EFFECT OF SOME PLANT EXTRACTS AND PESTICIDES ON SOME BIOLOGICAL ASPECTS OF TWO DIFFERENT SPECIES OF TETRANYCHID MITES
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ABSTRACT

The effect of treatment with pesticides (sanmite) and four plant extracts on the biology of spider mite and citrus brown mite was investigated. Treatment with the pesticides decreased female longevity, precoposition and oviposition period, number of eggs and percentage of hatchability in both Tetranychid mites: Tetranychus urticae Koch and Eutetranychus orientalis (klein).

Treatment with plant extracts; worm wood, caraway, lupin and lantana, decreased female adult longevity, oviposition period, egg hatchability and number of deposited eggs in both mite species.

INTRODUCTION

Plant extracts have been used as insecticides by humans before the time of the ancient Romans, a practice that continues to the present with many of plant species was known to have insecticidal properties. The two-spotted spider mite, Tetranychus urticae Koch and citrus brown mite Eutetranychus orientalis (Klein) are serious pests of food and fiber crops and often caused considerable reduction in yields. Mite control using acaricides on agriculture crops has become a routine practice by farmers all over the world.

As a result of continuous application of these chemicals on mite infested crops, the resistance problem has taken place beside residue contamination of human foods, mammalian toxicity and pollution of the environment.

Many investigators in different parts of the world studied the effect of plant extracts on the biology of insects and mites (Burce, 1976; Pandey, 1976; Amer, 1979; El-Naggar, 1980; El-Kabbany, 1980; Schauer and Schmutrer, 1981; Ali, 1981; Ahmed, 1983; Mohamed, 1983; Barakat & Shereef, 1984; Afifi and Hafez, 1988; El-Halawany et al., 1988; Pan et al., 1993; Iskander, 1993; Giadding, 1995; and Barakat, 2001).

The present work aimed to determine the efficacy of four plant extracts (worm wood, caraway, lupine and lantana) and one pesticide (sanmite 20% WP) at the LC50 level on the biological aspects of mites: T. urticae and E. orientalis.

MATERIAL AND METHODS

mites:

The spider mite T. urticae koch was collected from the field and reared in the laboratory on lima bean plants Phaseolus vulgaris L. under
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constant temperature (27±0.5) and relative humidity (70%) as described by (EL-Defrawi et al, 1965). While, citrus brown mite, *E. orientalis* (kleini) was collected from heavily infested leaves of citrus trees. Collected strain was transferred to laboratory, then adult females were reared on the host plant, *Plumeria alba* at 27°C and 70% R.H.

Selected sweet potato cuttings (20 cm. Length) with leaves placed in bottles filled with water and kept under laboratory conditions (27°C, and 70% R.H.). Fluorescent tubes (40 watt) were used to maintain continuous illumination. Potato cuttings and water were changed every day. To get a homogeneous and sensitive culture, this colony was left for one year under the previous laboratory conditions.

CHEMICALS:
One pesticide was used (sanmite 20% WP)

PLANT EXTRACTS:

<table>
<thead>
<tr>
<th>English name</th>
<th>Scientific name</th>
<th>Used part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worm wood</td>
<td><em>Artemisia herba-alba</em> Asso.</td>
<td>Whole plant</td>
</tr>
<tr>
<td>Caraway</td>
<td><em>Carum carvi</em> L.</td>
<td>Seeds</td>
</tr>
<tr>
<td>Lupine</td>
<td><em>Lupinus termis</em> Forsk</td>
<td>Seeds</td>
</tr>
<tr>
<td>Lantana</td>
<td><em>Lantana camara</em></td>
<td>Leaves</td>
</tr>
</tbody>
</table>

EXTRACTION PROCEDURE:
The parts of each sample (100g.) were ground in a food grinder and extracted using acetone and ethyl ether as solvents. And each solvent was used at the rate of 5ml/g. plant material compared with the method described by Su and Horvai (1981). After 24 hours, the ether extract was transferred to separatory funnel, added about 30ml chloroform and shaken to allow the organic solvent layer and water layer to separate. The crude extract was then weighted and adjusted to 10ml volume with acetone.

BILOGICAL STUDY:

About (50-60) adults females were placed on a single leaf of the host plant kept on moist cotton wool in Petri dishes. After egg deposition, adult females of the same age were sprayed then placed individually in Petri-dish. Fifteen replicates were used for each treatment. Old leaves were replaced with fresh ones. Incubation period, percentage of egg hatchability, preoviposition, oviposition, longevity and number of eggs were determined. Changes in the biology of mites were determined after treating adult females with pesticide or plant extracts at the LC50 level.

STATISTICAL ANALYSIS:
Biological data were statistically analyzed for standard error (S.E.) and least significant difference (L.S.D.) according to Steel and Torrie (1968). Data were statistically analyzed to estimate LC50 according to the method described by Finney (1952).
RESULTS AND DISCUSSION

Effect of pesticide (Sanmite WP 20%) on the biology of *T. urticae* and *E. orientalis*:

Data given in Table (1) show that the insecticidal treatment significantly shortened adult female longevity, number of eggs and oviposition period. The average of female longevity, oviposition period and number of deposited eggs were 14 days, 11 days and 90.6 eggs, respectively in case of mite *E. orientalis* (untreated), while in case of treated mites, the averages decreased to 5.1 days and 3.4 days and 39.1 eggs. While, in case of *T. urticae* (untreated) these average of were 12 days and 10.3 days and 76.4 eggs, respectively. All data observed between two mites with the insecticide were significant. On the other hand, in both two treated mites, the pesticide significantly prolonged pre-oviposition period compared with untreated mites. Egg hatchability was affected by pesticide. It recorded 70.9% in *T. urticae* and 67.2% in *E. orientalis* corresponding to 93.3% and 90% in untreated mites, respectively (Table 1). The results also show that the incubation period of both mite species was decreased in treated eggs. Thus, it could be concluded that, female longevity, pre-oviposition and oviposition periods, number of eggs and percentage of hatchability were significantly affected by exposing adult females of *T. urticae* and *E. orientalis* to the LC50 values. These results agreed with Barakat & Shereef (1984), who mentioned that, the oviposition, longevity and fecundity decreased significantly 8 days when *T. urticae* exposed to plectran and cypermethrin.

Table (1): Effect of Sanmite WP on the biological aspects of *T. urticae* and *E. orientalis*.

<table>
<thead>
<tr>
<th>Mites</th>
<th>Pesticide</th>
<th>LC50</th>
<th>Incubation period/day</th>
<th>Hatchability %</th>
<th>Pre-oviposition period/day</th>
<th>Oviposition period/day</th>
<th>Longevity</th>
<th>Number of eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>T. urticae</em></td>
<td>Sanmite</td>
<td>0.0056</td>
<td>2.0 ± 0.6</td>
<td>70.9 ± 5.2</td>
<td>3.5 ± 0.7</td>
<td>19 ± 0.7</td>
<td>4.4 ± 0.6</td>
<td>23.7 ± 3.7</td>
</tr>
<tr>
<td></td>
<td>Untreated</td>
<td></td>
<td>4 ± 0.5</td>
<td>92.3 ± 6.2</td>
<td>1.7 ± 0.2</td>
<td>10.3 ± 0.4</td>
<td>12 ± 1.5</td>
<td>75.4 ± 4.6</td>
</tr>
<tr>
<td></td>
<td>L.S.D level at 0.05</td>
<td></td>
<td>4.61</td>
<td>4.30</td>
<td>0.43</td>
<td>4.6</td>
<td>1.56</td>
<td>17.1</td>
</tr>
<tr>
<td><em>E. orientalis</em></td>
<td>Sanmite</td>
<td>0.00109</td>
<td>1.7 ± 0.5</td>
<td>67.2 ± 5.8</td>
<td>4.3 ± 0.8</td>
<td>3.4 ± 0.8</td>
<td>5.1 ± 0.9</td>
<td>38.1 ± 3.0</td>
</tr>
<tr>
<td></td>
<td>Untreated</td>
<td></td>
<td>3.6 ± 0.4</td>
<td>90 ± 6.4</td>
<td>1.6 ± 0.4</td>
<td>11 ± 0.8</td>
<td>14 ± 0.8</td>
<td>90.6 ± 10.2</td>
</tr>
<tr>
<td></td>
<td>L.S.D level at 0.05</td>
<td></td>
<td>3.6</td>
<td>4.23</td>
<td>0.40</td>
<td>4.1</td>
<td>1.73</td>
<td>15.3</td>
</tr>
</tbody>
</table>

Effect of plant extracts on the biology of *T. urticae* and *E. orientalis*:

It is clear from Table (2) that, the adult female longevity, oviposition period, egg hatchability and number of deposited eggs were decreased in all treatments when adult female in both mites; *T. urticae* and *E. orientalis* were treated with plant extracts; *Artemisia herba-alba*, *Carum carvi*, *Lupinus fermsis* and *Lantana camara*. Data also showed that, the differences between treated and untreated females in both different species of mites were highly significant. Barakat et al & Shereef (1984), mentioned that, treatment with plant extracts had no effect on egg hatchability in case of *T. urticae*. 

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Treatment with plant extracts; Artemisia herba-alba and Carum carvi prolonged pre-oviposition period (2.1 and 2.6 days) and (1.7 and 2.3 days) in case of T. urticae and E. orientalis, compared with 1.7 and 1.6 days in the control respectively, and the difference between both mites were significant, while Lantana camara shorted this period (0.9 and 0.6 days) as compared with the untreated females (1.7 and 1.6 days) (Table 2). The incubation period was significantly prolonged by plant extracts using worm wood, caraway and lupine (4.9, 4.8 and 5 days) in case of T. urticae respectively and caraway, lupine and lantana (4, 4.2 and 4.7 days) in case of E. orientalis respectively. Barakat et al (1984) mentioned that, the treatment with plant extracts prolonged pre-oviposition of female T. urticae by using black pepper, glarybower, garlic, onion an canna, and also mentioned that, the generation period was apparently prolonged by treatment with garlic, turpin, black pepper, caraway and fenugreek. In case of T. urticae and E. orientalis, the oviposition period was highly decreased to (3.8, 4.4, 4.6 and 5.1 days) and (3.2, 5.4, 6 and 7.3 days) by using lantana, lupine, caraway and worm wood, respectively, while it was 10.3 and 11 days in both mites in the control respectively (Table 2). Also, longevity of individuals from the treated replicates were (7.4, 6.3, 7.8 and 6 days) and (8.1, 8.2, 9.6 and 7.3 days) in case of T. urticae and E. orientalis by using worm wood, caraway, lupine and lantana respectively (Table 2). The same table revealed a pronounced reduction in the number of the deposited eggs per female, it was (31.6, 27.3, 11.7 and 9 eggs) in case of T. urticae and (44.5, 42.1, 15.8 and 10.6 eggs) in case of E. orientalis compared with 76.4 and 90.6 eggs for the control.

It can be concluded that use of plant extracts induced an obvious reduction in oviposition period, longevity, hatchability and the average number of deposited eggs per female.

**Table (2): Effect of four plant extracts on biological aspects of T. urticae and E. orientalis.**

<table>
<thead>
<tr>
<th>Mites</th>
<th>Plants</th>
<th>LC50 gm/m</th>
<th>Incubation period/day</th>
<th>Hatchability %</th>
<th>Pre-oviposition period/day</th>
<th>Oviposition period/day</th>
<th>Longevity</th>
<th>Number of eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. urticae</td>
<td>Artemisia</td>
<td>0.0223</td>
<td>4.9 ± 0.6</td>
<td>94.8</td>
<td>2.1 ± 0.6</td>
<td>3.1 ± 0.5</td>
<td>7.4 ± 0.5</td>
<td>51.8 ± 5.8</td>
</tr>
<tr>
<td></td>
<td>Herba-alba</td>
<td>0.0167</td>
<td>4.8 ± 0.3</td>
<td>71.7</td>
<td>2.6 ± 0.5</td>
<td>4.0 ± 0.4</td>
<td>6.3 ± 1.0</td>
<td>27.3 ± 1.2</td>
</tr>
<tr>
<td></td>
<td>Carum carvi</td>
<td>0.0041</td>
<td>5.0 ± 0.6</td>
<td>7.4</td>
<td>1.6 ± 0.3</td>
<td>4.4 ± 0.5</td>
<td>7.8 ± 0.7</td>
<td>11.7 ± 1.6</td>
</tr>
<tr>
<td></td>
<td>Lupinus termsis</td>
<td>0.0211</td>
<td>4.2 ± 0.7</td>
<td>64.5</td>
<td>0.9 ± 0.3</td>
<td>3.8 ± 0.7</td>
<td>6 ± 0.8</td>
<td>9 ± 1.4</td>
</tr>
<tr>
<td></td>
<td>Lantana camara</td>
<td>0.40 ± 5.0</td>
<td>93.3</td>
<td>1.7 ± 0.2</td>
<td>10.3 ± 0.4</td>
<td>12 ± 1.5</td>
<td>76.4 ± 6.5</td>
<td>6 ± 1.4</td>
</tr>
<tr>
<td></td>
<td>Untreated</td>
<td>0.94</td>
<td>5.61</td>
<td>0.46</td>
<td>1.22</td>
<td>1.34</td>
<td>1.34</td>
<td>6.62</td>
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<td></td>
<td>L.S.D. level at 0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. orientalis</td>
<td>Artemisia</td>
<td>0.0191</td>
<td>3.8 ± 0.5</td>
<td>80</td>
<td>1.7 ± 0.2</td>
<td>7.3 ± 0.3</td>
<td>8 ± 0.9</td>
<td>44 ± 5.0</td>
</tr>
<tr>
<td></td>
<td>Herba-alba</td>
<td>0.0147</td>
<td>4.0 ± 0.6</td>
<td>80</td>
<td>2.3 ± 0.5</td>
<td>6.0 ± 0.6</td>
<td>8.2 ± 1.2</td>
<td>42.1 ± 2.2</td>
</tr>
<tr>
<td></td>
<td>Carum carvi</td>
<td>0.0306</td>
<td>4.2 ± 0.8</td>
<td>81.6</td>
<td>1.6 ± 0.4</td>
<td>5.4 ± 0.6</td>
<td>9.6 ± 1.1</td>
<td>15.8 ± 3.7</td>
</tr>
<tr>
<td></td>
<td>Lupinus termsis</td>
<td>0.0113</td>
<td>4.7 ± 0.7</td>
<td>75.8</td>
<td>0.8 ± 0.2</td>
<td>3.2 ± 1.2</td>
<td>7.3 ± 0.8</td>
<td>10.6 ± 1.9</td>
</tr>
<tr>
<td></td>
<td>Lantana camara</td>
<td>3.5 ± 0.4</td>
<td>90</td>
<td>1.6 ± 0.3</td>
<td>110 ± 0.8</td>
<td>14 ± 0.5</td>
<td>90 ± 10.2</td>
<td>6.31</td>
</tr>
<tr>
<td></td>
<td>Untreated</td>
<td>0.62</td>
<td>5.12</td>
<td>0.93</td>
<td>1.40</td>
<td>1.42</td>
<td>1.42</td>
<td></td>
</tr>
</tbody>
</table>

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REFERENCES


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تأثر بعض المستخلصات النباتية والمبيدات على بيولوجيا نوعين من الآفات:

الجهاز النباتي

1. تأثير الشكل النباتي على نسبتة النباتات: راش (2010) على بيولوجيا آفات الأعشاب العالية والأوراق

2. تأثير الشكل النباتي على نسبتة النباتات: راش (2010) على بيولوجيا آفات الأعشاب العالية والأوراق

3. تأثير الشكل النباتي على نسبتة النباتات: راش (2010) على بيولوجيا آفات الأعشاب العالية والأوراق

4. تأثير الشكل النباتي على نسبتة النباتات: راش (2010) على بيولوجيا آفات الأعشاب العالية والأوراق

5. تأثير الشكل النباتي على نسبتة النباتات: راش (2010) على بيولوجيا آفات الأعشاب العالية والأوراق

6. تأثير الشكل النباتي على نسبتة النباتات: راش (2010) على بيولوجيا آفات الأعشاب العالية والأوراق
أدى استخدام مستخلصات الشيح الجبلي والكراوية إلى إبطالة فترة ما قبل وضع البيض (21 يوم) في حالة العنكبوت الأحمر العادي مقابل 17 يوم للإناث الغير معاملة (17 يوم لإكروس الرمال البيضاء مقابل 13 يوم للإناث الغير معاملة.

1- إنخفضت فترة وضع البيض في جميع العناقيد التي استخدمت فيها المستخلصات المقزرة بالإناث الغير معاملة في كل النوعين من الأكراوسات ونسبة خاصة مع الالانتانا كامارا حيث كانت الفترة 22 يوم، 10 يوم لأكراوس الإناث الأحمر العادي وأكراوس المواقع البيضاء على التوالي.

7- تأثرت فترة حياة الأنثى وخصوصاً جنباً إلى جنب باستخدام المستخلصات وكان استخدام الالانتانا كامارا ودور النترس له تأثير حيث كانت فترة حياة الأنثى عند 7،8 9،1 يوم وضعت خلالها 9،7،10،6،8،3 بضعة. بينما في حالة أكراوس المواقع البيضاء كانت نفس التأثير حيث بلغت فترة حياة الأنثى 9،1،10،1،15،8،11،1 بضعة عند معاملتها بمستخلص الالانتانا كامارا ودور النترس على التوالي وذلك مقابل 14 يوم للإناث الغير معاملة والتي وضعت خلالها 10،7،9،3 بضعة.

8- يضح من كل ما ذكر أن يمكن الاستفادة من المستخلصات النباتية في مكافحة أكراوس العنكبوت الأحمر وأكراوس المواقع البيضاء ونسبة خاصة مع أكراوس المواقع البيضاء بفضل استخدامهما كأدوية ضد الماء وأدوات الطبيعية كما أن تأثيرهما أقل توثيق للبيئة.