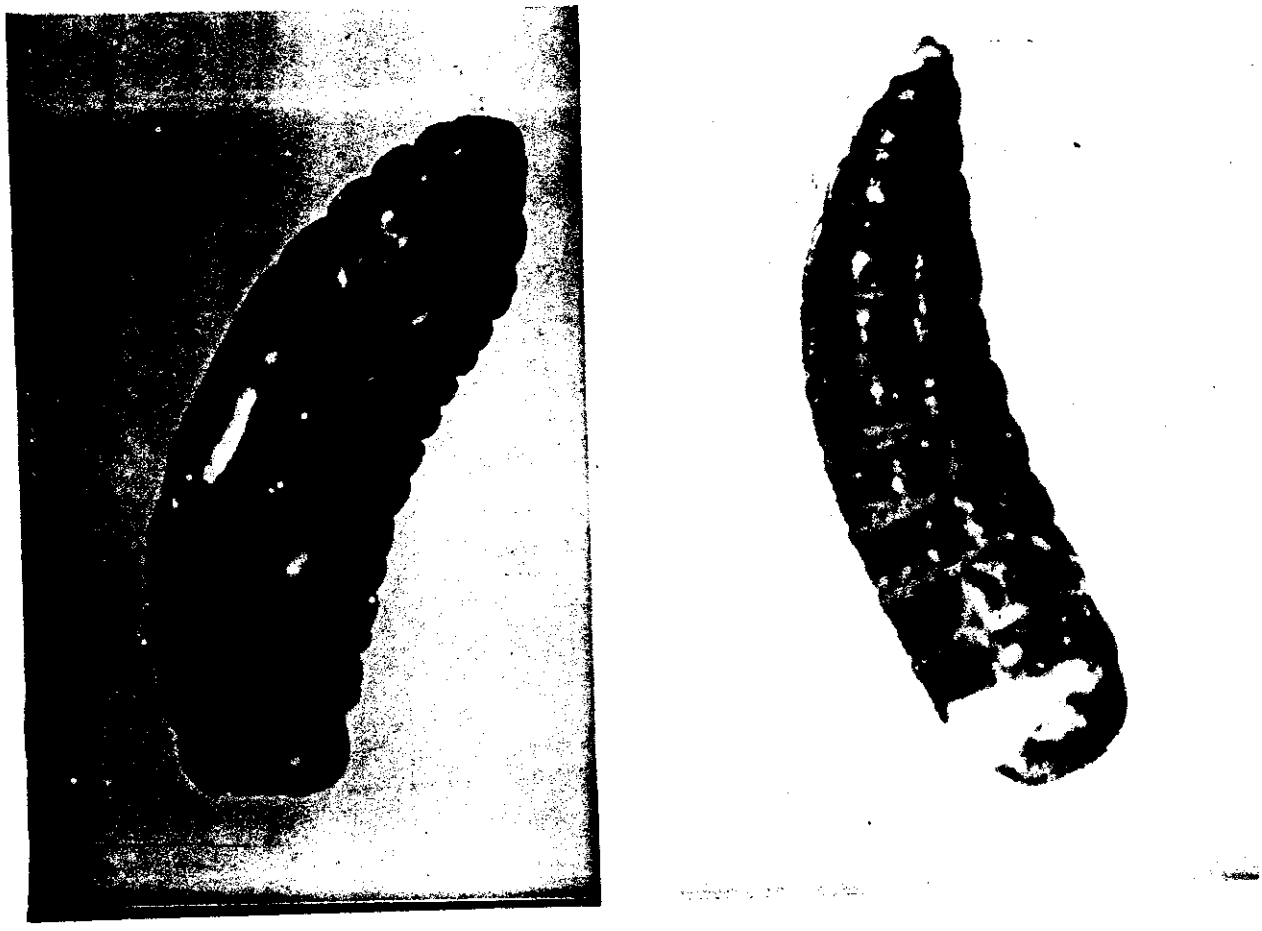
A B

Figure (33) : Deformed Pupae, constricted pupae. **A-** Fully formed pupae with conspicuous constriction in their puparia, so that they failed to give adult. **B-** Elongated melanized pupae with slightly constricted puparia . (X = 25).



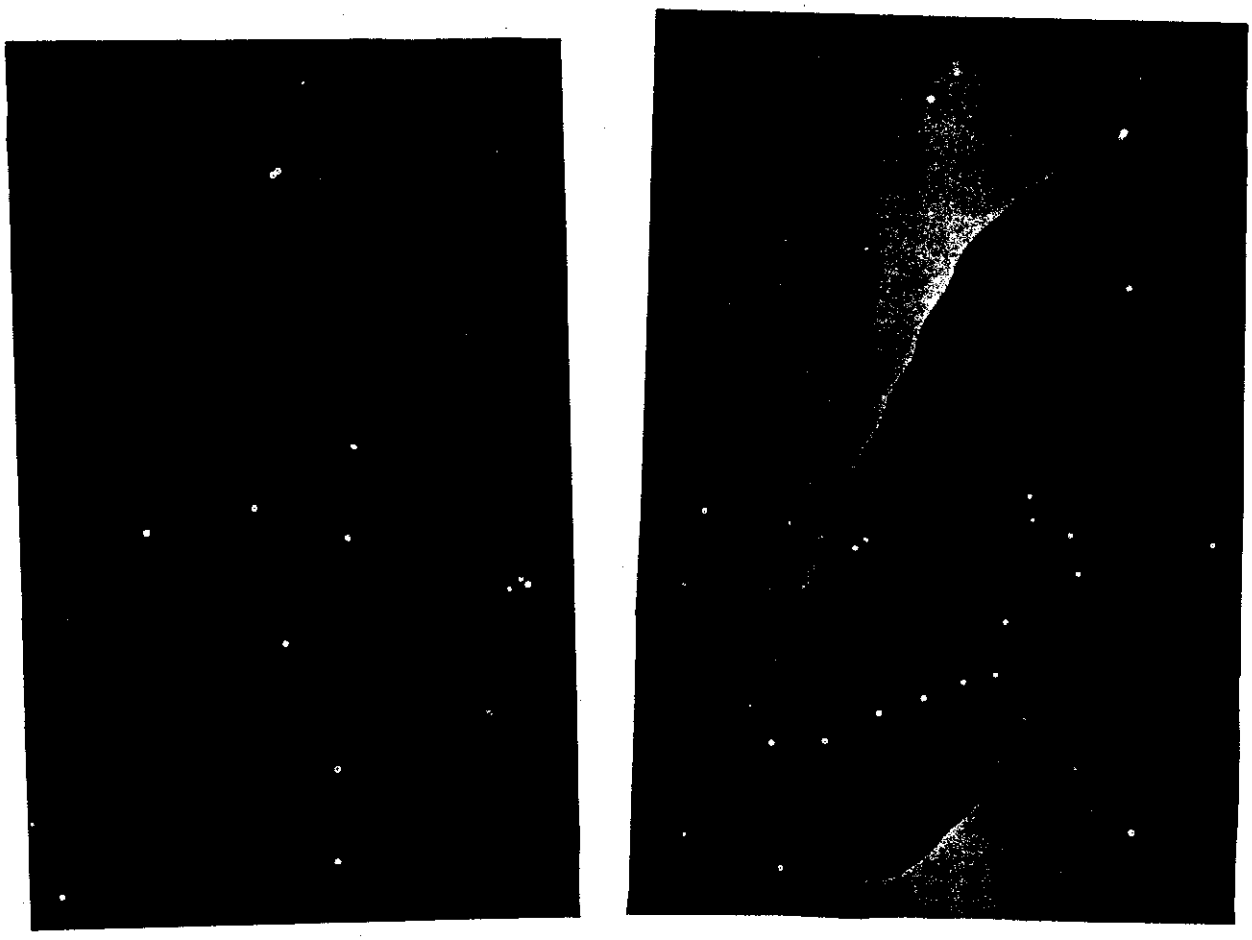
A B

Figure (34) : Deformed Pupae, C- shaped pupae . **A-** C-shaped pupae, the segmented puparia form abberant C-shaped. **B-** Elongated twisted pupae with segmented puparia. (X = 25).



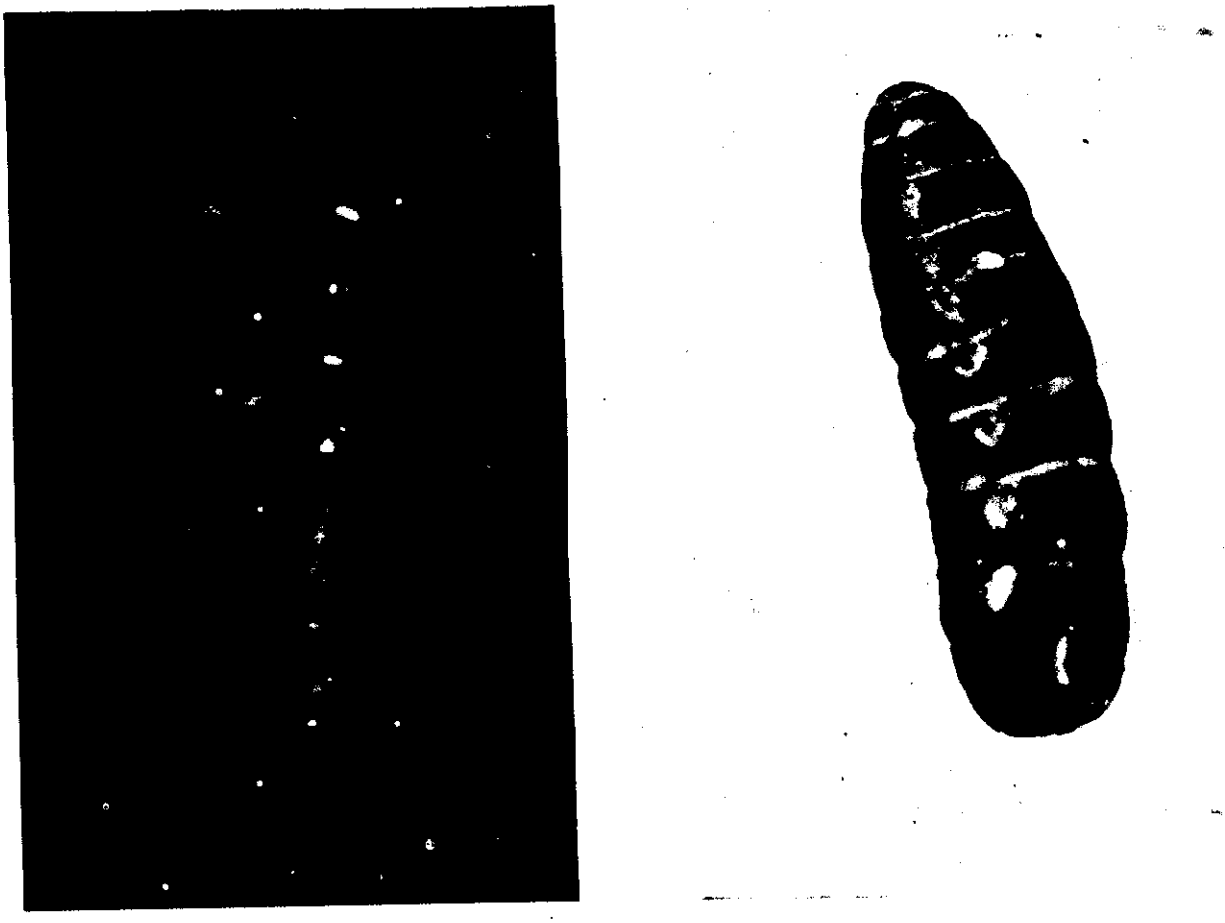
C D

Figure (34) : Deformed Pupae, C-shaped pupae. C - Twisted pupae, the dorsal surface was convexed and swelled . **D-** Pigmented twisted pupae with segmented puparia and tapring end. (X = 25).



A B

Figure (35) : Deformed Pupae. **A-** Rode-Like pupae, This almost thin and twice as long as normal pupae. **B-** The anterior segments of this deformed pupae which bear the cephalopharyngeal apparatus in the larval stage were visible unlike normal one. (X = 25).



A B

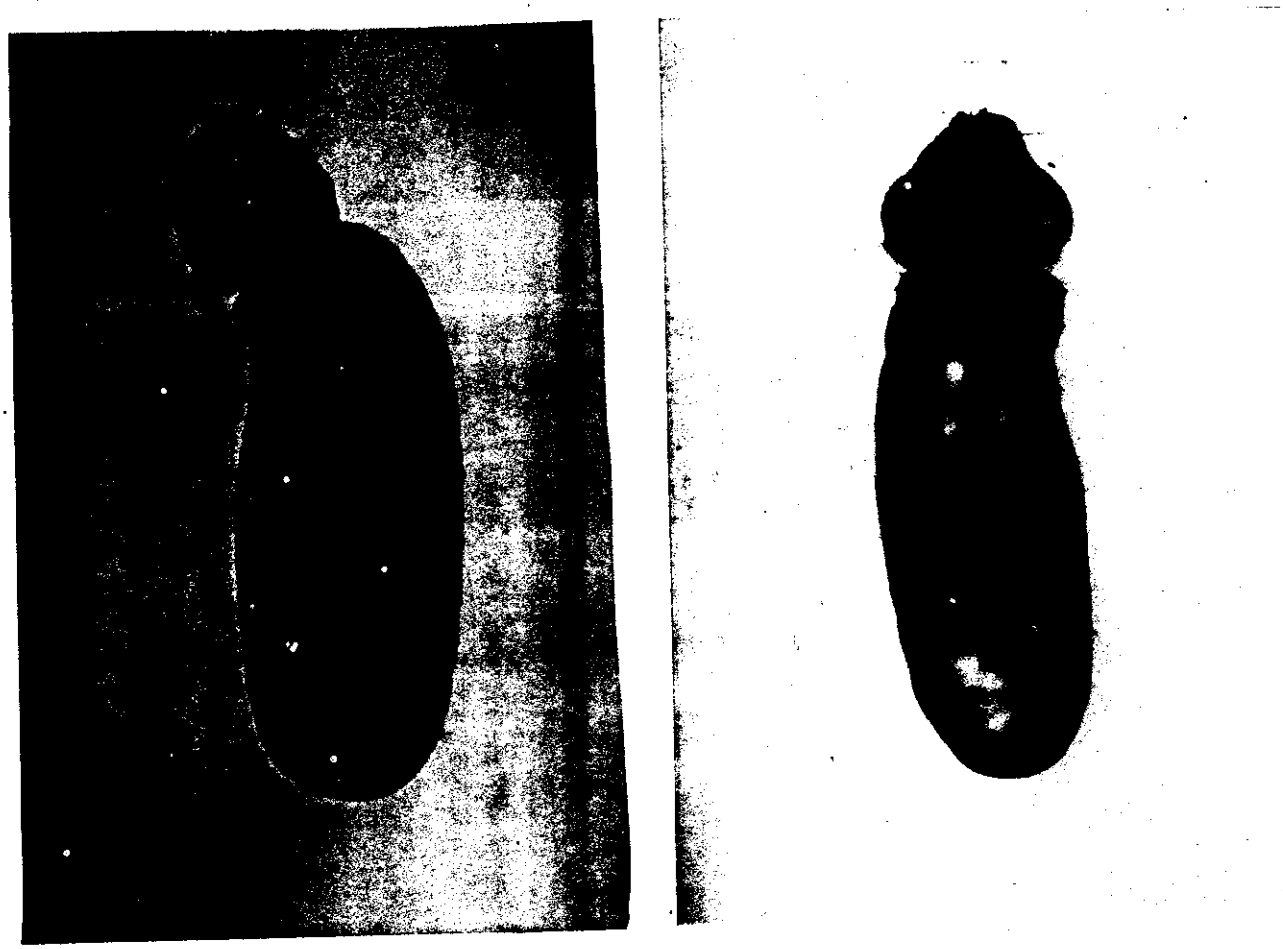
Figure (36) : Deformed Pupae, elongated pupae. **A & B** - Pupae normal in character but longer than normal one. (X = 25).

A

B

C

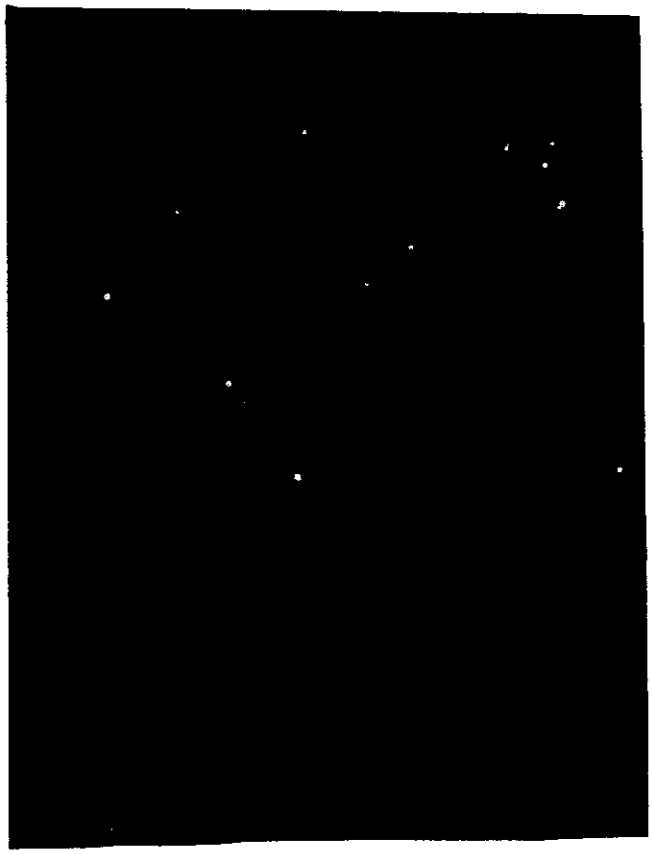
Figure (37) : Pupal-Adult Intermediates . **A-** Elongated pupal - adult intermediate with distinct adult head.
B- Twisted pupal-adult intermediate with larviform puparium and distinct adult head. **C-** Twisted pupal-adult intermediate with larviform puparium and distinct adult head and thorax. (X = 25).



A B

Figure (38) : Deformed Adult, incomplete adult eclosion. **A-** Only head eclosed from the puparia . **B-** Deformed head and part of thorax eclosed. (X = 25).

A

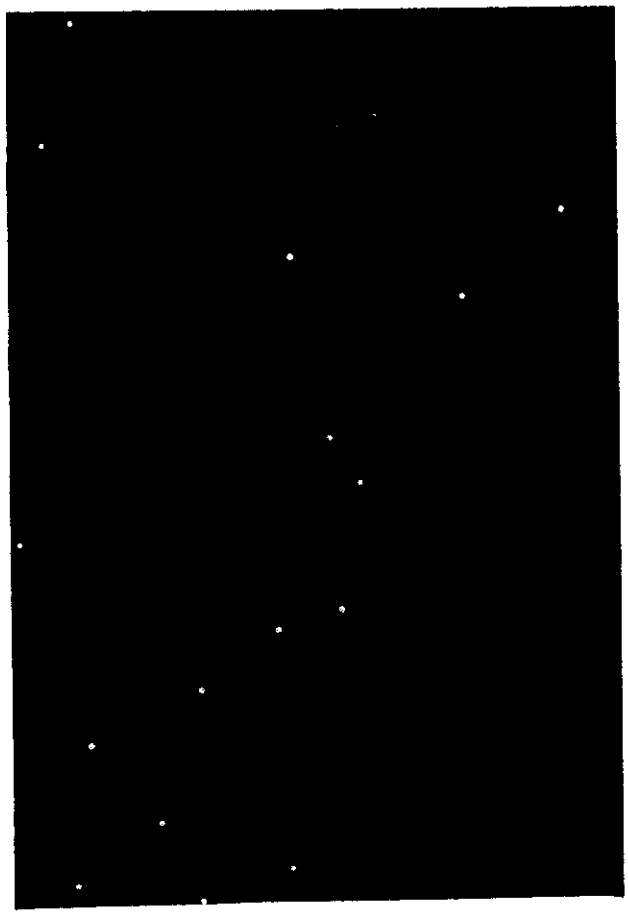


B

C

Figure (39): Deformed Adult, incomplete adult eclosion.
A- Head, thorax, one wing, legs of one side only and part of abdomen exuviated, but the remainder of the adult (abdomen, wings and legs of the another side) still retained within the pupal exuvia.
B- Pigmented thorax, crumpled wings and stiff legs are exuviated only. Abdomen and part of the wings are still retain in the pupal exuvia. **C-** All the fly eclosed with undeveloped last abdominal segments. Wings and mid leg of one side failed to wriggle out the pupal exuvia. (X = 25).

A

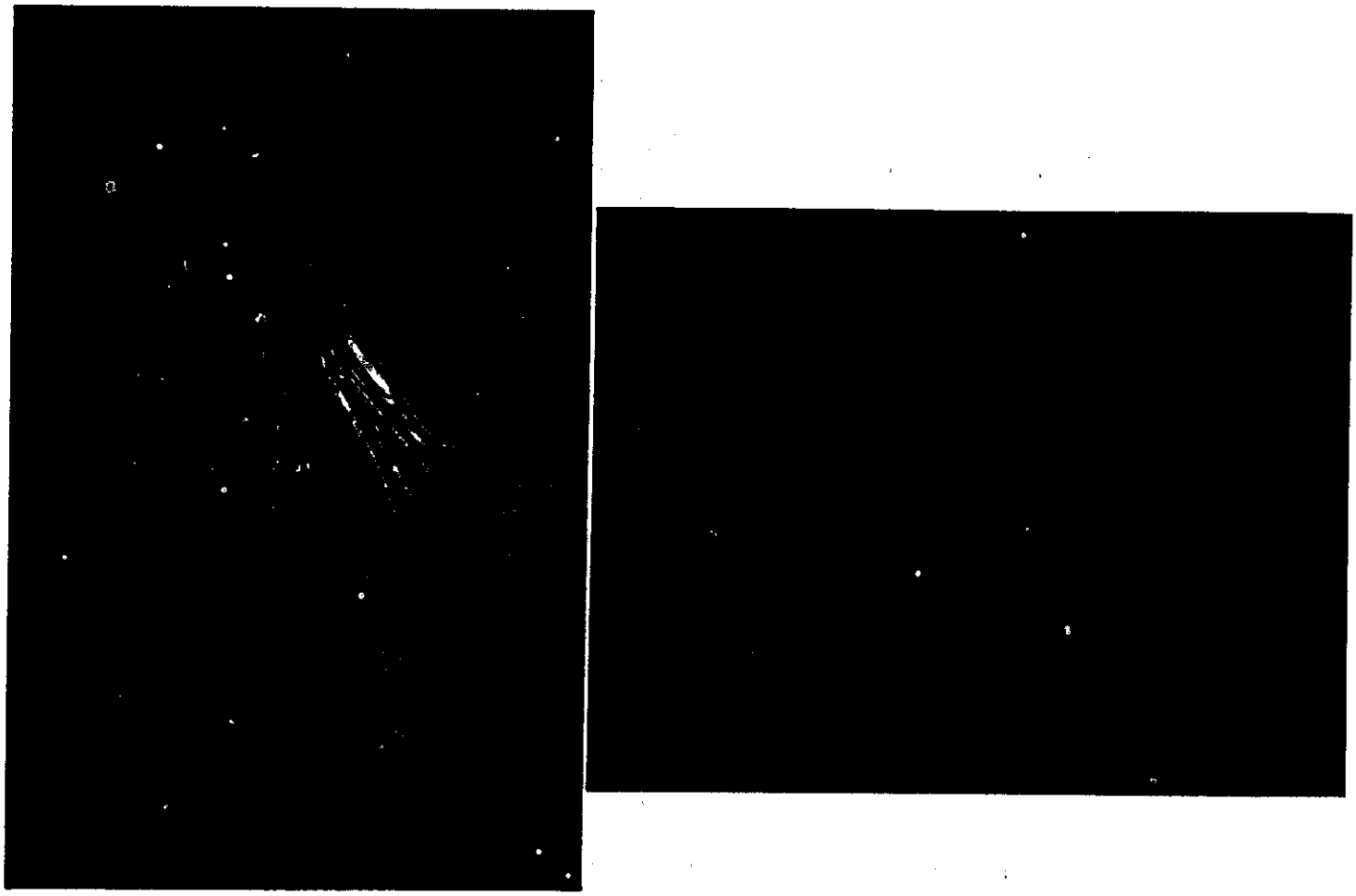


B

C

Figure (40) : Deformed Adult, incomplete adult eclosion .

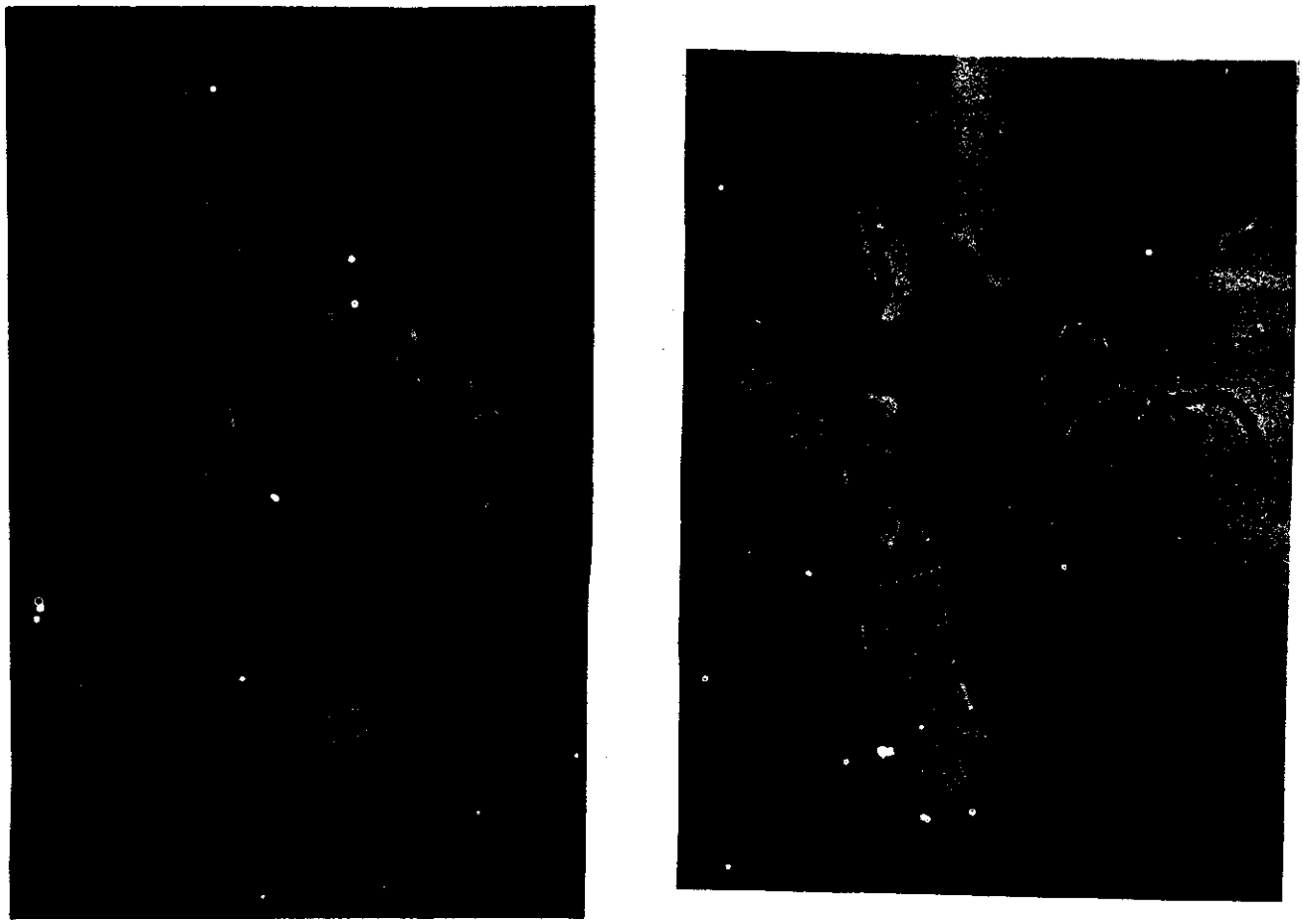
A- Deformed Adult were completely free from the pupal exoskeleton, except for the still attached tarsi. The fly has broken wing. **B-** Small malformed adult reduced wings was completely eclosed, but still attached to pupal case by tarsi. **C-** Adult was completely free from pupal exuvia, but the last abdominal segment still retained within the pupal exuvia. Wings are shriveled and having malformed disordered legs.



A

B

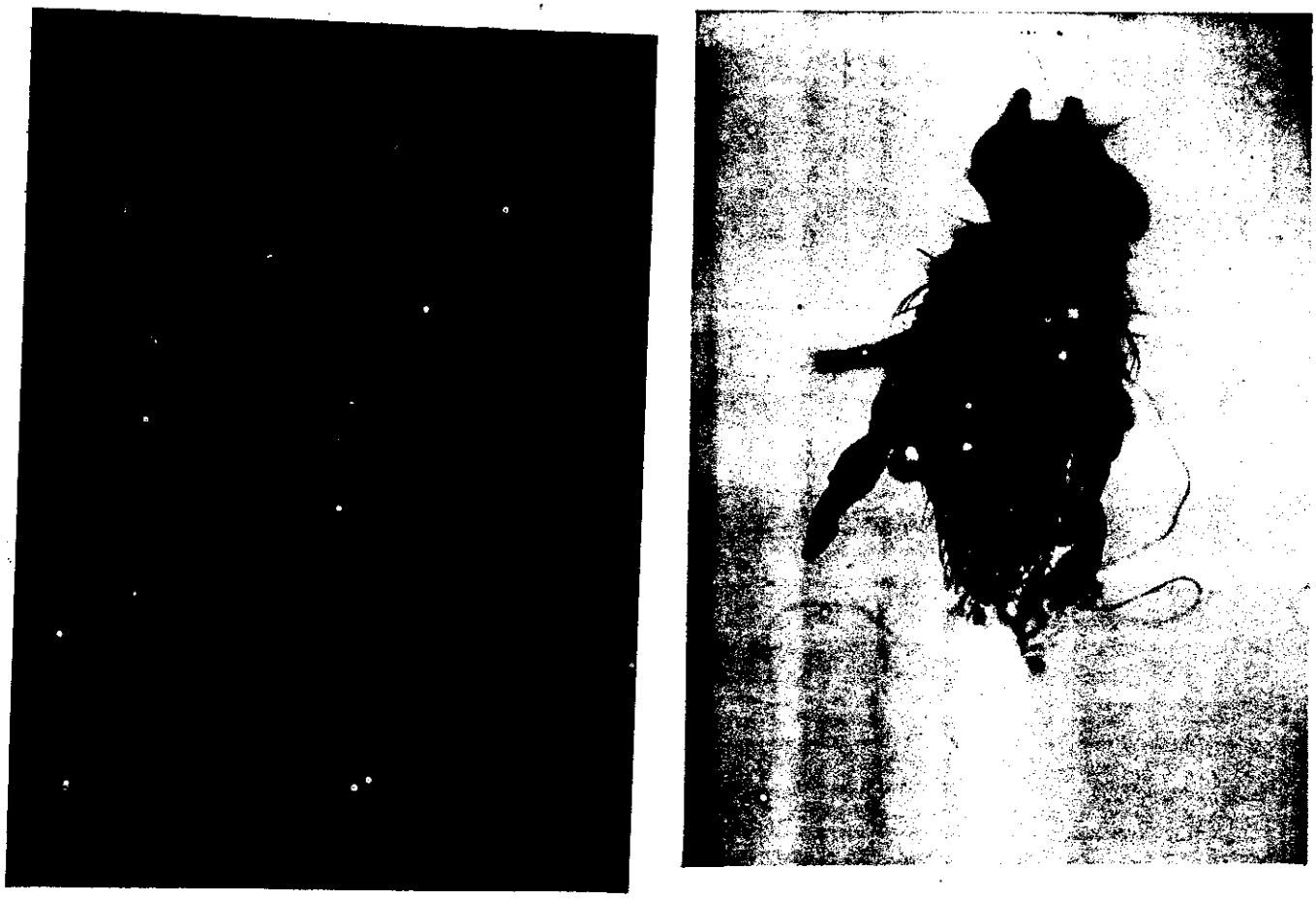
Figure (41) : Deformed Adult, adult completely free from pupal exuvia and has various deformity. **A-** Normal adult. **B-** Deformed adult with crumpled incomplete bent wigns (X = 25).



A

B

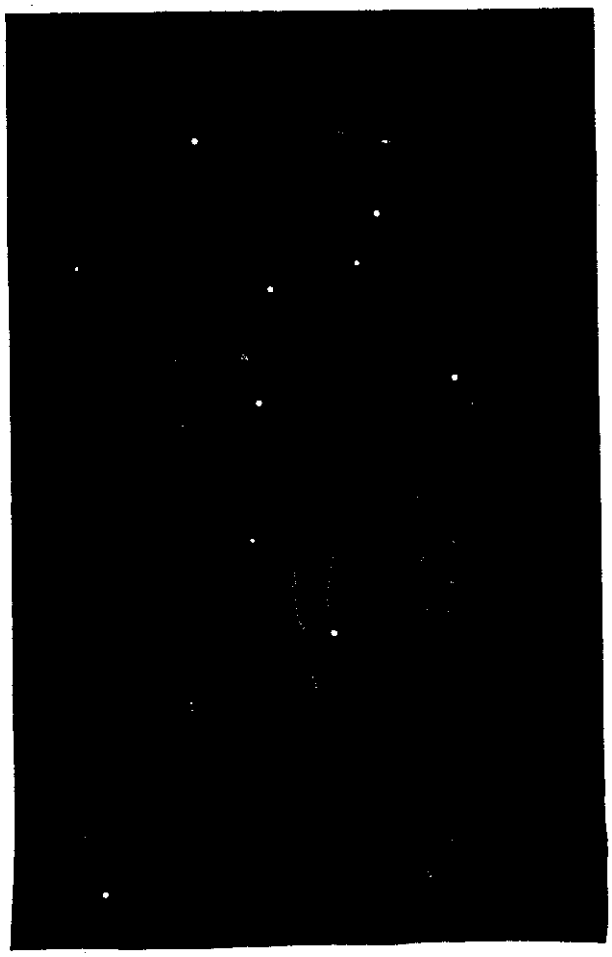
Figure (42) : Deformed Adult, adult completey free from pupal exuvia and has various deformity. A- Abnormal fly with deformed thorax and abdomen, legs are stiff and wings are poorly developed. B- Abnormal fly with deformed thorax and compresed twisted wings. Fly died before melanization. (X = 25).



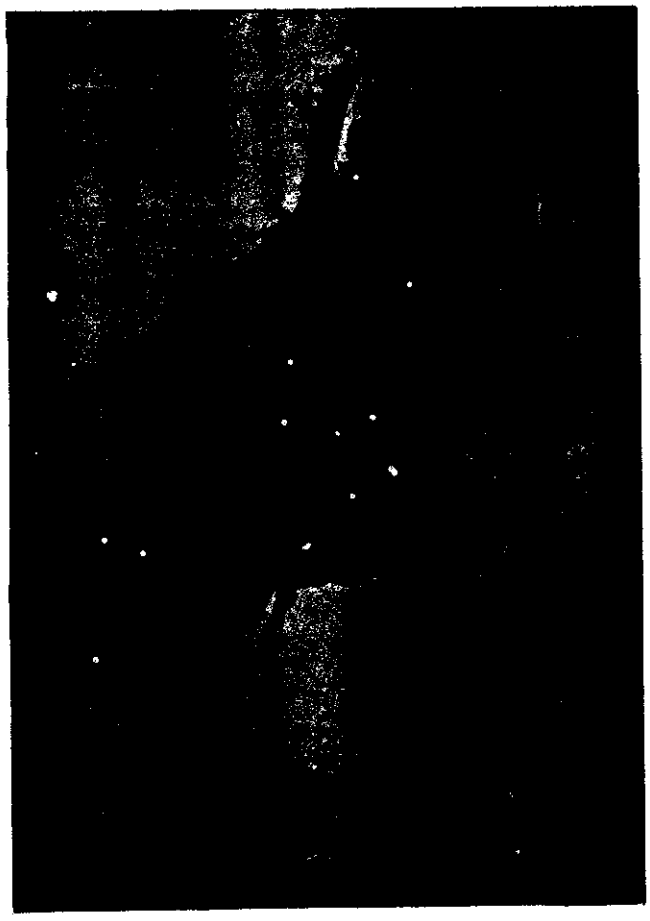
A

B

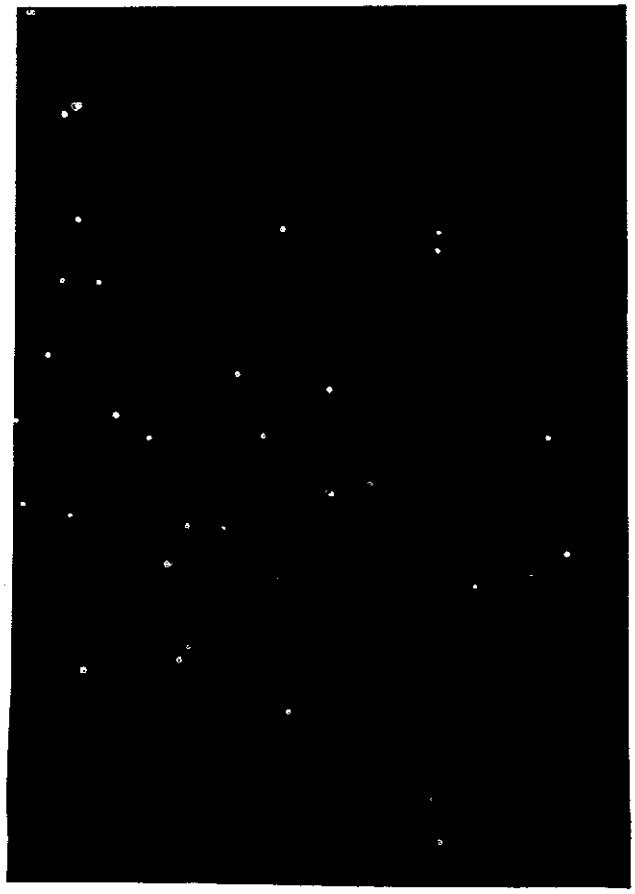
Figure (43): Deformed Adult, adult completely free from pupal exuvia and has various deformity. **A-** Deformed fly with obvious enlarged thorax and crumpled wings, these wings are glued on the reduced abdomen. (X = 30). **B-** Abnormal fly with enlarged thorax and reduced misshappen abdomen. Wings are twisted. (X = 25).



A



B



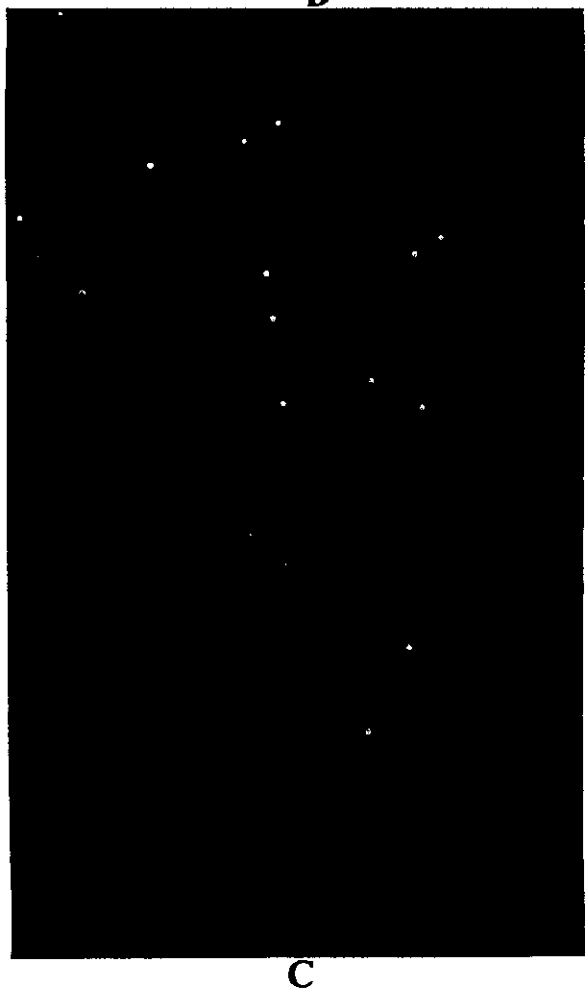
C

Figure (44) : Deformed Adult, adult completely free from pupal exuvia and has various deformity. **A-** Fly with cruled thorax, stiff legs, abnormal short abdomen and crumpled wings. **B-** Deformed fly with flattened abdomen, stiff legs and abnormal characteristic wings. **C-** Adult fly with pigmented thorax and crumpled wings glued on their abdomen. (X = 25).

Figure (45) : Deformed Adult, adult completely free from pupal exuvia and has various deformity. Deformed adult with chitinous melanized thorax and short crumpled wings floded on their abdomen. (X = 25).

A

B



C

Figure (46) : Deformed Adult, adult completely free from pupal exuvia and has various deformity. **A-** Abnormal fly with deformed thorax, deformed disordered extended legs and shriveled wings. **B-** Fly with abnormal prolonged legs, one crumpled wing, the other was twisted and elongated abdomen. **C-** Abnormal adult showed conspicuous constriction between thorax and abdomen, the latter was elongated and the wings were twisted. (X = 25).

A B

Figure (47) : Deformed Adult, adult completely free from pupal exuvia and has various deformity. **A-** Adult of normal appearance but had broken wing. **B-** Adult of normal appearance, had normal one wing but the other was less cruled. (X = 25).

C- BIOCHEMICAL STUDIES

Data in tables (22 and 23) indicated that the water extracts of the four used plants were generally more effective than alcoholic extracts. So, only water extracts were applied to both early and late 3rd larval instars of *Musca domestica* to estimate the physiological aberration induced as a result of the treatment with these extracts.

The water extracts of *C.procera, D.stramonium, H.muticus* and *Z. album* were topically applied to both early and late 3rd larval instars of *M. domestica* by the highest dose only (100 µg/larvae). Total carbohydrate, lipid and protein contents were determined.

1- EFFECT OF WATER EXTRACTS OF THE FOUR PLANT SPECIES ON THE MEAN TOTAL CARBOHYDRATES CONTENT (mg/gm FRESH BODY WEIGHT) OF EARLY AND LATE 3rd LARVAL INSTARS OF *M. DOMESTICA*

Table (25) and figure (48) showed the mean total carbohydrate in mg/gm fresh body weight in early 3rd larval instar, after 24 and 48 hours from application. Data showed that the mean total carbohydrate content increases remarkably during the larval period in the control groups. It was 8.2 ± 0.57 mg/gm after 24 hours and reached to 16.3 ± 0.68 mg/gm after 48 hours. The obtained results revealed that the mean

total carbohydrate content estimated in the treated early 3rd larval instar, with *H. muticus* extract was 21.44 ± 0.96, 25.77 ± 1.23 mg/gm after 24 and 48 hours, respectively. This means that the extract causes increase in the total carbohydrate content than controls by 198% and 58.09% respectively. This differences were statistically very highly significant. Similarly, the water extract of *C. procera* causes signifincat increase in the mean total carbohydrate content with respect to controls. The increase was 76.7% and 95.03% after 24 and 48 hours respectively.

A significant increasing in the mean total cabohydrate content was noticed when early 3rd larval instar being treated with extracts from *D. stramonium*. The increase was 89.6% and 29.75 after 24 and 48 hours respectively.

It is noticed from the data that the water extract of *Z. album* significantly increases the mean total carbohydrate content of treated larvae with respect to control. The difference was 33.04% and 19.93% after 24 and 48 hours respectively.

Data illustrated in table (26) and figure (49) revealed that, the different water extracts cause a significant elevation in the mean total carbohydrate content in the treated late 3rd larval instar. It was 25.52 ± 0.89 , 24.96 ± 0.21 , 24.63 ± 0.46 and 18.93 ± 0.35 mg/gm fresh body weight of the larvae treated with *H.muticus, C. procera, D.*

Table (25) : Effect of water extracts of *C. procera, H. muticus, D. stramonium and Z. album* on the mean total carbohydrate content of the early 3rd larval instar of *Musca domestica*.

Treatment	Observations							
	after 24 hours				after 48 hours			
	Range	Mean ± S.E. (mg carb./gm fresh body)	P vaule	Change %	Range	Mean ± S.E. (mg carb./gm fresh body)	P vaule	Change %
Control	7.14 9.52	8.20± 0.57			15.33 17.95	16.30±0.68		
Calotropis procera	15.41 8.24	14.49±1.79	P< 0.05	+ 76.70	27.38 34.28	31.79±1.81	P< 0.001	+ 95.03
Hyoscyamus muticus	23.80 20.14	21.44±0.96	P< 0.001	+ 198.00	30.73 25.76	25.77±1.23	P< 0.001	+ 58.09
Datura stramonium	11.90 18.89	15.55±1.65	P< 0.01	+ 89.60	24.80 18.03	21.15± 1.61	P< 0.05	+ 29.75
Zygophillum album	11.90 9.24	10.91±0.68	P< 0.05	+ 33.04	16.42 23.87	19.55±1.77	P< 0.05	+ 19.93

P › 0.05 : nonsignificant
P< 0.01 : highly significant
P< 0.05 : significant
P< 0.001 : very highly significant

Figure (48): Effect of water extracts of *C.procera*, *H.muticus*, *D.stramonium* and *Z.album* on the mean total carbohydrate content of the early 3rd larval instar of *Musca domestica*.

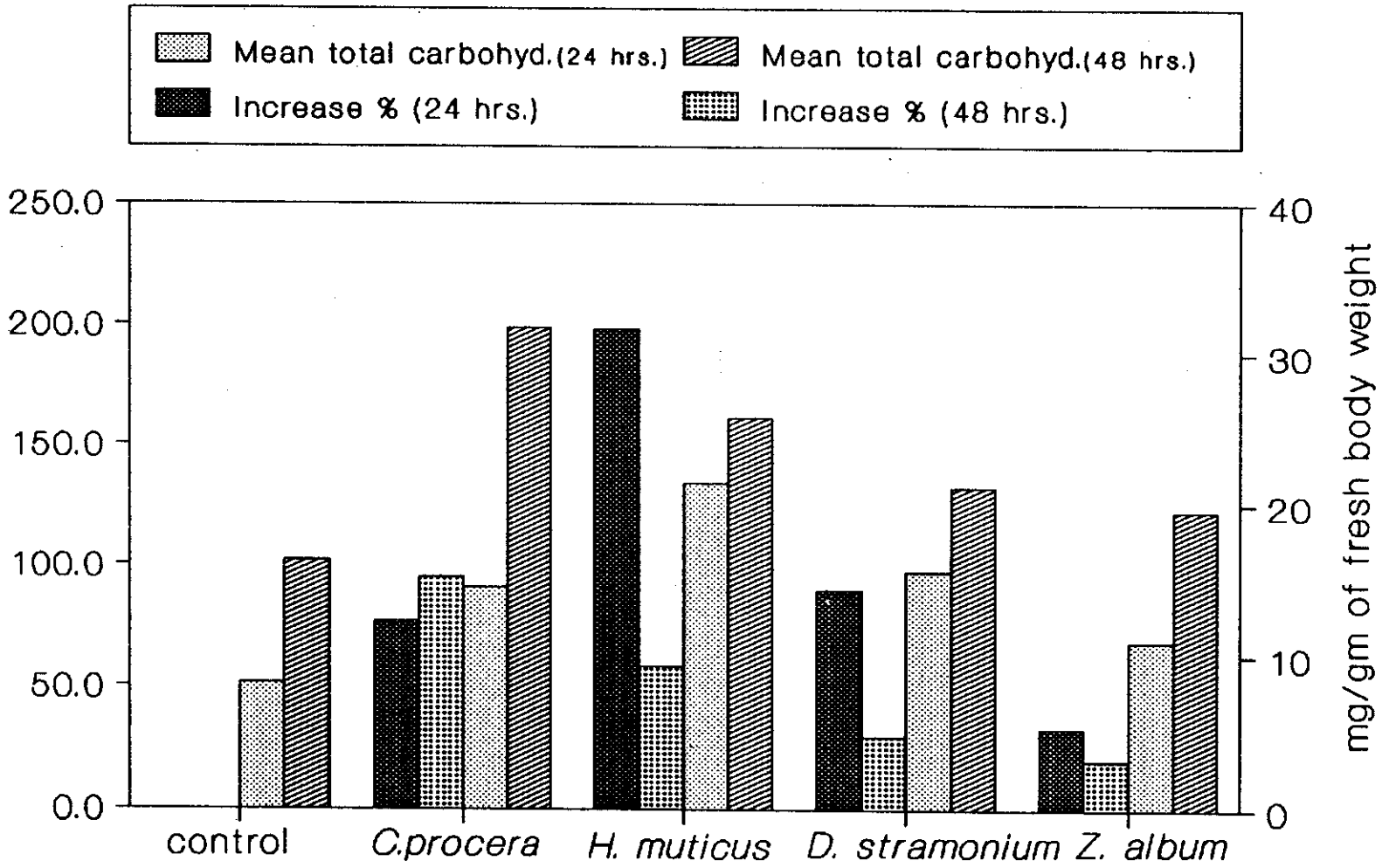


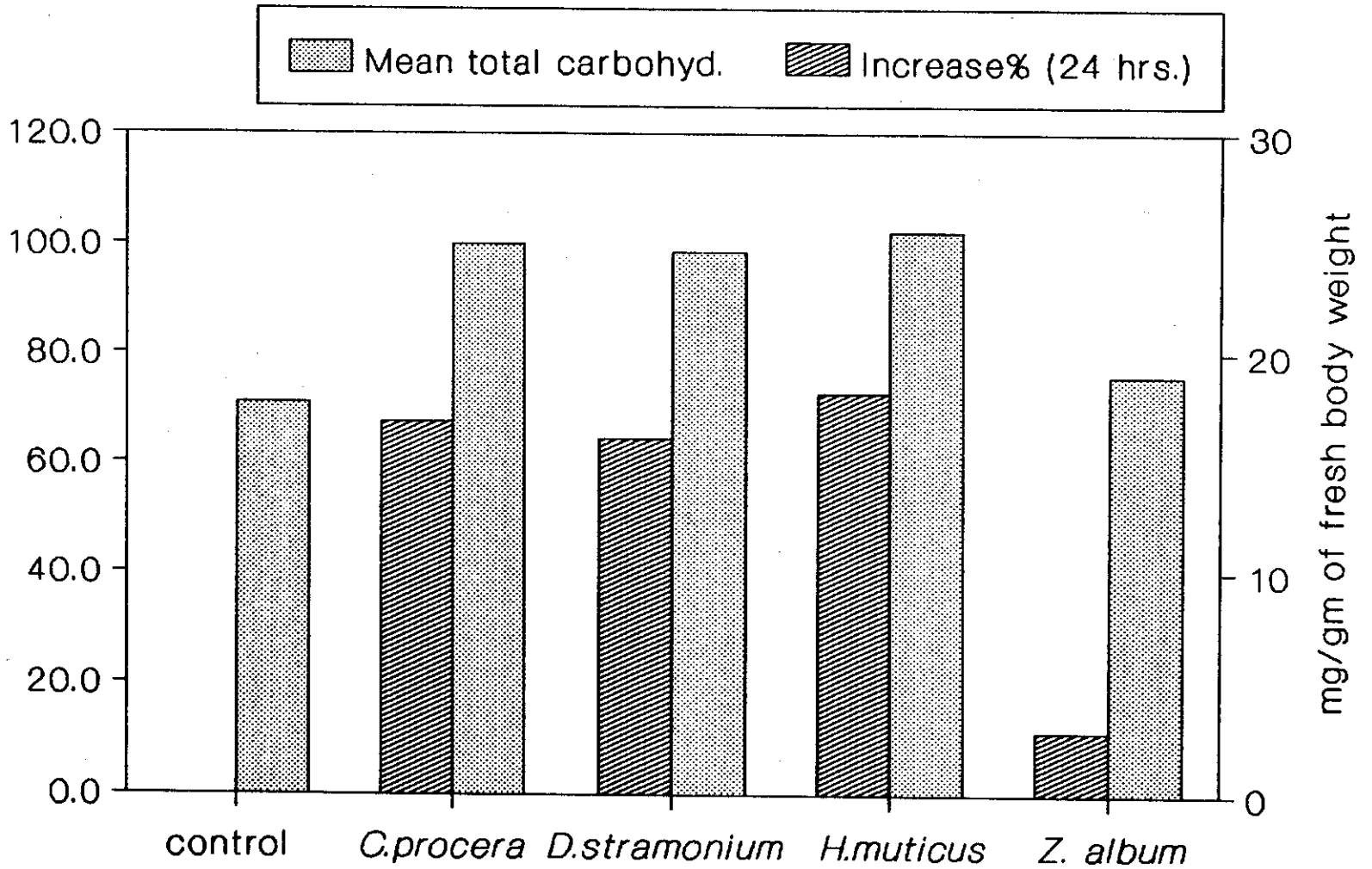
Table (26) : Effect of water extracts of *C. procera, H. muticus, D. stramonium* and *Z. album* on the mean total carbohydrate content of the late 3rd larval instar of *Musca domestica*.

Observations / Treatment	Range	Mean ± S.E. (mg Carb./gm fresh body)	P vaule	Change %
Control	10.40 11.29	17.73± 0.22		
Calotropis procera	17.63 18.40	24.69±0.21	P< 0.001	+ 67.38
Hyoscyamus muticus	16.55 18.49	24.63±0.46	P< 0.001	+ 64.30
Datura stramonium	16.81 20.56	25.52±0.89	P< 0.001	+ 72.60
Zygophillum album	11.20 12.69	18.93±0.35	P> 0.05	+ 11.18

P > 0.05 : nonsignificant

P< 0.001 : very highly significant

Figure (49): Effect of water extracts of *C.procera*, *H.muticus*, *D.stramonium* and *Z.album* on the mean total carbohydrate content of the late 3 rd larval insatr of *Musca domestica* .



stramonium and *Z.album* compared with controls which was 17.73 ± 0.22 mg/gm.

On comparing the efficiency of the four plant extracts in increasing the mean total carbohydrate content in both late and early 3rd larval instars of *M. domestica*, it appeared that *H.muticus* extract was the most effective, followed by *C. procera* and *D. stramonium* extracts which were slightly less effective. *Z. album* was the least effective extract.

2- EFFECT OF WATER EXTRACTS OF THE FOUR USED PLANTS ON THE MEAN TOTAL LIPID CONTENT (mg/gm FRESH BODY WEIGHT) OF EARLY AND LATE 3rd LARVAL INSTARS OF *M. DOMESTICA*

Data in table (27) and figure (50) showed that the mean total lipids increases gradually in quantity during the larval period in control groups from 40.92 ± 1.96 mg/gm to 52.05 ± 0.97 mg/gm after 24 and 48 hours respectively.

The mean total lipid content in early 3rd larval instar treated with *C. procera* extract was 52.63 ± 2.45 and 87.8 ± 2.1 mg/gm after 24 and 48 hours respectively. These values were significantly increased than contorls by 28.6% and 68.68% after 24 and 48 hours respectively.

Treatment with *H.muticus* extract causes significant inreasing in the mean total lipid of treated larvae. The percentage of increasing was 39.8% and 51.20% after 24 and 48 hours respectively.

Similarly, *D. stramonium* extract causes significant elevation in the mean total lipid content of the treated larvae, in respect to untreated counterparts. It was 54.71 ± 2.24 , 61 ± 2.26 mg/gm after 24 and 48 hours respectively.

Treatment with *Z. album* extract, significantly increases the mean total lipid of the same stage. The mean total lipid after 24 and 48 hours was 50.5 ± 2.36 and 56.82 ± 0.61 mg/gm respectively.

The data in table (28) and figure (51) illustrated the effect of water extracts of the four plant species on the mean total lipid content of the late 3rd larval instar after 24 hours from topical treatment. The mean total lipid in mg/gm fresh body weight was significantly increased as a result of extract treatment. It was 73.26 ± 1.04 , 71.42 ± 0.8 , 69.34 ± 0.4 and 66.27 ± 0.8 mg/gm in larvae treated with *C. procera, H.muticus, D. stramonium* and *Z. album* respectively. The mean total lipid content in controls was 61.4 ± 0.24 mg/gm.

From the fore-mentiond results, it is evident that the water extracts of the plants used causes singificant increasing in the total lipid of both early and late 3rd larval instars of *M. domestica.* The plant extracts

Table (27) : Effect of water extracts of *C. procera, H. muticus, D.stramonium and Z. album* on the mean total lipids content of the early 3rd larval instar of *Musca domestica*.

Treatment	Observations							
	after 24 hours				after 48 hours			
	Range	Mean ± S.E. (mg Lipid/gm fresh body)	P vaule	Change %	Range	Mean ± S.E. (mg Lipid/gm fresh body)	P vaule	Change %
Control	36.11 43.33	40.92 ± 1.96			53.33 49.66	52.05 ± 0.97		
Calotropis procera	49.58 58.63	52.63 ± 2.45	P< 0.05	+ 28.60	90.42 82.65	87.80 ± 2.10	P< 0.001	+ 68.68
Hyoscyamus muticus	60.44 52.86	57.21 ± 1.85	P< 0.01	+ 39.80	81.25 75.00	78.70 ± 1.55	P< 0.001	+ 51.20
Datura stramonium	49.24 57.87	54.71 ± 2.24	P< 0.01	+ 33.69	56.16 65.00	61.00 ± 2.26	P< 0.05	+ 17.19
Zygophillum album	45.55 55.55	50.51 ± 2.36	P< 0.05	- 23.43	58.33 55.98	56.82 ± 0.61	P< 0.05	+ 9.16

P > 0.05 : nonsignificant
P< 0.01 : highly significant
P< 0.05 : significant
P< 0.001 : very highly significant

Figure (50): Effect of water extracts of *C.procera*, *H.muticus*, *D.stramonium* and *Z.album* on the mean total lipid contents of the early 3rd larval instar of *Musca domestica*.

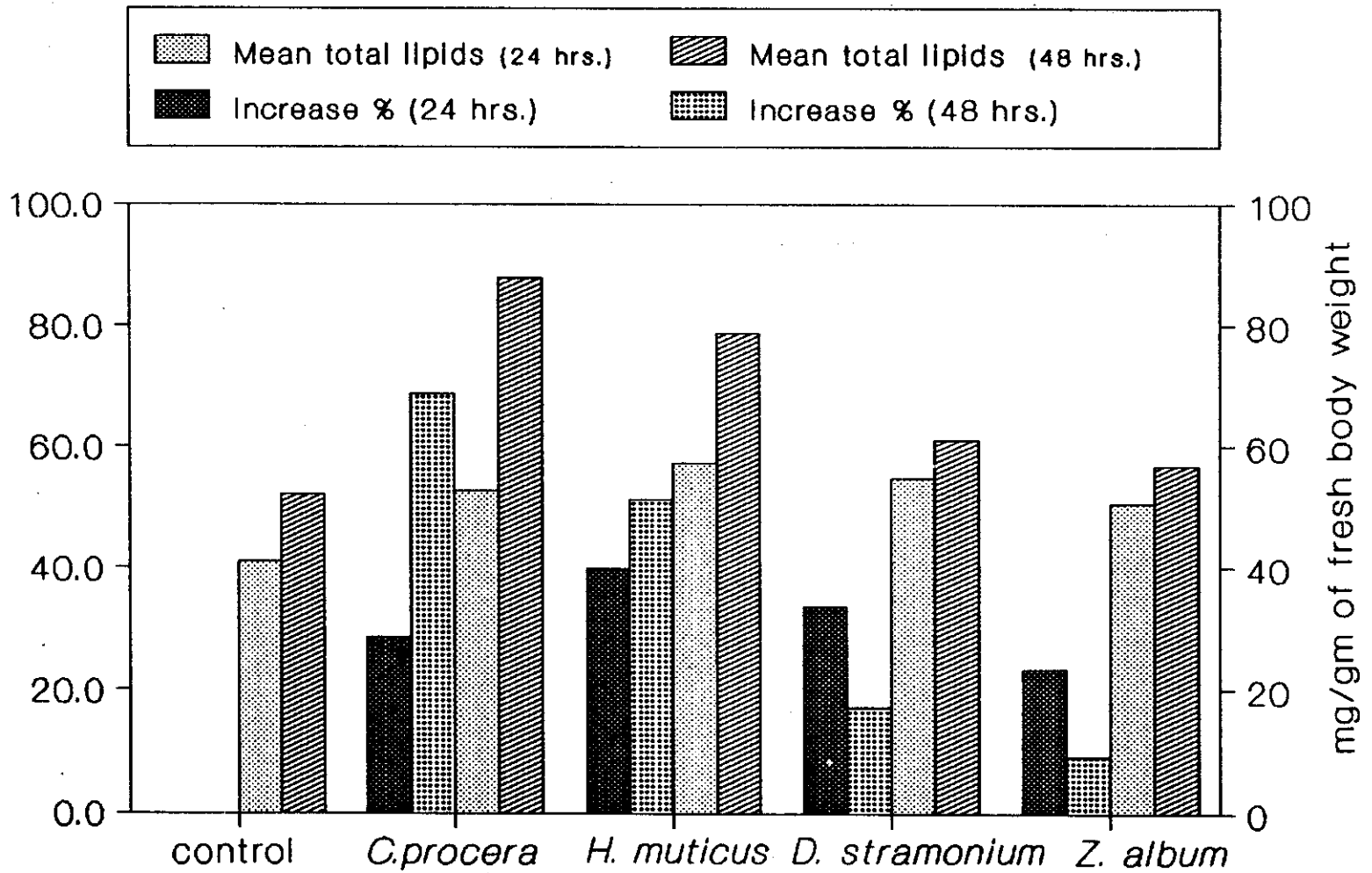
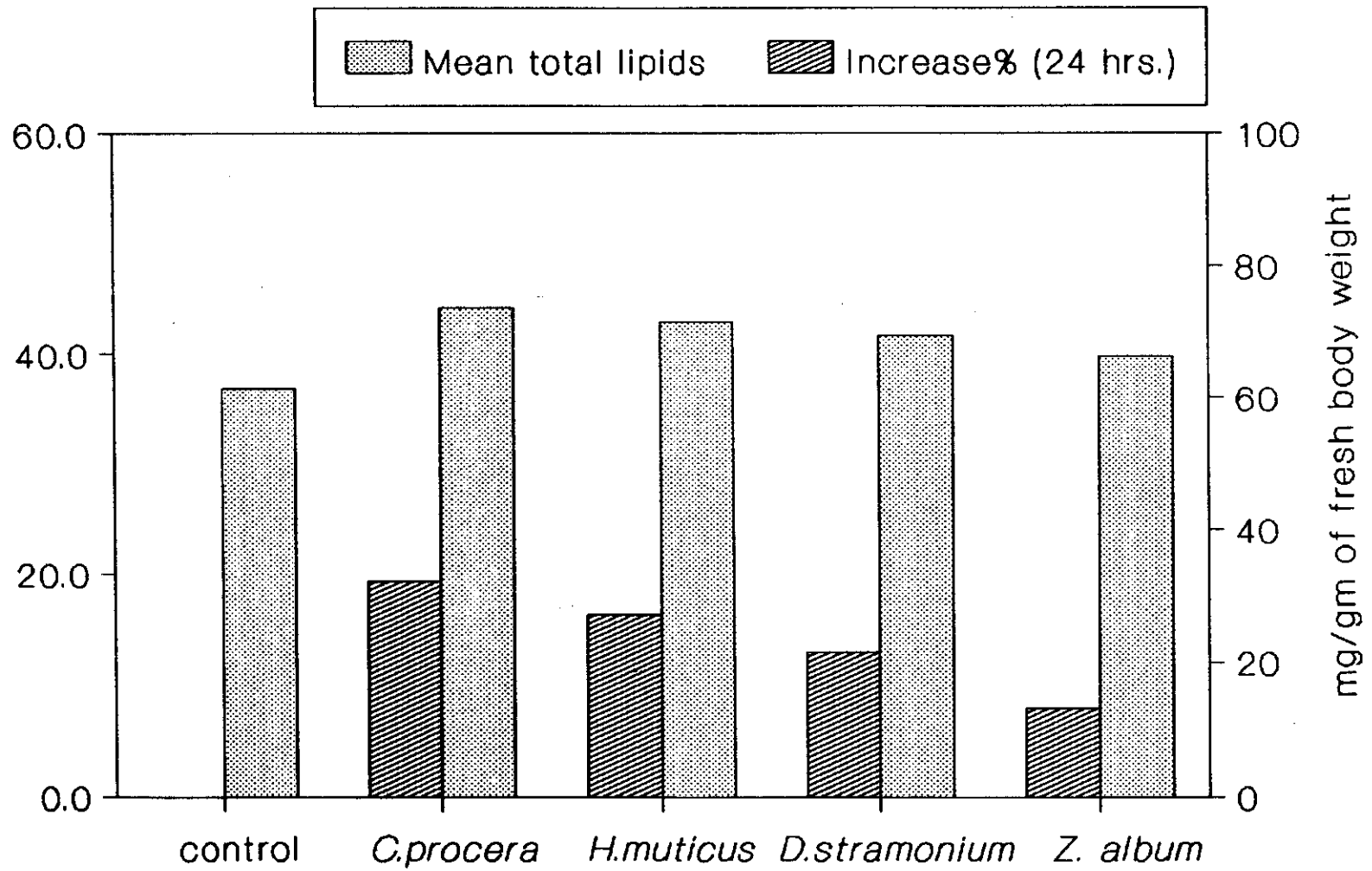


Table (28) : Effect of water extracts of *C. procera*, *H. muticus*, *D. stramonium* and *Z. album* on the mean total lipids content of the late 3rd larval instar of *Musca domestica*.

Observations / Treatment	Range	Mean ± S.E. (mg Lipid/gm fresh body)	P vaule	Change %
Control	60.98 61.82	61.40 ± 0.24		
Calotropis procera	71.58 75.78	73.26 ± 1.04	P< 0.001	+ 19.31
Hyoscyamus muticus	70.18 73.39	71.42 ± 0.80	P< 0.001	+ 16.30
Datura stramonium	68.62 70.07	69.34 ± 0.40	P< 0.001	+ 12.93
Zygophillum album	65.23 68.25	66.27 ± 0.80	P> 0.01	+ 7.93

P > 0.01 : highly significant P< 0.001 : very highly significant

Figure (51): Effect of water extracts of *C.procera*, *H.muticus*, *D.stramonium* and *Z.album* on the mean total lipids content of the late 3rd larval instar of *Musca domestica*.



were arranged according to their efficiency in increasing of total lipid contents as follow; *C. procera* > *H.muticus* > *D. stramonium*> *Z.album*

3- EFFECT OF WATER EXTRACTS OF THE FOUR PLANT SPECIES ON THE MEAN TOTAL PROTEIN CONTENT (mg/gm FRESH BODY WEIGHT) OF EARLY AND LATE 3 rd LARVAL INSTARS OF *M. DOMESTICA*

Data in table (29) and figure (52) illustrated that the total protein content increased remarkably during the larval period in the control groups. It was 46.37 ± 1.13 mg/gm after 24 hours from treatment and reached to 60.29 ±0.95 mg/gm after 48 hours.

Larvae treated topically with *C. procera* extract showed significant decrease in mean total protein contents. It was 35.74 ± 2.06 mg/gm, 41.43 ± 1.29 mg/gm after 24 and 48 hours respectively. The percentage of decrease was 22.92% and 31.35% respectively. This decrease was 3.84% (nonsignificant) after 24 hours and 18.94% (very highly singificant) after 48 hours from larval treatment with *Z. album* extract.

Treatment with *H.muticus* extract causes significant reduction in the protein content of the larvae. The percentage reduction was 11.26% and 26.9% after 24 and 48 hours respectively.

Similary, the average protein content in the larvae treated with *D. stramonium* extract was 40.34 ± 0.35 and 46.79 ± 1.64 mg/gm after 24 and 48 hours respectively. This reduction was very highly significant. It decreases by 13% and 23.03% than controls after 24 and 48 hours respectively.

The obtained data indicates that, the total protein of normal larvae is higher than that of treated one through the larvae periods, i.e, induces an inconsistant reduction in the mean total protein.

The effect of the water extracts of the four plant species on protein contents of the treated late 3rd larval instar was shown in table (30) and figure (53). Treatment with the four extracts used, induces highly significant reduction in the total protein content of the treated larvae after 24 hours of treatment.

Protein values in the larvae treated with *C. procera, H.muticus, D. stramonium* and *Z.album* extracts were ; 52.8 ± 0.82, 54.23 ± 0.85, 55.66 ± 0.88 and 56 .56 ± 0.42 mg/gm fresh body weight respectively. These levels were lower than controls by 18.11% , 15.89% , 13.67% and 12.28% for the four mentioned plants respectively.

From the above mentioned results, it is evident that the water extracts of the four used plants causes reduction in the total protein content of the both treatments (early and late 3 rd larval instars of *M. domestica*).

The plant extracts were arranged ascendingly according to their efficiency in decreasing the mean total protein as follow; *Z. album* < *D. stramonium* < *H. muticus* < *C. procera.*

In conclusion, it is clear that the water extracts of *C. procera, H. muticus, D. stramonium* and *Z. album* induces physiological aberration in both early and late 3rd larval instars of *M. domestica,* this by increasing of the mean total carbohydrate and lipid contents, and reducing the mean total protein content.

Table (29) : Effect of water extracts of *C. procera, H. muticus, D.stramonium and Z. album* on the mean total protein content of the early 3rd larval instar of *Musca domestica*.

Treatment	Observations							
	after 24 hours				after 48 hours			
	Range	Mean ± S.E. (mg prot./gm fresh body)	P vaule	Change %	Range	Mean ± S.E. (mg prot./gm fresh body)	P vaule	Change %
Control	44.64 49.10	46.37 ± 1.13			61.35 57.97	60.29 ± 0.95		
Calotropis procera	39.33 30.87	35.74 ± 2.06	P< 0.01	- 22.92	44.57 39.43	41.43 ± 1.29	P< 0.001	- 31.35
Hyoscyamus muticus	40.57 41.44	41.15 ± 0.24	P< 0.01	- 11.26	46.37 41.64	44.11 ± 1.12	P< 0.001	- 26.90
Datura stramonium	40.70 39.50	40.34 ± 0.35	P< 0.01	- 13.00	48.51 42.78	46.79 ± 1.64	P< 0.01	- 23.03
Zygophillum album	46.37 41.55	44.59 ± 1.25	P> 0.05	- 3.84	50.97 46.28	48.92 ± 1.13	P< 0.001	- 18.94

P > 0.05 : nonsignificant
P< 0.01 : highly significant
P< 0.05 : significant
P< 0.001 : very highly significant

Figure (52): Effect of water extracts of *C.procera*, *H.muticus*, *D.stramonium* and *Z.album* on the mean total protein content of the early 3rd larval instar of *Musca domestica*.

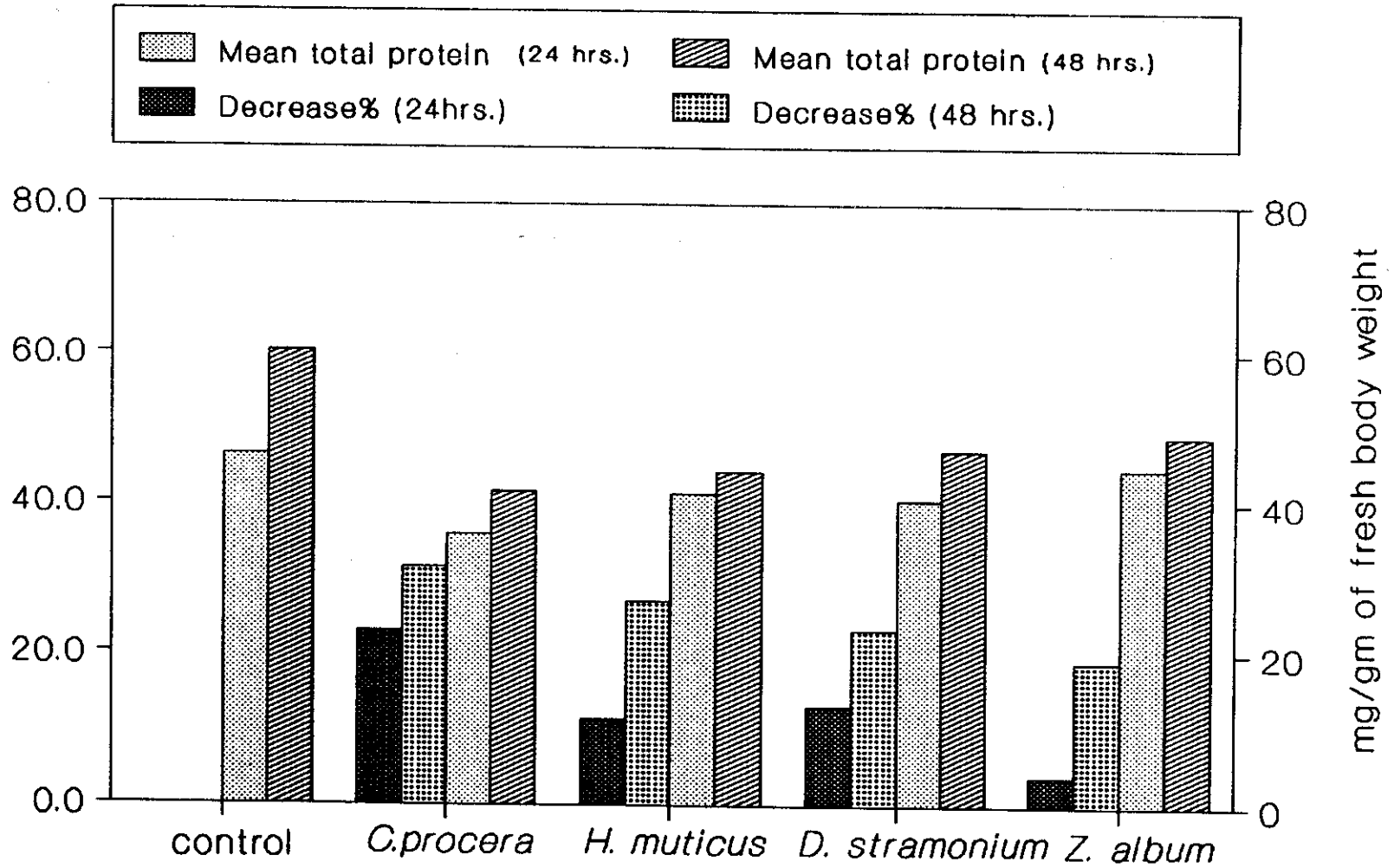


Table (30) : Effect of water extracts of *C. procera, H. muticus, D. stramonium* and *Z. album* on the mean total protein content of the late 3rd larval instar of *Musca domestica*.

Observations / Treatment	Range	Mean ± S.E. (mg prot./gm fresh body)	P vaule	Change %
Control	63.97 65.59	64.48 ± 0.45		
Calotropis procera	51.38 54.73	52.80 ± 0.82	P< 0.001	- 18.11
Hyoscyamus muticus	52.23 55.73	54.23 ± 0.85	P< 0.001	- 15.89
Datura stramonium	54.19 57.73	55.66 ± 0.88	P< 0.001	- 13.67
Zygophillum album	60.55 62.23	56.56 ± 0.42	P< 0.001	- 12.28

P > 0.01 : highly significant

P< 0.001 : very highly significant

Figure (53): Effect of water extracts of *C.procera*, *H.muticus*, *D.stramonium* and *Z.album* on the mean total protein content of the late 3rd larval insatr of *Musca domestica*