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The Effects of Aqueous Extracts of Unocron Weed, Ibcella Iutea L. on Some Biological Aspects of Bemisia Tabaci (Gennadius) (Homptera : Aleyrodidae)

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Abstract

Bioassay against the immature stages of the whitefly, Bemisia tabaci were conducted with 10, 25, 50, 100% aqueous extracts of unicorn, Ibcela Iutea in the laboratory. Egg-plant Solanum melangena L. fliages treated with unicron extracts resulted in modrate egg viability, oviposition, prolonged larval period, larval and pupal mortality, and having a repellency effect on the adult white-fly.

Introduction

Bemisia tabaci (Gennadius), has recently become a serious pest of agronemically improtant crops in many parts of the world. The white-fly causes economic damage to cotton by transmission of cotton leaf crumple viruse disease (Coudriet *et al.* 1985). Other crops such as carrots, lettuce,melons, squash, and sugarbeets are damaged by either lettuce infectious yellows or squash leaf curl viruses (Flock and Mayhew, 1981). In Iraq it became a serious pest to many crops either in the greenhouse or in the fields (Salman 1986). Recent studies have shown that B. tabaci has developed resistance to orgonaphosphate and pyrethroid insecticides (Prabhaker *et al.* 1985). So it is improtant to search for a new conrol tools. Field observations revealed that unicorn weed Ibcella Iutea L. allways covered with a huge numbers of dead adult whitfly B. tabaci suggesting that this weed plant may have certian allelochemics which may serve as control agent for this pest. The objectives of this study were to determine the biological activity of I. Iutea extracts against B. tabaci as measured by ovipositional response, immature stages mortality and developmental time.

Material and Methods

Unicorn weed plants were collected from eggplant, potato, and cucumber field during 1994. The collected plants were washed with tap water. The Leaves, stems and roots were separated and kept in plastic bags at (-18°C).

Whitflies were collected from the field and kept in a cylindrical cage (15 cm in diaeter and 30cm in hight) containing a young eggplant S. mnelangena as a host plant. Insects were mantained in incubator conditions of 25 °C ±1 and 70±5% relative humidity, and 600 lux light intensity. Insect identification was based on Azab *et al.* (1971).

Aqueous extracts of unicorn

weed repared as follow:-
100 gm of fresh wt of the leaves were cut into picies and milled with 200 ml of cold water for 15 minutes. After 30 min. extrated with filter paper, the filterate then transferd to centrifuge with speed of 3000 rpm for 10 min. The clear suppernatant then kept in the refregerator. The same above mentioned procedure was conducted by using the hot water. Concentrations of 0 (control), 10, 25 ,50 and 100% were prepared from both extracts. 1ml of liquid parafin 1% was added to each concentreation as adhasive agent, and 1-2 drops of tween as a surfactant.

The effects of aqueous extracts on adult whitefly :-
100 adult whitefly (24hr. old) were introduce to the experimental cage supplied with young host plant (4-leaf stage), Three replicates or each concentration. Each cage was spryed with 2ml of each concentreation by using laboratory spray gun supplied from London shandon scientific co. The cages were left for 24hrs. at incubator conditions. Then the adult mortality was recorded.

The effects of the extracts on the immature satages:-

Coudriet *et al.* (1985) procedure was used to evaluate the effects of water extracts. Each instar (100 individual, 3 replicates) was surrounded by oil ring (mus -tared oil : canada balsam 50:50). Then the above mentioned concentrations were used. The mortality rate was recorded after 24 hrs.

The persistancy of the active materials:-
100 adults 3 replicates for each concentreation were used, extract application was done before adult introduction. The adult mortality, egg deposition were recorded after one day, 7days and 14days after treatments.

For the effects of <u>I. lutea</u> extracts on the development of immature stages 25 newly hatch larvea (24 hrs old) 3 replicates were surrounded with oil ring and kept in incubator conditines.

Statistical analysis of the data was based on completely randomized desigen by using ana- lysis of variance with confidance limits of 95% (little & Hills,1972). All mortality rates were corrected according to Abbot's formula (Abbot,1925).

<u>Results and discussion</u>

Aqueous extracts (both in hot & cold water) affect egg hatachability in lesser degree as compared with larval & pupal stages (table1). There is a direct correlation between aqueous extracts concentration and egg mortality. The results indicated that cold water extracts are significantly more effictive on egg stage than hot water extracts (table1). Coudriet *et al.* (1985) found 29% reduction in egg viability when treated with 2% neem-seed extracts, which is supported present study findings. Larval stages are more suceptable to the extracts than egg stages. A direct correlation was observerd between larval mortality and extract concentration (table 1). Mortality ranged between 3.0-39.0 % in concentration of 0% and 100% respectively in hot water extracts. While, it was 0.0-21.3% in cold water extracts at the same concentrations respectively. The same trained was found with pupal stage (table1). It seems that hot water extracts is more effective than cold water extracts against larval and pupal stages. Adult stage adversely affected by aqueous extracts. Mortality rate ranged between 20-90 % in concentration of 0-100%

respectively in hot water extract, and 20-61% in cold water extract at the same concentrations. Again here hot water extracts is more effective than cold water extracts. This may be due to the fact that hot water may inhibited some plant enzymes that affect the active materials (or compounds) or it may change some inactive chemical compound to active ones (Harborne, 1977). Coudriet *et al.* (1985) found that neem-seed extracts adversly affected the mortality rate of immature stages of B. tabaci, which is supported present study findings. Adeyeye and Blum (1989) found that larval mortality and egg hatchability of corn earworms Heliothis zea were adversly affected by Liriope muscari extracts, which is agree with present study findings. While, Al-Sharrok & Girgies (1995a) (In press) found that different concentrations of stem bark extracts of Pinus halepensis exerts larvicidal activity against Culex molestus larvae.

Larval and pupal developmental period prolonged due to extract application (table2). Direct correlation was founed between extract concentration and the developmental period of larval and pupal stages. It ranged between 9.8-20.5 days in concentration of 0-100% respectively for larval stage, and from 5-8.5 days for pupal stage at the same concentrations respectively. Ladd *et al.* (1978) found that azadirachtins application increased the duration of the immature stages of Japanes beetls. Coudriet etal. (1985) found that the application of neem-seed extractes prelenged the duration of the immature stages of B. tabaci. While, Al-Sharooke and Girgies (1995b) (In press) found that Alkanna hirsutissma extracts prolonged developmental time of C. molestus larvae. The above mentioned findings generally agree with findings of present study.

I. lutea extracts seems to have arepellancy effects on adult whitefly. This reflected by a decreased egg deposition as extract concentration increased. The time of post application also was important in this respect. A significant reduction in egg deposition range from 227 to 4.3 eggs/leaf in concentrations of 0-100% respectively in the day after applications and 42.3-164.0 eggs/leaf after 7 days and 14 days post application respectively (table 3). The application did not have a significant effects on egg hatching. This supported our previous findings, that aqueous extracts of I. lutea have little effects egg hatchability (table 1). Significant adult mortality was observed one the day post tretment (table 3). Ladd et al. (1978) found that neem-seed extracts act as feeding deternts of Japanes beetle. While, Bently et al. (1984) found that Pyrrolizidine alkaloid which extracted from coltsfoot, Tussilago farfara had feeding deterrent activity for spruce budworm. Coudriet et al. (1985) found that neem-seed extract have a repellancy effect on whitefly. All these findings are supported present study findings.

It has been demonstrated in this study that unicorn, I. lutea extracts reduced oviposition, prolonged larval and pupal development time. The extracts presents a relatively safe, inexpensive, and novel approch the plant protection as compared with conventional insecticides. More studies are needed for seprating and identifying the active materials in this weed.

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Table 1 : The effects of Aqueous extracts hot (I) and cold (II) of unicorn I. lutea on the mortality rate of B. tabaci .

extracts conc. %	% mortality							
	egg I	egg II	larvae I	larvae II	pupae I	pupae II	adult I	adult II
control	0.0	0.0	3.0	0.0	1.6	0.0	20.0	20.0
10	2.6	0.6	6.0	0.6	4.6	0.0	21.0	17.0
25	6.3	10.0	23.3	10.0	18.6	9.0	43.3	24.0
50	6.0	13.0	33.3	13.0	24.0	14.3	72.0	42.0
100	12.3	21.3	39.0	21.3	33.3	19.0	90.0	61.0
L.S.D	4.0	12.3	7.7	12.3	21.3	3.3	9.4	14.5

Table 2 : The effects I . lutea extracts on the developmtal period of the immature stages of whitefly B. tabaci .

extracts conc. %	larval developmental period (days)			Pupal developmental time (days)
	1st	2nd	3rd	
control	3.6	3.0	3.2	5.0
10	4.0	3.5	4.0	5.1
25	4.3	4.7	4.3	5.7
50	4.8	4.8	5.0	6.3
100	6.1	6.5	7.1	8.5
L.S.D	1.25	1.23	1.3	2.1

Table 3 : The effects of hot water extract of I . lutea extracts on egg deposition, (egg/leaf) egg hatchability, and adult morality of B. tabaci after 1, 7, 14, days of treatment .

extracts conc. %	Egg deposition days after treatment			Egg hatchability% days after treatment			Adults morality% days after treatment		
	1	7	14	1	7	14	1	7	14
control	227	231	265.6	97.6	94.6	98.0	6.0	0.0	0.0
10	33.7	128	222.0	65.3	93.6	99.3	13.6	0.0	0.0
25	16.0	67.0	209.0	99.0	90.3	99.3	16.6	0.0	0.0
50	8.3	63.6	205.0	64.6	90.3	97.7	24.0	3.6	0.0
100	4.3	42.3	164.0	89.0	90.6	90.0	34.6	5.0	0.0
L.S.D	10.3	7.2	7.0	8.5	7.3	4.8	7.2	3.2	-