Arab and Near East Plant Protection Newsletter

Special Issue
November 2013

2012 Arab Universities Doctorate and Master Theses in Plant Protection

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EDITORIAL

Why This Special ISSUE ??!!

Graduate students in universities, whether working for their M. Sc. or Ph. D. degree, constitute the major thrust in conducting research worldwide. The Editorial Board of the Arab and Near East Plant Protection Newsletter (ANEPPNEL) felt the importance of shedding light on the research achievements of graduate students in plant protection sciences in the Arab countries by circulating annually the abstract of their theses/dissertations in a special issue of ANEPPNEL, starting in 2013 to include summaries of their completed work in 2012. The dissemination of such information through the Arab Society of Plant Protection newsletter will make the recently generated knowledge in plant protection accessible to the scientific community in the region and beyond. Through such effort, it becomes possible for all those involved in plant protection research to become well informed about the research problems tackled by colleagues from other universities and by identifying who is doing what. This will facilitate further exchange of information and enhance collaboration among young scientists from different countries. It will also help in avoiding duplication of efforts, when possible.

It is obvious that this issue did not capture all the graduate research work completed in 2012 in all the Arab countries. Serious effort was exercised to make this issue as complete as possible, but for sure we did not succeed as much as we anticipated. It is hoped that more coverage will be achieved next year. It is also hoped that in the coming years we will be able to expand coverage to include all the Arab and Near East countries.

Food shortage in the Arab and Near East countries is higher than the global average, and developing sustainable and ecologically sound solutions to crop and forest pest problems is a serious challenge to food security in our region. The role of the next generation of plant protection scientists in achieving this goal is crucial, and shedding light on their achievements will hopefully encourage them to do more.

Editorial Board

Phytoseiid Mites in Saudi Arabia with Evaluation of Two Species as Predators of the Old World Date Mite *Oligonychus afrasiaticus.*

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Supervision: D. Yousif N. Aldryhim & Dr. Fahad J. Alatawi.
Start and end date: 15/09/2008 - 05/12/2012
Defense date: 05/12/2012

Abstract:

The old world date mite (Ghoubar mite), *Oligonychus afrasiaticus* (McGregor, 1939) (Acari: Tetranychidae), is a severe spider mite pest of date palm in most of North African and Middle Eastern countries. Faunistic surveys were conducted during the period 2010-2012 on fruit trees with special emphasis on date palm and grasses beneath date palm trees at different provinces (Riyadh, Qassim, Medina, Hail, Makkah and Eastern Province) of Saudi Arabia, in searching for prospective predators (Acari: Mesostigmata: Phytoseiidae) to be used for the management of *O. afrasiaticus*. This research work was conducted at the Acarology Laboratory, King Saud University in Riyadh.

Thirteen phytoseiid mite species were recorded. *Neoseiulus saudiensis* n. sp**.** females, collected from aerial parts of bermuda grass, *Cynodon dactylon* (L.) (Poaceae) in a date palm orchard in Riyadh city, were described and illustrated. Ten species represent first records for Saudi Arabia, *Cydnoseius negevi* (Swirski and Amitai), *Neoseiulus bicaudus* (Wainstein), *N. conterminous* (Kolodochka), *N. makuwa* (Ehara), *N. paspalivorus* (De Leon), *N. rambami* (Swirski and Amitai), *Proprioseiopsi sasetus* (Chant), *P. beatus* (Chaudhri), *P. messor* (Wainstein), *P. ovatus* (Garman). Also, two previously reported species, *Euseiuss cutalis* (Athias-Henriot) and *Neoseiulus barkeri* Hughes, were collected. All phytoseiid species collected were redescribed and illustrated. An identification key to all known species of Phytoseiidae from Saudi Arabia is presented.

Laboratory experiments were conducted to evaluate the potential use of the two predators, *C. negevi* and *N. barkeri*, as biological control agents against *O. afrasiaticus*. Biology, predatory efficiency and life table parameters were evaluated at two temperature regimes (25, 35ºC) and 35 ± 10% relative humidity (RH). Both predators were observed predating on different movable prey stages. Development time of predators from egg to adult emergence was longer at 25ºC than reported at 35ºC and also was shorter in males than females. Total fecundity of both predators was significantly higher at 35 than 25ºC while female longevity showed an opposite trend. The following parameters were obtained for *C. negevi* and *N. barkeri* at 25 and 35ºC, respectively: female longevity 31.8, 20.1, 35.6, 27.4 days; fecundity 21.6, 38.0, 18.8, 34.8 eggs/female; oviposition period 23.9, 13.6, 25.9, 18.1 days. Prey consumption of pre-ovipositing, ovipositing and post-ovipositing females of *C. negevi* was lower at 25 than 35ºC. Life table parameters were estimated as net reproductive rate (R_o) 10.44, 17.35, 10.19, 13.84, intrinsic rate of increase (r_m) 0.14, 0.19, 0.13, 0.16 $days^{-1}$, finite rate of increase (λ) 1.15, 1.21, 1.12, 1.17, mean generation time (T) 17.03, 15.17, 17.83, 16.61 days, doubling time (DT) 4.95, 3.64, 5.33, 4.33 when *C. negevi* and *N. barkeri* fed on *O. afrasiaticus* at 25 and 35ºC, respectively. Unusual physical characteristics (rectal plugs attached to the opisthosoma) were observed on some *N. barkeri* adult females when fed on *O. afrasiaticus*. From comparing the intrinsic rate of increase, doubling time and other biological parameters, it was concluded that *C. negevi*is more promising than *N. barkeri* against *O. afrasiaticus* in laboratory and can be considered as a valuable addition to the existing methods for spider mites control.

The current study is the most comprehensive study that has conducted on phytoseiid fauna in Saudi Arabia. The new species and the ten new records may indicate that this area is rich in phytoseiid species. Recording *N. makuwa* and *P. asetus*for the first time in the Middle East as an alien species may indicate that phytoseiid mites may work well as biological control agents in this semi-arid area. Studies on the biological efficiency of the locally adapted phytoseiid species against *O. afrasiaticus* are limited. Therefore, further and extensive studies are recommended for discovering the phytoseiid mite fauna in Saudi Arabia.

Entomology

Comparative Studies on the Honey Quality in New Desert Regions with Specific Reference to Egyptian Honey Standard.

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Start and end date: 2007-2012
Defense date: 18/11/2012

Abstract:

The aim of this study was evaluate physical and chemical properties of honey types in new desert regions in Egypt, Also determine pollen type in honey. The present study was carried out on twenty-four samples of traditional and untraditional honeys were collected from new desert land in six provinces in Egypt. The results of some physical and chemical properties in traditional honeys showed that the moisture content were ranged between 18.75-21.50%, total soluble solids 78.50-81.25%, electrical conductivity(EC) 60-110 ppm, ash content 0.0807-0.2638%, pH 3.74-4.42, total acidity 20.34-33 ml.eq./kg., hydroxy methyl furfural(HMF) 3.49-30.39 mg/kg., diastase activity 8.57-30, sucrose 0.93-8.88%, reducing sugars 67.09-71.67%. Also in untraditional honeys showed that the moisture content were ranged between 17-22.50%, total soluble solids 77.50-83%, electrical conductivity 60-155 ppm, ash content 0.0896-0.3457%, pH 3.75-4.16, total acidity 14.17-57.16 ml.eq./kg., hydroxy methyl furfural 0.30-40.72 mg/kg., diastase activity 8.57-32, sucrose 0.29-5.56%, reducing sugars 65.49-72.30%. Pollen grains found in all honey samples were: citrus, eucalyptus, apricot, date-palm, coriander, broad bean, casuarina, alfalfa, pumpkin, clover and purslane.

Ecological and Biological Studies on *Euzophora Osseatella*

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Start and end date: March 2005- July 2012.
Defense date: 2012

Abstract:

1-Ecological studies:

1.1 Survey of insect pests and predators on eggplant *Solanum melongena* (L.):

Pests associated with some vegetable plants during the two successive years, 2005 and 2006 were surveyed on egg plant. *S. melongena*.

Several pest species belonging to some families of the orders; Coleoptera, Diptera, Hemiptera, Homoptera, Lepidoptera, Thysanoptera.

1.2 Survey of host plants infested with the eggplant stem borer *Euzophora osseatella* Treit.

Host plants and its susceptibility to egg plant stem borer, *E. osseatella* during two seasons the most susceptible plants were Egg-plant *S. melongena* and Black night shade *Solanum nigrum* and did not infest going pepper and potato and tomato plants.

1.3 Population fluctuation of the eggplant stem borer *E. osseatella* infesting eggplant *S. melongena*.

Field experiment was conducted during two successive seasons 2005 and 2006 to study the population fluctuation of the *E. osseatella* Also to study the effect of certain weather factors (daily mean temperature, daily mean R.H.) and plant age on the egg plant during two seasons. The obtained data showed that:

- The egg plant stem borer *E. osseatella* started to occur from 4th week of Jun and the first of July on eggplant and increased gradually reaching the peak in the first week of Oct. and plant age (days from sawing during two seasons) the highest number of larvae were recorded (52 larvae & pupae/20 plants and 104 larvae & pupae /20 plants) during the 2005 &2006 seasons on the egg plant, respectively.
- Number generations of *E. osseatella* four under conditions field in results the studied.

Biological study

2.1 Effect of different constant temperatures on the biology of *E. osseatella* (Lepidoptera: Pyralidae) on potato tubers *S. tuberosum*:

Some biological data of *E. osseatella* were recorded at four constant temperatures of 15, 20, 25 and 30 ± 1 °C and 70±5% RH

The obtained results indicated the following:

- The shortest incubation period of eggs (3.72 days) was recorded at 30°*C*, the longest (11 days) at 15°*C*.
- The highest hatching rate of eggs (77.4 %) was obtained at 30°*C* on potato tuber, while a lowest value (57.6%) was recorded at 15°*C*.
- The longest pre-oviposition period and post-oviposition periods were recorded at 15°*C*, while the shortest periods recorded at 30°*C*.
- Adult longevity decreased with increasing the temperature, whereas the shortest Female longevity (3.3 days and 2.2 days) for Male was detected at 30°C and longest (Female 18.8 days and 12.5 Male) at 15°*C*.
- The mean number of eggs laid per female was (134.4) (72.0), (97.3) and (62.0) eggs at 15, 20, 25 and 30°*C*, respectively, while the highest number of insect eggs was laid at temperature (15°*C*).

2.2 The effect of constant temperatures on the biological aspects of *E. osseatella* and estimation of the thermal requirements for different stages:

Development of the egg-plant stem borer *E. osseatella* (Lepidoptera: Pyralidae) was studied at constant temperatures 15, 20, 25 and 30 ± 1°C Development of immature stages was accelerated by increasing the tested temperatures. Total period of immature stages (Time averaged 201, 93.43, 57.2 and 48.17 days) at 15, 20, 25 and 30°C respectively. Generation period ranged between 205.6 and 49.17 days at 15 & 30°C, depending on rearing temperature. Adult female survived longer period than male. Fecundity was higher at lower temperature (15°C) than higher one (30°C). Female deposited 134.4 eggs at 15°C, while this number drastically lowered to 62.0 eggs at 30°C, however, egg hatchability (77.4 %) showed a reversed trend.

Thermal constant or threshold of development (t_o) and thermal requirements (K) degree- day (DD's) were estimated to be 7.34°C, 11.43°C and 8.11°C for egg, larva and pupa stages, respectively. Based on 25°C (preferred temperature) the average heat units estimated 82.85, 413.6 and 453.67 (U.T.) are required for completion the development of egg, larva and pupa stages. Development of one generation may require 929.62 degree-days.

Ecological and Biological Study of the Cigarette Beetle, *Lasioderma serricorne* and Survey its Natural Enemies

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Start and end date: 2009- 2012
Defense date: 05/12/2012

Abstract:
Ecological and biological study of the cigarette beetle *Lasioderma serricorne* (Fabricius) (Coleoptera: Anobiidae) has been conducted at the Biological Control Studies and Research Center Laboratories, (BCSRC), Faculty of Agriculture, Damascus University Syria, during 2010-2012.
The effects of food types, on some the biological parameters of the Cigarette beetle, *Lasioderma serricorne*(F.) at 28±1°C and 65±5% r.h and 16:8 (L:D) photoperiod were studied, and Using of Age-specific Fecundity Schedules to Determine the Favorite food type of *Lasioderma serricorne* (F.) and effects of constant and variable temperatures, on some the biological parameters of the Cigarette beetle when reared on Baker's yeast, and identify natural enemies fauna associated with the cigarette beetle in warehouses at three locations in Syria.
A rearing laboratory was been for insect beetle tobacco on five types of food (powdered chicken stock (Maggi), Baker's yeast, grains milo, dried ficus, dried tobacco leaves), under laboratory conditions at a temperature of 28± 1°C and 65 ± 5% RH. For studying development time of different stages of the insect and the duration of one generation, and the total fecundity of female. The study showed a variance of life stages to one generation of the insect, depending on a type of food. Averages for one generation (66.14 ± 0.82), (40.20 ± 0.27), (39.83 ± 0.48)(39.33 ± 0.58), (34.23 ± 0.13) days when rearing on dried tobacco leaves and powdered chicken stock (Maggi) and dried ficus and grains millo and yeast, respectively. The highest real mortality of the immature stages73.3% when rearing the beetle on the dried ficus and then 53.3 20.0, 6.7, 3.3% (dried tobacco leaves, grains millo, powdered chicken stock (Maggi), yeast) respectively. Also differed longevity of the adult cigarette beetle, depending on a type of food. The average longevity of female was: (19.80 ± 0.66), (15.20 ± 0.37),(14.20 ± 0.37), (13.80 ± 0.37) (12.80 ± 0.37) days when rearing on dried ficus, grains millo, powdered chicken stock (Maggi), yeast, dried tobacco leaves respectively. Fecundity of female variated depending on a type of food. Which reached 95.50 , 84.25 , 65.25 , 63.50 and 12.00 eggs / female rearing at the chicken stock powder (maggi),

Baker's yeast, dried ficus, grains millo dried tobacco leaves, respectively

Age-specific fecundity schedules of the of the cigarette beetle *Lasioderma serricorne* (F.) was constructed in the laboratory. Observations indicated that at temperature 28± 1°C, the total reproduction rate (GRR) by females feeding on chicken stock powder (maggi), Baker's yeast, grains millo, dried ficus, and dried tobacco leaves, was 47.46, 42.125, 31.75, 32.625 and 6.00 females/ females/generation , the net reproduction rate (R_0) 47.46, 42.125, 31.75, 32.625 and 6.00 female/ female/day, respectively. the doubling time of population (DT) was 7.22, 6.30, 7.88, 7.97 and 25.67 days; intrinsic rate of increase (r_m) was 0.096, 0.11, 0.088, 0.087 and 0.027 female/ female/day, respectively. This Age-specific fecundity schedules reflect *L. serricorne*a bility for doubling its population faster on Baker's yeast than on (powdered chicken stock (Maggi), grains milo, dried ficus and dried tobacco leaves at same temperature 28± 1°C.The cigarette beetle, *Lasioderma serricorne* (F.) biology was investigated under controlled laboratory conditions at 17, 22, 27, 32, and 37 °C, 65± 5 % r.h. and a photoperiod of 16:8 (L:D) h when reared on Baker's yeast . *Lasioderma serricorne* had a significantly shorter mean total Developmental period at 32 °C compared with other temperature. The results showed that no laying egg at 17 and 37°C and The highest mean of Fecundity was found to be 85.40 eggs / female at 32 °C. The lower developmental thresholds (LDT) for eggs, larvae and pupa were 11.0, 13.5 °C and 14.6°C, respectively, and *Lasioderma serricorne*re quires a Sum of Effective Temperatures (SET) of 555.5 degree-days above the lower developmental threshold 13.5 °C to complete development from egg to adult.

Also the results of this study revealed the presence of four species of parasitoids; three pteromalids; *Anisopteromalus calanrae* (Howard) *Lariophagus distinguendus* (Forster) and *Pteromalus cereallae* (Ashmead) and one encyrtid; *Ericydnus sipylus* (Walker) were recorded associated with the pest throughout the study period. *A. calanrae* was the most abundant one. As well, the two predacious mites, *Tyrophagus putrescentiae* (Schrank) (Acaridae) and *Amblyseius swirskii* (Athias-Henriot) (Phytoseiidae), and was recorded for the first time as natural enemies fauna associated with the cigarette beetle in warehouses, in Syria.

Ecological Studies of *Vespa orientalis* L. (Hymenoptera: Vespidae) and Methods of Control in some Districts of Al-Dhala Governorate, Republic of Yemen

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Start and end date: 01/01/2010 - 31/01/2011
Defense date: 2/12/2012

Abstract:

The red wasp *Vespa orientalis* L. is considered as one of the most important pests of honey bee colonies in Yemen and causes damage when attacking Apiaries. This study aims to determine the importance of this insect as well as the best ways to combat it.

A survey has been conducted through field visits to apiaries for a number of beekeepers in the districts following: Al- Dhala‹ Al–Azareq, Quataba, jihaf and Al-Husein area**.** A questionnaire was distributed to the beekeepers for the purpose of identifying the season of abundance of *V. orientalis*‹ the damages on honey bee colonies and the methods that are used by the beekeepers to combat it.

The results of the survey have shown different views of the beekeepers about season of abundance *V. orientalis* .The fertilized queens appeared in the districts of Al- Dhala and Al - Azareq between the first half of March and the second half of March‹ while it appeared in the districts of Quataba and Al- Husein in the middle of March and the appendance delayed in Jihaf to the first half of April.

The period of disappearance ranged from mid-May to mid June in the districts of Al- Dhala and Al – Azareq, while beekeepers did not know about the period of disappearance in the rest of the districts**.**

The workers started to appear in the districts of Al-Dhala and Al – Azareq between mid-May and the first half of June‹while beekeepers do not know the their appearance in other districts .

With respect to the intensification of damage of workers the survey results have shown it difference in the opinions of beekeepers about the intensification of the damage it ranged from July to October and sources of answered that damage was from August to October; and in other districts was delayed the intensification of the damage extends till of September and October.

For the highest peak of the worker appearance 40-50% of the beekeepers the districts of Al- Dhala‹ Al – Azareq answered that it was that was in September. While the rest of beekeepers said in October‹ and the numbers of workers began fall dawn disappear between the first half of November‹ the second half of November‹ but the

disappeared completely was between mid–December and the first half of January.

With regard to the order of importance of *V. orientalis* (54 %) of the beekeepers have considered that *V. orientalis* is the most important pests of hives bees that put it in the first place. while the rest (46%) of the beekeepers have put *V. orientalis* in the second place.

The views of beekeepers have shown that the most common damage of the wasp was to weaken bee communities، as pointed out of the answers (33.3%).

The second type of damage was caused from preventing the bees from getting their hives (22.75%), while it was reported by 11.19 % of the beekeepers that *V. orientalis* may cause the elimination of some colonies bees. Other damages the were reported by (33.03%) of beekeepers which included harassment of honey bees in water sources and food sugar،where large number of wasps aggregate at the sources of water and sugar solutions which leads honey bees flay away from theses canals as well as in addition to that was also catching the workers from the door of the hive and bee competition for pastures particularly *Zizyphus spina chirst* and *Euphorbia inarticulate*.

with regard to the methods used by the beekeepers to fight *V. orientalis*، opinions of beekeepers have shown that poisoning the nest and the hunting workers manually are the most commonly used methods in addition to burning method wired traps،while the bucket trap which ranks the third Albalde and queen hunting then manually were used by a small number of beekeeper in the areas particularly at Al- Dhala، Al–Azareq.

The views of beekeepers have shown that there is cooperation between beekeepers fighting the wasp where 83% of surveyed beekeepers have indicted the existence of cooperation in fighting is *V. orientalis*.

Experimental research studies were conducted during the period from the beginning of February 2010 to the end of July 2011 in Apiaries a number of beekeepers in Al- Dhala districts in order to study the population density for *V. orientalis* and evaluating a number of ways to combat it.

Results in A sela area Al-Dhala have shown that of the study that was *Vespa orientalis*. Queens exist during the period from the third week of March until the fourth week of May. The workers began to appear in the third week of May, while the appearance of the new queens with the coincides that appearance males in the third week of October، and all the numbers of *V. orientalis*. disappeared in the first week of January and only the fertilized modern queens observed in Apiary on remains of sugar solution .

The results also have showed that the highest peak activity of the *V. orientalis* was in October، followed by September and November and the numbers were higher than the rest of the months. During the daylight hours the activity began at six o'clock in the morning reaching its highest rate in the apiary during the period from 8 o'clock until ten in the morning as well as from tow until the three evening.

With regard to the effect of temperature and humidity on the activity of *Vespa orientalis* L. the results have shown the presence of a positive and very week Correlation (r =0.06) between temperature and population density of wasps، while the Correlation has been Negative and very weak (r = 0.24) between the humidity and the population density of the wasps in the sites of study during the months of the year .There was also a positive and week Correlation (r =0.28) between temperature and activity of *V. orientalis* during the daylight hours، while the Correlation has been Negative and weak (r = 0.35) between the humidity and activity *V. orientalis* during the daylight hours.

The results have shown that the number of queens that were caught manually by two people (using tree branches coated with gum mice) is higher at water sources compared with theses which were caught in Apiary. Also the population density of the workers in the area of hunting queens has been decreased compared to the location where the queens have not been caught.

Regarding trials test the best bait for attracting queens and workers، the results have shown that the canned tuna in attracted more wasp queens, while fresh fish attracted more wasp orientalis workers.

In Experiments to search for the best a traps to catch queens and workers، the results have shown that the highest rate of queens were caught by sticky traps (Alatararat); while the wired trap (Al-madala) caught the highest rate of workers.

With regard to the assessment of the feasibility of a number of ways to eliminate wasp orientalis *V. orientalis* nests results have shown that the diesel burning and fogging nest by use of Methomyl (Granite) and spraying with a chemical pesticide have effective results in elimination of wasp nests.

Effect of Some Factors on Rearing Honeybee *(Apis mellifera jemenitica* R. Hymenoptera: Apidae) Commercial Queens

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Start and End date: 8/4/2010 – 7/4/2012
Defence date: 2/12/2012

Abstract:

The research has been conducted during 2010- 2011 in the Apiary Honey Bee Unit, Agriculture Research station – Elkod/Abyan Governorate – General Authority For Agriculture Research And Extention, Minstery Of Agriculture and Water Resources, Yemen. Determine best conditions for commercial queen rearing of honey bee Yemen *Apis mellifera jemenitica*. The effects of some factors, i.e. Place of grafting (laboratory chamber and apiary yard), diameter of wax cup (6 and 8 mm), age of grafted larva (1 and 2 days old), grafting condition (wet with royal jelly and dry), supplementary feeding (sugar syrup fortified with pollen and plain sugar syrup) and strength of nurse colony (bees covered 10 and 5 combs).

Results indicated that the best conditions for commercial queen rearing of honey bee in good quality were: wet or dry grafting of one day-old female larva in wax queen cups (6 mm in diameter) under laboratory chamber condition and nursing in queen less colony with high strength (bees covered 10 combs) and fed during queen rearing on sugar syrup fortified with pollen.

The highest number of accepted larvae, number and weight of emerged queens and queen cell volume during experiment of grafting place (laboratory chamber and Apiary yard), were obtained in laboratory chamber (28±0.58 accepted larvae, 23.67±1.20 emerged queens with average weight (152.00±3.06 mg) and queen cell volume (0.70±0.02 ml), with significant increase of 35.51, 41.99 and 13.71%, in accepted larvae, emerged queens and queen weight, respectively and insignificant increase (4.48%) in queen cell volume, compared to grafting in apiary yard. In experiment of wax cup diameter (6 and 8 mm), it is found that grafting in wax cup diameter of 6 mm produced 28.33±3.61 accepted larvae, 25.33±5.29 emerged queens of average weight (152.00±3.06 mg) and queen cell volume (0.67±0.03 ml), with significant increase of 66.64 and 72.67%, in accepted larvae and emerged queens and insignificant increase of 10.14% and- 4.45%, in average weight and queen cell volume, respectively compared to wax cup diameter of 8 mm. In experiment of age of grafted larvae (1 and 2 days-old) and grafting condition (wet with royal jelly and dry), it is found that wet grafting with 1 day-old larvae produced 36.67±0.58 accepted larvae, 31.00±0.33 emerged queens of average weight 159.67±5.78 mg and queen cell volume of (0.68±0.01 ml with significant increase of 34.17, 63.15, 20.05 and 17.24%, respectively compared to dry grafting with 2 day-old larvae, and of 5.77, 13.43, 6.21 and 13.33 % respectively, compared by dry grafting with 1 days-old larvae, and of 10.02 and 27.41%,in accepted larvae and emerged queens, insignificant increase of 4.59% in average weight, and significant increase of 11.48%, respectively compared with wet grafting with 2 days-old larvae.

In experiment of supplementary feeding (sugar syrup fortified with pollen and plain sugar syrup) and strength of nurse colony (bees covered 10 and 5 combs) it is found that nursing in queen less large colony (bees covered 10 combs) and fed on sugar syrup fortified with pollen produced 35.33±0.38 accepted larvae, 30.33±0.33 emerged queens of average weight (158.00±1.53 mg) and queen cell volume (0.69±0.01 ml) with significant increase of 11.59, 31.87, 4.17 and 2.99%, respectively, compared to nursing in queen less small colony (bees covered 5 combs) and fed on sugar syrup fortified with pollen, of 37.69, 97.85, 13.12 and 21.05%, respectively, compared to nursing in queen less small colony (bees covered 5 combs) and fed on plain sugar syrup, and of 23.23, 46.73, 8.72 and 16.95%, respectively, compared to nursing in queen less large colony (bees covered 10 combs) and fed on plain sugar syrup.

The results also indicated that larger diameter of spermathecae and dimensions (length and width) of each ovary in virgin queen during experiment of grafting place (laboratory chamber and apiary yard) were obtained with grafting in laboratory chamber (1.17±0.02 mm), with insignificant increase of 2.63%, and ovaries dimensions of (right ovary 3.76±0.08 and 1.31± 0.12 mm, respectively and left ovary 3.71±0.57 and 1.26± 0.01 mm, respectively), without any significant differences, compared to grafting in apiary yard. In experiment of wax cup diameter (6 and 8 mm), grafting in wax cup diameter of 6 mm produced spermathecae larger in diameter (1.18±0.04 mm) with insignificant increase of 3.51%, and ovaries dimensions of (right ovary 3.93±0.17 and 1.32±0.08 mm, respectively and left ovary 3.90±0.31 and 1.28±0.05 mm, respectively), without any significant differences, compared with grafting in wax cup diameter of 8 mm.

In experiment of age of grafted larvae (1 and 2 days-old) and grafting condition (wet with royal jelly and dry), it is found that wet grafting with 2 day-old larvae produced spermathecae large in diameter (1.19±0.02 mm) followed insignificantly on dry grafting with 1 or 2 days-old

larvae (1.18±0.02 mm), and significantly on wet grafting with 1 days-old larvae (1.08±0.02 mm). Dry grafting with 1 day-old larvae significantly produced ovaries larger in dimensions (right ovary 4.02±0.06 and 1.35±0.04 mm, respectively and left ovary 3.94±0.09 and 1.34±0.04 mm, respectively). Mean while, wet grafting with 1 day-old larvae came the last in order with ovaries dimensions of (right ovary 3.39±0.05 and 1.29±0.01 mm, respectively and left ovary 3.33±0.03 and 1.32±0.04 mm, respectively).

In experiment of supplementary feeding (sugar syrup fortified with pollen and plain sugar syrup) and strength of nurse colony (bees covered 10 and 5 combs), it is found that nursing queen cells in queen less large colony (bees covered 10 combs) and fed on sugar syrup fortified with pollen produced queens with spermathecae significantly large in diameter (1.17±0.02 mm), and ovaries insignificantly large in dimensions (right ovary 3.55±0.00 and 1.48±0.09 mm, respectively and left ovary 3.52±0.0 and 1.44±0.14 mm, respectively), compared to other treatments in the same experiment.

Evaluation of some Types of Control Methods against the Onion Maggot, *Delia alliaria* Fonseca (Diptera: Anthomyiidae)

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Defense date: 05.09.2012

Abstract:
Onion maggot *Delia alliaria* Fonseca (Diptera: Anthomyiidae), is considered as an economic pest on Allium in many parts of the world infects onion and garlic and can cause an economic loss ranges from (20 – 60) %, the species is recorded as a serious pest during this study. No previous studies have been recorded in Iraq. Since the recent trend is going towards organic Agriculture, the attempts to find alternative method for chemical control considered to be safe to natural enemies, human, and the environment and can be used with integrated control of the pest. Laboratory and filed studies were conducted during the growing seasons of 2010 / 2011in the field of the college of Agriculture ,Abu – Ghraib ,Baghdad which included rearing the insect in the laboratory , evaluate the efficiency of two isolates of the entomopathogenic fungi, *Beauveria bassiana* (BSA3, BSA1) on different stages of the maggot, examine susceptibility of some onion cultivars against onion maggot, study the effect of seed treatment ,furrow application , Foliar application with some bio-pesticides and chemical evaluate their impact on infestation rate and yield, and evaluatecertain types of adhesive and attractant traps against adults and the possibility of these methods forcontrols the pest was discussed.Result showed the following :

1: Laboratory Studies:

1-Results of Pathogenicity studies of the two isolate of *Beauveria bassiana*1(BSA3, BSA1) indicated the superiority of the isolate (BSA3) which inducedsignificant and high mortalities on all stages of the insect reached to 100 % and 98% after 5 days from treatment to the egg by the isolates BSA3, and BSA1 respectively. However, mortality of the first and second instars larvae reached100 % after two weeks of treatment by the two isolates, while it was 74 % for the third larval instars, and 87 % and the proportions emergence for treatedpupa afterwere 16%, The mortality was 85% in adults males and 75% in adults females.

2- Result was also indicated that the bio-pesticides Spinosad was the most effective against all stages of the onion maggot, followed by Dozer and then Trigard. Percentage for eggs hatched after 4 days from the treatment of these insecticides were (9.22, 14.16 and 17.94) % respectively. Larval mortalities of the first, second and third instars reached to 100% after 7 days for Spinosad and the insecticides Dozer, Trigard was the least effective, Percentage oflarval mortality was 23-32% during the same period. The proportions emergence for treatedpupa afterwere (6.67,13.33,and 18.33) % after 21 days from treatments for the three insecticides respectively, Death of treated males & females reached100 % after 5 days from treatment with Spinosad & Dozer ,While was83.33% and 78.33 % for Trigard

2: Field Studies:

1-When testing the sensitivity of the four cultivars of onion to infestation by the onion maggot in nursery, the most sensitive to injury was White Grano, followed by Texas Early Grano, the Percentage of infestation were 10.77 % and 7.27%.The infestation Percentage for Giza and Khepos were 4.88% and 5.0% respectively. The infestation rates in the field reached its peak during April with Percentage of (30, 23.33, 25.19 and 21.11) % of the cultivars, White Grano, Texas Early Grano, Khepos and Giza respectively. The highest number of larvae recorded 4.95,4.5 /45plant on cultivars White Grano and Giza which were significantly different from numbers of larvae on the cultivars Texas Early Grano and Khepos, which were 2.4 and 1.95 larvae / 45 plant

respectively. Which were during April and reached to 140.4 on the cultivar White Grano which significantly different from the other cultivars which were at 126.6, 111.00 and 100.2 of the Texas Early Grano, Khepos and Giza respectively. The highest peak was observed different in number of pupae recorded on, the highest numbers of was 9.48 on White Grano, following by 6.11 Texas Early Grano, and 4.65 on Khepos. While the lower numbers was 4.83 on Giza, The numbers of pupa increased to reached its peak of 108.6 on cultivar White Grano which the 90.52, 74.4, 73.8 on Texas Early Grano, Giza and Khepos respectively.

2- The results of testing the sensitivity of two types smalls bulbsred local and white local to infection by the onion maggot revealed that there were significant differences between them , in the rate of infestation numbers of larvae and number of pupae ,The highest infestation was 11.96%and 10.26%on white local and red local respectively .The numbers of larvae were 61.8 and 53.2 /45 plant for the white local and red local respectively, while numbers of pupa was 59.17and 48.12 the two cultivars respectively.

3- The results also showed the superiority of the White sticky traps in capturing adults of onion flies during the period of nursery reached to 1.83, 2.61/week for females and males respectively followed by the light Blue sticky traps with numbers of females and males of 1.42 and 1.89 respectively, the lowest numbers of 0.52 and 1.41 /week for females and males was observed the yellow sticky traps. The sex ratio was in favor of males in all types of traps which were 41:59, 44:56 and 73:27for females and males respectively to the three types of traps. In the field, the result showed the superiority of the White sticky traps also in capturing the highest numbers of onion flies ,which were 9.47 and 10.59 respectively followed by 7.27 and 7.97captured in the light blue sticky traps, while the lowest numbers were 5.01 and 5.58 in the yellow sticky traps respectively. The sex ratio was also in favor of males in all types of sticky traps, which were 41:59, 48:52 and 47:53 for the white, blue and yellow traps respectively.

4- For the attractant traps, Tephri traps caught the highest numbers of females and males of 3.11and 5.11/week in nursery respectively, with 1.05 and 1.40/week caught in local traps and the sex ratio in favor of males reaching 38:62 in Tephri traps and 43:57 for the local traps, Tephri traps also caught significantly higher numbers of the onion flies in filed which were 8.56, 10.84 for females and males respectively. Compared to 4.86, 6.13 caught in the local traps. Sex ratio in favor of males reaching 44:56 for the two types of traps.

5- Result of testing some attractive baits to the onion fly, indicated the superiority of the local baits in capturing onion flies in the field, The numbers were10.55, 8.6 females and males respectively. Which were significantly different from numbers trapped in the rest of other baits, The baits contain a mixture of 2-phenylethanol With *n* –Valeric acid and 2-phenylethanolcause in the second place in which number of trapped males were 8.14, 7.42 and that of females 6.59 and5.64 for the two types of baits respectively. As for Russell IPM Lures, R-IPML1 and R-IPML2, numbers of males and females captured were 5.31, 3.74 and 4.94, 2.93 for the first and second baits respectively. The sex ratio in favor of males reaching to 44:56, 40:60, 40:60, 40:60 and 39:61 for the local bait 2-phenylethanol, 2-phenylethanolwith 2-phenylethanol with *n* – Valeric acid , R-IPML1and R-IPML2 respectively.

6- Seed treatment with Spinosad significantly reduced infestation rate by the onion maggot, to lowest rate of 4.06 % in the nursery, followed by Cruiser with 5.06 %, and then 6.64 % for Trigard compared with 15.73 % in the control treatment, This means that the treatment of Spinosad had been reduced incidence of infestation by approximately 75 %. As for the seed treatment before planting with the two isolates of *B. bassiana.* Isolate BSA3 reduced infestation rate to 11% followed 13.4 % for isolate BSA1 compared with 17.95% for the control treatment, this mean that the seed treatment with these two isolate had reduced infestation by 38 % and 24 % respectively.

7- The result of spraying onion seedling with 2 isolates of *B. bassiana* showed the superiority of the BSA3 isolate treatment after two weeks from emergence compared to the spraying after 4 weeks of emergence, The general ratio of infestation after two weeks from application were (12.66.13.8 and 19.53) % and after 4 weeks (14.00, 15.06 and 17.86) % to the treatment of BSA3, BSA1and the control treatment respectively.

8- Results of the Furrow application by the solution of different pesticides Indicated the superiority of Spinosad in reducing infection, the percentage of infestation by the onion maggot were (6.67, 10.63, 8.51 and 22.47) % for the treatment of Spinosad, Trigard, Cruiser and control treatment respectively. The BSA3 isolate showed superiority over BSA1 in reducing the percentage of infestation by the onion maggot, which were (12.24, 14.55 and 24.98) % for the two isolate control treatment respectively.

9- The results of the relative efficiency of foliar pesticides sprays indicated the superiority of Spinosad on insect growth regulator Trigard and Dozer with percentage of 83.41 %, 66.06 % and

81.10% for the 3 insecticides respectively which represent the infestation rate of (10.41, 13.44, 11.64 and 21.29) %. For the 3 treatment and control treatment respectively. This treatment led to a significantly increase in plant yield, Yield of treated plant reaches (296.20, 252.50, 285.60) gm/plant respectively compared with 239.50 gm/plant in the control treatment .These treatment also led to a significantly increase in the percentage of the first class bulb (Class1) to (79.66, 65.97, 76.54) % for the 3 treatment respectively compared to 62.45% for the control treatment.

10- The results showed that spraying onion plants in the field with 2 isolates of *B. bassiana* had reduced infestation rates with the Superiority of BSA3 isolate. Infestation rates were 14.57%, 16.88% and25.49% for isolates BSA3, BSA1 and the control treatment. The relative efficiency of these isolates were 68.71 %, 62.16 respectively. Also these treatments had led to an increase in plant yield as the sum total (267.60, 256.20) g/plant compared with 216.20 g/plant in the control treatment .Treatments with the 2 isolates led to increase sizes of bulb of the first class from 65.10 in the control treatment to 78.60% and 71.70% for the 2 isolates BSA3 and BSA1 respectively.

Evaluation the Efficacy of some Insect Growth regulators to Control Subterranean Termite, *Microcerotermes diversus* (Silvestri) (Isoptera: Termitidae)

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Date of Defense: 27/06/2012

Abstract:

The study was conducted to evaluate the efficiency of Insect Growth Regulators(IGR) Alsystin (Triflumuron), Dimilin (Diflubenzuron) and Nemsis (Chlorfluazuron) in causing mortality to some members of subterranean termites *Microcerotermes diversus* (Silv.) at different concentrations with direct spraying method and treating of nutrient termite media under the laboratory condition and the incubator conditions at a temperature of 30 ± 5 C and relative humidity of 80 ± 10%, in addition to evaluating the efficiency of these (IGR) when added to bait stations at various concentrations, spraying citrus trees to control termites under field conditions in Iraq.

The results was showed that all (IGR) in all tested concentrations caused mortality to the worker and the swarmers of termites and the time length to achieve the mortality percentage of 100% dependent up on the concentration, duration of exposure, method of treatment, type of (IGR), conditions of the study (laboratory or incubator) and the temperature. There was a positive correlation between increasing concentrations of Alsystin and Nemsis and required time to cause the mortality while the increasing of the Dimilin concentrations does not affect on duration to caused mortality, and there was an inverse relationship between the concentrations of the different growth regulators and the duration of exposure to caused mortality.

The results of the study was demonstrated that the direct spraying technique to the termite individuals in the beginning of treatment was most efficient and the fastest in causing the mortality of termite as compared with the treating media with the different concentrations of the insect growth regulators, but with time progress, the treated media was most efficient in occurring mortality.

The results of the study demonstrated that the relatively constant temperature in the incubator conditions have a great positive impact in the effectiveness of (IGR)and the speed of occurring mortality compared with the fluctuated temperatures in laboratory conditions during the different months of the year.

The results of the study proved that the termite's swarmers more sensitive and susceptible from termite worker. They were fastest in the death at the all concentrations of insect growth regulators in the different ways of treatment and different conditions (incubator and laboratory).

The results of persistence time of insect growth regulators to cause mortality was showed that the persistence time of all insect growth regulators was longer at incubator temperature compared with shortest time at the laboratory temperature. There was a positive correlation between the persistence time and the concentrations, where for the insect growth regulators effectiveness in the laboratory conditions continued for a period of 180 - 200 days from the beginning of treatment and 225 - 250 days for incubator of both ways of the application.

The study demonstrated that the secondary reproductives started laying eggs on termite media after three days from isolating them out of the colony, the eggs were white transparencies color, and oval ridge shape . Each eggs laid individually the workers cleaned them up (groomed) and gathered them in a masses form, monitoring them, and walking around them, the incubation period

was 16 days, after that eggs hatched to small white transparent nymphs. Also it was noted that the workers were licking and touching secondary reproductives with their bodies these behaviors continued for 45 days. The results of the study demonstrated that all growth regulators prevented eggs hatching for all eggs laid by secondary reproductives that exposed to the insect growth regulators.

The results showed that the both of Alsystin and Nemsis caused slight repellence to termites workers at the beginning of treatment while the Dimilin caused obvious repellence to the worker where the attraction percentage reached 100% after 7 - 9 days of treatment with Alsystin and Nemsis for all tested concentrations and after 17 - 20 days of treatment with Dimilin for all tested concentrations and this reflected on the time period to achieve 100% mortality rate which was fast in Alsystin and Nemsis and slow in Dimilin.

The results also showed varying efficiency for the growth regulators to provide the protection to citrus trees which sprayed with growth regulators from termite infestation. For the Alsystin 250 ppm consternation did not provide any protection for spraying trees while the concentrations 500 - 1000 ppm provided a protection for 3 months, and for Dimilin the concentrations 250, 500, 1000 ppm provided Protection for 2, 3, 3 months respectively, while Nemsis has provided protection for the sprayed trees for 3, 4, 4 month ; 200,250, 300 ppm concentrations respectively, despite of the treated trees were re-infested, the numbers of the visited workers were low and significantly deferent from the workers number in the control treatment insignificant from the number of workers in the treatment of the termicide Moursban 48% TC. The field study results also revealed growth regulator efficiency disappearance to control the termites when they add to the timber bait station, where Alsystin was the most efficient in termite control .Although Alsystin didn't provide protection for the treatment wood but the influence of growth regulators in various concentrations on the whole termite colony was obvious, the numbers of workers visiting the treated bait station declined with over time until they disappeared from bait stations in November, July and May from bait stations treated with concentrations 250, 500, 1000 ppm, respectively, while Dimilin had excelled with providing full protection for the treated station baits and that protection increased with increasing of the tested concentrations where the protection continued for 3, 4, 4 months for the concentrations 250, 500, 1000 ppm, respectively, after that the infestation was showed in the stations, but in little number of workers except the consternation 500 ppm, which affected on the structure of the termite colony, where the infestation disappeared from the stations in October. The Nemsis was the less growth regulators efficiency in controlling the termites where it didn't not provide protection for the bait timber only for 1, 2 month of the concentrations 200, 300 ppm, respectively, while the concentrations 250 ppm did not provide any protection for treated baits, but in general the density of workers were less than the worker density in the stations of control in which this results indicates a minor impact of growth regulators on the structure of the colony.

Feeding Behavior and Biological Performance of Cowpea aphid, *Aphis craccivora* Koch (Hemiptera: Aphididae) on Faba Bean, *Vicia faba* L. cultivars

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Start and end date: 2008 - 28/05/2012
Defense date: 28/05/2012

Abstract:

Cowpea aphid, *Aphis craccivora* Koch., performance on five selected faba bean, *Vicia faba* L., cultivars was evaluated through a biological study, a feeding behavior study and a plant biochemical response study. In biological study, fourteen days period of cowpea aphid colony development study revealed that the cultivar Gazira2 was the least preferred, whereas the cultivar Misr1 was the most prefer. The order of resistance of the cultivars was Gazira2>Misr>Giza3 Improved>Goff1>Misr1. Generally, cowpea aphid infestation significantly inhibited plant growth of infested plants as compared to uninfested ones (*F*: 41.38, *P*: <0.0001), except for Gazira2 and Goff1. Further study on some biological parameters justified that Gazira2 was less preferred by the cowpea aphid as compared with Misr1. Longer total aphid longevity and fewer progeny produced were noted either in whole plant or detached leaf. Detached leaf demographic parameters supported the less preferred of Gazira2 compared to Misr1, indicated by significantly lower net reproduction rate (Ro), intrinsic rate of increase (rm) and finite rate of increase (λ), but longer generation time (T) and doubling time (Td). These results indicated the

occurrence of resistance with antibiosis type in the cultivar Gazira2 as compared to the cultivar Misr1.

Feeding behavior study revealed that the different resistant levels among five faba bean cultivars were not related to phloem tissue factors or leaf surface factor, as indicated by the lack of significance of phloem ingestion duration (E2) and scanning electron microscope (SEM), respectively. Resistance factor in the whole plant of cultivar Gazira2, is suggested because of longer duration of stylet penetration difficulties (waveform F). However, the longer waveform F duration was not retained on detached leaf.

Peroxidase (POD) analysis showed that the cultivar Gazira2 has more POD activity compared to susceptible cultivar Misr1. However it was not inducible, shown by insignificant POD activity value of infested plant compared to uninfested plant. Polyphenol oxidase (PPO) activity on cultivar Gazira2 also was higher than on Misr1. It is suggested that higher activity of POD and PPO in cultivar Gazira2 had a strong relation with longer duration of waveform F (stylet penetration difficulties).

First Record of Important Natural Enemies on Tomato Borer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in Greenhouses in Middle of Iraq

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Defense date: 2012

Abstract:
A survey was conducted for natural enemies of Tomato Borer *Tuta absoluta* (Meyrick) on selected Tomato greenhouses at Abu-Ghraib/ Baghdad Province and Kut, Ahrar and Sweera/Wasit Province during the season of 2011-2012. All samples were identified by British Natural History Museum. According to the Museum report, five Hymenopterous parasitoids were identified on *Tuta absoluta*; they were namely: two egg parasitoids *Trichogramma pintoi* (Trchogrammatidae) and *Telenomus* sp. (Platygastridae); two larval parasitoids *Bracon* (*Habrobracon*) sp. (Braconidae) and *Closterocerus* sp.(Eulophidae); pupal parasitoid *Proconura* sp. (Chalcididae) .This is the first record for Iraq except of the second one and all of them for *Tuta absoluta* as well. Furthermore four predators were identified; Hemipterous predators: *Nesidiocoris tenius* (Miridae), *Orius albidipennis* (Anthocoridae), *Metacanthus lineata* (Berytidae) and Neuropterous predator *Chrysoperla carnea* (Chrysopidae). The third predator was considered as the first record in Iraq yet all of them for *Tuta absoluta* as well.

Larvicidal Potentialities of Botanical Extracts from Ten Indigenous Plant Species against *Anopheles arabiensis* Patton

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Defense date: 5.12.2012

Abstract:
Certain mosquito species are important vectors of fatal human diseases, among which *Anopheles arabiensis* Patton (Diptera: Culicidae) is known to be associated with malaria transmission in different tropical and subtropical countries, including the Sudan. Since chemical control of mosquitoes was linked with numerous drawbacks, such as resistance development, the search for effective environmentally sound alternatives is urgently needed. Therefore, the main objectives of this study were to survey the occurrence of the malaria vector *Anopheles arabiensis* in Khartoum area, and to screen mosquitocidal potentialities and phytochemical constituents of different extracts (water, ethanol and petroleum ether) prepared from some botanical parts of ten local plant species. These plants included; *Acacia nilotica* "Sunt", *Eucalyptus camaldulensis* "Ban", *Ricinuscommunis* "Khirwe", *Citrulluscolocynthis* "Handal", *Solenostemmaargel* "Hargel", *Citrus paradisi* "Grape fruit", *Artemisia annua* "Shieh", *Ocimumbasilicum* "Rehan", *Calotropisprocera* "Ushar" and *Nerium oleander* "Ward Elhameer". Regarding the bioassays, two laboratory experiments were conducted separately to evaluate the knockdown and residual effects of treatments against the 4th instar larvae of *An. arabiensis*, as compared with two standard insecticides (Malathion 50% EC and Abate 50% EC).

The results of surveys conducted at three locations in Khartoum area revealed the highest population percent of *An. arabiensis* larvae at Elozozab location (79.1±5.4%) near the White Nile River, followed by Elmostodaat (39.2±0.7%), whereas Abu Adam location recorded the lowest incidence (1.8±0.0%). The former location is

characterized by the occurrence of various pools of stagnant water occupied with submerged and floating aquatic weeds that make the habitats more conducive to the *Anopheles* breeding. Various predatory insects and fishes were observed associated with immature stages of mosquitoes especially in breeding areas near the White Nile. Such natural enemies are waiting for further studies to evaluate their actual role in natural control.

Regarding the larvicidal activities of botanical extracts, significant variations were recorded among treatments as influenced by; plant species, botanical parts, types of extracts and concentrations applied. Generally, the fruiting parts (i.e. seeds) and a polar extracts (petroleum ether) showed more potentialities as larvicides than the leaf parts and polar extracts (water and ethanol), and in most cases mortality effects were increased in response to increasing concentrations and exposure time. Some extracts of three plants (*S. argel*, *A. nilotica* and *R. communis*) scored knockdown effects (90.0±0.0% mortality) similar to those of the two insecticides, 24h post treatments. However, the seeds petroleum ether extract of *Solenostemma argel* at 0.5% concentration was the best botanical treatment that attained the lowest LC_{50} (1000 ppm) at 48h of exposure. This extract also showed the best residual performance up to three days post application, but was surpassed by the insecticides thereafter.

The results of phytochemical analysis revealed that the eight investigated chemical groups (secondary metabolites) were present in all plants, but distributed in different parts at variable levels. These included; alkaloids, saponins, flavonoids, flavones, tannins, amino acids, triterpenoids and steroids. Wide ranges of chemical classes were achieved in polar extracts. On the other hand, all petroleum ether extracts chiefly yielded triterpenoids and steroids, which seem to be connected with the resultant high larvicidal effects in almost all plant samples as compared with the other extracts.

It is concluded that the seeds petroleum ether extract of *S. argel* was the most potent botanical part among the tested plants, as the best larvicidal treatment against the mosquito, *An. arabiensis*. This extract should be focused in future studies to characterize its active principles through advanced techniques, and to be evaluated under field conditions for proper utilization in mosquitos' control.

Studies on Honeybee Colonies Activities under Environmental Conditions of North Sinai

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Start and end date: 2007-2012
Defense date10/03/2012

Abstract:
This study was undertaken in North Sinai governorate during years of 2007-2008 and 2008-2009 .
1-The activity of colonies in rearing brood.
The highest sealed brood rearing in the spring season in Rafah and Shiekh Zowied while summer season in EL-Arish. The lowest sealed brood quantity at winter season in Rafah , Shiekh Zowied and, EL-Arish.,The highest unsealed brood rearing spring season in Rafah and EL-Arish while Autumn season in Shiekh Zowied. The lowest unsealed brood quantity at winter season in Rafah , Shiekh Zowied andin EL-Arish., The highest drone brood production during spring season in Rafah, shiekh Zowied and Arish., the lowest mean was in autumn seasons in Rafah, shiekh Zowied and EL-Arish, The highest queen cups construction were recorded during spring season in Rafah, shiekh , Zowied and Arish., Non queen e cups was found during summer and winter seasons in EL- Arish, The highest queen cups construction recorded during spring season in Rafah, , shiekh Zowied and Arish. None queen cells was found during summer , autumn and winter seasons in the three lactation.
The maximum quantity at summer season in Rafah, while it was in spring season in Shiekh Zowied and EL-Arish, less amounts of pollen were stored in winter season in Rafah, Shiekh Zowied while autumn season in EL-Arish. The highest amounts of stored honey were recorded in spring season in Rafah and Shiekh Zowied while it was recorded in autumn season in EL-Arish. The lowest amount of the stored honey was in winter season in Rafah, Shiekh Zowied and EL-Arish.
The highest numbers of combs covered were recorded in spring season in Rafah and Shiekh Zowied while it was recorded in summer season in EL-Arish. The lowest number of combs covered was in winter season in Rafah, Shiekh Zowied and EL-Arish.
2. Pollen gathering activity:
Including Periodical pollen gathering activity at North Sinai, the highest amount were recorded during spring season (204.2 and 265.0 grams/colony/day respectively), which represented (35.4 and 32.9% respectively) of the total amounts collected. In EL-Arish region, the highest amount were recorded during spring season (402.5 grams/colony/day) in the first year, winter (419.6 grams/colony/day) in the second year which represented (36.8 and 33.8 % respectively). In

Shiekh Zowied region, the highest amount were recorded during winter season (469.8 and 643.4 grams/colony/day respectively), which represented (34.5 and 36.7% respectively) of the total amounts collected. Rafah region, the highest amount were recorded during spring season (1038.8 grams/colony/day)in the first year, winter season 1298.7 grams/colony/day) in the second year which represented (34.3 and 34.2 % respectively) of the total amounts collected. North Sinai region.

Pollen sources at North Sinai: the major pollen source could be arranged according to importance on the basis of pollen quantity as follows: Broad bean, (*Vicia faba* L.), Acacia (*Acacia* ssp.), Maize (*Zea mays*), Caper (*Zygophyllum simplex*), Vegetable marrow (*Cucurbita pepo*), Sunflower (*Helianthus annuus*), Daisy (*Calendula arvensis*), apples (*Malus sylvestris*), Almond tree (*Prunus amygdalus*), marigold (*Calendula officinalis*), Prickly pear (*Opuntia Ficus-indica*) peaches (*Prunus persica*), coriande r (*Coriandrum sativum*), Purslane (*portulaca oleraceae*) Aloe (*Aloe vera*), Eucalyptus (*Eucalyptus* spp.), Sage (*Salvia officinalis*), Date-palm (*Phoenix dactylifera*), Casuarina (*Casuarina glauca*), Citrus (*Citrus* spp.) and about Pollen gathering activity at three hour intervals: a. occurred between 10-8 am hour, (43.8%), and between hour of 10-12 noon, (40.0%), and at 12-2 pm. came in the third rank representing 31.0%, between 2-4 pm, where it represented 21.0% of the total collected pollen all over the year. b. The quantities abundant percentages of pollen from different pollen sources at North Sinai were relatively varied between these sources throughout different hours of the day time. The highest pollen gathering percentages of both broad beans, (29.6%) was recorded during a time from 12-2 pm of the day. Acacia, (42.9%), Maize, (43.8%) and Daisy, (32.0%) were recorded during a time from 8-10 am of the day. Caper, (40.0 %) and Vegetable marrow, (32.4 %) were recorded during a time from 10-12 am of the day. Sunflower, (37.0%) was recorded during a time from 6-8 pm of the day.

Susceptibility of some Local Varieties of Sorghum to infestation by the corn borer, *Sesamia cretica* Led. (Lepidoptera: Noctuidae) and the efficiency of some plant extracts in it's control

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Start and end date: 1/6/2011 – 1/5/2012
Defense date: 8/7/2012

Abstract:

A field study was conducted in the College of Agriculture, Abu-Ghraib during the autumn season 2011, to evaluate the susceptibility of four local varieties of sorghum (Ishtar, Babylon, al-Warkaa, Lillo) against the infestation by the corn stem borer, *Sesamia cretica* Led. (Lepidoptera: Noctuidae), Compared with the previously studied variety Inkhad, and study the effect of infestation on the ratio of loss in protein and carbohydrates, as well as evaluating the efficiency of onion preparation and neem extract against this insect on variety Lillo, the results showed the following:

1 – Results indicated that highest percentage of seedlings with borer eggs were laid on variety Lillo 5.33%, which differs significantly from ratios of other amount (2.33, 1.67, 0.33 and 0.33)% for variety Inkhad, Ishtar, al-Warkaa and Babylon respectively, and there is a significant differences in the total number of eggs laid on variety Lillo (19.67), which vary significantly from the numbers of (3.33, 3.33, 0.67 and 0.67) laid on, Ishtar, Inkhad, al-Warkaa and Babylon respectively, thus variety Lillo was the most preferred for oviposition by females of the corn borer.

2 - Results showed the susceptibility of all varieties of sorghum to the corn borer, *Sesamia cretica* Led. Without the presence of significant differences in the percentages of infestation between the varieties after 3 weeks from emergence, the highest infestation rate of 13.62% was recorded for variety Lillo, Babylon showed the lowest rate of infestation of 3.87%. There were no significant differences between variety in infestation rates during the flowering stage, At harvest, the infestation rates was increased, and the highest infestation rate of 41.77% were recorded on al-Warkaa while the lowest (26.91%) on Babylon. As for the dead heart, the highest percentage of 7.19% on the variety Lillo and lowest rate 2.01% on Babylon.

3 - Results indicated that there were no significant differences in the number of holes on the sorghum stalk varieties, the lowest number of 1.85 / plant on Ishtar, while al-Warkaa was marked for the highest number of holes on 3.15 / plant. There are no significant differences in the numbers of larvae that found inside the stems of different varieties, which ranged in number between (0.5-0.9) larvae/plant, and there were no significant differences in the number of feeding tunnels, the highest numbers of 1.5/plant was recorded for the variety al-Warkaa, and less number of 1.1/plant on Ishtar, the lowest of the total area tunneled/plant of 4.79%, for variety Ishtar, which differed significantly of the

rest of the others varieties and reached the highest percentage of 13.62% for the variety Inkhad.

4 - There was no effect for the corn borer infestation in plant height, loss in height ratios, ranging between sorghum varieties from the lowest of 7.9% on al-Warkaa and the highest of 12% for variety Inkhad. There was no significant differences in the number and weight of grains in the sorghum varieties , do rates of loss in the grains number ranged from the lowest percentage of 14.58% for Ishtar, and the highest rate loss of 20.84% variety Lillo. Plant yield loss has ranged in the different varieties as a result of infestation by the corn borer between 20.17% for the variety Ishtar and the highest percentage of 25.05% for Lillo.

5 –There were no significant differences in the rates of loss in the grain protein, the lowest percentage of 11.19% for Al-warkaa, and then followed by 14.47% for Inkhad, while the highest loss rates on the rest varieties ranged between (19.14 -21.41)%. There were no significant differences in the rates of loss of carbohydrates between varieties, and the lowest percentage loss of (2.69%) was recorded for the variety Lillo, and the highest percentage of 9.44% variety Inkhad, while the loss for other varieties ranged between 4.95 – 7.59%.

6 - There were significant differences in infestation rates by the corn in the flowering stage, one application of neem, one and two applications of onion preparations resulted in the lowest infestation rates of (7.64, 7.85 and 8.36)% receptively, compared with 12.9% for two application of neem. The treatment of pesticide Cruiser differed significantly from the rest of other treatment wheretheincidence was 16.78%, which differ significantly from the comparison treatment amounting to 26.42%. There were no significant differences in infestation rates in the corn borer at harvest, although there are differences in virtual reaching percentages of infestation 16.54%, 19.31, 22.53% and 34.22% for the treatment of one application of onion preparation, two applications of neem extracts, the chemical insecticide Cruiser and the control treatment respectively.

7 - The results revealed a significant differences in the percentages of the dead heart after 4 weeks of emergence, which refers to the superiority of one application of onion, neem one and two applications where the percentage of dead heart reaching (1.45, 2.04, 1.68 and 1.46) % respectively, Which differ significantly from the treatment of insecticide Cruiser (5.61%) and 8.45% for the control treatment.

8 - There were no significant differences in the number of feeding tunnels for the corn borer, as a result of spraying onion preparation or neem extract where numbers ranged between 1.07-1.27 tunnels/plant, and there were no significant differences among the treatments, in the percentage of the total area of stalk tunneled, the two application of onion extract were marked by the lowest of ratio of 7.3%, compared with the highest of ratio of 13.4% for the control treatment, while the rest of the other treatment ranged from 3.9 to 11%.

9 – There are no significant differences between treatments in the numbers of larvae and the numbers of holes recorded at harvest, larvae numbers ranged between 0.6-0.93 larvae / plant, while the number of holes was between 1.93-2.53/plant. Treatment of onion and neem extracts reduced the loss in plant height except the application of one spray of onion preparation which caused equal reduction in plant height to the control treatment. The lowest loss was 6.75% for neem treatment (one spray), plant height loss for other treatments ranged between (7.55-9.29)% and there were no significant differences between them.

10 - The results indicated no significant differences in the yields of plants for the different treatments, results can be into two groups: the first includes the treatment of divided one application neem and onion and the insecticide Cruiser, were plant yield (60.6, 58 and 56.3) g/plant and led to an increase of yield by 30%, 27% and 25%, and increase the total production of sorghum grains per acre (2427, 2080 and 1853) kg/ha, while the second group which include by two sprays of onion preparation an neem extracts were plant yield (44.6 and 46.8) g/plant respectively, which did not different of 42.4 g/plant for the control treatment, and led to an increase of plant yield by 5% and 9% and increase the total production per acre by (293 and 587) kg/ha. The possibility of applying these results in the control program for the corn stem borer, *S. cretica,* also discussed.

Biological Control of Root–Knot Nematode, *Meloidogyne,* which Infecting Tomato Plants under Greenhouse Conditions in Syrian Coastal Region by Using Native Isolates of the Fungi *Trichoderma*

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Abstract:

Laboratory and semi-field studies was conducted to evaluate the use of local isolates of the fungus *Trichoderma* spp. As a biocontrol agent against root-knot nematode; *Meloidogyne incognita* that infect the roots of tomato plants in greenhouses in the Syrian coast, compared with the usage of the commercial imported product Biocont, which has the fungus *T. harzianum* as an active substance, against root-knot nematode, during the years 2009, 2010, 2011.

50 samples of soils and roots of tomato infected with nematode was collected from 25 greenhouse along the Syrian coastline during the months of June and July of 2009, It shows that 28% of the total samples were positive for being that fungi, It was obtained seven local isolates of the fungus *Trichoderma* from rizospher soil and from females and egg masses of nematode *Meloidogyne* sp., They were defined to the species level, it is clear that they belong to the three types: *T. viride*, *T. longibrachiatum* and *T. harzianum*, which contained 4 isolates of type *T. viride* which represents 57.1% and 2 isolates of type *T. longibrachiatum* which represents 28.6% and one isolate of the type *T. harzianum* by 14.3%.

Two groups of laboratory experiments were performed to evaluate the effectiveness of all local isolates and the commercial product of this fungus against various stages of nematodes *M. incognita*, which were reared on tomato plants in the synthetic infection conditions of certain type to have a pure society of these nematodes for subsequent experiments.

* The first group **Dealt** with study the effect of direct parasitism of the fungi on various stages of nematodes.

The results showed the ability of all local isolates of the fungi in parasitism on nematode egg masses, eggs inside egg masses, freed eggs and the mature females in dishes, the local isolation (7) which belong to the type *T. harzianum* showed highest rate of parasitism on the other seven isolation and it overtook the commercial formulation in egg masses, the eggs inside them and the female experiments reached (95%, 43.7%, 90.6%), respectively, compared with the commercial product (39.8%, 26.2%, 63.2%) respectively, As for the direct parasitism on the freed eggs of nematodes, all isolates showed a high potential for parasitism and the highest one is isolates No. (7) of the type *T. harzianum* followed by isolates (3) and (4) which belong the type *T. longibrachiatum* and the percentage of parasitism as an average of the three superior isolates before (71.4%), while the other local isolates reaching as an average to (55.8%), and all of these isolates excelled on the commercial product in freed eggs parasitism which reach to (40.2%), This direct parasitism of all treatments causes inhibition in egg hatch showed by a decrease in the average number of J_2 larvae and that confirms the role of fungi to control the nematodes.

* The second laboratory experiments dealt with the effect of cultures filtrates of all treatments on hatching eggs and the movement of larvae in dishes using different levels of concentrations of filtrate 100%, 75%, 50%, 0%, the results showed that the filtrate of local isolate which belong to *T. harzianum* exceed in preventing the hatching eggs of nematodes at each of the concentrations 100% and 75% and reached 98.1% and 86.4% respectively, whereas in the filtrate of commercial product reach 97.3% and 83.7% respectively, but at the 50% concentration showed the percentage of inhibition of egg hatch of the local isolates (1, 3, 7) which belong of the types: *T. viride*, *T. longibrachiatum* and *T. harzianum* (71.3%, 71.1% and 70.5%), respectively, compared with Biocont product (69.2%).

On the other hand, according to index inhibition of nematode larvae movement the results showed that the local isolation filtrate (1) *T. viride* at 100% concentration excelled the other treatments (98%) compared with commercial product (93.7%), while at 75% and 50%

concentrations the results showed the excelled of the local isolation filtrate(3) *T. longibrachiatum* reached to (94.8%, 91%, respectively) compared with Biocont (81.1%, 70.3%, respectively) in immobile the movement of larvae of nematodes.

Three local isolates fungi (which proved its superiority in laboratory) was evaluated in controlling *Meloidogyne incognita* in semi-field experience which were carried out on **Saif** breed of tomato plants which is sensitive to infection with nematode, planted in pots in greenhouse conditions, Soil was sterilized and it was infected with nematode *M. incognita* to assess the effectiveness of these three isolates of the fungus which is the isolation number (1) of the type *T. viride* and the isolation number (3) of the type *T. longibrachiatum* and the isolation number (7) of the type *T. harzianum* compared with commercial product Biocont to study their impact on the infection's index (number of knots + the number of egg masses in roots), and to study the indicators of growth and production, they were applied six different treatments includes four of them the fungi was added as fungi infested wheat and two of them served as controls, the first control act as Nematode inoculated alone without any fungi, while the second control act as non-inoculated treatment contains only wheat without fungi.

The seedling were transplanted after 30, 60 and 90 days since Nematode inoculated, and the results showed a high ability of all fungi's isolates to reduce the number of knots on tomato's roots compared with the first control which contain only nematodes, the results showed the superiority of isolation number (3) of the type *T. longibrachiatum* (especially in the third reading) in reducing the number of knots on the root compared with the other isolates and Biocont, the effect of fungi in controlling nematode according to the number of knots index increased to 62.39% at isolation number (3) while it was lower in isolates number (1) and (7), compared with the commercial product, which showed the influence of fungi in controlling nematode reaches 36.8%, 48.39%, 32.24%, respectively, according to the first control which contain only nematodes.

on the other hand, there was an impact of fungi in controlling nematode according to the number of formed egg masses index, the highest value as an average, was in the first control that which the number of egg masses in the third reading reaches to 488.9 mass on the other side there was a decrease in this number in fungi treatments especially the isolation number (3) the strongest effect, followed by isolation number (7) then isolation number (1) at last the commercial product which the number of formed egg masses reach as an average (166.50, 228.43, 282.33, 305.76) egg masses respectively in the infected root.

It was noted that the fungi has an improvement properties for plant growth and production in fungi treatments pots, where the lengths of seedlings increased significantly when applying the local isolation of the type *T. longibrachiatum* reach to 174 cm compared with the commercial product 146 cm after 90 days of initial infection with nematode, (after this period) the length of the roots was increased when we applied the same isolation to by 74.1 cm compared with the commercial product 39.5 cm, while the increased in fresh fruit weight after 90 days of the experiment beginning reaches to 519.8 g at the local isolation *T. longibrachiatum* apply and 487.3 g at the commercial product apply compared with the nematodes control (380.17 g), and it was noticed that the nematode control has promote effect to some growth index in the first reading, , but this effect seemed to be decreased in the following readings.

This confirms the success of the process of controlling *Trichoderma* fungi to nematodes *M. incognita* and its positive impact on reducing the incidence of these lesions and increasing production.

Pathogenicity, Biology and Control of Wheat Seed Gall Nematode, *Anguina tritici*.

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Abstract:
A survey of several wheat fields at Duhok province (Iraq-kurdistan region) during 2010 and 2011 was carried out in Slevani (Duban) plain, Kemeka and Bakhetmi villages, fields around Semel city and other fields along roads of Kora and Kemeka. The highest infection (50%) occurred in a field of Bakhetmi followed by field in Kemeka (40%) during the 2010. The lowest infection (13 and 14%) was reported in a field in Kemeka and in the field between Kora and Kameka respectively. In silos of Zakho, Faydeyi, Shekhan in 2010 and 2011, the highest infested seeds were 10.76 and 13.03% which collected from samples of bread and

durum wheat, respectively in Faydeyi silo in 2011. *Anguina tritici* completed its life cycle in 135- 165 days under field conditions in College of Agriculture, Semel-Duhok. Females were 2400 × 132.55 µm, whereas males 1790 × 82.19 µm. second stage Juveniles (J_2) and eggs was 490 × 24.9 µm and 94.5 × 38.7 µm respectively. Among durum wheat cultivars Arey c.v. was more susceptible when infected by (65.33%) compared to (37.12%) on Wahe c.v. among durum cultivars. In Bread cultivars, Maxipak infection was (72.85%) and less infection was (42.17%) in Cham-4 c.v. Detection of the pathogen host range on some poaceae plants revealed that weed plants of **[**Oat (*Avena fatua*), Ray grass (*Bromus inermis*), darnel or cockle (*Lolium temulentum*) and small canary grass (*Phalaris minor)***]** and two barley c.v. infested with *A. tritici* did not affected by this nematode except Triticale infection was (20.32%). Result from host range study proved that may be there are new race of this nematode in Duhok province due to it is ability to parasitism on both durum and bread wheat cultivars. Bioassay of fungicides (Vitavax, Divident, Dithane) and herbicide of "Granstar" caused mortality to the J_2 of *A. tritici* reached to (89.125%) after week of immersion J_2 in 8 ppm Dithane. Spore suspension of Biocont-T *Trichoderma harzianum* (19×10^6 spores/ml) caused mortality 53.9% to second stage juveniles (J_2). Application of *T. harzianum* in the field realized significant improvement in some plant growth and yield criteria of harvest index and seed weight by 30.57 and 31.6 % respectively, in addition to increasing in number of seeds by 28.7%. Sowing of Cham-6 c.v. at 15/ Jan/2011 in infested soil caused a significant reduction of infected plant (22.59%), number of galls (4.97 gall/plant), gall weight (0.97 mg/gall) and J_2 population density (4525 nematode/gall).The highest wheat growth and yield criteria (harvest index, seed weight, hay weight, plant length and number of seeds) were recorded in the same planting date. Cultivation of seeds treated with Dithane caused the lowest infected plants 35.68% with 3galls/plant. However, combination of seed dressing and delaying of seeding date resulted in a significant effect on the chlorophyll content and plant vigor.

Population Dynamic Changes in Nematodes Associated with Cotton, Role of Biological Control in Reducing the Population and Effect of Interaction with Vascular Wilt Fungus

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Defense date: 2012

Abstract:

A survey was conducted to determine the frequency and mean densities of plant-parasitic nematodes associated with cotton crop (*Gossypium hirsutum* L.) during 2008 season in Syria. Results showed that twelve genera of plant-parasitic nematodes were found associated with cotton roots. *Pratylenchus* spp., *Meloidogyne* spp. and *Rotylenchulus* spp. were present in most cotton fields in all Syrian governorates. Their distribution was relatively uniform. They occurred in 80.7%, 46.6% and 32.95%, respectively, of tested fields.

Average of nematode population density in soil decreased after sowing (May) and near the end of the season (at harvest) in both years and in all of the studied fields, then the numbers of nematode increased slowly again in June to reach a peak at mid-season (July). Ghab region had the higher population density in both seasons (69 and 1180.8 juveniles/100cm^3 soil, respectively). An increase in numbers of nematode in soil was accompanied with a decrease in number of roots.

Results showed that all cultivars were damaged by root-knot nematode infection (Gall index= 4.8-5.0), Nematode reproduction factor (R) ranged from its maximum (R= 64.8) on cultivar Aleppo 33 to its minimum (R= 7.6) on cultivar Raqqah 5. The cultivar Aleppo 33 was clearly susceptible, but all the tested Syrian cultivars could be considered as moderately resistant.

The pathogenicity of 19 single spore isolates of *Verticillium* spp. isolated from stems of cotton plants infected with vascular wilt was examined on susceptible variety Deltapine 16, The first contained 7 defoliating isolates (V6, V7, V9, V11, V13, V14 and V16) which were highly aggressive and fast growing on PDA medium, their leaf infection index was high (3-3.8). The second group of nondefoliating isolates were moderate to highly aggressive and they grown fast on PDA medium, their leaf infection index ranged between 1.8- 2.9. The isolate V11 had the higher aggressively and the isolate V3 was the less aggressive.

The two varieties Raqqah 5 and Aleppo 90 which showed less susceptibility to infection with *V. dahlia* (isolate V11) and the disease index of cross-section discoloration was 15 and 27.5,

respectively, Against to that, the other group contained the varieties (Deir Ezzor 22, Aleppo 33, Aleppo 118) which showed higher susceptibility and recorded high degrees of stem discoloration (80, 65 and 57.5, respectively).

Increase in nematode population and wilt severity in mixed inoculated plants on three cotton cultivars (Deltapine16, Aleppo33 and Deir Ezzor 22) indicated a synergetic reaction. Isolate V3 of wilt fungus caused significant increase in population of second stage larva number/250 cm^3 soil in two cultivars: Deltapine16 and Aleppo 33 (353.9 and 518.4/250 cm^3 soil respectively) in combined inoculation in comparison with isolate V11. Whereas, in cultivar Deir-Ezzor 22, it reduced reproduction index, mean egg mass number, mean eggs per egg mass\root and second stage larvae number/250 cm^3 soil in comparison with inoculation with nematodes alone. On the other hand isolate V11 did not show significant difference in individual inoculation.

The efficiency of 7 antagonistic fungi (*Trichoderma harzianum*, *Monacrosporium eudermatum* Strain 2024, *Arthrobotrys conoides* Strain 2022, *A. candida* Strain 2012, *Paecilomyces lilacinus* Strain 14052, *P. variotii* Strain I and *P. variotii* Strain II) was evaluated against root not nematode *M. incognita* (race 3) on cotton plants (variety Aleppo 33) in pots experiment under field conditions during 2011. Results showed that all used fungi were effective in reducing the density of root knot nematode, and improved plant growth compared with nematode inoculated plants. The species of *Paecilomyces* reduced the eggs hatching rates significantly (13.2-17.8%) compared with control plants inoculated with the nematode only (63.5%), without significant differences among the fungal species. Also, a similarity was recorded between the average of the efficiency of some fungi (*A. conoides*, *A. candida* and *P. lilacinus*) and the nematicide Mocab in reducing the average of egg masses (72.1, 56 and 55.4%, respectively). The effect of the fungus *M. eudermatum* was not only as the parasitism of the mobile nematode stages, but it reducing the average of eggs number in egg masses (455.8 egg\egg mass) and was similar significantly with the effect of nematicide Mocab (203.7 egg/egg mass).

Survey of Plant-Parasitic Nematodes in Peanut Rhizospher Studying Population Dynamic during Growing Season and Evaluating some Control Methods

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Defense date: 2012

Abstract:

A survey was conducted in 68 peanut (*Araschishypogaea* L.) fields in governorates of (Homs, Hama, Latakia and Tartaus) in Syrian to determine the frequency and mean densities of plant-parasitic nematodes associated with peanut crop during the period from April to September of the growing seasons 2009 and 2010. Nineteen genera of plant-parasitic nematodes were reported in peanut rhizosphere. The most distributed genera during the two growing season were *Pratylenchus* (57.8%), *Aphelenchoides* (57.6%), *Longidorus* (51.4%), *Meloidogyne* (33.3%), and *Ditylenchus* (34.9%).While other genera were less frequent, difference in population density of plant-parasitic nematode was noticed in both seasons.

Study of development of parasitic nematode genera society in peanuts fields in all regions of the study, indicated that the population density of nematodes tend to be similar in both growth seasons 2009 and 2010, initial population density decreases in May and June, while begins to rise from July to September. Development of population of the most important genera of the parasitic nematode (*Pratylenchus*, *Meloidogyne* and *Ditylenchus*) on the peanut crop, which was widespread in all fields, was studied. A difference in the average initial population density (Pi) for all three genera was recorded, Reproduction rate was negatively correlated with initial average population density (-0.38, -0.51, -0.25 respectively), positively with final average population density (0.97, 0.95, 0.94 respectively) and significant difference was recorded with the date of sampling in both seasons. Correlation between accumulative daily temperatures DD_5 and average population density ranged between weak and moderate.

Efficiency of some fungi (*Fusarium moniliform*, *Trichoderma harzianum*, *Pacilomyces lilacinus*, *Gliocladium virens* and pesticide Fenamiphos EC 40% (0.7 ml/l) in reducing the density of the parasitic nematode on peanut plants was evaluated. Results of variables analysis showed that all biotical-fungi were efficient in reducing the density of the parasitic nematode in peanut rizosphere and ranged between 97-100%. Time of biotical-fungi application had a great effect on their efficacy.

Significant differences were noticed when adding the fungus at seeding stage (85.2%- 96%) in comparison with adding after 70 days (midseason) (52.7-74%). No significant difference was recorded when comparing the effect of treatments in two different regions central and coastal on their efficacy to decrease population of parasitic nematode associated with peanut rhizosphere. Results showed significant increase in growth and productivity of plants treated with fungi in all treatments, it ranged between 6.8-55%. A strong negative correlation was recorded between parasitic nematode density and peanut productivity in the three trials.

The Use of Biotechnology Tools to Study the Genetic Variation within Wild Olive Population and the Wilt Pathogen *Verticillium dahlia* Kleb and their Interaction in Syria.

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Abstract:

Verticillium wilt disease is the most important disease affecting olive trees in the interior and southern regions of Syria. It is caused by the soil-borne fungus *Verticillium dahliae*. This pathogen infects its hosts through roots of a wide range of cultivated plants, and then invades, grows, and multiplies within the vascular bundles, causing wilting and significant losses in yields. Due to the lack of efficient methods to combat this disease, it is useful to search for genetic resistance in wild Olive accessions. However, it is also important to identify the occurrence of wild olive natural growth location(s) and to test its reaction to the Verticillium wilt disease, in order to select the resistant accession and make use of them as root-stocks as well as to preserve them in the gene bank.

The aim of this study was to characterize some wild olive accessions collected from different parts of Syria for morphological, molecular, geographical, and environmental characteristics; also to test their reaction / degree of resistance to the Verticillium wilt disease. Samples were collected for leaves, fruits and seeds from different wild olive accessions and the two cultivated varieties Sorani and Zayti. The accessions were collected from the following sites: Fakro, Seghata, Berkit, Jarras, Harem (WadiKabeir, Kafr-Tkharim, Herra-Dorra, Rajou, Sheikh Helal, Bllaine, Afrin, and Skerry. Morphological characteristics were studied according to the Standard Guide for the characterization of the olive set by the International Olive Oil (IOOC). Description of the site geography was studied in terms of site latitude, longitude and altitude. Climate has also been classified according to the classification of UNESCO ACZ for the annual average, maximum and minimum temperature, rainfall, and drought index. Results were analyzed statistically to study the coefficient of variation and to analyse the basic elements of PCA and cluster analysis.

Collected fresh wild-olive leaves were used for DNA extraction and related studies using molecular tools, such as Microsatellites (SSR), in order to assess the genetic diversity and relationship. Also, the results were statistically analyzed using the basic elements PCOA and cluster analysis.

A field survey was conducted on the olive groves in different parts of Syria, where disease incidence of Verticillium wilt disease was estimated, and samples were collected from olive trees branches, carrying disease symptoms. The causal pathogen was isolated, and its characteristics studied, mainly the colony color, growth speed, and microsclerotia densities in the colony. Pathogenicity of different isolates were evaluated on cotton (Delta Pine 50 and Deir 22); and on Defoliated (D) and Non-Defoliated (ND) isolates. The appropriate periods for distinguishing between such isolates are also determined. DNAs were extracted for molecular studies, such as genetic diversity by AFLP technique and identification of bands correlated to defoliation trait, as well as projected D isolates. Results were analyzed statistically using ANOVA, regression equation for isolates colony growth speed, and cluster analysis, Jacquard coefficient and Chi-squared test for the isolates molecular diversity.

One year old of self-rooted genotypes are tested for their reaction against a mixture of 22 *Verticillium dahliae* isolates under artificial inoculation. Root tips are slightly striped and immersed in the inoculum for 15 minutes. The severity of infection as well as degree of resistance were evaluated depending on the percentage of infected plant parts and the area under the disease progress curve (AUDPC), respectively. Results are statistically analyzed using ANOVA and regression equation for disease progress models.

Results showed that there is high diversity between the studied accessions; and morphological association between 2 cultivated and 38 wild olives. The accessions were clustered into three major groups, where a significant variability was shown among characteristics studied. The dissimilarity percentage for the first group was 8%, the second 6% and the third 19.2%. Fruit characteristics played a major role in group distribution. The acessions studied are widely adapted to the Syrian climate (from humid to semi-

arid environment; from -40 m to 838 m above sea level).

The fungus *Verticillium dahlia* has been frequently isolated from the olive infected samples. In the studied olive orchards, incidence percentage of infection has reached up to 22.59%. Results revealed also cultural characteristics, variability among the studied pathogen isolates, where 2 groups were identified according to colony color: white (isolates SD2 and SH2) and black for all remaining isolates. Also, the isolates differed in growth rate: slow, medium, and fast, the date of microsclerotium formation, and their percentage of colony occupation. The colony occupation (%) has ranged as follows: low (1–40%), medium (41–75%), and high (76–100%).

Isolates varied in their virulence/pathogenicity degree (virulent, medium, and weak), in particular the following elements: incubation period, D/ND, number, speed of defoliation, plant height, and proportion of vascular bundles of stem discoloration. Isolates were divided as to D by 40% of the total number of isolates (22 isolates), and the rest were ND. The study revealed that the molecular characteristics and the presence of bands are significantly linked to the number of defoliated leaves and to defoliating isolates D, and these can therefore be associated with the gene responsible for the isolates defoliation trait.

Accessions had also differed in their reaction (degree of resistance) against the Verticillium olive-wilt disease, as 17 accessions have scored "highly resistant" and 13 genotypes "resistant" in Syria.

Integrated Management of Citrus Canker Caused by *Xanthomonas citri* subsp. *citri*

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Start and end date:2008 - 1/2012
Defense date: 14/1/2012

Abstract:

Four bacterial isolates from Abha region in Saudi Arabia (Abh01, Abh05, Abh11, and Abh14) were isolated from different plant tissues (leaves, twigs and fruits) and selected for further investigation. Identity of these isolates was confirmed as *Xanthomonas citri* subsp. *citri* (*Xcc*) through physiological and biochemical tests, carbon source utilization test (BIOLOG test), and molecular techniques; polymerase chain reaction with specific primer (2/3, Jpth01-02, Xac01-02, *J-Rxg* and *J-Rxc2*). Grapefruit response against these isolates divided them into two groups; the first group isolates Abh 01, 11, and 14 which are close to *Xanthomonas citri* subsp *citri* (*Xcc*) strain A and the second group Abh 05 which is close to strain A*. Our studies showed that local biocontrol agents (*Pseudomonas fluorescens*and phage) and salicylic acid were able to inhibit the growth of *Xcc*. Studies on disease management were conducted through applications of combinations of local biocontrol agent (*P. fluorescens*and phage), Salicylic acid and commercial biopesticide (Serenade ®). Combination of Salicylic acid (SA) 10mM with *P. fluorescens*and combination of Salicylic acid and Serenade® and phage seemed to be prospective for management of citrus canker in greenhouse. This combination able to reduce the area under disease progressive curve (AUDPC) by 79% compared to the control. Moreover, this combination did not give a significant different with drexide as a common control means for citrus canker disease which reduce AUDPC by 87.4%. However, combination of salicylic acid and *P. fluorescens*able to reduce the AUDPC by 75% compared to the control. This combination also did not give significant different with drexide.

Studies on some Economic Importance and Epidemic Aspects on Wheat Yellow Rust in Sulaimani Provence, Iraq

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Start and end date: 20/11/2009 - 20/11/2011
Defense date: 20/06/2012

Abstract:

Extensive survey has been conducted in most of the major wheat fields in Sulaimani during April 2010 to determine distribution and incidence of yellow rust disease incited by *Puccinia striiformis* f. sp. *tritici* and susceptibility of the commercial wheat cultivars to the disease under natural epidemic condition at adult plant stage. Results revealed that yellow rust is a serious disease in most of the wheat fields in Sulaimani province, most of the commercial wheat cultivars were showed susceptible to moderately susceptible reaction to the disease. The highest infection was

found on SaberBeg, Araz, Sham 6, and Azadi at early stages of wheat growth in Bakrajo, Tanjaro, Halabja and Derbendhekan.

Many experiments were carried out during 2010-2011 seasons at Bakrajo experimental station in Sulaimani to determine the economic importance of yellow rust and the amount of losses in wheat grain yield and yield components of different wheat genotypes. This was also to evaluate the susceptibility of different wheat cultivars to the disease at adult plant stage in the field. Results showed that yellow rust disease significantly decreased grain yield of different genotypes by 3.7 to 35% under natural epidemic of the disease at Bakrajo. Yield losses were mainly attributed to wheat genotypes, infection rate, disease severity, and growth stage of wheat plant at the time of disease appearance which depends on availability of favorable environmental conditions. Yield loss experiment results explored significant effect of yellow rust disease on decreasing grains weight, and the number of grains in each spike. The disease also had significant effect on the qualitative characters of wheat grains by decreasing protein and gluten content of the grains.

Many traps were used in the susceptible plots to monitor the primary inoculums arrival and development in the field, results revealed that *P. striiformis* inoculums arrived to wheat fields in Sulaimani by the mid of March, while the primary infection did not appear on the tissues of susceptible cultivars until 24 April 2011. Genetic variation was detected among the genotypes in their response to the disease, the highest values of disease severity and infection rate were observed on SaberBeg which were 100% and 0.247 respectively, while the lowest values were observed on Al-124 which was about 4.3 and 0.076 respectively.

Host parasite interaction at adult plant stages in the field revealed that there are different levels of reaction among the genotypes against the pathogen population starting from resistance (R) in Al-124 genotype to highly susceptible (HS) in SaberBeg and susceptible in Araz, and Al-8/70. A negative correlation between the Area under Disease Progress Curve (AUDPC) and the amount of grain yield loss was also detected.

Efficiency of the systematic fungicide Bayfidan 250 EC was tested on yellow rust development and control of the disease on the susceptible cultivar SaberBeg at Bakrajo experimental station, results revealed that one application of Bayfidan significantly reduced yellow rust severity on the susceptible cultivar by 80% in the field, while two applications of the fungicide successfully control the disease completely. Each application of Bayfidan gives good protection from the disease for two to three weeks.

Susceptibility of the commercial wheat cultivars were also tested against yellow rust disease at adult plant stage in the field. Results explored wide range differences in levels of host reaction and coefficient of infection against the disease. The highest disease severity and coefficient of infection was recorded on SaberBeg, while the lowest values were recorded on Cham1 and Bouhoth 6.

Viability of *P. striiformis* uridio spores was tested at two different preservation conditions (5°C and -18°C); the results showed that the uridiospores could stay viable to about 11 weeks in freezer condition (-18°C) and for seven weeks in the refrigerator (5°C).

Characteristics of the *P. striiformis* pustules and uredio spores were studied on tissues of different wheat genotypes; results revealed that there were significant differences in the pustule size, the number of pustules per unit area, and the dimension of the uridio spores on different bread wheat genotypes. The highest values were recorded on the susceptible cultivar SaberBeg, Al-8/70 and Araz while the lowest values were recorded on the resistant to moderately resistant cultivars Al-124 and Al-8/172.

Differential varieties set of yellow rust disease (Avocet) was used to determine the effectiveness of the known yellow rust resistant genes under Sulaimani conditions, results showed that the known yellow rust resistant genes *Yr5*, *Yr8*, *Yr12*, *Yr17*, *Yr18*, and *Yr24* were highly effective against *P. striiformis* populations under Sulaimani province conditions, while the rest known resistant genes are not effective against the pathogen populations.

A Study of the Effectiveness of Some Applying Means to Protect the Potato Crop from Potato Virus Y Infection

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Start and end date: 1/3/2010 - 18/4/2012
Defence date: 6/11/2012

Abstract:

Potato virus Y (PVY, genus *Potyvirus,* family Potyviridae), is the most common and destructive virus found in most potato crop production area. It is considered the main reason for the drop of the class of potato seeds and the decrease of production; 10-80% yield losses have been reported.

Five Syrian isolates of PVY collected from potato fields in various places were characterized by serological, biological and molecular methods. ELISA test showed that all tested samples (60 samples) did not react with the following five virus antisera PVA, PVS, PVM, PVX and PLRV, whereas it showed positive reaction to PVY polyclonal antibodies. RT-PCR test showed that all these five isolates were infected with PVY as the ELISA test demonstrated. After that, 6 separate RT-PCR tests were conducted to characterize the PVY strain. The RT-PCR results showed that L1 isolate collected from Lattakia contained mixed infection with PVY^{NTN-NW} and PVY^{NTN} subgroups, whereas H2 isolate collected from Hama and K5 isolate collected from Al-Qaunetra contained PVY^{NW} subgroup, and D3 isolate collected from Damascus as well as A4 isolate collected from Aleppo contained PVY^{NTN} subgroup**.**

When the nucleotide sequences of the 441bp fragment of L1, D3, K5 and AL6 (positive control) isolates were compared with other 8 Syrian and 5 worldwide PVY isolates from GenBank, a 97-99% similarity in nucleotide sequence homology was found between the 4 tested isolates and the Syrian isolates: SYR-Wi-11 (AB185832.1), PVY-12 (AB185833.2), PVY^{SYR} (AB270705.1), SYR-II-2-8 (AB461451.1), SYR-II-Be1 (AB461452.1), SYR-II-DrH (AB461453.1), SYR-III-L4 (AB461454.1), PVY-Bu3 (AB461488.1) and USA (PVY^{NTN} isolate HR1: FJ204166.1), and 83-98% homology with USA isolates (PVY-O5: HQ912901.1; PVY^{Wi}: HQ912868.1), UK (PVY^{N}, isolate SASA 207: AJ584851.1) and German (PVY^{Wi}, isolate 261-4: AM113988.1).

A local Syrian PVY isolate was purified; 3.84 mg purified PVY was obtained from 600 g infected frozen tobacco leaves. The purified preparation was injected into a white rabbit and 14 ml crude antiserum were obtained and used to detect PVY in infected tissues by ELISA. IgG was purified from crude antiserum and conjugated to Alkaline phosphatase to produce IgG-Alp. The optimum concentration of IgG was 0.001 mg/ml and the optimum dilation of conjugate (IgG-Alp) was 1/1000 in ELISA test. The antiserum obtained was able to detect PVY by ELISA up to a IgG concentration: 0.00033 mg/ml, and IgG-Alp dilation: 1/3000.

This polyclonal antibody succeeds in detecting PVY infection in various samples collected from local potato fields by TBIA and DAS-ELISA tests. No differences in value were detected when it was compared with Bioreba polyclonal antibody, Switzerland.

Tubers of two potato cultivars (Marfona and Spunta) which were inoculated with Syrian isolate of PVY (primary infection under field condition) during 2010 and 2011 growing seasons, and which were listed in three groups according to diameter (big: > 50 mm, medium: 35-50 mm, small: < 35 mm), were tested by TBIA to calculate the translocation rate of the virus through tubers to detect the tuber size which carry the lowest percentage of PVY as an applying means to choose the optimum seed size when natural primary infection occurs in the seed potato field.

The observation results showed that no external symptoms, e.g. PTNRD, appeared on the tubers. Serology TBIA results showed different rates of translocation of PVY through tubers according to the cultivars and tubers size in both seasons. The translocation rate of PVY through tubers ranged from 16.4-75.0%, 52.1-81.8% in 2010 and 2011 seasons, respectively. The highest translocation rate of PVY through tubers was in the big size in comparison with other sizes; 75.0%, 81.1% in Spunta cultivar and 44.0%, 81.8% in Marfona cultivar in 2010 and 2011 seasons, respectively.

Field experiments were conducted in Trkmanbarh village, Aleppo, during 2010 and 2011 growing seasons to investigate the effects of a number of management components [barrier crops (sorghum and soybean borders), mineral oil (foliar spray with mineral oil) and seed dressing

with Gaucho "Imidacloprid" in two concentrations (2, 4 g / 10 kg potato seed) in comparison with insecticide spray] in reducing the spread of Potato virus Y, which transmitted by aphids in non-persistent manner in seed potato production fields. Two potato varieties (Marfona and Spunta) were used. Samples were tested by TBIA and PVY and incidence percentage was calculated for each treatment. In the barrier crops experiments results showed that sorghum border was the best by significant differences than other treatments in reducing the PVY infection rate in both seasons. In the mineral oil and Gaucho experiments, the results showed significant differences among most treatments. The treatment of foliar spray with mineral oil and insecticide every 15 days was the best by significant differences than other treatments in both seasons.

A Survey of Cucumber Mosaic Virus and Alfalfa Mosaic Virus in Weeds Spread in Solanaceae Fields in Syrian Coastal Region

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Defense date: 26/3/2012

Abstract:
In order to identify the weeds that accompany Solanaceous in the Syrian costal region, as well as investigate the spread of *cucumber mosaic virus* and *alfalfa mosaic virus* in these weeds; field surveys have been conducted in outside fields (tomato, pepper, potato, eggplant and tobacco), as well as in and outside greenhouses during the agricultural seasons of 2009 and 2010. The surveys covered 165 outside fields and 290 greenhouses. The number of collected samples was 3448 of which 2741 samples from Solanaceous fields and their vicinities, and 707 samples from greenhouses and their vicinities. Samples of weeds were collected that showed symptoms similar to those caused by viral diseases (transparent veins, mosaic, dwarf, differently-shaped stains and curled leaves). The samples were classified and serologically tested. 23 species belonging to 14 plant family were found.
Serological test (TIBIA) results against cucumber mosaic and alfalfa mosaic viruses showed the spread of CMV and AMV on different species of weeds. The average percentage of infection CMV and AMV to the total number of tested samples was 17.40%, 9.74% respectively. The highest percentage of infection with CMV and AMV on weeds collected from outside fields was 36.77% on *solanium nigrum* L. and 33.33% on *Sonchus olereaceus* L. respectively; whereas it was 17.03% on *physalis floridana* Rydb. and 10.69% on *solanium nigrum* L. respectively for the samples collected from greenhouses.
In order to test the transmission of CMV and AMV in the seeds of some weeds and calculate the percentage of transmission, the seeds of some weeds infected with the above-mentioned viruses were collected and sown in a sterilized soil with regular irrigation until shoots reached the proper length and were serologically tested.
Serological test (TIBIA) results of the tested samples against cucumber mosaic and alfalfa mosaic viruses showed the transmission of CMV and AMV in the seeds of some weed species known to carry the above-mentioned viruses. The highest percentage of transmission of these viruses by seeds was 34% in *solanium nigrum* L. and 18% in *cephalaria amana* L. respectively; whereas the lowest percentage was 3% in *Rumix pulcher* L. and 1% in *Raphanus raphanistrum* L. respectively. The average percentage of transmission of CMV and AMV by seeds was 13.25% and 5.62% respectively.
This is considered the first record of CMV and AMV on *Solanium nigrum* L., *Datura ferox* L., *Beta vulgaris var martima* L., *Chenopodium murale* L., *Chicorium intybus* L., *Pecris echiodes* L., *Cephalaria amana* L., *Raphanus raphanistrum* L., *Rumix pulcher* L., *Sonchus olereaceus* L. and *Trifolium repens* L.; the first record of CMV on *Sinapis arvensis* L.; the first record of AMV on *Medicago Arabica* L. and *Xanthium Strumarium* L.; the first record of the transmission of the CMV and AMV by the seeds of *Solanium nigrum* L., *Pecris echiodes* L., *Cephalaria amana* L., *Raphanus raphanistrum* L., *Sinapis arvensis L.*, *Rumix pulcher* L., and the first record of the transmission of the CMV by the seeds of *Chenpodium album* L. that spread in Solanaceous fields in the Syrian costal region.

Characterization of *Cowpea aphid-borne mosaic potyvirus* on cowpea in Alhasa, Saudi Arabia

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Start and end date: 2008 - 1/2012
Defense date: 10/1/2012

Abstract:

Mosaic symptoms were observed in a field of cowpea plants that were grown in Alahsa Governorate, in the Eastern Region of the Kingdom of Saudi Arabia in May 2009. Symptoms expressed on the infected plants were mosaic, vein clearing, green vein banding, stunting, and distortion of cowpea leaves. The infected plants were randomly distributed in the field. Samples, as whole plants, were collected from the infected field and brought to the virology laboratory, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University (KSU). Seeds from the same seed lot used to grow this cowpea field were also brought to the laboratory.

Healthy cowpea (*Vigna unguiculata* subsp. *unguiculata*) seedlings were inoculated mechanically using the four isolates. Two weeks post inoculation, vein clearing and mosaic symptoms appeared on the new leaves. Later on, blisters, leaf deformation, and stunting were also observed on the inoculated plants. Host range reactions of all four isolates are the same. Systemic infections were observed on *V. unguiculata* subsp. *unguiculata*, *V. unguiculata* subsp. *sesquipedalis*, and *Nicotiana benthamiana* while local lesions were shown on *Chenopodium quinoa*, *C. amaranticolor* and *N. occidentalis*. The latent infections were shown on *Ocimum basilicum* and *Cajanuscajan.* All isolates failed to infect the following plant species: *Pisumsativum, Viciafaba, Phaseolus vulgaris, Glycine max, Arachis hypogaea, V. radiata, Datura stramonium, Gomphrena globosa, Solanum nigrum, N. tabaccum, N. glutinosa, Petunia hybrida, Beta vulgaris, Cucumis sativus, Cucurbita pepo, Solanum lycopersicum,* and *Medicago sativa*.

Thermal inactivation points for these isolates ranged between 50°C and 60°C, the dilution end points ranged between 10^{-3} and10^{-4}. Isolates remained infective after storage of sap at room temperature for 2 days but not for 3 days. Leaf dip preparations of the infected leaf extracts of each isolate were examined using Transmission Electron Microscope JEOL – JEM 1011. Leaf dip preparation from each isolate revealed flexuous rod shaped viral particles 750 x 12 nm in size. *Aphis craccivora* Koch. transmitted each virus isolate to healthy cowpea plants. The virus was transmitted through cowpea seed with transmissibility of 5%.

Using DAS-ELISA test, all four virus isolates gave positive reactions with *Cowpea aphid-borne mosaic potyvirus* (CABMV) antibody and negative reactions with *Blackeye cowpea mosaic potyvirus* (BlCMV) antibody. Three samples from the plants that showed virus symptom when germinated from cowpea seeds were also included in this assay and gave the same results. RT-PCR assay was also used to identify the virus. RT-PCR assay was done using specific primers (CABMV-F: 5′-cgctcaaacccattgtagaa-3′ and CABMV-R: 5′-tattgcttcccttgctctttc-3′) designed from the CP gene of CABMV yielded a 221-bp product. All RT-PCR products that showed the specific bands in the agarosegel indicated positive results for the tested samples. Nucleic acid hybridization assay was also used to prove the obtained results of RT-PCR. The probe used in this study was made from the RT-PCR product for detecting CABMV. The infected leaf samples from each isolate and another infected leaf sample from seed-borne virus of the cowpea plant gave positive results by showing the purple color on the nitrocellulose membranes.

The nucleotide identity comparison of the coat protein genes between the CABMV-Saudi isolates was analyzed. The identity percentage between these isolates is 100% which suggest that the tested samples from plants were infected with the same isolate. The nucleotide sequence process, followed by the phylogenetic tree analysis revealed that CABMV-Saudi isolates have the highest similarity (93.2 – 93.7%) with the two CABMV strains from Morocco (Accession Number AF083558 and Y18634) and one strain from Ibadan Nigeria (Accession Number AJ132414) while the lowest similarity (87.9 %) was with the two CABMV strains from Zimbabwe (Accession Number AF348210 and X82873). To our knowledge, this is the first report of the presence of CABMV in Saudi Arabia.

Characterization of *Tomato Mosaic Virus* and *Tomato Spotted Wilt Virus* Isolates and Evaluation of Some Tomato Cultivars in Syria

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Start and end date: Start: 01-05-2007, End: 18-03-2012
Defense date: 18-03-2012

Abstract:

A survey was conducted during spring and summer of 2007 and 2008 to identify *Tomato spotted wilt virus* (TSWV, genus *Tospovirus*, family *Bunyaviridae*) and *Tomato mosaic virus* (ToMV, genus Tobamovirus, family Virgaviridae). A total of 643 and 250 selective individual tomato and pepper samples (leaves and fruits), respectively, for the first virus and 665 and 250 selective individual tomato and pepper samples (leaves and fruits), respectively, for the second virus, were collected from growers fields and from some Agricultural Research Stations in the case of tomato, and from growers fields only in the case of pepper, representing 8 Syrian governorates: Dar'a, Al-Qunaitara, Damascus countryside, Homs, Hama, Idleb, Aleppo and Tartous and were tested by DAS-ELISA using polyclonal antibodies. Results showed that TSWV was spread in most regions; the average infection of tomato samples was 11.1% and 41.2% of pepper samples. Meanwhile, the virus incidence rates observed in each tomato and pepper fields were 0.7 and 3.1%, respectively. The highest spread of the virus was in tested tomato samples collected from Al-Qunaitara (41.0%) followed by Dar'a, Damascus countryside, Aleppo, and Idleb (21.8, 12.0, 2.6, 1.8%). No virus infection was recorded in tomato samples collected from Homs, Hama and Tartous. Damascus countryside was the highest in virus spread in tested pepper samples (100.0%), followed by Dar'a and Hama (64.7 and 15.4%, respectively). No virus infection was detected in pepper samples collected from Al-Qunaitara, Homs, Hama, Idleb and Tartous. Results showed the spread of ToMV in most regions, the rate of virus infections in all tested samples was 18.5% and 8.8% in pepper samples. Meanwhile, the virus incidence in the field on tomato and pepper individual samples were 1.2 and 0.5%, respectively. The highest infection level of the virus in tested samples was recorded in Dar'a governorate (27.1%), followed by Homs, Al-Qunaitara, Idleb, Damascus countryside, and Tartous (22.7, 21.3, 7.2, 5.2 and 2.0%), respectively. No ToMV infection in tomato samples collected from Hama and Aleppo governorates. Tartous governorate was the first in the rate of infection in pepper samples, it was 58.1%, followed by Idleb, Aleppo and Dar'a governorates (6.3, 4.2 and 2.0%), respectively. No ToMV infection in pepper samples was recorded in Al-Qunaitara, Damascus countryside, Homs and Hama, governorates. Results of reaction of 34 local TSWV isolates collected from tomato (14 isolates) and pepper (20 isolates) crops with 5 specific monoclonal antibodies by TAS-ELISA demonstrated that they were divided into two different serogroups. All tomato isolates and 16 pepper isolates were similar in their positive reaction with Mab-2, Mab-4, Mab-5 and Mab-6, but they did not react with Mab-7. Meanwhile, the rest 4 isolates collected from pepper reacted positively with all Mabs. 7 isolates of TSWV and 6 isolates of ToMV were tested by RT-PCR using specific primer pairs of the two viruses. A fragment of the capsid protein gene of TSWV with 620 bp and a fragment of the RNA polymerase gene with 459 bp have been amplified. Results of sequence analysis of the tested TSWV isolates were homologous with similarity between 98.87 and 99.67%, whereas, the homologue rates at the amino acids level ranged between 97.56 and 99.67%. The Syrian isolates of ToMV were homologous in their sequences with similarity between 99.56 and 100%, while, homologue rates between them at the amino acids level ranged between 99.33 and 100%. The homology tree showed high similarity of the Syrian TSWV isolates with their parallel isolates from different countries (97 and 98%). The Syrian ToMV isolates were in homology especially with Asian isolates and one isolate from Australia (98 and 99%). No homologies were seen with isolates from other continents. The Syrian ToMV isolates were in homology with some Asian TMV isolates also, with homology rates ranged between 81 and 99%. The response of 20 imported tomato hybrids was evaluated to infection with ToMV under artificial inoculation in field conditions at pre-flowering stage and with TSWV under natural infection conditions in open field during 2009. The response of 15 local tomato genotypes was evaluated against the same two viruses in growth chamber under artificial inoculation during 2009 also. Yield and quality of produced fruits from grown inoculated and non-inoculated hybrids were assessed. Results of serological test (DAS-ELISA) of inoculated plants with ToMV and non inoculated plants after one month of artificial inoculation showed that 7 imported tomato hybrids (LORIT, ELEGRO, TH 01308, T-30, TY-QUEEN and Pamela) were not infected with ToMV, and have resistance to the virus. No viral symptoms were observed on their canopies. The productivity of resistant hybrids did not influenced by infection with virus in comparison with non-inoculated check plants, meanwhile, plants of other tested hybrids were infected with the virus. Different symptoms were shown on their plants represented by mosaic, leaf curl, deformation, dwarfism of plants and formation of fern-leaf symptoms, their fruits were small size, their surfaces were covered by yellow spots and they were unmarketable. The rates of

yield loss of infected hybrids ranged between 31.9 and 54.7% in comparison with check plants. All local tomato genotypes were infected with ToMV under artificial inoculation in growth chamber conditions, yellowing, leaf deformation and fern-leaf symptoms were observed on their leaves. All hybrids were not infected with TSWV under natural infection conditions in open field, that was due to the absence of Thrips insects which transmit this virus. Meanwhile, the artificial inoculation by TSWV was not succeed under growth chamber conditions according to ELISA results. Results of Polymerase Chain Reaction (PCR) test to detect the two resistance genes: *Sw-5b* for TSWV and *Tm-2*^{2} for ToMV in 44 local tomato genotypes using one pairs of specific primers for each resistance gene, and after run on Agarose gel through electrophoresis of PCR products, showed that the two resistance genes were not found in all tomato tested genotypes. The rate of seed transmission of ToMV in 400 seedlings derived from seeds collected from infected tomato fruits and in other 400 seedlings derived from seeds collected from infected pepper using DAS-ELISA during 2008 was 16.7% in tomato seeds, meanwhile, no seed transmission was recorded in pepper tested seeds. Survey results of ToMV in grinded seeds of each 21 tomato imported hybrids showed that the virus was present in two tested hybrids only, meanwhile, the seedlings of all tested hybrids were free from the virus after planting their seeds. The efficiency of virus transmission by onion thrips: *Thrips tabaci* Lindeman (Family *Thripidae*, Order Thysanoptera) was 7.5% in 2010, adults insects carrying the virus were able to transmit the virus to healthy plants after one day of its feeding on virus infected plants, and the symptoms appeared on inoculated plants after 8 days of inoculation, represented by mottling, yellow blotching and leaf curling.

Study of the response of different lentil and faba bean genotypes to *Bean yellow mosaic virus* when infected with other viruses

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Start and end date: March 2010- May 2012
Defense date: 27/12/2012

Abstract:

Bean yellow mosaic virus (BYMV, genus: *Potyvirus*, family: *Potyviridae*) is one of the most important virus affecting faba bean (*Viciafaba* L.) and lentil (*Lens culinaris* Medikus). The characteristic symptoms of BYMV on infected plants are chlorosis, mild mosaic or mottling and stunting. Faba bean and lentil crops are considered as one of the main protein source for a large part of the population, besides to its importance as animal feed in most countries around the world. Both of those crops are infecting with different pathogens including viruses, which considered the most danger because its control is very difficult.

Mixed infection with viruses are common in nature, as the plant viruses have a wide host range and can be transmitted by different ways. The interaction between two viruses can be synergistic or antagonistic, and the recent research works showed that such type of interaction can be used in biocontrol.

A total of 100 lentil genotypes were evaluated for their reaction to BYMV and *Alfalfa mosaic virus* (AMV, genus: *Alfa movirus*, family: *Bromoviridae*) under field condition during 2010/2011 growing season. All plants were inoculated mechanically with a sprayer using an air compressor. Visual readings of incidence and severity of infection based on the characteristic symptoms was made 25 days after inoculation. Disease score (DS) was based on a 0-3 score (0=no symptoms, 3=sever symptoms) and recorded for each genotype. In addition, all inoculated plants were tested by tissue-blot immunoassay (TBIA) 4 weeks after inoculation, and percent of infected plants was determined for each genotype. Results showed that, 50% of genotypes tested were highly susceptible to BYMV (100% infection) with clear symptoms. Whereas the DS was 0 only in 4 lentil genotypes (ILL 1949, ILL 1935, ILL 1933, ILL 1786) and the % of infection were 10-50% of these genotypes. Similar reaction to AMV was observated of the tested genotypes. Only two genotypes (ILL 5005 and ILL 1949) were highly resistant to virus AMV (% of infected was less than 10%).

Few lentil and faba bean genotypes were selected to study the effects of mixed infection on their susceptibility to BYMV infection. The following three viruses were used in mixed infected under plastic house conditions: *Faba bean necrotic yellows virus* (FBNYV, genus: *Nanovirus*, family: *Nanoviridae*), *Pea seed-borne mosaic virus* (PSbMV, genus: *Potyvirus*, family: *Potyviridae*) and AMV. Inoculation with FBNYV was done using pea aphids (*Acyrthosiphon pisum* Harris) in persistent manner, whereas PSbMV, AMV and BYMV were inoculated mechanically. The

inoculation with two viruses was done in the same day; in addition, the same genotypes were inoculated with single virus to be used as control. Results showed that tested genotypes have different response to the mixed infection, some of them were highly susceptible (100% infection), whereas few genotypes were resistant to all viruses used either with single or mixed infection (such as ILL 75, ILL 518, ILL 1949, ILL 5005, ILL 7436). In addition, some lentil genotypes were found resistant or susceptible with single infection and become susceptible or resistant, respectively when inoculated with two viruses.

The results of faba bean genotypes showed that there was cross-protection between BYMV and FBNYV in most faba bean genotypes such as: BPL 5247, BPL 5250, BPL 5251, BPL 5252, and BPL 5253, that acquired resistant to FBNYV in mixed infection with BYMV to become resistant to both viruses studied.

And the same for all faba bean genotypes except four genotypes which became susceptible in mixed infection after it was resistant in single infection, so it was excluded because there wasn't agricultural feasibility to use.

Survey of Weeds Hosting Tomato yellow leaf curl virus (TYLCV) in and Surroundings Tomato Fields in Syrian Coast

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Defence date: 3/5/2012

Abstract:
A survey was conducted to determine the incidence of *Tomato yellow leaf curl virus* (TYLCV, genus *Begomovirus*, and family Geminiviridae) in 430 samples showing symptoms of viral infection, collected from 141 open fields and plastic tunnels in the governorates of Lattakia and Tartous in Syria during the growing seasons 2008/2009 and 2009/2010, each sample represented one tomato plant, using DAS-ELISA. TYLCV incidence in symptomatic tomato samples collected from the Syrian coast was 32.09%, whereas the TYLCV incidence of similar samples collected from provinces of Lattakia and Tartous was 35% and 30.96%, respectively. The percentages of fields/plastic tunnels planted with tomato and already infested with yellow leaf curl disease in the Syrian coast was 58.3%, whereas the it was 79.5% in Lattakia, and 49.0% in Tartous provinces. The virus incidence in tomato plants in the field ranged from 9.3 to 40.0%, and was the highest in the regions of Qurdaha (40%), and Banias (37.5%), near sea level, and the lowest in the regions of Kadmous (9.3%) and Sheikh Bader (12.4%) at around 500 m above sea level. The results of ELISA test (TAS-ELISA) for 443 non-tomato plant samples collected from the tomatoes fields and their environs in the Syrian coast, and represented of 75 plant species and 27 families showed that 40 samples were infected with TYLCV naturally, which accounted for 13 plant species and 6 different families. The percentage of infected non-tomato plant samples with virus was 9.03%, most of them belonged to Euphorbiaceae (4 species), followed by Malvaceae (3 species), Asteraceae (2 species), Amaranthaceae (2 species), and the least number belonged to Fabaceae and Solanaceae (one species for each). *Amaranthus hybridus* L., *Abelmoschus esculentus* (L.) Moench. and *Melilotus officinalis* (L.) Pallas were national and international recorded for first time as natural hosts of TYLCV in Syrian coast conditions, the last species is able to use for virus multiplication and reservation. Serological characterization has been done for 60 of the TYLCV isolates by using TAS-ELISA and 5 MAbs. The results showed the existence of diversity among tested virus isolates which distributed in six different serological groups including tow identified ones: TYLCV-European and *East african cassava mosaic virus* (EACMV), no reaction was carried out between tested isolates and two MAbs SCR55 and SCR60 which indicated to Indian isolates of TYLCV-Indian and ICMV, 39 isolates had not been reacted with any of the MAbs used in this study which clearly pointed to another viral recombination's in the complex of viral species causing Tomato yellow leaf curl disease in Syrian coast. The results of the serological test by ELISA (DAS-ELISA) for representative samples of different organs of tomato plants infected with TYLCV showed high variation in the distribution of virus particles (readings values of Optical Density) depending on tested plant organ and its old. The young leaves were the most parts contain the virus particles, followed by fruits and adult leaves. Viral particles concentrations in young stems and flowers were identical, and occupied an intermediate values, while the concentration of virus particles was very low in adult stems and roots.

Physiological and Histological Response of Certain Larvae of Cotton Insect Pests Treated with Some Novel Compounds.

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Defense date: 27 - 11 - 2012

Abstract:

The efficiency of three insecticides with different mode of actionindoxacarb (**oxadiazines**), pyridalyl (**phenoxy-pyridaloxy derivative**) and spinetoram (**spinosyn**) were evaluated on two major cotton insect pests, the Egyptian cotton leaf worm, *Spodoptera littoralis* (Boisd.) and the pink bollworm *Pectinophora gossypiella* (Saund.). Evaluation was conducted under constant laboratory conditions and by using the leaf dipping technique. Toxicity of the compounds was expressed as LC_{25}, LC_{50} and LC_{90} values. The impact of the determined LC_{50} for each compound was studied on some biological, physiological and biochemical aspects of treated 2nd and 4th instar *S. littoralis* (Boisd.) larvae and 1st instar *P. gossypiella* (Saund.) larvae.

The obtained results could be summarized as follows:

I. Bioassay:-

Spinetoram was the most significant insecticide against 2nd and 4th instar *S. littoralis* and 1st instar *P. gossypiella* larvae followed by indoxacarb and then pyridalyl. Statistical analysis depending on probit values showed no significant difference between spinetoram and indoxacarb while there is a significant difference between spinetoram and pyridalyl as well as between indoxacarb and pyridalyl.

II. Biological impacts :-

1. Development of treatedlarvae:-

The duration of the subsequent instar's of 2nd instar *S. littoralis* larvae treated with LC_{50} of indoxacarb, pyridalyl and spinetoram was lengthened by 0.85, 2.05 and 1.65 days, respectively. Similarly, treatment of 4th instar *S. littoralis* larvae with LC_{50} of spinetoram and indoxacarb also lengthened the duration of the subsequent instars, however, pyridalyl did not exhibit this effect. Treatment of 1st instar *P. gossypiella* larvae with LC_{50}indoxacarb reduced the duration of the following larval instars (a mean of 17.4 days as opposed to 20.13 days in untreated larvae. Meanwhile, treatment with pyridalyl and spinetoram caused an extension in development of larvae (a mean of 22.7 and 21.9 days, respectively).

2- Effect on pupae:-

Percentage pupation was markedly reduced in treated 2nd and 4th instar *S. littoralis* larvae, this effect wasmore pronounced following treatment with spinetoram giving 27 and 24% pupation, respectively. Meanwhile, pupation percentage was lowest in 1st instar *P. gossypiella* larvae treated by LC_{50} pyridalyl being 26%.

3- Effect on adult:-

Adult emergence was reduced as a result of larval treatment with the considered compounds, furthermore, there was an increase in the percentage of malformation in emerged moths. This effect was most evident following the application of spinetoram followed by pyridalyl then indoxacarb. The reproduction potential of moths was significantly impaired; the maximum reduction ratio in egg viability was recorded in 4th instar *S. littoralis* larvae treated by pyridalyl.

Following treatment of 2nd and 4th instar *S. littoralis* larvae with spinetoram and pyridalyl the moth's adult life span was significantly reduced than their control. Meanwhile, LC_{50}indoxacarb had no effect on moth life span emerging from treatment of 2nd instar, while the life span was increased in moths emerging from 4th instar *S. littoralis* larvae treated with LC_{50}indoxacarb. Treatment of 1st instar *P. gossypiella* larvae with either of the tested three compounds significantly increased moth life span.

III. Biochemical impacts:-

1. Electrophoresis patterns:-

SDP PAGE electrophoresis of total proteins and isozymes was carried out on 2nd and 4th instar *S. littoralis* larvae and 1st instar *P. gossypiella* larvae treated with their determined LC_{50} values of indoxacarb, pyridalyl and spinetoram as well as in their untreated control.

In both untreated and treated *S. littoralis* and *P. gossypiella* larvae with either of the three insecticides, several monomorphic protein bands were displayed. Meanwhile, one or more protein band were exhibited in untreated larvae which were not exhibited in treated larvae. Also, each of the three insecticides led to an expression of one or

more unique band in treated larvae that were different from one another according to the tested compound. The highest number of three unique protein bands was displayed in 4th instar larvae treated by LC_{50}pyridalyl. The display of unique bands in treated larvae could be considered specific in larvae as a response to treatment.

IV- Physiological effects:

i- Major components: Total carbohydrates, proteins and lipids content were significantly decreased in 4th instar *S. littoralis* larvae treated by either of the three compounds at their LC_{50} values. Meanwhile, treatment of 2nd instar *S. littoralis*larvae with indoxacarb led to an increase in total carbohydrates. Also, this compound caused an increase in carbohydrates and total protein in treated 1st instar *P. gossypiella* larvae.

ii- Digestive enzymes: Treatment with the tested insecticides caused an increase in amylase, trehalase, invertase, and protease activities and a decrease in lipase activity in the 2nd and 4th instar larvae of cotton leafworm. Meanwhile, the activity of all enzymes was markedly decreased in treated 1st instar larvae of pink bollworm.

iii- Acetyl choline esterase activity was reduced in 2nd and 4th instar *S. littoralis* larvae treated with the three insecticides. In 1st instar *P. gossypiella* larvae treated with pyridalyl, acetyl choline esterase activity was decreased, but was increased following treatment with spinetoram and indoxacarb.

iv- Non-specific esterases enzymes activities: α-esterase activity increased in 2nd and 4th instar *S. littoralis* larvae treated with the tested insecticides, however it decreased in treated 1stinstars *P. gossypiella* larvae. β-Esterase enzyme activity increased in cotton leafworm treated with pyridalyl and spinetoram but reduced following treatment with indoxacarb as well as in pink bollworm larvae treated with the three tested incecticides.

v- Phosphatases enzymes: Acid phosphatase activity was significantly less in 2nd and 4th instar *S. littoralis* larvae treated with the tested insecticides. Meanwhile this enzyme was higher in 1st instar *P. gossypiella* treated with indoxacarb than the control.

vi- Glutathione S-transferase: this enzyme activity increased in 2nd instar *S. littoralis* larvae treated by the three insecticides. Meanwhile, only indoxacarb caused a decrease 4th instar *S. littoralis* larvae. Similarly, in *P. gossypiella* treatment by either LC_{50} indoxacarb or spinetoram caused a decrease in this enzyme activity.

vii- Transaminases enzymes activities**:** ALT enzyme activity decreased in treated larvae of the cotton leafworm and pink bollworm except in 2nd instar cotton leafworm treated pyridalyl and spinetoram.

AST enzyme activity was decreased in 2nd and 4th instar larvae of cotton leaf worm except in 2nd instar treated with spinetoram. AST activity increased in the treated 1st instar larvae of pink bollworm with indoxacarb and pyridalyl and decreased following treatment with spinetoram.

V- **Histological studies:**

Effect of the three tested insecticide on the ultra structure of the cerebral median neurosecretory cells (NSC) in treated 2nd and 4th larvae of the cotton leafworm *S. littoralis* 24 h post treatment was studied. These cells are located in the pars inter- cerebralis area of the brain.

In the control, the NSC in both 2nd and 4th instar larvae as a group of closely packed relatively round cells with definite nuclei. The nuclei are filled with chromatin of different intensity and some appear with a prominent nucleoli sited close to the nuclear membrane. Granules fill the cytoplasm of these cells presumably depicting neurosecretory material.

The effect of the considered insecticides on the cerebral neurosecretory cells were relatively similar, 24 h post treatment, however it was more intensified on younger treated larvae. The NSCs were somewhat malformed with the appearance of gaps between adjacent cells, as well as vacuoles in their cytoplasm. In some cells, chromatin material in the nuclei was denser and centrally located. At higher magnification the many mitochondria was seen with broken cristae and with scattered endoplasmic reticulum.

Susceptibility Status of House Flies Field Strains *Musca domestica* L. in Riyadh City to the Traditional and New Bioinsecticides

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Start and End Dates: September 2010- September 2012

Defense Date: 29-05-2012

Abstract:

This study was conducted during 2010 - 2011 to determine the Susceptibility and resistance of house flies strains *Musca domestica* L. In some locations in Riyadh city to the traditional insecticides used by the Riyadh Municipality for flies control, and the effectiveness of the New bioinsecticides as an alternative to these insecticides.

Field collected strains of house flies, *Musca domestica* L. from five locations in Riyadh city represents five slaughterhouses where flies spread significantly and these slaughterhouses are (north slaughterhouse, Azizia slaughterhouse, Alsaadah district slaughterhouse, west of Riyadh slaughterhouse and Almowanisiyah slaughterhouse). Four traditional insecticides were tested on these five strains, Diazinon, Deltamtherin, Lambda-Cyhalothrin and Alpha-Cypermethrin. The LD_{50} for north slaughterhouse strain were 1.089, 0.295, 0.132 and 0.09 µg/female fly, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 7, 17, 10 and 11-fold respectively. The LD_{50} for Azizia slaughterhouse strain were 2.737, 0.191, 0.388 and 0.357 µg/female fly, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 17, 11, 30 and 45-fold respectively. The LD_{50} for Alsaadah district slaughterhouse strain were 11.516, 0.718, 0.707 and 1.103 µg/female fly, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 72, 41, 54 and 138-fold respectively. The LD_{50} for west of Riyadh slaughterhouse strain were 6.335, 0.236, 0.544 and 0.792 µg/female fly, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 40, 13, 42 and 99-fold respectively. Finally, The LD_{50}s for Almowanisiyah slaughterhouse strain were 1.583, 0.359, 0.185 and 0.465 µg/female fly, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 10, 21, 14 and 58-fold respectively.

Moreover two Insect Growth Regulators insecticides Pyriproxyfen and Triflumuron were tested on the house fly strains, The LC_{50} for north slaughterhouse strain were 1.191 and 2.622 ppm, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 4 and 15-fold respectively. The LC_{50} for Azizia slaughterhouse strain were 0.946 and 2.861 ppm, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 3 and 17-fold respectively. The LC_{50} for Alsaadah slaughterhouse strain were 0.849 and 6.517 ppm, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 2.5 and 38-fold respectively. The LC_{50}s for west of Riyadh slaughterhouse strain were 1.098 and 3.824 ppm, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 3 and 22-fold respectively. Finally, the LC_{50}s for Almowanisiyah slaughterhouse strain were 1.545 and 4.73 ppm, respectively, and the resistance factor (RF) to these insecticides compared to the laboratory strain was 5 and 28-fold respectively.

Annual Grasses in Cotton Field and Their Resistance to Trifluralin.

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Start and end date: 2009-2011
Defense date: 5/1/2012

Abstract:
Weed is a major problem that causes decrease in production of crops in quantity and quality especially in cotton crop, and often depend on chemical control by using Trifluralin herbicide to suspension its damage. The field experiments were conducted at the extension fields in Edlib, Syria in 2008 season and laboratory experiments at the Laboratory of weeds- Department of plant protection- Faculty of Agriculture- Damascus University in 2009. The investigation aimed to survey the weed species in cotton fields and detect the presence of weed resistance to Trifluralin in cotton fields in Syria. Fields experiments included detection of weed species that persist in the field after herbicide treatment. Weed seeds of those species were collected and grown later in vitro in Petry dishes, and in pots to confirm their resistance. Petry dishes were treated by Trifluralin at 3 different rates: field rate (1.5 L/He) and 1 and 2 L/Hectare while in Pots only field rate was used. Results showed the presence of many broad leaves weed species grown with cotton after herbicide treatment, like: *Chenopodium* sp., *Amaranthus* sp. and *Physalis* sp. and further experiments showed the tolerance of their seeds to higher rate of Trifluralin. The annual grasses were less common in cotton field and only two species were recorded: *Setaria* sp. and *Echinochloa* sp. and they were tolerated to the field rate of Trifluralin but not more.