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EVALUATION THE EFFICACY OF SOME PLANT EXTRACTS AGAINST THE BULB MITE, *Rhizoglyphus echinopus (*Fumouze & Rabin*)* (Acari: Acaridae :Astigmata)

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ABSTRACT

The efficacy of two plant (ethanol&hexan) extracts namely:Geranium, *Geranium macrorrhizum* Album and Oleander, *Nerium oleander* L. Were assayed against the bulb mite *Rhizoglyphus echinopus* (F.&R.).

Obtained results showed that ethanol oleander extract exhibited the highest toxic action against adult females for both disk of yeast and dipping techniques, followed by hexane- geranium , hexane-oleander and ethanol-geranium extracts , where as values of LC_{50} were :26.958 ,35.059 ,52.212 and 54.989 respectively.

On the other hand , the same trend occurred with ethanol-oleander against eggs but differ with hexane-geranium , extrac produced higher activity than ethanol extract.

INTRODUCTION

The bulb mite *Rhizoglyphus echinopus* (F.&R.) considered one of the main pests infesting bulbs, corms, tubers, tuberous roots and rhizomes (Fan. *et al.* 2007) reported that mites belonging to Rhizoglyphus are the most important soil-dwelling pests**.**

This pest could be controlled by different efficient acaricides but the use of such materials are created a lot off encountered problems such as development of resistant strains,destroying natural enemies and pesticide residues as well as soil and pollution of environment (Hassan et al 2005) .

Many investigators in different parts of the world initiated large screening efforts to find plant extracts which have interesting physiological and miticidal effects on mites (Mansour *et al.,* 1986; Dimetry *et al.,* 1988;Abo El-Ghar *et al.,* 1990).

The aim of the present study threw light on the efficacy of some plant extracts, Geranium,(*Geranium macrorrhizum* Album and Oleander) and Nerium,(*Nerium oleander* L.) against eggs and adult females of bulb mite *R. echinopus*.

MATERIALS AND METHODS

Mite stock culture:

Pure culture of *R. Echinopus(F.&R.)* was maintained on yeast in the laboratory using small rearing cell (2.5 cm in diameter and 1.5 cm in depth) El-Khateeb, 1998. A layer of plaster of paris, Clay and Charcoal (7: 2: 1) was placed on the bottom at about 3 mm depth and provided with 3 drops of water daily to keep a suitable relative humidity and kept at constant temperature 25 2篯 and relative humidity 65 5 ٪RH.

Plant extracts:

Leaves of two plants namely Granium and Nerium were extracted according to Freedom *et al.*, 1979 with some modification. Leaves of plants were dried and grinded using laboratory grinder into fine powder and 200 gm of the powder were extracted three times successively with two solvents varied in their polarity. Hexane was the first solvent used followed by ethanol. The homogenous extract was allowed to stand for three days and extracts were filtered through an hydrous sodium sulphate, combined and solvent was evaporated under vacuum at temperature 50篓. The marc was then extracted subsequently with 99 ٪ethanol. The crude extract was then weighted and adjusted to 25 ml with solvent used and kept in the refrigerator for further biological investigation.

Bioassay test:

Two methods were used to evaluate the toxicity effects of the two plant extracts against eggs and adult females of bulb mite *R. echinopus.*

1- Yeast discs

This technique was made with 0.5 gm of dried yeast mixed with 1 ml of each concentration (10,25,50 and 75ppm)of granium extracts and (10,20,40 and 60 ppm) of oleander extracts and provided with 5 adult females. Five replicates were used for every concentration. The treated discs were placed onto pads of wet cotton wool in cages well sealed and kept under laboratory conditions percentages mortality of adult females were recorded to estimate LC_{50} and slope according to method described by Finney, 1952. Distilled water replicates served as control.

2– Dipping technique

The efficacy of the two extracts were also investigated in the laboratory against adult females of *R. echinopus* using the dipping method. To determine the impact activity of the tested extracts discs of a double face stock provided with five adult females were dipped in different concentration for 10 seconds. Excess solutions were dried off using filter paper. The discs were put on wet cotton wool in petri-dish and kept under constant conditions (25 2篓 and 65 5 ٪RH).

Hatching test:

The toxicity effects of the two plant extracts were tested against 1, 2 and 3 days old eggs of *R. echinopus* using leaf-dip method. To determine the impact activity and latent effects of the tested extracts, discs of sweet potato leaves were placed on wet cotton wool in petri-dishes. Five adult females were permitted to oviposit for 24 h. The resulting eggs were dipped in different concentrations for 10 seconds. Excess solutions were dried off using filter paper. The discs were put on wet cotton wool in petri-dish and kept under constant conditions (25 2篓 and 65 5 ٪RH).

Mortality regression lives were calculated according to Finney's method.

RESULTS AND DISCUSSION

Effect of some plant extracts on adult females of *R. echinopus* using disc of yeast technique:

The action of the tested plant extracts revealed a great variation in effectiveness against *R. echinopus(F.&R.)* as indicated in (Table 1). It was found that ethanol-oleander extract exhibited the highest toxic action against the females for both disc of yeast and dipping techniques followed by hexane extract. The LC_{50} values of ethanol and hexane extract of oleander were 26.958 and 52.212 gm/ ml, respectively. On the other hand the hexane extract of granium was more effective against adult female stages. The LC_{50} values of hexane and ethanol extract of granium were 35.059 and 54.989 gm/ ml for adult females, respectively.

The toxicity index that illustrated in (Fig. 1) showed that ethanol-oleander extract was the most toxic compound against adult females followed by granium hexane, nerium hexane and granium ethanol extracts.In this respect Iskander N.,et al.,(1996) showed that the toxicity index of Shihh was the most toxic extract against egg and adult female stages of *T. urticae* followed by sorrel and kalakh.On the other hand ,the adult females of *T. urticae* were more susceptible to three tested plant extracts than the eggs

Toxicity of plant extracts on eggs of *R. echinopus* by using dipping technique:

Data obtained in (Table 2) showed that toxicity of plant extracts was strongly influenced by the solvent used in extraction.Ethanol-oleander extracts produced higher activity than with hexane-oleander extracts. But hexane-granium extracts produced higher activity than with Granium ethanol against egg of *R. echinopus* by using dipping method. The LC_{50} values were 29.075 and 48.345 gm / ml for ethanol and hexane extracts of oleander, respectively. But were 29.237 and 59.929 gm/ml for hexane and ethanol extracts of Granium, respectively.

The toxicity index in (Fig. 2) showed that ethanol-oleander extract was the most toxic compound against eggs followed by hexane-Granium, hexane-oleander and ethanol-Granium respectively.

Farag ,A. et al.,(1993) reported that hexane extracts of Rosmararinus , Melia and Salix was more effective on the egg of *Tetranychus urticae* than ethanol extracts.

Toxicity of plant extracts on adult females of *R. echinopus* by using dipping technique:

Data have the same trend of toxicity of plant extracts. The LC_{50} values of ethanol and hexane of oleander extracts were 32.804 and 44.312 gm/ml, respectively and were 36.244 and 63.526 of the hexane and ethanol extracts of geranium.

Data illustrated on (Fig. 3) showed the effect of plant extracts against adult females by using dipping method. ethanol-oleander extract produced the higher activity than the other extracts while ethanol-granium extract was the lowest activity, while Velcheva, N. *et al.,* (2001) reported that the ethanol extract of granium reduced considerably the density of the treated population on the third day post treatment of the mite *Tetranychus urticae* Koch.

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تقيـــيم فعاليـــة بعـــض المستخلصـــات النباتيـــه ضـــد حلـــم الابصـــال *Rhizoglyphus echinopus(*F.&R.*)* (Acari:Acaridae :Astigmata)

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اجريت دراسه لتقييم فعالية نوعين من المستخلصات النباتيه لنبات الجرانيم و التفله حيث استخدم الايثانول و الهكسان كمذيبات ضد البيض و الاناث البالغة لحلم الابصال *Rhizoglyphus echinopus* بطريقتين مختلفتين:

١- Yeast discs .

٢- Dipping technique.

اوضحت النتائج المتحصل عليها ان مستخلص التفله الايثانولى الاكثر فعاليه ضد الاناث البالغة لحلم الابصال باستخدام الطريقتين المذكورتين يليه الجرانيم هكسان و التفله هكسان واخيرا الايثانول جرانيم حيث كانت نصف الجرعه المميتة ٢٦,٩٨٩، ٣٥,٥٩،٥٢,٢١و اخيرا ٥٤,٩٨٩ على الترتيب ومن ناحيه اخرى فان التأثير على البيض كان على نفس النمط بالنسبة لمستخلص التفله الايثانولى و على العكس مستخلص الجرانيم هكسان حيث اعطى معدل ابادة اعلى من الجرانيم الايثانولى.

Table 1: Toxicity of plant extracts on adult females of *R. echinopus* by using disc of yeast technique.

No.	Plant extracts	LC_{50} ٪ (ppm) and it's limts at 95 ٪		LC_{90} ٪ (ppm) and it's limts at 95 ٪		Slope ( )	Toxicity index (٪) at LC_{50}
		Lower limit	Upper limit	Lower limit	Upper limit		
1	Ethanol-oleander	26.958		72.751		2.972 0.265	100
		19.242	37.768	51.928	101.924		
2	Hexane-oleander	52.212		114.95		3.739 3.688	51.632
		41.937	65.004	92.329	143.113		
3	Ethanol-Geranium	54.989		122.4		2.742 0.251	49.024
		41.904	72.159	93.275	160.619		
4	Hexane-Geranium	35.059		102.843		3.739 0.374	76.893
		31.074	39.521	84.584	134.204		

Fig. 1: Toxicity index of some plant extracts against adult females of *R. echinopus* by using disc of yeast technique.

Table 2: Toxicity of plant extracts on eggs of *R. echinopus* by using dipping technique.

No.	Plant extracts	LC_{50} ٪ (ppm) and it's limts at 95 ٪		LC_{90} ٪ (ppm) and it's limts at 95 ٪		Slope ( )	Toxicity index (٪) at LC_{50}
		Lower limit	Upper limit	Lower limit	Upper limit		
1	**Ethanol-oleander**	29.075		73.53		3.181 0.278	100
		26.182	32.293	62.242	91.886		
2	**Hexane-oleander**	48.345		103.537		3.875 0.37	60.141
		40.356	52.534	98.362	127.435		
3	**Ethanol-Geranium**	59.929		135.252		3.625 0.356	48.516
		54.821	65.489	116.023	167.778		
4	**Hexane-Geranium**	29.237		102.716		2.348 0.227	99.446
		20.633	41.429	72.488	145.549		

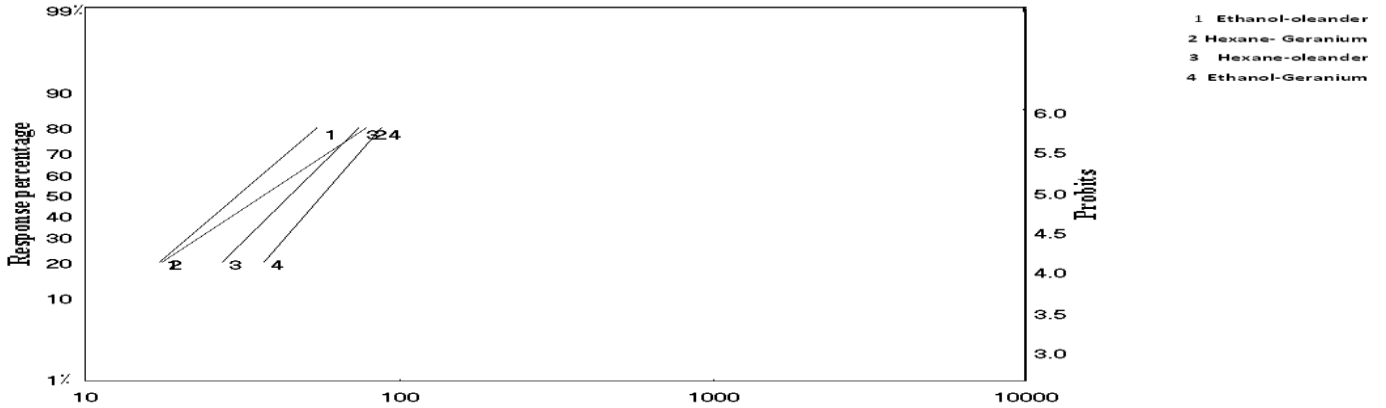

Fig. 2: Toxicity index of some plant extracts on eggs of *R. echinopus* by using dipping technique.

Table 3: Toxicity of plant extracts on adult female stages *R. echinopus* by using dipping technique.

No.	Plant extracts	LC_{50} ٪ (ppm) and it's limts at 95 ٪		LC_{90} ٪ (ppm) and it's limts at 95 ٪		Slope ( )	Toxicity index (٪) at LC_{50}
		Lower limit	Upper limit	Lower limit	Upper limit		
1	Ethanol-oleander	32.804 28.344	38.256	130.307 118.366	142.422	2.139 0.0.242	100
2	Hexane-oleander	44.321 40.755	47.982	91.059 80.479	107.514	4.097 0.37	74.03
3	Ethanol-Geranium	63.526 51.066	79.026	120.812 97.116	150.29	4.591 0.427	51.639
4	Hexane-Geranium	36.244 31.727	41.511	124.447 98.042	174.293	2.392 0.236	90.509

Fig. 3: Toxicity index of plant extracts on adult females *R. echinopus* by using dipping technique.