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SUMMARY

The present investigation covers a survey of scale insects and mealy bugs attacking eleven species of ornamental plants in two public gardens: Montazah palace garden and El-Nouzha gardens during two successive years (2005-2006 & 2006-2007).

The chosen studied ornamental plants were as follows:

- 1- Algerian ivy: *Hedra canariensis*
- 2- Puka: *Meryta sinclairii*
- 3- Copperleaf: *Acalypha wilkesiana*
- 4- Croton: *Codiaeum variegatum*
- 5- Basil: *Ocimum basilicum*
- 6- Southern Magnolia: *Magnolia grandiflora*
- 7- Chinese banyan: *Ficus nitida Hawaii*
- 8- Tobira: *Pittosporum tobira*
- 9- Egyptian star flower: *Pentas lanceolata*
- 10- Vanish-leaf: *Dodonaea viscosa*
- 11- Lantana: *Lantana camara*

The collected scale insects and mealybugs species associated with these ornamental plants were:

1. Soft scale insects:

- **Soft brown scale, *Coccus hesperidum hesperidum* L.**

The soft brown scale observed all over the year associated with *Hedera canariensis* and in a few number on *Meryta sinclairii* at Montazah gardens.

- **Green Shield scale, *Pulvinaria psidii* Maskell**

The Green Shield scale observed all over the year associated with *Hedera canariensis* and *Meryta sinclairii* at Montazah gardens.

2. Armoured scales:

- **Oleander scale, *Aspidiotus nerii* Bouche**

The oleander scale observed associated with *Hedera canariensis* and *Meryta sinclairii* at Montazah gardens in winter and autumn.

- **The masked scale, *Mycetaspis personata* (Comstock)**

In the present study it observed on *Ficus nitida hawaii*, *Hedera canariensis* and *Meryta sinclairii* at Montazah gardens all the year.

3. Margarodid Mealy bugs:

- **Cottony Cushion scale, *Icerya purchasi purchasi***

In the present study it is recorded association with *Acalypha wilkesiana* and *Pittosporum tobira* in Montazah gardens.

- **Seychellarum mealybug, *Icerya seychellarum seychellarum* .**

In the present study it was observed associated with *Dodonaea viscosa*, *Acalypha wilkesiana*, *Magnolia grandiflora*, *Codiaeum variegatum*, *Pittosporum tobira* and *Hedra helix* in Montazah garden.

4. Citrus mealy bug, *Planococcus citri*

In the present study it was associated with *Lantana camara* and *Ficus nitida hawaii* in Montazah gardens.

5. Orthezia scale:

- **Lantana bug, *Insignorthezia insignis***

It observed during this study on *Lantana camara*, *Ocimum basilicum* and *Pentas lanceolata* in Montazah and El-Nouzha gardens.

2. Bioecology and dynamical population fluctuation of the common species on the chosen ornamental plants:

1. *Acalypha wilkesiana*

Two margarodid species were recorded infesting *A. wilkesiana* in Montazah garden during the period of study. They were *Icerya purchasi* and *I. seychellarum*.

The estimated values of total counted numbers of two margarodid species per 5 trees in both of the following years (2005 – 2006 & 2006 – 2007) exhibited the highest occurrence rates of mealy bugs population during October – November. These high values were decreased during December, January and February.

While, the lowest population density was observed during spring months (March, April and May) and early summer (June and July) in the two subsequent years.

2. *Dodonaea viscosa*:

During the period of study, no scale insects were recorded on this ornamental plant species in Montazah garden due to the negligible palatability of this ornamental plant species to most of prevailing mealy bugs species in this garden, with an exception of recorded more or less lowered numbers of the white mealy bug, *I. seychellarum* all over the months of performed inspection.

The data showed that the seychellarum mealy bug infests *D. viscosa* was recorded in low number compared with that in *A. wilkesiana* in the same garden during two successive years (2005 – 2006 & 2006 – 2007).

The results show the weak significant positive relationship between daily mean temperature, relative humidity and dew point and estimated population density of *I. seychellarum* individuals. But on the other hand this relationship was significantly negative with wind speed.

3. *Ficus nitida Hawaii*

The performed inspection on the leaves of this tree species was carried out in Montazah garden during two successive years (June, 2005 till May, 2007). The observed

scale insects and mealy bugs infesting leaves are: *Mycetaspis personata* (Diaspididae) and *Planococcus citri* (Pseudococcidae).

Results concerning the monthly variations in the total monthly counted individuals of the masked scale, *M. personata* per 5 trees throughout the period of study revealed the presence of five highly variation periods in the first year, one in summer , two during autumn months , one in winter months as well as one took place in late spring. While, in the second year the obtained data revealed that there were six highly variation periods, one in summer, two during autumn months, two during winter as well as one in late spring. In the first year the number of adult female reached the maximum of total population during July (100% of the total counted insect), then decreased to 68% of the total count during October, increased to 72% in November, decreased again to 66% of total count in December, re-increased slightly to 69% in March then re-decreased to 62% in April and reached the maximum 94% of total count in May. Similar trend of results was also observed in the second year.

4. *Hedra canariensis*

A survey of scale insects and mealy bugs infesting the ornamental plant species *Hedra canariensis* in Montazah garden was carried out in the years of 2005-2007. The results revealed the occurrence of two armored scales: *M. personata* & *Aspidiotus nerii*; two coccid species named: *Pulvinaria psidii* & *Coccus hesperidum* and one pseudococcid species: *Planococcus citri*.

Considering the armored scale group, the highly abundance was recorded during January & February (75 & 83.4 % of grand total count) in the first year and in February (77.8 %) in the second year. The lowest abundance was recorded during July in two successive years.

Regarding the population count of soft scale group, it's clear that the highest rate of these coccids was observed during July and August during the first year while in the second year this rate reached 94.0% during July only. The lowest rate of soft scale recorded during February in two years (16.4 & 22.2 % of total count in respect).

The scarcely inspected citrus mealy bug individuals; *P. citri* was found in low numbers, while disappeared completely during the elapsing spring-summer months from April till August or / and September; and early winter month of January or / and January-February in the 1st or / and 2nd years, respectively.

5. *Lantana camara*

The carried out investigation throughout the subsequent years of 2005 till 2007 indicated that the main pest species prevailing on *L. camara* is ensign insect, *Insignorthezia insignis*. It is recorded in relatively high rates all over the year on this host species.

Generally, the calculated rates of inspected insects were relatively lowered in autumn and January winter month in both years in addition to March month in the second year.

Considering the adult females, their higher population incidence took place on September and October in both years. The more or less lower numbers occurred in spring, summer and late winter months in both years, except in the second year the rate of inspected adults re-increased during January.

The results show that there is a significant positive weak correlation between daily mean temperature and total counted individuals of *I. insignis* while it is highly significant positive with dew point. On the other hand the correlation with both factors, relative humidity and wind speed and total counted individuals of *I. insignis* show significant negative strong relationship.

3. Effect of some IGR's, mineral oils, neonicotinoids on control and enzyme activity on *Orthezia insignis* attacking *Lantana camara* plant at El Nouzha garden.

3.1. Field Experiment:

The field experiment was conducted on the second week of March, 2008 at El Nouzha garden, Alexandria governorate. Pre- and post treatment inspections of the insects were examined and recorded before and after spraying (2,4,8 and 12 weeks) to evaluate the efficiency of the tested compounds Mineral oils (KZ oil and Star oil)- IGR's (Chlorfluazuron – Lufenuron – Pyriproxyfen)-Neem oil-Emamectin benzoate – Thiamethoxam) percentage of reduction.

From the obtained results, it can be concluded that the use of the tested materials, Azidrachtine (Nimbecidine), neonicotinoid (Thiamethoxam), mineral oils (Star oil and KZ oil) gave a good results for controlling both adult and immature stages of *Insignorthezia insignis* infested *Lantana camara* shrubs.

3.2. Enzyme activities assays:

The enzyme activity was determined for three enzymes Aspartate transferase (AST), Alanine transferase (ALT) and Alkaline –phosphatase (ALPK) after treating the plants with the same materials used in the field experiment to examine their effect on reducing the enzyme activity in the insects. There were five treatment (Lufenuron, Azadirachtin, Kz oil, Pyriproxyfen and Thiamethoxam) induced on increase of Aspartate transferase enzyme inhibition with the elapse of time causing inhibition after 96 hours.

There were five treatment (Lufenuron, Pyriproxyfen, Thiamethoxam, Azadirachtin and Chlorfluazuron) increased Alanine transferase (ALT) enzyme inhibition as a function with time causing inhibition after 96 hours.

Six treatments (Thiamethoxam, Kz oil, Azadirachtin, Lufenuron, Chlorfluazuron and Star oil) had the same effect method where their enzyme inhibition effect increased as a function with the experiment time's intervals and caused their highest inhibition effect after 96 hours.

4. Ultrastructure of egg shell of *Insignorthezia insignis*.

Histological studies on *Insignorthezia insignis* were done using Scanning Electron Microscope (SEM). The obtained results proved that, there are negative relationship

between both measurements and number of eggs and the dense of spiral filaments on the egg shell between the studied species. Also, it can be consider this phenomena as a taxonomic point of view to differ between two orthezia egg species.