

## Biotypes of *Bemisia tabaci* from Fars Province

Maryam Shahbazi<sup>1</sup>, Seyed Ali Akbar Behjatnia<sup>2\*</sup>, Mahmood Alich<sup>3</sup>, Vahid Roumi<sup>4</sup>  
and Keramatollah Izadpanah<sup>5</sup>

1, 2, 3, 5. Former M.Sc. Student, Associate Professor, Professor and Assistant Professor, Plant Virology  
Research Centre, College of Agriculture, University of Shiraz, Shiraz, Iran

4. Assistant Professor, Plant Protection Department, Faculty of Agriculture, Maragheh University,  
Maragheh, Iran

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### ABSTRACT

The sweet potato whitefly, *Bemisia tabaci* (Genn.) (Hemiptera: Aleyrodidae), is considered as a complex species. The aim of the present work was to study the variability, including the biotypes of this pest in Fars province of Iran. *B. tabaci* individuals were collected in cotton and pepper fields in Shiraz, Maharlu, Kaftarak, Fasa and Khir (Estahban) during 2009-2010 growing seasons. DNA was extracted from selected samples and subjected to RAPD-PCR test. The patterns obtained in RAPD-PCR revealed that most Iranian *B. tabaci* samples belong to the B biotype. Another biotype was identified as Cv. In addition, a different pattern was observed which had no similarity with known B, Cv. and Q biotypes. On the basis of DNA nucleotide sequence of the mitochondrial cytochrome oxidase I gene of the whiteflies, Iranian samples of *B. tabaci* had 94.2-100% identity with *B. tabaci* B biotypes and 84.9-93.2% identity with *B. tabaci* non-B biotypes in the GenBank. Phylogenetic analysis showed that the Fars province samples of *B. tabaci* were classified into two subgroups. Among 11 main groups and 24 subgroups of *B. tabaci* described recently, the Iranian samples of *B. tabaci* were placed in Africa/Middle East/Asia Minor main group and Middle East/Asia Minor 1 subgroup.

**Keywords:** biotype, *Bemisia tabaci*, mitochondrial cytochrome oxidase i (*mtCOI*), RAPD-PCR, phylogenetic analysis.

## Biology and Life Table Parameters of Jasmine Whitefly *Aleuroclava jasmini* on Five Different Species of Citrus

Ayda Ghodrati<sup>1\*</sup>, Parviz Shishe-bor<sup>2</sup> and Farhan Kachili<sup>3</sup>

1, 2, 3. M.Sc. Student, Professor and Associate Professor, Plant Protection Department,  
Faculty of Agriculture, Shahid Chamran University of Ahvaz, Ahvaz, Iran

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### ABSTRACT

Biology of Jasmine whitefly, *Aleuroclava jasmini* (Takahashi) was studied on tangerine, orange, grapefruit, lime and sour orange under laboratory conditions ( $27\pm 1^\circ\text{C}$ ,  $60\pm 5\%$  RH and 14:10 L: D). The mean female immature developmental times on tangerine, orange, grapefruit and lime was recorded as  $25.62\pm 0.31$ ,  $28.38\pm 0.34$ ,  $26.74\pm 0.11$  and  $21.76\pm 0.2$  days, respectively. *A. jasmini* survived as far as first nymphal instar on sour orange. Mean sex ratios (female %) was  $53.32\pm 2.8$ ,  $59.45\pm 2.04$ ,  $51.67\pm 1.15$  and  $52.41\pm 2.48\%$  on above mentioned hosts plants, respectively. Mean immature mortality was  $22.59\pm 1.08$ ,  $26.53\pm 0.73$ ,  $12.34\pm 0.43$  and  $25.25\pm 0.58\%$ , respectively, on the same host plants. The mean adult longevity was  $4.51\pm 0.1$ ,  $3.40\pm 0.12$ ,  $4.23\pm 0.06$  and  $3.64\pm 0.08$  days for females, respectively, on the same host plants. Mean total fecundity was  $30.67\pm 2.41$ ,  $25.53\pm 1.45$ ,  $31.40\pm 2.63$  and  $38.47\pm 2.09$  eggs, respectively, on the same named host plants. Intrinsic rates of increase ( $r_m$ ) were  $0.093\pm 0.002$ ,  $0.076\pm 0.002$ ,  $0.091\pm 0.001$  and  $0.101\pm 0.002$  number of female/female/ day on the above mentioned host plants. Based upon the biological characteristics and life table parameters, lemon was found as the most suitable host for growth and reproduction of *A. jasmini*.

**Keywords:** *Aleuroclava jasmini*, biology, intrinsic rate of increase, sex ratio, citrus.

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\* Corresponding Author E-mail: Ghodrati.aida@yahoo.com

Tel: +989163076778

## Study on Biological Characteristics and Seasonal Population Fluctuations of Elm Aphid, *Tinocalli nevskyi* (Hem., Aphididae) in Shahrekord

Nafiseh Poorjavad<sup>1</sup>, Jahangir Khajehali<sup>2\*</sup>, Bijan Hatami<sup>3</sup> and Abdol Rahman Motamedi<sup>4</sup>

1, 2, 3. Assistant Professors and Professor, Department of Plant Protection, College of Agriculture, Isfahan University of Technology, Isfahan, Iran

4. Assistant Professor, Department of Plant Protection, College of Agriculture, Shahrekord University, Shahrekord, Iran

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### ABSTRACT

Elm aphids damage elm trees through feeding and producing considerable amounts of honeydew especially on trees of recreational areas. Biological characteristics and seasonal fluctuations of the aphid were studied in two sites by weekly sampling from infested trees during 2002-2003. To determine important life table parameters of the aphid, *Tinocallis nevskyi* Remaudiere, Quednau and Heie, in natural conditions leaf cages were used. The results indicated that the aphid overwinter as egg on the branches of trees. First nymphs and alatae were observed in early and late April, respectively. The population of viviparae was increased rapidly in late April and May and went down in summer. Wingless oviparae and alate males appeared in mid fall. Oviposition occurred in early November to early December. Intrinsic rate of increase ( $r_m$ ), finite capacity for increase ( $\lambda$ ), net reproductive rate ( $R_0$ ) and mean generation time of the aphid were  $0.15 \pm 0.02 \text{ day}^{-1}$ ,  $1.17 \pm 0.04 \text{ day}^{-1}$ ,  $14.89 \pm 1.54$  nymphs and  $17.54 \pm 0.30$  days, respectively.

**Keywords:** fertility, life table, elm tree, intrinsic rate of increase, elm aphid.

## Generation of Transgenic Tobacco Plants with Immunity against a Broad Spectrum of *Potato virus Y* Strains

Hadi Khateri<sup>1\*</sup>, Gholam-Hosein Mosahebi-Mohammadi<sup>2</sup>, Stephan Winter<sup>3</sup>,  
Mina Koochi-Habibi<sup>4</sup> and Akbar Dizadji<sup>5</sup>

1, 2, 4, 5. Former Ph.D. Student, Professors and Assistant professor, Department of Plant Protection,  
University College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran

3. Department of Plant Virus, German Collection of Microorganisms and Cell Cultures (DSMZ),  
Braunschweig, Germany

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### ABSTRACT

*Potato virus Y* (PVY) is one of the most important plant viruses affecting tobacco fields in Golestan, Mazandaran and Guilan provinces (Iran). Given the lack of insecticide impact in reducing infection to PVY, breakdown of the natural resistance resources by certain strains and the problems with traditional breeding methods, the use of alternative methods to generate PVY resistant tobacco by pathogen-derived resistance could be considered as a method for reducing the damages. The objective of this study was to produce transgenic tobacco plants with resistance against a diverse spectrum of PVY isolates from different strains. A 472 bp fragment of the genome of an Iranian PVY isolate including the partial nucleotide sequences of CP and 3'UTR regions was used for constructing a hairpin structure for PVY resistance. This construct was used for *Agrobacterium*-mediated transformation of tobacco variety Wisconsin 38. Following transformation, 61% of the resulting transgenic plants in T<sub>0</sub> were resistant to PVY and the inheritance of resistance to the next generation of nine different lines was confirmed using DAS-ELISA which confirmed the immunity in all tested plants. One of these lines was tested against 12 different PVY isolates, including four Iranian and eight foreign ones, and the immunity against PVY was confirmed based on the lack of symptoms and the results of DAS-ELISA and RT-PCR tests. The results showed that the hairpin construct had a high-performance for generating transgenic tobacco plants with resistance against different PVY strains.

**Keywords:** hairpin construct, broad-spectrum resistance, *Agrobacterium*-mediated transformation.

## Seedling and Adult Plant Reaction of Some Promising Wheat Lines to Yellow Rust

Safar Ali Safavi<sup>1\*</sup> and Farzad Afshari<sup>2</sup>

1. Assistant Professor, Seed and Plant Improvement Department, Agricultural and Natural Resources Research Center of Ardebil, the Research, Education and Agricultural Extension, Ardebil, Iran
2. Professor, Seed and Plant Improvement Institute, the Research, Education and Agricultural Extension, Karaj, Iran

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### ABSTRACT

Yellow (stripe) rust caused by *Puccinia striiformis* f.sp. *tritici* is an important disease that threatens wheat production worldwide. Host resistance is the most economical strategy to manage wheat stripe rust. For this purpose, 18 promising wheat lines of moderate zone were evaluated against yellow rust in Ardebil in order to determine their resistance level. The seedling reaction was evaluated in greenhouse by using race 6E150A+, Yr27. Adult plant resistance was also evaluated by measuring of final rust severity (FRS) and coefficient of infection (CI) under field infection conditions with two times artificial inoculations. Artificial inoculation was carried out using yellow rust race population virulent resistance genes including *Yr2*, *Yr6*, *Yr7*, *Yr9*, *Yr22*, *Yr23*, *Yr24*, *Yr25*, *Yr26*, *Yr27*, *YrA*, and *YrSU*. Field evaluation was conducted based on randomized complete block design with three replications during 2011-2012 cropping season at Ardebil agricultural research station (Iran). Results showed that lines M-90-13, M-90-15, M-90-18 along with susceptible check (Bolani) had the highest values of FRS and CI. The lines M-90-2, M-90-4, M-90-5, M-90-7, M-90-8, M-90-13 and M-90-17 were susceptible at the seedling stage and had low level infection at the adult plant stage. Consequently, these lines had different levels of durable resistance based on the results of this investigation and their pedigree information. The remaining lines that had low level of infection at the seedling and adult plant stages were selected as moderately resistant or resistant lines.

**Keywords:** wheat, yellow rust, seedling resistance, adult plant resistance, durable resistance.

## Biochemical Characterization of $\alpha$ - Amylase in Melon Ladybird, *Epilachna chrysomelina* and Inhibitory Effects of Inhibitors Extracted from Plant Seeds on its Activity

Rouh-angiz Ghanbari-Nejad<sup>1</sup>, Mohammad Ghadamyari<sup>2\*</sup> and Reza Hassan Sajedi<sup>3</sup>

1, 2. Former M.Sc. Student and Associate Professor, Department of Plant Protection, Faculty of Agricultural Sciences, University of Guilan, Rasht, Iran

3. Associate Professor, Department of Biochemistry, Faculty of Sciences, University of Tarbiat Modares, Tehran, Iran

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### ABSTRACT

*Epilachna chrysomelina* is one of major pests of cucurbitaceous plants. Biochemical properties of  $\alpha$ - amylase were studied in melon ladybird. The optimal pH for  $\alpha$ - amylase was found at 4. Also, high amyolytic activity was found at temperature 50 °C. The specific activity of this enzyme in digestive system of different larval instar, foregut, midgut, hindgut and female and male adults were determined. Results showed that the highest specific  $\alpha$ - amylase activity was detected in the digestive system of 3rd instar larvae and the enzyme activity in males and females digestive system did not show any significant difference. The enzyme specific activity in midgut was 5- and 8.3-fold higher than foregut and hindgut. The Michaelis–Menten constant (Km) of  $\alpha$ -amylase was obtained as 0.69 mg/ml. Zymogram analysis of  $\alpha$ - amylase showed one isoform. Also, inhibitory effect of inhibitors extracted from seeds of *Lathyrus sativus*, *Trifolium alexandrium*, *Zea mays*, *Faba vulgaris*, *Lentis culinaris*, *Vigna unguiculata*, *Phaseolus vulgaris* and *Vigna radiate* were evaluated on *E. chrysomelina*  $\alpha$ - amylase activity. Among these inhibitors, the inhibitors extracted *P. vulgaris* and *V. radiate* were able to inhibit *E. chrysomelina* amylase.

**Keywords:**  $\alpha$ - amylase, melon ladybird, biochemical characterization, inhibitor.

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\* Corresponding Author E-mail: mghadamyari@gmail.com

Tel: +989111438400

## Abundance and Parasitism Rate of Larval and Pupal Parasitoids of Diamondback Moth, *Plutella xylostella* (Lepidoptera: Plutellidae) in Four Regions of Iran

Hamid-Reza Pourian<sup>1</sup>, Reza Talaei-Hassanlou<sup>2\*</sup>, Ahmad Ashouri<sup>3</sup>, Hossein Lotfalizadeh<sup>4</sup> and Jamasb Nozari<sup>5</sup>

1, 2, 3, 5. Former Ph.D. Student, Associate Professor, Professor and Assistant Professor, Department of Plant Protection, College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran

4. Associate Professor, Department of Plant Protection, East-Azərbayjan Research Centre for Agriculture and Natural Resources, Tabriz, Iran

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### ABSTRACT

Abundance and parasitism rate of larval and pupal parasitoids of Diamondback moth, *Plutella xylostella* L. (Lepidoptera: Plutellidae) were studied at four different climatic regions in Iran (Golestan, Alborz, Isfahan and Khozestan Provinces). Nine wasp species including six larval and one pupal parasitoid and two hyperparasitoid wasps were determined. The identified parasitoids were included the braconids *Cotesia vestalis* (Kurdjumov, 1912) (at four selected regions), *Apanteles* sp. (Alborz and Isfahan Provinces), *Bracon hebetor* Say (Alborz Province), *Microplitis* sp. (Khozestan Province), ichneumoid *Diadegma semiclausum* (Hellen) (Alborz, Isfahan and Khozestan Provinces), the eulophid *Oomyzus sokolowskii* (Kurdjumov) (Alborz and Isfahan Provinces) as larval parasitoids and the ichneumonid *Diadromus subtilicornis* (Gravenhorst) as pupal parasitoid (Isfahan and Khozestan Provinces). In addition, the petromalid *Mokrzeckia* sp. (Khozestan Province) and *Pteromalus* sp. (Alborz and Isfahan Provinces) were identified as hyperparasitoids that parasitize *C. vestalis* and *D. semiclausum*, respectively. In three regions (Alborz, Isfahan and Khozestan Provinces), *D. semiclausum* was the most predominant species with high parasitism rate. Our findings demonstrated that the *D. semiclausum*, is good candidate and could be considered for release in *P. xylostella* biological control programs.

**Keywords:** *Plutella xylostella*, larval and pupal stages, parasitoid, region, abundance, Iran.

## Tolerance and Antibiosis of Four Tomato Varieties to Fruit Worm *Helicoverpa armigera* in Greenhouse

Mehrnaz Tankhahi<sup>1</sup>, Shahzad Iranipour<sup>2\*</sup>, Esmail Alizadeh<sup>3</sup>, Manije Jamshidi<sup>4</sup>  
and Nahid Vaez<sup>5</sup>

1. Former M.Sc. Student, Department of Plant Protection, Faculty of Agriculture Islamic Azad University of Tabriz, Tabriz, Iran
2. Associate Professor, Department of Plant Protection, Faculty of Agriculture, University of Tabriz, Tabriz, Iran
3. Assistant Professor, Azerbaijan-e-Gharbi Research Center of Agriculture and Natural Resources, Urmia, Iran
4. Assistant Professor, Department of Plant Protection, Faculty of Agriculture Islamic Azad University of Tabriz, Tabriz, Iran
5. Assistant Professor, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Iran

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### ABSTRACT

Tomato fruit worm is one of the most important pests of tomato in Iran which attacks a wide variety of crops and weeds. Differences between species or varieties can use in management of this pest. In this study, antibiosis and tolerance of four varieties "Super Beta", "Super Luna", "Super Chief" and "KJN3" were studied against the pest. An experiment was conducted with a couple of plants of each variety allocated as random to "control" and "pest released treatment". In recent treatment, 10 third instar larvae were released in fruiting stage. Total number of fruits and injured fruits, mean weight of a fruit and bunch yield were measured as tolerance criteria, while number of live pupae, development time of larvae and weight of pupae were measured as antibiosis indices. A relative tolerance was observed in Super Chief, but due to low yield in damage absence, it is not recommendable. Fruit weight as well as yield was impacted by infection. Super Luna and Super Beta loosed more weight and acknowledged as relatively susceptible varieties. Yet, they displayed most yields in presence of the pest. Consequently, there was no considerable difference among the varieties in terms of resistance against the pest.

**Keywords:** plant resistance, interaction, pest management.

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\* Corresponding Author E-mail: shiranipour@tabrizu.ac.ir

Tel: +989143150345



## Nutritional Indices of the Cotton Bollworm *Helicoverpa armigera* on Four Chickpea and One Cowpea Cultivars

Neda Fallahnejad-Mojarrad<sup>1</sup>, Yaghub Fathipour<sup>2\*</sup>, Karim Kamali<sup>3</sup> and Amin Sedaratian-jahromi<sup>4</sup>

1. Former M.Sc. Student, Department of Entomology, Faculty of Agriculture, Islamic Azad University of Science and Research, Tehran, Iran

2, 3. Professors, Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran

4. Assistant Professor, Department of Plant Protection, Faculty of Agriculture, Yasouj University, Yasouj, Iran

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### ABSTRACT

The cotton bollworm, *Helicoverpa armigera* (Hübner) is one of the most important polyphagous insect pests attacking different crops in many parts of the world. In the present study, nutritional indices of *H. armigera* larvae (third to sixth instars) were determined on artificial diets based on the seeds of four chickpea cultivars (Arman, Azad, Binivich and Hashem) and one cowpea cultivar (Mashhad). The experiments were performed at  $25\pm 1^{\circ}\text{C}$ ,  $65\pm 5\%$  RH and a photoperiod of 16:8 (L: D) h. The results showed that the nutritional indices of *H. armigera* were significantly influenced by different host plants tested. Accordingly, the highest and lowest values of efficiency of conversion of ingested food (ECI) for total larval stages were on Arman (0.427) and Azad (0.027), respectively. Additionally, the highest value of efficiency of digested food (ECD) was on Binivich (0.567) and the lowest value of this index on Azad (0.030). The highest and lowest value of consumption index (CI) was on Hashem (3.902 mg/mg/d) and Arman (1.977 mg/mg/d), respectively. Also, the results showed that the highest value of approximate digestibility (AD) for total larval stages was on Hashem (0.933). The relative growth rate (RGR) and relative consumption rate (RCR) were maximum on Hashem and Mashhad (0.599 and 2.051 mg/mg/d, respectively). The results obtained in the present study could be helpful in integrated management of *H. armigera*.

**Keywords:** *Helicoverpa armigera*, different cultivars, nutritional indices, host plant resistance.

## Induced Resistance by $\beta$ -Amino Butyric Acid (BABA) against Fusarium Stem and Root Rot of Cucumber

Hamidreza Alizadeh<sup>1\*</sup> and Khadijeh Salari<sup>2</sup>

1, 2. Assistant Professor and Instructor, Department of Plant Protection, College of Agriculture, University of Jiroft, Jiroft, Iran

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### ABSTRACT

One of the new methods in plant disease management is induced resistance.  $\beta$ -amino butyric acid (BABA) is a compounds that able to induce resistance in plants. In this study, induction of resistance by this compound against *Fusarium oxysporum* f. sp. *radices-cucumerinum* F42 on cucumber plants was studied. This compound significantly reduced severity of the disease through induced resistance. Quantitative analysis of the expression of *LOX1* and *PRI* genes using QPCR was showed that *PRI* gene was up regulated after challenging with pathogen in pretreated plants with BABA. This finding suggests the pathway implicated in the induction of resistance is dependent on salicylic acid. Evaluation of the expression of *chitinase* and *beta-1, 3 - glucanase* showed that BABA potentiated the expression of these genes upon challenging with pathogen.

**Keywords:** *Chitinase*, *Glucanase*, priming, salicylic acid, systemic resistance.

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\* Corresponding Author E-mail: hamidalizadeh@ujiroft.ac.ir

Tel: +989125665972

## The Effects of Ecdysteroidal Extracts of *Matteuccia struthiopteris* on Demographic Parameters of *Plutella xylostella*

Fatemeh Tabebordbar<sup>1</sup> and Saeid Moharramipour<sup>2\*</sup>

1, 2. Former M.Sc. Student and Associate Professor, Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran

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### ABSTRACT

Plant extracts, like phytoecdysteroids, are currently studied because of the possibility of their use in plant protection. There are several reports concerning the presence of ecdysteroid. But there is no report on possibility of ecdysteroidal compounds in *Matteuccia struthiopteris* (L.) (Onocleaceae). In this research, the effect of lethal and sublethal concentration of methanolic extract of *M. struthiopteris* was examined on *Plutella xylostella* (L.). Ecdysteroidal extracts of leaves from this plant were incorporated into food given to third instar larvae for two days. Then the larvae were reared on untreated leaves. Experiment was carried out at  $27\pm 1^\circ\text{C}$ ,  $65\pm 5\%$  RH and 16:8 (L:D) h. Compared to control, methanolic extracts fed at larval stage led to significant decrease in the percentage of pupation and adult emergence. The eggs from the emerging adults were picked up for demographic experiments. The rearing of the newly hatched larvae was continued individually on untreated leaves. Data analysis demonstrated that significant decrease in net reproductive rate ( $R_0$ ), intrinsic rate of increase ( $r_m$ ) and finite rate of increase ( $\lambda$ ). The highest values for  $r_m$  and  $\lambda$  were  $0.19\pm 0.002 \text{ day}^{-1}$  and  $1.21\pm 0.06$  days, at 0.69%, respectively. The present study demonstrated that mean generation time ( $T$ ) and doubling time ( $DT$ ) was increased significantly as concentration of the extract increased. These findings indicated that *M. struthiopteris* are effective for the control of *P. xylostella*. Therefore, this extract has potential to use as a reliable method in integrated management of this pest.

**Keywords:** phytoecdysteroids, matteuccia struthiopteris, plutella xylostella, demographic

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\* Corresponding Author E-mail: moharami@modares.ac.ir

Tel: +989122035653

## Imidaclopride Residue Levels in Greenhouse-Grown Strawberry under Cold-Storage Conditions

Farzane Norouzi<sup>1</sup>, Aurang Kavousi<sup>2\*</sup>, Khalil Talebi Jahromi<sup>3</sup>, Shohreh Mohebbi<sup>4</sup> and Morteza Movahhedi Fazel<sup>5</sup>

1, 2, 5. Former MSc. Student and Assistant Professors, Department of Plant Protection, Faculty of Agriculture, University of Zanjan, Zanjan, Iran

3. Professor, Department of Plant Protection, College of Agricultural and Natural Resources, University of Tehran, Karaj, Iran

4. Assistant Professor, Department of Medicinal Chemistry, Zanjan University of Medical Science, Zanjan, Iran

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### ABSTRACT

Imidacloprid is an insecticide commonly to control the sucking pests in greenhouses. Therefore the knowledge about its residue is necessary. In this research the effect of storage time on dissipation rate of imidacloprid residues in strawberry was studied. Imidacloprid (SC 35) was applied to strawberry plants at the rate of 1 ml/l. The sample preparing was performed using the QuEChERS method including the extraction with acetonitrile and purification by dispersive solid phase extraction clean-up. Analysis of the residues was performed using HPLC method equipped with a UV detector. The instrumental detection limit (IDL) was 0.12  $\mu\text{gml}^{-1}$ . The average recovery was 94.80%. The data were fitted to the first-order and bi-exponential kinetic models. According to the results first-order kinetic model was the best model to describe the dissipation rate of imidacloprid residues in strawberry. Half-life for degradation of imidacloprid in strawberry at 4-5 °C was observed to be 10.48 days using the first-order kinetics model. The residue at the application day of the insecticide was 5.31 mg/kg, 10.62 fold higher than the maximum residue limit (MRL) for imidacloprid in strawberries (0.5 mg/kg) given by the Codex Alimentarius food. After 20 days, the residue (3.36 mg/kg) still was higher than the MRL. Accordingly, although refrigerated storage increases the durability of the fruit but it reduces the dissipation rate as well.

**Keywords:** high-performance liquid chromatography (HPLC), QuEChERS, Kinetic models.

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\* Corresponding Author E-mail: akavousi@znu.ac.ir

Tel: +989143235690

## Demographic Parameters of Dried Fruit Mite *Carpoglyphus lactis* (Acari: Carpoglyphidae) on Bakrer's Yeast in Two Different Temperatures

Hamid Reza Sarraf Moayeri<sup>1\*</sup>, Hosein Pourasgari<sup>2</sup> and Aurang Kavousi<sup>3</sup>

1, 2, 3. Assistant Professor, Former M.Sc. Student and Assistant Professor, Department of Plant Protection, Faculty of Agriculture, University of Zanjan, Zanjan, Iran

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### ABSTRACT

Dried fruit mite, *Carpoglyphus lactis* (L) in addition to be considered as one of the serious and economic pests of some stored products also is used as an alternative prey for commercially mass rearing of predatory mites. In this study, life table parameters of dried fruit mite were examined on bakrer's yeast under laboratory conditions at 20 and 25°C, 70±5 relative humidity and full darkness, based on age-stage, two-sex life table theory. The intrinsic rate of increase ( $r$ ), finite rate of population increase ( $\lambda$ ) and the mean generation time ( $T$ ) at 20°C were 0.287 day<sup>-1</sup>, 1.333 day<sup>-1</sup> and 16.7 days, respectively and at 25°C were 0.383 day<sup>-1</sup>, 1.467 day<sup>-1</sup> and 11.87 days. A significant difference was observed between mentioned parameters in two temperatures ( $P < 0.01$ ). Likewise there was a significant difference between the value of gross reproductive rate ( $GRR$ ) ( $P < 0.05$ ), but no significant difference was observed between net reproductive rate ( $R_0$ ) in two temperatures ( $P > 0.05$ ). The obtained information in this study will be useful for the optimization of *C. lactis* mass rearing conditions.

**Keywords:** two-sex life table, intrinsic rate of increase, fecundity, developmental time, *Carpoglyphus lactis*.

## Identification of Partial Fauna of the Family Isotomidae (Hexapoda: Collembola) in Mazandaran Province

Elham Yoosefi Lafooraki<sup>1\*</sup> and Masoumeh Shayanmehr<sup>2</sup>

1. M.Sc. Student, Department of Plant Protection, Faculty of Plant Protection, Sari University of Agricultural Sciences and Natural Resources, Sari, Iran
2. Assistant Professor, Department of Plant Protection, Faculty of Crop Sciences, Sari University of Agricultural Sciences and Natural Resources, Sari, Iran  
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### ABSTRACT

Members of family Isotomidae are slender, without setae and scale on body. They occur in various habitats. Due to study of their fauna in Mazandaran province, several samplings were carried out in 2012-2013. The animals were extracted by Berlese funnel and microscopic slides were made and the samples identified. A total of nine genera and 13 species belonging to family Isotomidae were identified. The genus *Pseudisotoma* and the species *P. sensibilis*, *Isotomurus afghanicus* and *Folsomia ksenemani* are recorded for the first time from Iran and the genus *Anurophorus* and the species *Proisotoma subminuta* are new for Mazandaran fauna of Collembola.

**Keywords:** species diversity, *pseudisotoma sensibilis*, *isotomurus afghanicus*, *Folsomia ksenemani*.

## The Effect of Adult Sunn Pest (*Eurygaster integriceps* Put.; Het.: Scutelleridae), Feeding on Wheat Nutrient Uptake in Hydroponic Conditions

Ehsan Ghaemmaghani<sup>1\*</sup>, Morteza Movahedi Fazel<sup>2</sup> and Alireza Vaezi<sup>3</sup>

1, 2. Former M.Sc. Student and Assistant Professor, Department of Plant Protection, College of Agriculture Zanjan University, Zanjan, Iran

3. Assistant Professor, Department of Soil Science, College of Agriculture, Zanjan University, Zanjan, Iran

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### ABSTRACT

In this research, the effects of Sunn pest feeding in different densities were studied on root uptake of NPK in Falat wheat variety. For this purpose, densities of 0 (as control), 1, 2 and 3 adult per plant released on wheat at both tillering and stem elongation stages. Plants were grown in hydroponic culture and then were fed by overwintering adults for 10 days. The results indicated that the uptake of nitrogen is affected with wheat phenological stages ( $p < 0.001$ ), interaction effects of adults sex and densities ( $p < 0.001$ ), interaction effects of wheat phenological stages and adults sex ( $p < 0.05$ ). More decreasing in N uptake observed in stem elongation with 2 males. Phosphor uptake was significantly affected by interaction effects of wheat phenological stages, adults sex and densities ( $p < 0.05$ ). More decreasing in P uptake observed in stem elongation with 2 females. K uptake was not affected with no interaction effects. In attention to wide variations of N uptake, its appear that nitrogen to be better index to evaluate the indirect effects of *E. integriceps* feeding on wheat nutrient uptake, at least in short period.

**Keywords:** nutriente, sunn pest, wheat, *Eurygaster integriceps*.

## Effect of Plant Extracts of *Fumaria parviflora*, *Teucrium polium* and Insecticide Pymetrozine on Mortality and Activity of Esterase Enzyme of *Bemisia tabaci* on Resistant and Susceptible Variety of Tomato

Masoomeh Samareh Fekri<sup>1</sup>, Mohammad Amin Samih<sup>2\*</sup>, Bidolah Shahouzhah<sup>3</sup>,  
Sohrab Imani<sup>4</sup> and Mehdi Zarabi<sup>5</sup>

1. Assistant Professor, Department of Plant Protection, Islamic Azad University of Jiroft, Jiroft, Iran

2. Associate Professor, Department of Plant Protection, Faculty of Agriculture, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran

3. M.Sc. Student, Department of Clinical Biochemistry, Physiology Research Center, Kerman University of Medical Sciences, Kerman, Iran

4. Assistant Professor, Department of Entomology Branch Islamic Azad University of Science and Research, Tehran, Iran

5. Assistant Professor, Department of Sciences and Environmental Technologies, Faculty of New Sciences and Technologies, University of Tehran, Tehran, Iran

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### ABSTRACT

In this research, the effect methanolic extracts of *Fumaria parviflora*, *Teucrium polium* and pesticide pymetrozine was assessed on the lethality and general esterase activity of adult *Bemisia Tabaci* (Genn.) at  $27\pm 2^{\circ}\text{C}$ ,  $50\pm 5\%$  RH and 16:8 (L:D) photoperiod. In bioassay experiments tomato plants of resistant (cal-j-n<sub>3</sub>) and susceptible (Ergon) cultivars with 2-4 leaves were immersed in different concentrations of plant extracts, and mortality was calculated 72 h after treatment. This study was conducted by using a randomized complete design with three replications. For each treatment, distilled water and methanol were used as control. To evaluate effects of treatments on esterase activity, seedling with 2-4 leaves are being thread with extracts and insecticides (LC<sub>25</sub>). The results showed that, the LC<sub>50</sub> of the extract of *F. parviflora*, *T. polium* and pesticides pymetrozine for adults reared on susceptible and resistant cultivars, were, 17.26, 93.88, 0.026 and 13.26, 68.36, 0.019(g/lit), respectively. Sublethal effect of extracts and pesticides was significant on esterase enzyme activity compared to control. The amount of esterase enzymes, for control and adults treated with the extract of *F. parviflora*, *T. polium*, pesticides pymetrozine on susceptible cultivar, were 0.0161, 0.0086, 0.009 ,0.0038, respectively and for resistant cultivar were 0.027, 0.0068, 0.0097, 0.0043 ( $\mu\text{g}$  alpha naphtyl acetat per minute/mg protein) respectively. Thus the rate of toxicity of *F. parviflora*, *T. polium* extracts, and pesticide pymetrozine was more insects that reared on resistant variety in comparison of adults that reared on susceptible variety. Also, pesticide pymetrozine showed the most toxicity rate. The toxicity rate of *F. parviflora* was recorded more than *T. polium*. Esterase enzyme activity was more in treated insects on resistant varieties compared to susceptible varieties. According to the results usage of resistant varieties with plant extract or pesticide can be a good strategy against whitefly in IPM programs.

**Keywords:** bioassay, lethal and sublethal effects, LC<sub>50</sub>, plant resistant.



## Isolation and Identification of Dominant Arbuscular Mycorrhizal Fungi in Some Trees in Region of Kiasar

Amir Modarresi Chahardehi<sup>1\*</sup>, Leyla Mousavi<sup>2</sup>, Taha Bakhtkhah Ardeh Jani<sup>3</sup>,  
Yoones Rezaee Danesh<sup>4</sup> and Darah Ibrahim<sup>5</sup>

1, 5. Former Ph.D. Student, Industrial Biotechnology Research Laboratory, School of Biological Sciences, University Sains Malaysia, Malaysia

2. Ph.D. Student, School of Industrial Technology, University Sains Malaysia, Malaysia.

3. Former MSc. Student, Department of Plant Pathology, Faculty of Agriculture, Islamic Azad University, Damghan, Damghan, Iran

4. Former Ph.D. Student, Department of Plant Pathology, Faculty of Agriculture, Urmia University, Urmia, Iran

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### ABSTRACT

The symbiotic arbuscular mycorrhizal vesicular fungi caused growth improvement of plants and increased uptake some minerals by plants, and also improve the water relations of plants and protect them against diseases. In this study, Kiasar forest area selected due to abundant variety of plant species which located in northern part of Damghan city in Semnan province. About 56 sample collections were done in spring 1390. Almost 14 species of trees in this area were examined for the percentage of relative frequency, density accumulation, accumulation of abundance, species richness and evenness indices were calculated. The highest average of spore population with a mean 1382.35 spores per 300 g soil sample was achieved followed by other soil samples from European black alder, wild myrobalan plum and orientalis beech. The highest rates of prevalence mycorrhizal (%F) and the average of accumulation mycorrhizal density (%M) was belongs to wild myrobalan plum with %66.35 and %46.79, respectively, while the lowest was elm tree with %69.37 and %63.58, respectively. Also, 8 species in species richness value were found in some trees like chestnut, white popular, Caucasian wingnut and melder, while in other soil samples of trees such as ash and wild myrobalan plum were only four species. Of the 14 trees, 10 species of arbuscular mycorrhizal fungi were identified which 8 out of them were *Glomus* species. The highest relative abundance of species were belongs to *G. aggregatum* (%29.30) and *Gigaspora albida* (%9.34), respectively.

**Keywords:** arbuscular mycorrhizal fungi (AMF), Kiasar, *Glomus*.