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Determination of Biological and Molecular Characteristics of Urmian *Isolate* of *Watermelon mosaic Virus*

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Abstract

Watermelon mosaic virus is the most prevalent potyvirus infecting cucurbits in Iran. In order to determine the distribution and frequency of the virus, 326 watermelon, melon, cucumber, winter and summer squash samples were collected from 22 villages around Urmia during summer 2010 and tested by DAS-ELISA with a polyclonal antibody. Ninety four samples were detected as infected by ELISA. To determine host range of the virus, different plants from 4 familieas were tested. *Cucurbita pepo*, *Cucumis melo* L. Cv. Flexus, *C.sativus* L.cv. Peto Seed and *Nicotiana tobaccum* cv. Burley were detected as the virus hosts. One strain of squash that was positive in ELISA was used for IC-RT-PCR. A 958 bp product was amplified by IC-RT-PCR using specific primers and was sent for sequencing directly. Phylogenetic trees were constructed by Maximum likelihood, Maximum parsimony and Neighbour joining. Urmian isolate of WMV was not classified in any of the 6 groups which were shown by previous researches.

Keywords: *Watermelon mosaic virus*, Phylogenetic analysis, DAS-ELISA, Urmia

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Detection of Barley yellow mosaic virus by Serological and Molecular Methods in some Provinces of Iran

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Abstract

In order to investigate the presence of *Barley mild mosaic virus*, 425 samples of barley and wheat from Razavi Khorasan, Northern Khorasan, Golestan, Yazd and Western Azarbayjan were collected in spring 2011. Plolyclonal antiserum was used in order to detect BaYMV by DAS-ELISA. The highest level of BaYMV infection was found in Azarbayjan gharbi and detect inRazavi Khorasan, Northern Khorasan and Golestan. Polymerase Chain Reaction (PCR) was carried out using specific primers for coat protein. A fragment of ~392 bp corresponding to BaMMV coat protein gene were amplified by PCR. Then one PCR product of Western Azarbayjan samples was sequenced and analyzed for additional confirmation. This is the first report of occurrence of BaMMV in aforementioned provinces of Iran.

Keywords: PCR, *Barley mild mosaic virus*, Iran, Coat protein

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Phylogenetic Comparison of The Iranian Isolate of *Carnation Etched Ring Virus* (CERV) with Other The CERV Isolates Around The World Based on Coat Protein and Movement Protein Genes Sequences

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Abstract

Carnation etched ring virus (CERV) is a member of the *caulimovirus* genus of the *caulimoviridae*. The virus is the second most important virus of Carnation around the world and the only DNA virus among infecting viruses of carnation. The virus infected plants were collected from greenhouse in Chenaran and two fragments of ~1500 bp and ~1000 bp respectively for coat protein and movement protein were amplified by PCR using specific primers for coat protein and movement protein genes of CERV. The iranian isolate was compared with two isolates of CERV (India and Holand) and some of caulimoviruses. After multiple sequence alignment the phylogenetic tree of coat protein (CP) and movement protein (MP) sequences of the CERV isolates were drawn by MEGA5 and DNAMAN softwares using Neighbor joining method. The results showed that the CP of the iranian isolate (Acc. No. JF957838) has 98.9 and 99.3 percent identity with Dutch isolate (Acc. No. XO4658) in nucleotide (nt) and amino acid (aa) sequences respectively.While the CP of the iranian isolate has 98.3 and 98.6 percent identity in nt and aa sequences respectively. Also the MP of the iranian isolate (Acc. No. JF957839) has 97.7 and 99.6 percent identity with Dutch isolate (Acc. No. XO4658) in nt and aa sequences respectively. The MP gene of the iranian isolate has 96.1 and 98.9 percent identity with Indian isolate (Acc. No. AJ853858) in nt and aa sequences respectively. This is the first molecular study of CERV in Iran.

Keywords: Carnation etched ring virus, Phylogenetic analysis, Dianthus caryophyllus

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Enzymatic Activities and Secondary Metabolite Contents in Roots of Melon Genotypes Infected with *Fusariumoxysporum* f. sp. *melonis*Race 1

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Abstract

Melon (*Cucumismelo*) production is significantly affected by Fusarium wilt worldwide. The pathogen, *Fusariumoxysporum* f. sp. *melonis* race 1 (*Fom*1) causes serious economic losses in Iran. To find resistance sources of melon, 45 local genotypes and breeding lines, collected from different parts of Iran, were screened against race 1 of *Fom*. Seedlings were inoculated with a suspension of 1×10^6 conidia/ml at first true leaf stage. The severity of the disease was assessed on leaves using a rating scale from 0 to 4. Analysis of variance demonstrated highly significant differences between the genotypes. Five susceptible and five resistant genotypes were inoculated with the causal agent and root samples were taken for 8 days. The activity of polyphenoloxidase (PPO)enzyme, phenolic compounds (PCs) and cucurbitacins content of the samples were analyzed to identifypossible relations between resistance and enzymatic activities. PPO activity and PCs content inresistantgenotypes significantincreased in response to infection by the pathogen, but there were not significant differences in susceptible genotypes. Analysis of variance showed that there was a direct relation between cucurbitacins D with resistance to the disease, while there was no clear relation between the content of cucurbitacins E with disease resistance.

Keywords: Fusarium wilt, Resistance mechanism, Cucurbitacin, Polyphenoloxidase, Phenolic compounds

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Investigation on the Tolerance Level of Wild Barley (*Hordeum spontaneum*) Populations to Clodinafop Propargyl under Greenhouse Condition

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Abstract

In order to study the tolerance level of different wild barley (*Hordeum spontaneum*) populations to Clodinafop propargyl (Topic®), a pot dose response experiment was conducted in a completely randomized design with three replications at Ferdowsi University of Mashhad Greenhouse in 2009. Cultivared barley (*Hordeum vulgare*) and three wild barley populations (Shiraz, Boshroyeh, and Torogh) were studied in this experiment. Also, wild oat (*Avena ludoviciana*) was included as a susceptible species. Clodinafop propargyl was applied postemergence at 2-3 leaf stage of plant species at different rates. Dry weight of each plant was determined three weeks after herbicide application, and then ED_{50}, ED_{25}, and level of tolerance index were determined for each wild barley population. Results showed that all wild barley populations were highly tolerant to herbicide even at higher doses, while wild oat was completely controlled at lower than recommended dose. ED50, and ED25 doses for wild oat was 16.3 and 5.6 g a.i ha^{-1}, respectively, while no ED50 doses could be estimated for barley species. Based on ED25 doses, common barley showed highest tolerance to the herbicide. Tolerance level of wild barley population calculated based on ED25 of each wild barley relative to wild oat, was 29.2, 29.3, and 43.7 for Shiraz, Boshroyeh, and Torogh, respectively. It seems that all wild barley populations are highly tolerant to this herbicide, and Clodinafop propargyl can not be a solution for wild barley in wheat, while it has high efficacy on wild oat.

Keywords: Cultivated barley, Dose response, Herbicide tolerance, Wild barley

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The Influence of Spray Tank Turbidity on Chemical Management Efficacy of Barnyardgrass [*Echinochloa crus-galli* (L.) P. Beauv.], and Velvetleaf (*Abutilon theophrasti* Medicus.) at Greenhouse Conditions

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Abstract

The influence of spray tank turbidity on glyphosate (Roundup®, 41% SL) and nicosulfuron (Cruse®, 4% SC) performance on barnyard-grass and velvetleaf was examined in a greenhouse study as a factorial arrangement of treatments 2×6 based on a completely randomized design with six replications (+six control pots) for each weed species at Ferdowsi University of Mashhad, Iran during 2008-9. Factors were included turbidity at six levels (0, 100, 200, 300, 400, 500, and 600 ppm sieved soil particles containing 31.7% clay into deionized water (w/v)), and two herbicides (glyphosate and nicosulfuron). In a preliminary test, a dose-response experiment was carried out to estimate the ED_{50} doses of the herbicides at greenhouse. The glyphosate and nicosulfuron solutions were applied as post emergence at 3 to 4 leaf stage of the weeds at the estimated ED_{50} doses in the preliminary experiment (158 and 22 g ai ha^{-1}, respectively) based on spray volume of 250 L ha^{-1}. The results showed that adding soil particles (turbidity) into spray tank was reduced herbicides performance significantly ($P \leq 0.01$), whereas, survival, plant height, leaf area, and shoot dry weight of weeds (% control) were increased. The antagonistic effect of turbidity was higher with glyphosate than with nicosulfuron for barnyard-grass, but for velvetleaf the results was reversed. In conclusion, the results have highlighted the importance of spray tank turbidity on herbicide performance.

Keywords: ED_{50} index, Herbicide efficacy, Soil particles, Water turbidity

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Allelopathic Effects of Aqueous Extracts of Two Crops (Wheat and Barley) and Wild Mustard (*Sinapis arvensis*)

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Abstract

In order to study the interaction allelopathic effects of wheat, barley and wild mustard on seed germination and seedling growth, this investigation was conducted in 2009 in two separate experiments. Allelopathic effect of four aqueous extracts (0, 2.5, 5 and 10%) of wild mustard on wheat and barley germination was evaluated in the first experiment, based on two randomized completely designs (RCD) with three replications. In the second experiment, the effects of barley and wheat aqueous extracts (0, 2.5, 5 and 10%) on germination and seedling growth of wild mustard were investigated in two separate experiments. Results indicated that the extract concentrations of wild mustard reduced germination rate and seedling growth of wheat and barley, significantly. In the second experiment, effects of extract concentrations on seed germination and seedling growth of wild mustard was significant in 1% probability level. Seed germination reduction of wild mustard under 2.5 and 5% extract concentrations compared to control, was 64 and 91% in wheat and 80 and 96.6% in barley, respectively. The germinations of wild mustard were terminated by 10w/v of all crop extracts. Generally, results showed that the allelopathic effects of wild mustard on wheat were higher than barley. Also, barley had higher allelopathic impact on wild mustard compared with wheat.

Keywords: Germination rate, Radicle length, Aqueous extract concentrations

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Seed Viability of Spotted Spurge (*Euphorbia maculata*) in Various Environmental Conditions

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Abstract

To investigate the spreading possibility of spotted spurge (*Euphorbia maculata*) as a new-introduced and troublesome weed species of soybean field in Golestan province, viability of this weed seed in soil, water and elevated temperature conditions were examined. Experiments were conducted as completely randomized design with eight replications. Treatment levels of seed viability in soil and water included 1-11 months of seed burial at 10-15 cm depth, and 1-9 weeks of seed soaked in water, respectively. Evaluation of high temperature effect were carried out as three-factor factorial experiment that consisted of 5 temperature levels (ambient temperature (25 ˚C as control), 80, 100, 120 and 140 ˚C), two exposure times (1 and 5 min), and seed moisture status in two levels (dry and wet). The results indicated that buried seed in soil after 11 months showed germination above 95%. Seeds were not able to germinate under submergence. Removed seed of water after 2 weeks germinated above 90%, but it reduced with increasing immersion time, as after 9 weeks lost their viability. Elevated temperature had significant effect on germination. Germination was significantly reduced by increasing temperature, as the maximum and minimum of germination was observed at control and 140 ˚C, respectively. Elevated temperature, exposure times and seed moisture content had interaction effect. Germination of wet seeds completely inhibited at 140 ˚C for 5 min. Based on these results, spotted spurge seeds had high persistence in the soil. Seed viability in water for a few weeks will provide the chance of dispersal by water irrigation.

Keywords: Flooding, Germination, High temperature, Seed bank, Seed viability

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Efficacy of Two Methods ''Seed Coating'' and ''Soil Application'' of *Trichoderma* on Growth Parameters of Tomato Plant

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Abstract

Trichoderma spp. are free living fungi which mostly are considered as biocontrol agents of plant pathogenic fungi. Some isolates of this fungus also have an effect on plants growth promotion and regulation. The this research, evaluated the effect of ten *Trichoderma* isolates including *Trichoderma harzianum* (T.BI, T.7, T.16, T.16A, T.20), *T.virens* (T.6, T.21, T.65), *T.koningi* T.77 and *Trichoderma* sp. T.14N were tested on tomato growth parameters by two methods of seed coating and soil application. These experiments carried out in a factorial arrangement based on completely randomized design with five replications. The treatments were included two factors: "isolates" in 11 levels and "inoculation method" in 2 levels. Inoculants of *Trichoderma* isolates were averagely applied at a ratio of 10^7 propagle per gram of soil and 5×10^6 spore on seed surface for soil application and seed coating methods, respectively. Two months after the sowing the seeds, the dry weight of shoots and roots were measured. The results showed the significant difference between the effect of *Trichoderma* isolates and inoculation method as well as their interactions ($P\leq0.05$). Based on the results of this study, The T20 isolate increased 58.68% and 61.93% in roots and shoots dry weight compared to control in soil application method, respectively. Soil application method has showed better performance of *Trichoderma* isolates on plant growth compared to seed coating method. Results of this study implied that *Trichoderma* isolate type and inoculation method have significant effect on tomato growth parameters.

Keywords: *Trichoderma*, Tomato, Seed coating, Soil application, Growth parameters

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Investigating the Efficacy of Some New Herbicides on Corn Weeds in Jiroft Region

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Abstract

In order to evaluate the efficacy of some new herbicides in corn farms, a field study was conducted during the 2010 growing season in Jiroft. The experimental design was completely randomized blocks, with 11 treatments and 4 replications. Treatments were nicosulfuron at 2lit/ha, foramsulfuron at 2.5 lit/ha, rimsulfuron at 50 g/ha, nicosulfuron+ rimsulfuron at 175 g/ha, bromoxynil+mcpa at 1.5 lit/ha + hand weeding of grasses, 2, 4-D+ MCPA + hand weeding of grasses, foramsulfuron + iodosulfuron at 1.25, 1.5, 1.75 l/ha, bromoxynil+mcpa at 1.5 lit/ha + nicosulfuron at 1 lit/ha, and Weed free. Results indicated that all herbicides showed a significant impact on weed density and dry weight of *Echinochola colonum, Digera muricata, Portulaca oleracea, Amatanthus viridis,* and *A. blitoides.* These weeds were successfully controlled by foramsulfuron + iodosulfuron at 1.5 and 1.75 l/ha .Satisfactory control of these weeds obtained by bromoxynil+mcpa + nicosulfuron and nicosulfuron+ rimsulfuron. But they are poorly controlled by herbicide rimsulfuron. The highest and lowest grain yields belonged to foramsulfuron + iodosulfuron at 1.75 l/ha and rimsulfuron, respectively.

Keywords: Nicosulfuron, Foramsulfuron, Rimsulfuron, Herbicide

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Evaluation of Population Density and Damage of the sugar beet weevil, *Lixus incanescens* (Col.: Curculionidae) on six sugar beet cultivars

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Abstract

The sugar beet weevil, *Lixus incanescens* Boh., is an important insect pest of sugar beet, *Beta vulgaris* L., in Razavi Khorasan Province. In this research, population densities of the sugar beet weevil eggs and larvae were evaluated on plants of six sugar beet cultivars including Ardabili, Aras, Persia, Flores, Laetitia and Rosire in an experimental field in 2011 and 2012. Also, the percentage of larval damage on petioles, the percentage of weight loss of tuber and the percentage of reduction in sugar content of the tuber were studied in these cultivars infected by five larvae under field condition. The lowest and the highest densities of eggs and larvae were observed on Persia and Ardabili cultivars, respectively in both years. Also, the percentage of larval damage on petioles was significantly lower in Persia and Laetitia than the other cultivars. In addition, the percentage of weight loss of tuber and the percentage of reduction in sugar content of tuber were lowest in infected plants of Persia. Therefore, it can be concluded that the sugar beet weevil damage was both quantitatively and qualitatively least in Persia among the examined cultivars and so this cultivar has the potential for being used in an integrated pest management program of *L. incanescens* in sugar beet fields.

Keywords: Weevil, Sugar beet cultivars, Population density, Quantitative and qualitative damage

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Effect of Silicon, Potassium and Zinc Foliar Application on some Agronomic Characteristics, Blast and Stem Borer (*Chilo suppressalis* Walker) Control in Rice (cv. Tarom Hashemi)

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Abstract

In order to study the effects of foliar application of Si (5/1000 ratio), K (2/1000 ratio) and Zn (2/1000 ratio) on rice (cv. Tarom Hashem), an on-farm experiment carried out based on randomized complete block design with three replications in 2012. Some traits such as paddy yield and yield components, neck blast disease and stem borer damage were evaluated. Results showed that the effect of foliar application in terms of all traits except panicle length, 1000 grain weight and tiller number were significantly different than control. Mean comparison showed that the highest paddy yield (4518 kg ha^{-1}), grain number per panicle (185.2), filled grains (174.6), panicle fertility percentage (94.3%) and the lowest sterile grain number per panicle (10.6), blast disease (3%) and stem borer (0.3% death heart and 1.2 % white head) were obtained in Si application. A negative and significant correlation was observed between filled grain number and blast damage percentage (r=-0.71**), percentage of stem borer infection (r=-0.72**) and percentage of white head (r=-0.89). According to results it seems that foliar spraying of Zn, Si and K had a positive effect on grain yield (closely increase 2-14%) and also suppress stem borer (closely 9-87%) and neck panicle blast (closely 27-87%) as compared to control. In conclusion, Si foliar application had the most positive effect rather than Zn and K.

Keywords: Blast, Foliar application, Rice, Silicon, Stem borer

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Study on the Effect of Orchard Grass (*Dactylis glomerata* L.) Allelopathy on Germination and Seedling Growth of Alfalfa (*Medicago sativa* L.)

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Abstract

In order to identification of allelopathic compounds and investigation of the effect of aerial part extract of orchard grass on germination and seedling growth of alfalfa an experiment conducted as completely randomized design with four replications at University of Mohaghegh Ardabili, Iran. Treatments were concentrations of orchard grass extracts including 0, 25, 50, 75, and 100%. Radicle and plumule length, fresh weight of seedling, percentage and rate of germination were measured. Results showed that with increasing extract concentration there was a reduction trend in all studied traits (except of seedling fresh weight and plumule length which increased at lower concentrations and then declined). The highest content of allelopathic substances related to phenolic compounds (7.98 and 13.91 mg in root and shoot, respectively). Plumule length and seedling fresh weight increased at the concentrations between 23 to 26% and after then reduced sharply and prevented completely at 100% concentration. All the traits reached to zero at 100% concentration. Orchard grass allelopathic substances inhibited the germination and growth of alfalfa seeds at higher concentrations.

Keywords: Allelopathy, Extract, Germination, Weed

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Evaluation of Cultivated and Wild Tomato Genotypes (*Solanum lycopersicum*) and (*Solanum* spp.) for Resistance to Egyptian Broomrape (*Orobanche aegyptiaca*)

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Abstract

Orobanche aegyptiaca, commonly known as Egyptian broomrape, is a holo-parasite that causes high economic damages on tomato production in Iran. Breeding for resistance is the most economic and feasible method to reduce broomrape infestation. 20 tomato cultivars and four wild tomato species were screened for *O. aegyptiaca* resistance. Tomato yield reduction, dry weight reduction of shoot and root, total number of attached broomrapes, dry weight of broomrapes and tolerance index were widely varied among tomato genotypes. The results showed that LA2530 (*Ora* mutant) was a very susceptible genotype while it was previously introduced as *O. aegyptiaca* resistant. According to the reports, the resistance phenotype is controlled by a dominant gene (*Ora*) and it seems that it is broken by the parasite because the overcoming of monogenic resistances by parasites is more likely than polygenic resistances. High levels of resistance were found in two wild species *Solanum chilense* TL00798 and *S. pimpinellifolium* L00134 respectively. The results suggested that wild relative species of tomato are promising diverse genetic resources for developing resistant crops to broomrape.

Keywords: *Orobanche aegyptiaca*, Tomato genotypes, Screening, Resistance

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Study on the Effects of Blast Disease (*Pyricularia oryzae*) on Yield of Rice under Field Condition

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Abstract

Blast disease of rice caused by *Pyricularia oryzae* is a potentially damaging disease in northern due to planting of susceptible local cultivars and favorable conditions. To assess the effects of blast on rice yield components and yield loss, one field experiment was conducted at the lowland culture conditions. Analysis of blast effects on rice indicated that the maximum yield losses due to unprotected treatments at vegetative, reproductive and both stages were 4.72, 6.39 and 14.41% respectively. Node blast had more influence than neck blast in decreasing the 1000-grain weight and number of filed grains and in increasing the number of unfiled grains per panicle. Yield losses due to blast were correlated either to percentage of leaf blast (LB) or percentage of neck, node and panicle blast (NNPB) in unprotected treatments at vegetative stage in each two years of 2009 (for LB, R= 0.868, *P. value= 0.00517*; for NNPB, R= 0.848, *P. value= 0.00775*) and 2011(for LB, R= 0.785, *P. value= 0.0211*; for NNPB, R= 0.801, *P. value= 0.0169*). Also two positive significant correlations were observed between LB % and NNPB% in 2009 (R= 0.882, *P. value= 0.00376*) and 2011 (R= 0.812, *P. value= 0.0143*) in this treatment. Whereas, in unprotected treatment at reproductive stage yield loss was correlated only to percentage of NNPB (R= 0.918, *P. value= 0.0013*).

Keywords: Rice, *Pyricularia oryzae*, Yield loss, Tricyclazole

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Fauna of Predatory Mites of Mesostigmata and Prostigmata (Acari: Mesostigmata, Trombidiformes) Associated with Stored Food Products in Mashhad, Iran

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Abstract

To identify the mite species associated with food products in Mashhad, a variety of stored food products were visited and sampled during years 2011 and 2012. Storage mites were extracted by means of Berlese-Tullgreen funnel. Mite specimens were cleared using Lactic acid or Nesbit's fluid. Using Hoyer's medium, cleared specimens were mounted as permanent microscopic slides. Specimens were identified or confirmed by the relevant specialist. As a result, a total of 21 species, belonging to 15 genera of 11 families from 2 orders including Mesostigmata and Trombidiformes were identified. Among the identified species, those flagged with one and two asterisks are new records for the study area and Iran, respectively. Voucher specimens are deposited in the Acarology collection of Ferdowsi University of Mashhad, Iran. The list of identified species is as follows:

I- Order Trombidiformes- Bdellidae: *Spinibdella cronini* Baker & Balock, *Spinibdella* ?sp. **, **Caligonellidae**: *Molothrognathus mehrnejadi* Liang & Zhang*, *Paraneognathus oblongus* (Soliman)*. **Cheyletidae**: *Acaropsellina sollers*(Kuzin), *Cheyletus eruditus* (Schrank)*, *Cheyletus malaccensis* Oudemans, *Cheyletus trouessarti* Oudemans*, *Lepidocheyla gracilis* Volgin*, *Neoucheyla iranica* Fain & Ardeshir*. **Cunaxidae**: *Cunaxa capreolus* Berlese*, *Cunaxa setirostris* Hermann. **Raphignathidae**: *Raphignathus hecmatanaensis* Khanjani & Ueckermann*, *Raphignathus gracilis* Rack*, **Stigmaeidae**: *Stigmaeus elongates* Berlese, *Storchia robustus* Oudemans*. **II- O. Mesostigmata- Ameroseiidae**: *Ameroseius pavidus* Koch*, *Ameroseius delicatus* Berlese**. **Ascidae**: *Arctoseius cetratus* Sellnick*, *Arctoseius* sp., **Laelapidae**: *Haemolaelaps fenilis* Megnin*, *H. casalis* Berlese*. **Macrochelidae**: *Macrocheles muscaedomesticae* (Scopoli)*, *Macrocheles merdarius* (Berlese). **Mellicaridae**: *Proctolaelapsventrianalis* Karg*, *P. pygmaeus* (Müller)*.

Keywords: Iran, Storage mites, Mesostigmata, Prostigmata, Stored cereals

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The Effect of Piperonyl Butoxide on Susceptibility of the Common Pistachio Psyllid, Agonoscena Pistaciae Burkhardt and Lauterer to Amitraz and Specific Activity of Esterase Enzyme

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Abstract

Amitraz is one of the pesticides which is used in a vast area for controlling of the common pistachio psyllid, *Agonoscena pistaciae* (Hem.: Aphalaridae). In this study the synergistic effect of piperonyl butoxide (PBO) on the toxicity of amitraz on adults of Rafsanjan population of common pistachio psyllid was evaluated by residual contact vial (RCV) in laboratory conditions. The results showed that LC_{50} values of amitraz when use alone and with PBO together in the summer form of common pistachio psyllid were 213.7 and 151.8 mg L^{-1}, respectively. Synergistic ratio of these results obtained 1.3 fold. LC_{50} values for amitraz alone and with PBO together in the winter form of *A. pistaciae* were 351.6 and 95.3 mg L^{-1} that according to the statistic measurements, there is a significant difference in the winter form when used amitraz alone and with PBO together and the synergism ratio obtained 3.6 for this form. Results of this study showed that susceptibility of the winter form of pistachio psyllid to amitraz was less than summer form and PBO has a synergistic effect on amitraz toxicity. Indeed determination of esterase activity showed that there is significant difference between summer and winter forms. It seems that one of the reasons of less susceptibility of the winter form to amitraz pesticide is related to the increase esterase activity.

Keywords: Piperonyl butoxide, *Agonoscena pistaciae*, Amitraz, Esterase activity

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Molecular Analysis of Six *Beet yellows virus* (BYV) Isolates from West Azarbayjan, Kermanshah and Hamedan Provinces of Iran Based on ORF CP

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Abstract

Beet yellows virus (BYV) belongs to the genus *Closterovirus*, *Closteroviridae* family, is one the most important viruses of sugar beet worldwide. In order to identify and characterize some molecular aspects of the BYV, a total of 75 symptomatic leaf samples of sugar beet were collected from sugar beet field of West Azarbayjan, Hamedan and Kermanshah provinces, Iran. Leaves showing general yellowing, vein clearing and thickness were collected. The primary detection of BYV performed by DAS-ELISA, using specific antibodies raised against coat protein of the virus, resulted in positive reaction of six out of 75 samples. The coat protein ORF of BYV isolates was amplified by RT-PCR, using BYV-F/BYV-R primer pair. Amplified fragments in expected size of 615 bp were directly sequenced. All sequence data were multiple aligned with other BYV isolates (from NCBI) using DNAMAN 7 software. An Ukrainian isolate (X73476) showed the highest nucleotide (99.19%) and amino acid (97.55%) identity with our isolates in this study. Phylogenetic analyses were conducted by MEGA 5.2. The results of phylogenetic analysis showed that BYV Iranian isolates and BYV Ukrainian isolate are clustered together.

Keywords: *Beet yellows virus,* sugar beet, western Azarbayejan, Kermanshah and Hamadan and cp.

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Effect of Soil Solarization on the Control of Different Purple Nutsedge (*Cyperus rotundus* L.) Ecotypes

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Abstract

Employment of solarization using the polyethylene mulch can be effective as a non-chemical approach for some control noxious weed management such as purple nutsedge (Cyperus rotundus). In order to determine the effect of different levels of polyethylene mulches including one- layer clear polyethylene film, two- layer clear polyethylene film, one- layer black polyethylene film and two- layer black polyethylene film as well as a non-mulched control on three different populations of purple nutsedge from Birjand, Kahnooj and Jiroft, a factorial experiment based on a randomized complete block design with three replications was conducted at research field of Birjand university, during a 60-day period in summer 2012. Results indicated that polyethylene mulches significantly reduced tubers number and weight, pre-tuber (tubers with a diameter less than 2 mm) number and weight, number and weight of above mulch shoots as well as number and weight of below mulch shoots in all three purple nutsedge populations. One-layer mulches (either clear or black sheets), however, did not show a remarkable preventive effect on purple nutsedge shoots growth, so that plant shoots can easily pass over the plastic sheets. Moreover, results showed that the two-layer black polyethylene mulch provided the most effective control among all three purple nutsedge populations.

Keywords: Non chemical management, Solarization, Tuber, Pre-tuber

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Control of Green Peach Aphid by using Fungus, *Metarhizium anisopliae*, and Imidacloprid, on three Canola Cultivars, under Microcosm Conditions

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Abstract

The effect of the fungus, *Metarhizium anisopliae*, sub-lethal dose of imidacloprid, the aphid, *Myzus persicae* and the three canola cultivars under microcosm conditions inside plastic cages in greenhouse (27 ± 3°C, RH 90 ± 5 %) indicated that field and semi-field concentrations of the fungus significantly reduced the population of Green Peach Aphid (GPA) as well as in combination with LC_{10} of imidacloprid. Comparison of mean percent of the GPA mortality, 7 and 23 days after treatment, indicated the distribution of pathogen inside the aphid population. Comparing different treatments determined that not only imidacloprid had no negative impact on pathogenicity of fungal pathogens but also increased the efficiency of the fungus.The highest and lowest mean value of plant dry weight was concerned to the Licord in treatment containing field concentration of the fungus plus imidacloprid (4.57 ± 0.48 gr) and the RGS003 cultivar in treatment including sublethal dose of imidacloprid (1.29±0.27 gr), respectively and there was significant difference between them. Comparison of different cultivars showed the highest mean number of the GPA colonisation on the Zarfam (2040.50±126.92 aphids) and the lowest one (1583.17±213.17 aphids) on the RGS003 cultivar, respectively but no significant difference was observed between Zarfam and Licord cultivars. The results indicated that using semi-field concentration of *M. anisopliae* added with LC_{10} of imidacloprid in compared with the other treatments to control the GPA could be the best alternative. In addition to cause remarkable mean mortality percent after a week, the less fungal concentration was applied.

Keywords: Canola cultivar, Neonicotinoid insecticides, Microcosm conditions, Entomopathogenic fungus

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