Teratogenic effect of lead acetate on *Bactrocera dorsalis* and *Bactrocera zonata*

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Abstract: *Bactrocera dorsalis and Bactrocera zonata* were studied under the effect of lead acetate for 48 hours exposure at larval stages. Since, lead is widely distributed industrial pollutant in the world. It is significant environmental pollutant which contaminates foods, water, soil and air and insect could get easily the influence of such pollutants. Therefore, the teratogenic effects of lead (lead acetate) on external morphology on fruit flies was determined.
The effects of lead acetate, in the concentrations of 0.125 mg., 0.25 mg., 0.5 mg, 1.0 mg and 2.0 mg on *Bactrocera dorsalis*, *Bactrocera zonata*, were studied at 48 hours post treatment. It was observed that under the effects of lead abnormalities and malformation were developed in the larvae of flies. Teratomorphic changes were observed as elongated wings, de-shaped wings, elongated and folded legs, change in melanization of larvae, pupae and adults. Some other structural abnormalities of larvae and pupal shape were also observed. Thus, the Diptera flies could present a useful module for the rapid screening of the environmental hazards due to lead contamination, which exerts a definite physiological and morphological effect on Diptera flies. Therefore, in this respect *Bactrocera dorsalis, Bactrocera zonzta,* could be included in a test system for heavy metals toxicity determination.

Keyword: Heavy metal, lead acetate, *B. dorsalis* and *B. zonata.*

INTRODUCTION

Lead, a widely in use industrial heavy metal, is a significant environmental pollutant that contaminates food, water, urban soil and air. "As it is established that lead has been found to have a definite cytogenetic effect (Tachi & Nishime, 1975; Michailova, 1987b; Short, 1990; Wilson, 1995; Watson, 1999; Walter, 2000; Porter, 2002; Ramel, 2003; Talbot, 2004 and Margim. 2005). The detection of possible hazardous effects of this metal is, therefore; a matter of urgent concern. Although, many studies have been carried out to investigate the biological effects of lead, however, its toxic potential against insects remained to be established. Some studies have been carried out on natural populations of *Bactrocera dorsalis* and *B. zonata* in respect of effects of heavy, metals, it has been found that contamination with heavy metals (Zinc, Lead etc.) can induce the effects on feeding behavior of Chironomidae, structural and functional modifications and malformations (Michailova, 1987a and Timmermans 1988). Investigations on *Bactrocera dorsalis* and *B.zonata* indicated abnormalities due to the effect on meiotic nondisjunction (Ramel, 2003). However, sufficient data on the action of heavy metals and lead is limited available on the group of insects such as *Bactrocera dorsalis* and *B.zonata*, those are widely distributed species of the family tephritidae.

B. dorsalis and B. zonata have been reported on different varieties of mango, the adult flies have been found infesting fruit on maturation during the month of June (Qureshi *et al.,* 1991). *Bactrocera spp.* is regular pest of fruits, which considered being responsible for causing up to 25-50% loss in fruit yield. It has now been considered to infesting heavily mango, peach, plum, citrus and many others (Kapoor and Agarwal, 1982). *B.dorsalis and B. zonata* has been observed from the entire oriental region on a specific host plants (Kapoor, 1970). Thus, the fruit fly *Bactrocera dorsaliss* complex has been reported in a vast field as pest of fruits in Asia (Drew and Hancock, 1994). Thus the use of Diptera flies could present a useful module for the rapid screening of the environmental hazards due to lead contamination, which exerts a definite physiological and morphological effect on Diptera. Therefore, presently, the species *Bactrocera dorsalis, Bactrocera zonzta,* were used to determine the deleterious effects of lead metal, to generate necessary data in respect of *Bactrocera dorsalis, Bactrocera zonzta* to use as a test system for heavy metals and to follow up the later teratomorphic effects.

MATERIALS AND METHODS

Initial strains of the test materials, *Bactrocera dorsalis* and *Bactrocera zonata* were procured from the Plant Protection and Diagnostic Laboratory, DPP, Karachi. The oviposited mangoes with *Bactrocera dorsali* and *Bactrocera zonata* were collected from the said laboratory for further rearing. Larvae were reared under aseptic conditions on a usual prescribed diet with a little amended procedure (Bridges *et al.,* 1965). The newly emerged 3rd instar larvae were collected in Petri dishes for the

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treatments. Batches of three bottles were prepared with 3 gram feed of mangoes and bananas pulp mixed with lead acetate in the desired concentration, as, 0.125 mg, 0.25 mg, 0.5 mg, 1.0 mg and 2.0 mg and a batch of three bottles was kept as control. Thereafter, 10 larvae were released in each bottle for 48 hours exposure. At the post 48 hours exposure mortality count was made then the surviving larvae were transferred in separate bottles on pure diet and kept till pupation and adult emergence. At each stage the effect of lead acetate of different concentration was recorded.

RESULTS

In normal condition, *Bactrocera dorsalis* larvae were found possessing elongated cylindrical body, fusiform in shape and creamy white in color. Encircled the body on the first body segment. "Respiratory organs, the spiracles were found located one on each side of the head of the larvae. The caudal segment was smooth, the posterior spiracles were found located on third segment. It has a body length of 10 mm (fig. 1). Larvae treated, with lead acetate, 0.125 mg at 48 hours exposure, were creamy white in color, the band of spinules encircled the body, found on first segment, the spiracle, located one on each side of the pointed head end of the larva, elongated cylindrical shape, anterior end narrow and curved ventrally, with anterior mouth hooks, ventral fusiform in shape, and flattened caudal end, 9 mm. in length, segmented marks on whole body, morphologically changed structure and more melanization (fig. 2).

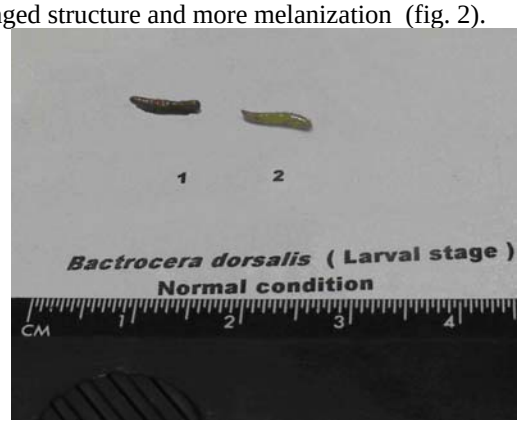

Fig. 1: *Bactrocera dorsalis* (larval stage), in normal condition. Body elongated cylindrical fusiform in shape creamy white in colour, spinules band encircling the body, the larva is 10 mm. in length.

Larvae treated with lead acetate, 0.25 mg at 48 hours exposure, was found same creamy white, slightly segmented, curve at middle portion of the body, deep contraction at middle portion of the body, 7 to 9 mm. in length, toxic effect of lead acetate as morphological changed in shape, structure and melanization shown in (fig. 3).

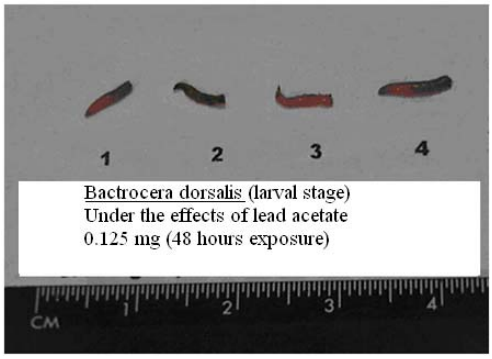

Fig. 2: *Bactrocera dorsalis* (larval stage) effected, with acetate, 0.125 mg at 48 hours.

Larvae, under the effects with lead acetate 0.5 mg at 48 hours exposure were found same with creamy white elongated cylindrical body, pointed at anterior end and flattened at posterior end, slightly segmented, curved at anterior portion of the body. The body length was 10 mm. No prominent change in larvae body was observed (fig. 4). Larvae treated with lead acetate 1.0 mg and 2.0 mg respectively, at 48 hours exposure *Bactrocera dorsalis* larvae were observed, these larvae were with creamy white elongated cylindrical body, pointed at anterior end and flattened at posterior end, slightly segmented body, 7 to 10 mm. in length", No morphology change was recorded on larvae body in this case as well (figs. 5-6).

Showing curved structure of larvae and pigmentation.

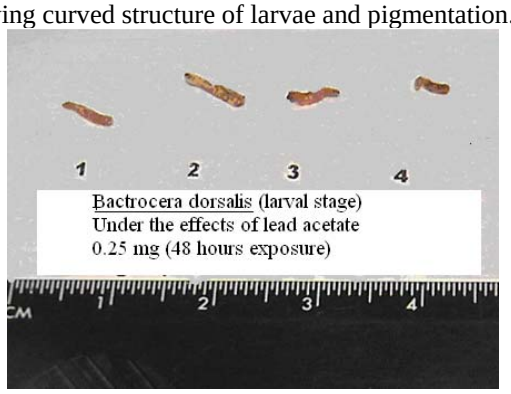

Fig. 3: *Bactrocera dorsalis* (larval stage) effected with lead acetate, 0.25 mg. at 48 hours. Showing hazardous toxic effect on larval structure.

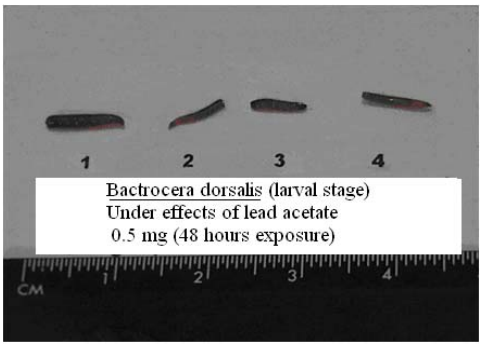

Fig. 4: *Bactrocera dorsalis* (larval stage), effected with lead acetate 0.5 mg at 48 hours. Showing almost normal.

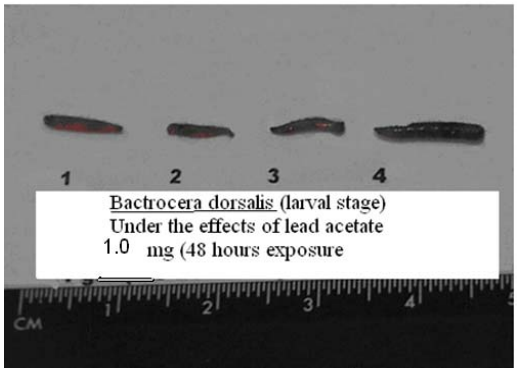

Fig. 5: *Bactrocera dorsalis* (larval stage), effected with lead acetate 1.0 mg at 48 hours. Showing almost normal.

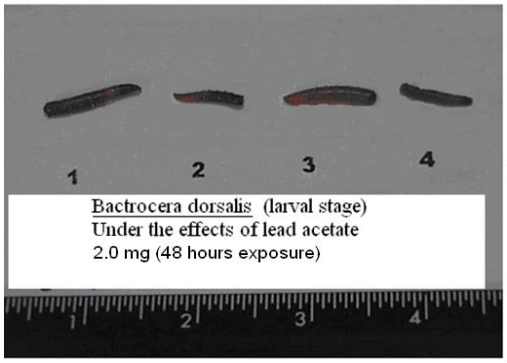

Fig. 6: *Bactrocera dorsalis* (larval stage) effected with lead acetate 2.0 mg at 48 hours. Showing no toxic effect almost normal.

Normal *Bactrocera dorsalis* pupae were observed as a capsule like structure, elastic cover, body length 4mm yellowish brown pigmentation, slightly segmented body (fig. 7). "Larvae, treated with lead acetate, 0.125 mg and at 48 hours exposure, pupae were yellowish brown, slightly elastic, 3 to 4 mm in length. Morphological change appeared in the shape of a pointed projection at one end (fig. 8). Pupae obtained from treated larvae with lead acetate 0.25 mg at 48 hours exposure pupae were, yellowish brown, capsule shape, slightly elastic, 4 to 5 mm. in length, showing toxic effect on the structure of pupae body and changed melanization (fig. 9)". Pupae obtained from the larvae effected with, lead acetate 0.5 mg at 48 hours exposure were yellowish brown, abnormally, rough surface, pointed at one end, contracted at middle portion, 4 to 5 mm. in length, seemed abnormal in shape, with slightly abnormalities on structure, and melanization (fig. 10). "Pupae treated with, lead acetate 1.0 mg at 48 hours exposure, with same yellowish brown pigmentation, slightly abnormalities appeared on shape, rough surface, pointed projection at one end. Body length 4 mm (fig. 11). Pupae effected with lead acetate 2.0 mg at 48 hours exposure, were found same pigmentation as above yellowish, slightly segmented capsule shape, 4 to 5 mm. in length. Morphologically slightly changed structure and melanization" (fig. 12).

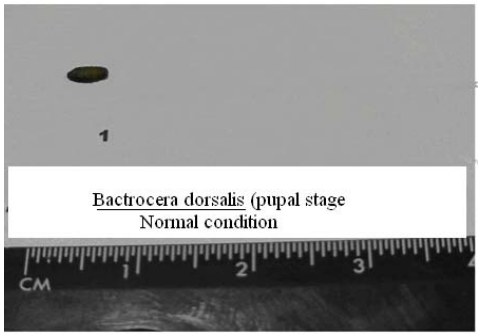

Fig. 7: *Bactrocera dorsalis* (pupal stage) in normal condition. Capsule like structure, elastic cover, 4mm. in length, yellowish brown pigmentation, slightly segmented body.

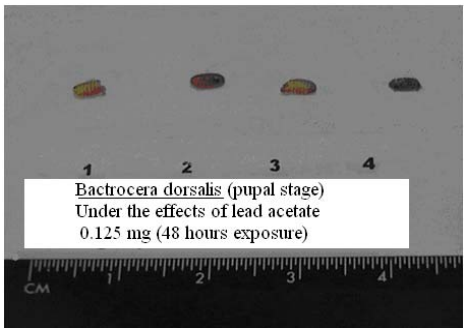

Fig. 8: *Bactrocera dorsalis* pupal stage effected with lead acetate 0.125 mg at 48 hours. Showing structural change in pupae and effected melanization.

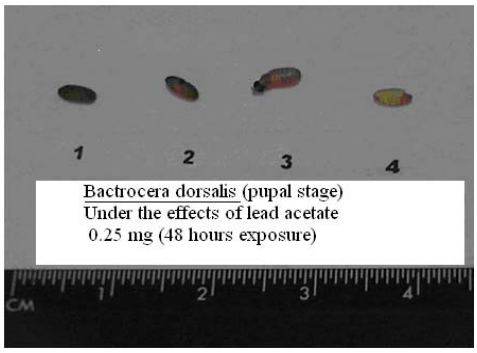

Fig. 9: *Bactrocera dorsalis* (pupal stage) effected with lead acetate 0.25 mg at 48 hours. Showing morphological change in structure due to toxic effect of lead acetate.

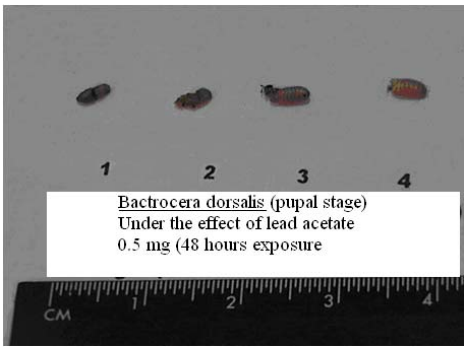

Fig. 10: *Bactrocera dorsalis* (pupal stage) effected with, lead acetate 0.5 mg at 48 hours. Toxic effect of lead acetate showing structural changes in pupae.

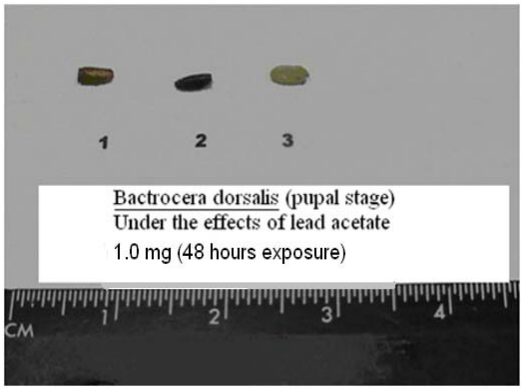

Fig. 11: *Bactrocera dorsalis* (pupal stage) effected with, lead acetate 1.0 mg at 48 hours. Showing toxic effect on structure of pupae.

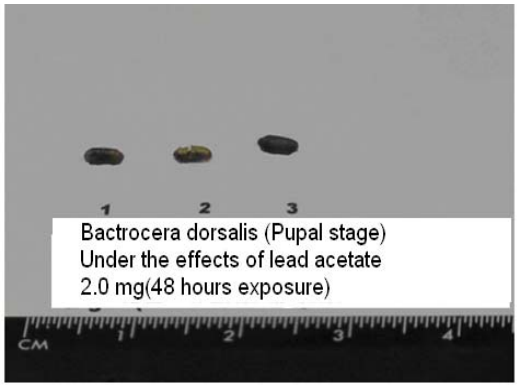

Fig. 12: *Bactrocera dorsalis* (pupal stage) effected with lead acetate 2.0 mg. at 48 hours. Showing toxic effect on structural abnormalities and melanization.

Adult normal fly *Bactrocera dorsalis* was observed as in a triangular shaped body, 8 mm in length. The wings were about 7.3 mm. in length, yellow, greenish brown pigmentation, black marking on the thorax, the abdomen has two horizontal black stripes and a longitudinal median stripe extending from the base of the third segment to the apex of the abdomen with two scape and pedicel red-brown, antennae on head (fig. 13). Adult developed from the treated larvae with lead acetate, 0.125 mg, at 48 hours exposure were found with elongated body, about 8 mm. in length, expanded transparent wings with a slight cutting at the edges, yellowish brown pigmentation, folded legs, dark brown eyes, physical changes on curved wings and folded legs were prominent (fig. 14). "Adult developed from effected larvae with lead acetate, 0.25 mg, at 48 hours exposure with 8 mm. in body length, expanded transparent wing, cutting at the edges, black strips on abdomen, yellowish green brown body pigmentation, black marking on thorax, folded legs", dark brown eyes (fig. 15).

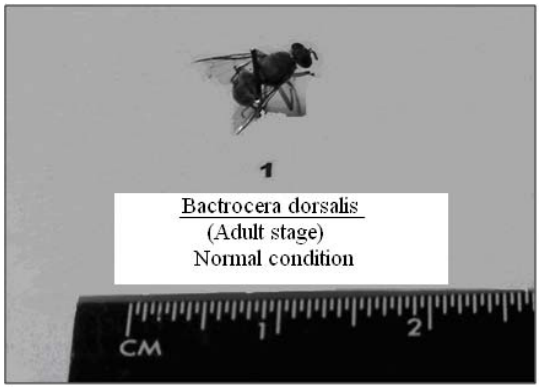

Fig. 13: *Bactrocera dorsalis* (Adult stage) in normal condition. Fly is triangular in shape, body length 8 mm. The wings are about 7.3 mm in length, yellow, green brown pigmentation, black marking on the thorax, and abdomen.

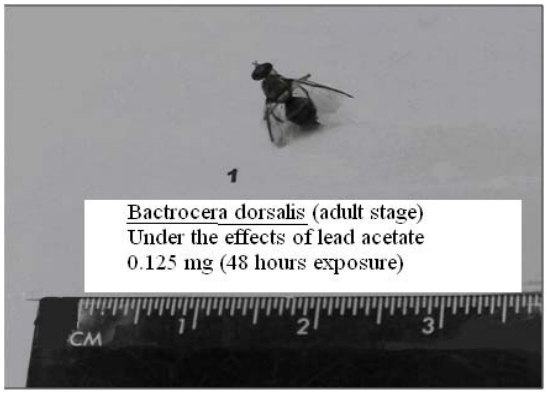

Fig. 14: *Bactrocera dorsalis* (Adult stage), effected with lead acetate 0.125 mg. at 48 hours. Showing slightly curved wing, folded legs and melanization.

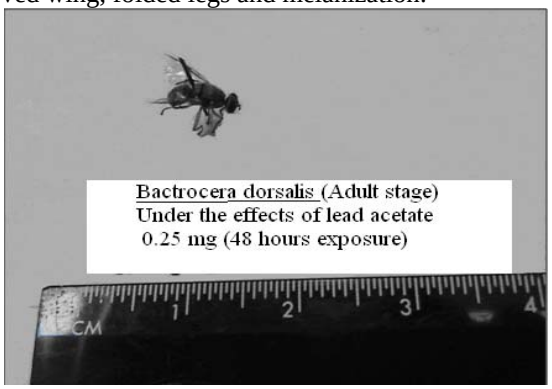

Fig. 15: *Bactrocera dorsalis* (Adult stage), effected with lead acetate, 0.25 mg. at 48 hours. Showing toxic effect of lead acetate as cutting edges of wings.

Adult developed from the treated larvae with lead acetate, 0.5 mg, at 48 hours exposure were found with abnormal body in shape, about 8 mm. in length, expanded transparent wing, cutting at the edges, black strips on abdomen, same body pigmentation as above, black marking on thorax folded legs, dark brown eyes, specimen with absence of one wing was also obtained (fig. 16). Adult developed from the treated

larvae with lead acetate, 1.0 mg, at 48 hours exposure were found with a body length of 8 mm. transparent wing, same body pigmentation and black marking on thorax as above, folded legs, eyes dark brown melanized, changed morphological appearance on body structure and wings (fig. 17). Adult through the larvae effected with lead acetate, 2.0 mg, at 48 hours exposure were slightly abnormal body shape, about 7 mm. in length, veinleted transparent wing, yellowish green brown body pigmentation, black strips on thorax, folded legs, with dark brown malanized eyes, in most of the cases abnormal physical appearance was observed, absence of one wing and elongated legs were the marked abnormality" (fig. 18).

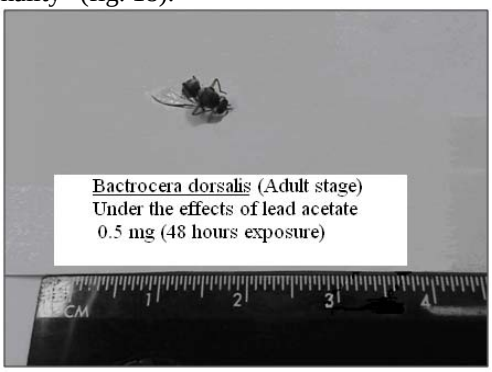

Fig. 16: *Bactrocera dorsalis* (Adult stage), effected with lead acetate, 0.5 mg. at 48 hours. Showing toxic effect as absence of one wings, and folded legs.

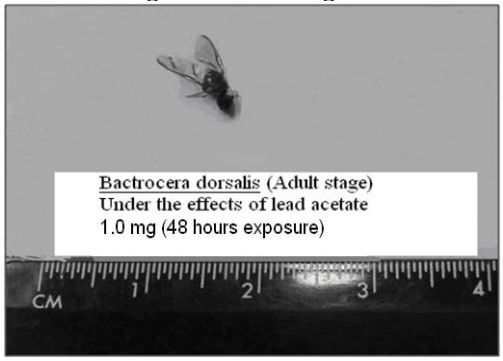

Fig. 17: *Bactrocera dorsalis* (Adult stage), effected with lead acetate, 0.1 mg at 48 hours. Showing toxic effect as absence of one wings, and folded legs.

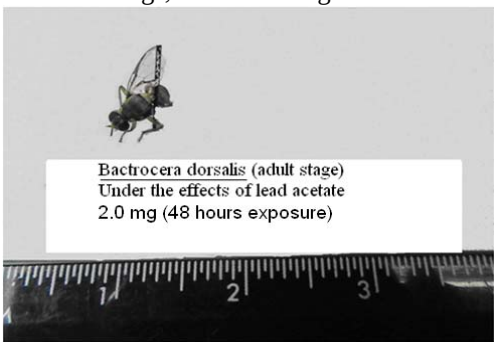

Fig. 18: *Bactrocera dorsalis* (Adult stage), effected with lead acetate, 2.0 mg. at 48 hours. Toxic effect showing absence of one wing and elongated legs.

Bactrocera zonata, "normal larva was observed as elongated body, fusiform in shape, pointed at anterior end, broad at posterior end, slightly segmented body creamy white color, anterior spiracle, mouth hook present, creeping welt present for movement. 7 to 10 mm in length (fig. 19). Larvae treated with lead acetate, 0.125 mg, at 48 hours exposure, dull white creamy body, abnormal in shape, curved at anterior and posterior end, rough surface, 5 to 6 mm. in length", showing hazardrous effect on shape and structure of larvae (fig. 20).

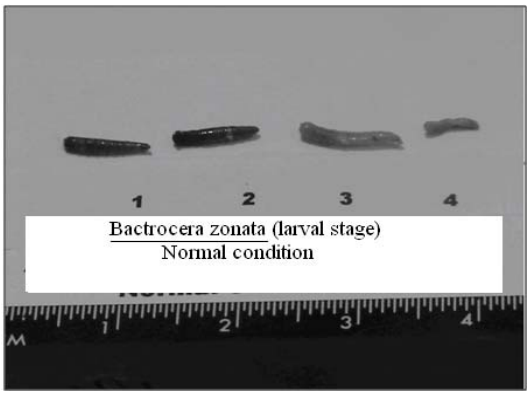

Fig. 19: *Bactrocera zonata* (larval stage), in normal condition, elongated body, fusiform in shape, pointed at anterior end, broad at posterior end, slightly segmented body, dull white colour.

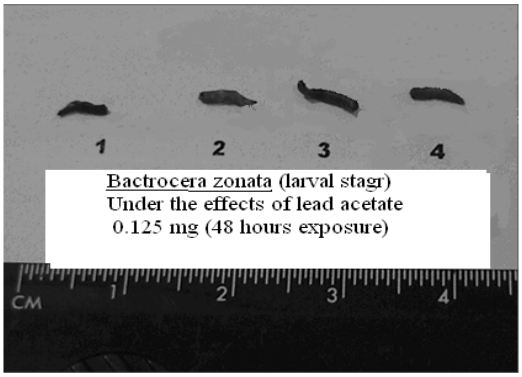

Fig. 20: *Bactrocera zonata* (larval stage), effected with lead acetate, 0.125 mg. at 48 hours. Showing hazardous toxic effect of lead acetate on structure of larvae, such as curved and banded body, rough surface, shrinkage body, dull white brown colour.

Bactrocera zonata larvae treated with lead acetate, 0.25 mg at 48 hours exposure, elongated smooth shiny body, slightly segmented, pointed at anterior end, white creamy colour, 5 to 7 mm. in length. Toxic effect showing structural abnormalities and melanization (fig. 21).

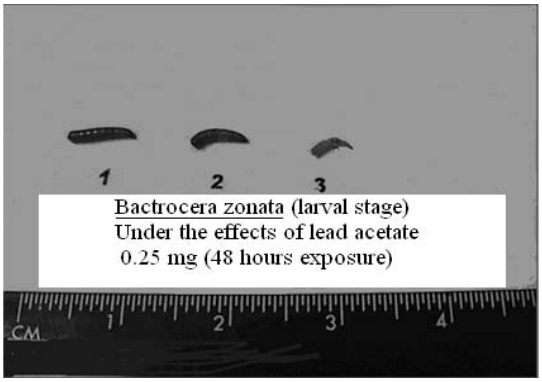

Fig. 21: *Bactrocera zonata* (larval stage) effected with lead acetate, 0.25 mg. at 48 hours. Showing structural abnormalities and curved larvae.

Bactrocera zonata larvae was treated with lead acetate 0.5 mg, at 48 hours exposure, elongated straight, slightly shiny body, pointed at anterior end and flattened at posterior end, white creamy body, 7 mm. in length, Slightly abnormalities on body structure (fig. 22).

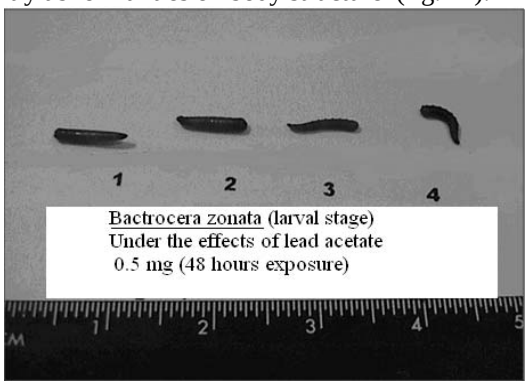

Fig. 22: *Bactrocera zonata* (larval stage) effected with lead acetate 0.5 mg. at 48 hours. Showing toxic effect on larva No. 4.as curved and banded body.

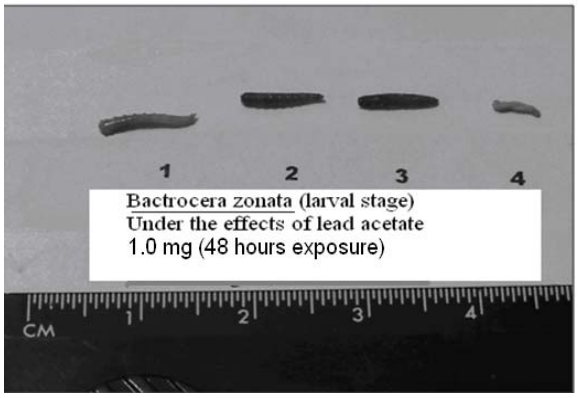

Fig. 23: *Bactrocera zonata* (larval stage) effected with lead acetate 1.0 mg. at 48 hours. Showing toxic effects and abnormal structure of larvae.

Bactrocera zonata "larvae effected with lead acetate 1.0 mg, at 48 hours exposure, 8 to 10 mm. in length, cylindrical body, broader at one end and tapering at other end, fusiform in shape, segmented body", dull white colour (fig. 23).

Bactrocera zonata "larvae treated with lead acetate 2.0 mg., at 48 hours exposure, cylindrical fusiform in shape, dull white light brownish in colour, 7 to 8 mm. in length. Abnormalities appeared on curved larvae, rough surface and melanization" (fig. 24).

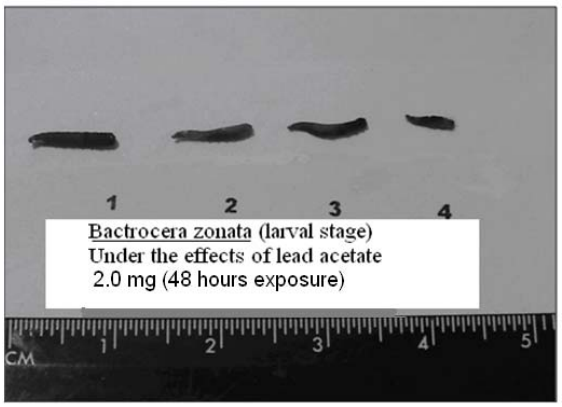

Fig. 24: *Bactrocera zonata* (larval stage) effected with acetate 2.0 mg. at 48 hours. Showing structural abnormalities as curved and banded bodies, rough surface dull white brown colour.

Bactrocera zonata "pupa in normal condition was observed as yellowish brown in colour, 4 to 5 mm. in length, elastic body cover rounded and sloppy at both the end, slightly segmented body, small capsule shape, body length 5 mm. (fig. 25) from the larvae effected with lead acetate, 0.125 mg at 48 hours developed *Bactrocera zonata* (pupal stage) was yellow brown colour, dumbale shape, slightly elastic cover, 5 mm. in length. It was with a pointed projection at one end, toxic effect of lead acetate showed abnormalities in structure of puparium, with head projection at one end" (fig. 26).

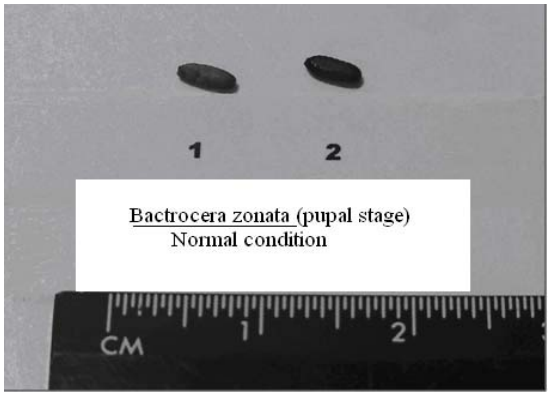

Fig. 25: *Bactrocera zonata* (pupal stage) in normal condition. Yellowish brown colour, 4 to 5 mm. in length, elastic body cover, round at both the end, slightly segmented body, small capsule shape.

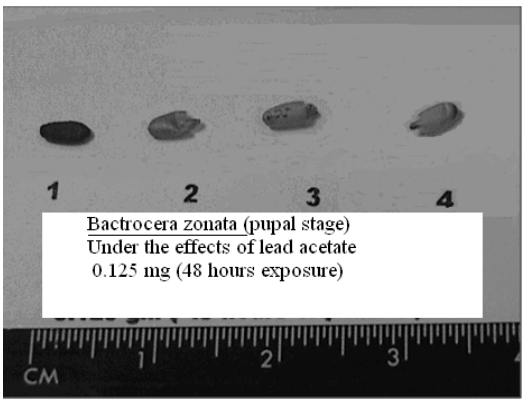

Fig. 26: *Bactrocera zonata* (pupal stage) effected with lead acetate, 0.125 mg. at 48 hours. Toxic effect of lead acetate showing the abnormalities on pupal structures and pigmentation.

Pupae obtained from the treated larvae with lead acetate 0.25 mg at 48 hours exposure of "*Bactrocera zonata* were Dumble shaped, yellowish brown in colour, slightly elastic body, 5 mm. in length. An abnormal structure with spotted body was also observed" (fig. 27).

Fig. 27: *Bactrocera zonata* (pupal stage) effected with lead acetate 0.25 mg. at 48 hours. Showing effect as abnormal structure of pupae and spoted body.

Bactrocera zonata pupae from larvae effected with lead acetate 0.5 mg at 48 hours exposure were with a slightly effected body shape, brown yellowish in colour, 5 mm. in length, physiologically changed body structure (fig. 28).

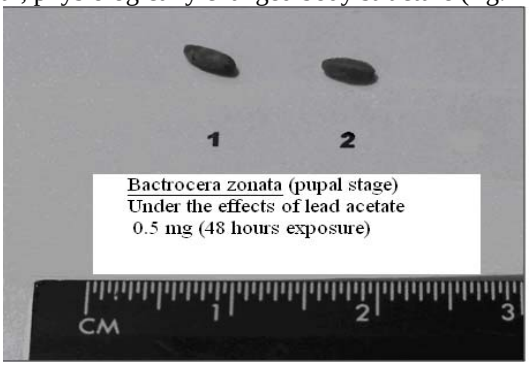

Fig. 28: *Bactrocera zonata* (pupal stage) effected with lead acetate 0.5 mg at 48 hours. Slightly effected body shape and colour.

Bactrocera zonata "pupae, formed from effected larvae with lead acetate 1.0 mg at 48 hours exposure, were abnormal in shape, spotted body with a body length 4 to 5 mm. Dark brown malanization and abnormal body shape with spotted body was also observed (fig. 29) from larvae treated with lead acetate 2.0 mg at 48 hours exposure, *Bactrocera zonata* pupae were slightly in abnormal shape, with changed melanization as brown in colour and spotted body, 4 to 5 mm in length" (fig. 30).

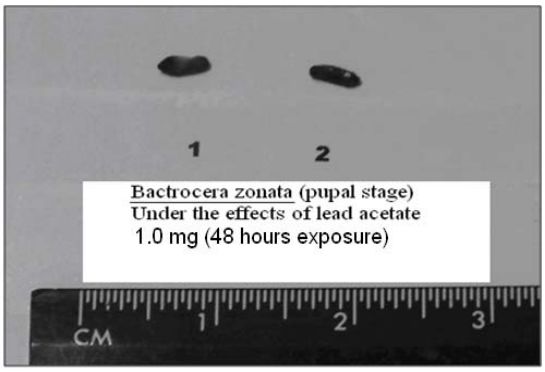

Fig. 29: *Bactrocera zonata* (pupal stage) effected with lead acetate 1.0 mg at 48 hours. Showing abnormalities in body structure and spotted body.

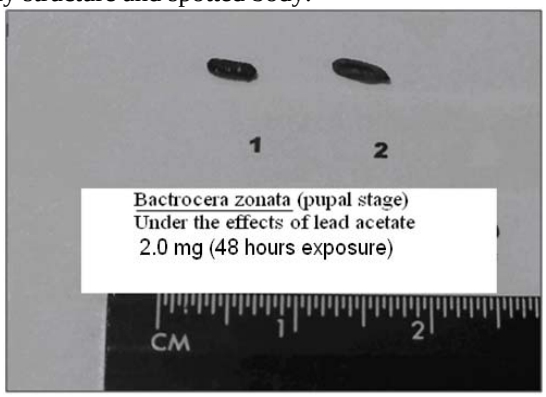

Fig. 30: *Bactrocera zonata* (pupal stage) effected with lead acetate 2.0 mg at 48 hours. Showing structural change in body and melanization.

Bactrocera zonata "adult in normal condition were observed as redish brown in colour, marking on abdomen and thorax, transparent expanded wings, with a small brown spot on the tip of each wing a pair of dark marks on tergite III. Body length 8 mm. and wings are 7 mm. in length. Two spots were found present as one in each furrow, just above the mouth. The antennae were scape and pedicel red-brown. They were found shorter than the vertical length of the head (fig. 31) larvae effected with lead acetate, 0.125 mg at 48 hours exposure developed in *Bactrocera zonata.* Adult as with slightly segmented marking on abdomen, redish brown body colour, blakish brown marking, furrow on thorax, transparent veinleted wings, moveable head, redish black eyes", 8 mm. in length, cut edges of wing showed the abnormal effect of

lead acetate, as developed abnormalities on wing edges, and reduced abdomen (fig. 32).

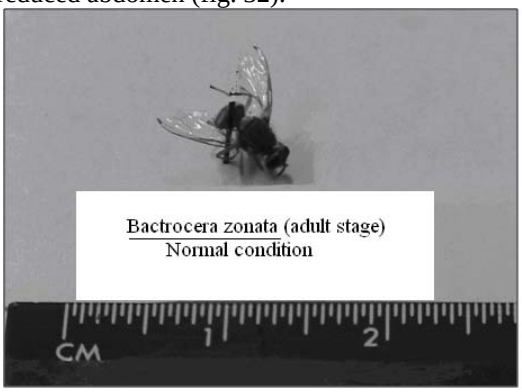

Fig. 31: *Bactrocera zonata* (Adult stage) in normal condition, red brown in colour, marking on abdomen and thorax can be seen, transparent expanded wing, a pair of dark marks on tergite. Body length 8 mm. and wings are 7 mm in length.

Fig. 32: *Bactrocera zonata* (Adult stage) effected with lead acetate, 0.125 mg. at 48 hours. Slightly toxic effect on wing legs and abdomen.

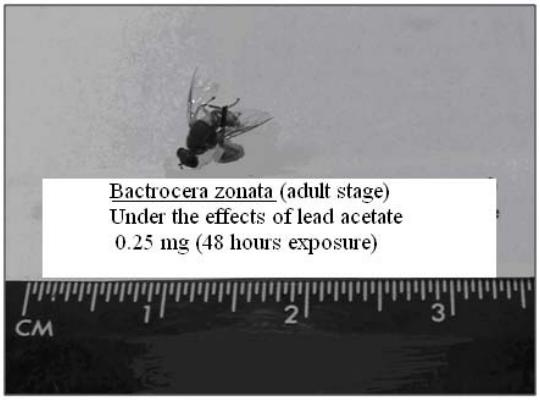

Fig. 33: *Bactrocera zonata* (Adult stage) effected with lead acetate, 0.25 mg at 48 hours. Almost no toxic effect.

Bactrocera zonata adult effected with lead acetate, 0.25g. at 48 hours wings. No toxication recorded (fig. 33). *Bactrocera zonata* adult, formed from effected larvae with lead acetate, 0.5 mg. at 48 hours exposure, were with marking bands on abdomen, blackish brown marking furrow on thorax, transparent veinleted wings, small scape and pedicel red-brown antennaed, red brown body colour, redish black eyes, body length 7 mm. abnormal wing structure and folded legs (fig. 34).

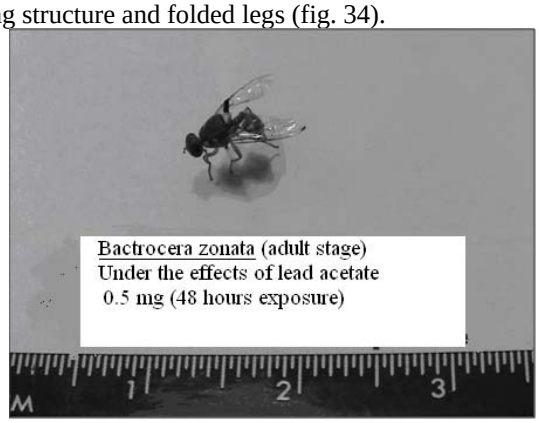

Fig. 34: *Bactrocera zonata* (Adult stage) effected with lead acetate, 0.5 mg at 48 hours. Showing slightly toxic effectively of lead acetate as elongated wings and legs.

DISCUSSION

The results of flies *Bactrocera dorsalis, Bactrocera zonata*, "treated with lead acetate 0.125 mg, 0.25 mg, 0.5 mg, 01 mg, 02 mg of different concentrations, revealed an increase in mortality rates. Parke *et al*. (1991) have shown it takes a minimal concentration of the chemical compound to induce *in vivo* experiments.

The results of our experiments show that Pb influences mostly the functional activity. However, the differences in the frequencies of these changes between the control and the treated material were almost minimal.

Jilani *et al.* (1990) have "shown strong growth inhibiting effect of neem, turmeric and sweetflag oil against some major insect pests" of stored grains.

It revealed that, in *Bactrocera zonata* when larvae were treated with 0.125 mg, concentration of lead acetate at 48 hours, the percentage of mortality rate from 46.66 increases gradually and at 1gm concentration of lead acetate, the mortality rate gradually increases upto 66.66 percent and after 2gm of concentration, it gradually decreasers 56.66 percent, however the control remained normal.

The larvae treated with lead acetate showed the abnormalities in their structure as compare to normal larvae (figs. 20-24). The change in puparium structures may also be seen on same concentration of lead a). These changes revealed the toxic effect of lead acetate (figs. 26-30).

The larvae of *Bactrocera dorsalis* treated with lead acetate 0.125 mg of concentration, the mortality percentage remained 53.33 and at 2.0 gm. of concentration at 48 hours the percentage remained 80 and

Table 1: Mortality effect of lead acetate on *Bactrocera dorsalis* (3rd instar larvae) at post 48 hours exposure period.

S. No.	Lead acetate in mg	Mortality/ replicate	Average % Mortality
1	0.125	04	43.33
2		04	
3		05	
4	0.25	05	53.33
5		05	
6		06	
7	0.50	06	60.00
8		06	
9		06	
10	1. 00	07	70.33
11		07	
12		07	
13	2.00	07	80.00
14		08	
15		08	
16	Control	02	16.66
17		01	
18		02	

Number of larvae exposed in each replicate = 10

Table 2: Mortality effect of lead acetate on *Bactrocera zonata* (3rd instar larvae) at post 48 hours exposure period.

S. No.	Lead acetate in mg	Mortality/ replicate	Average % Mortality
1	0.125	05	46.66
2		04	
3		05	
4	0.25	05	53.33
5		05	
6		06	
7	0.50	07	63.33
8		06	
9		06	
10	1.00	08	73.33
11		07	
12		07	
13	2.00	08	80.00
14		08	
15		08	
16	Control	02	23.33
17		03	
18		02	

Number of larvae exposed in each replicate = 10

control remained at minimal level. The abnormalities in larvae structure may also been observed (figs. 1-6). The puparium treated with same concentration of lead acetate may also been observed in their abnormal structure, which revealed the toxication of lead acetate (figs. 8-12).

The larvae of *Bactrocera. zonata* treated with lead acetate 0.125 mg of concentration at 48 hours, the mortality of larvae remained at 46.66 percent, and gradually increases upto 86.66 percent, at 1.0 gm. of concentration of lead acetate, the structural abnormalities could be seen (figs. 20- 24). The puparium at the same concentration of lead acetate, showed the abnormalities in their structure (figs. 26-30) that revealed the toxicities of lead acetate.

Adults flies with abnormalities in external morphology (elongated legs, hirsute bodies, yellow wings, yellow-spotted wings) were found at different concentration as, 0.125 mg, 0.25 mg.0.5 mg, 1.0 mg and 2.0 mg. The physiological and morphological abnormalities on larvae pupae and adults changes due to lead influence through different structural aberrations (Michailova, Belcheva, 1990).

Mortality effect of lead acetate on *B. dorsalis* and *B. zonata* (3rd instar larvae) at post 48 hours exposure period, indicated in (tables 1-2).

The mortality curve of *Bactrocera dorsalis* (3rd instar larvae) at post 48 hours exposure was plotted at probit log mortality graph paper. The obtained curve indicated that the LD_{50} as 0.19 mg. At the doses less than 0. 19 mg of lead acetate developed abnormalities on physiological and morphological characters in adult stages, such as, folded legs, curved spotted wings, and more melanization. Whereas in *Bactrocera zonata* the mortality curve at probit log mortality graph paper, showed LD_{50} as 0.150 mg of lead acetate, the dose less than 0.150 mg. caused abnormal effect on physiological and morphological characters of adults, as well.

The present studies showed that lead acetate caused influence mostly on the morphology and development of the under test insects. However, the differences due to increase in concentration of lead acetate effected the level of these changes as compared to control.

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