



Evaluation of Allelopathic Effects of Fenugreek Extract on Germination and Growth of Some Crop and Weed Species

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Received: 29-4-2008

Accepted: 23-11-2010

Abstract

In order to study the effect of different organ extracts of Fenugreek (*Trigonella gracum*) on germination of some crops and weeds, an experiment was conducted in completely randomized design with 3 replications. Factors included 4 species Soybean (*Glysin max*), Sesame (*Sesamus indicum*), Pigweed (*Amaranthus retroflexus*) and Velvetleaf (*Abotilon teophrasti*) and the extract of different Fenugreek organs (leaf, stem, seed, pod and total organs) in 4 levels (check, 4, 8, 32 and 64 g powder/1000 ml distilled water). Results indicated that plants had different reaction to concentrations of different organ extracts. In the all studied species, negative and significant correlation was obtained between different concentrations of extract and germination percentage. Also, with increasing extract concentration of fenugreek, germination rate decreased in the studied crops and weed. Negative and significant correlation was observed between germination percent and different concentrations of organs and minimum of regression slope was obtained in stem extract. Root and shoot length had negative and significant correlation with extract concentrations, in total species, except of Soybean. In general, Velvetleaf had the most sensitivity for Fenugreek allelochemical.

Keywords: Allelopathy, Germination, Fenugreek (*Trigonella gracum*), Soybean (*Glysin max*), Sesame (*Sesamus indicum*), Pigweed (*Amaranthus retroflexus*), Velvetleaf (*Abotilon teophrasti*)

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Infestation of Rice Varieties to the Egg Masses of *Chilo suppressalis* Walker (Lepidoptera: Pyralidae) in Rice Nurseries of Mazandaran

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Received: 16-6-2008

Accepted: 23-11-2010

Abstract

Striped rice stem borer, *Chilo suppressalis* Walker (Lepidoptera: Pyralidae) is one of the important pests in rice fields of Mazandaran. Therefore, almost the farmers of Northern Iran apply several pesticides in nurseries for the pest control; while it causes environmental risks and damages to human. In this research two different items including, 1- Study of egg masses density in nurseries of different varieties, 2- Study of egg masses density in nurseries of different localities of Mazandaran, were analyzed in order to screening many resistant rice varieties, and evaluation the necessity of chemical control in nurseries. The results indicated that the highest egg masses density was observed on the varieties Tarom and Fajr, and the lowest density was on Kados. Mean comparison of egg masses densities in different stages of sampling (7-22 May 2006) indicated that there was not significant difference between the different sampling stages. Additionally, egg masses densities had not significant difference in different localities of Mazandaran, because the density of egg masses was low in all sampled regions. The main result of this project indicates that egg masses density of *C. suppressalis* is very low in all nurseries of Mazandaran and even without any egg mass in some regions, while several insecticides are applied in the nurseries. Therefore, application of insecticides is not necessary in nurseries and on the other hand it will be resulted to increasing the expenses for the rice farmers.

Keywords: *Chilo suppressalis*, Egg masses density, Rice varieties, Nursery, Mazandaran

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Study on the Efficacy of Some Current Herbicides for Control of Wild Oat (*Avena ludoviciana* Durieu) Biotypes Resistant and Susceptible to Acetyl CoA Carboxylase (ACCase) Inhibitors

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Received: 7-7-2008

Accepted: 1-12-2010

Abstract

Three separate greenhouse experiments were conducted in the greenhouse facilities of the Iranian Plant Protection Research Institute, Tehran, to study the efficacy of some ACCase inhibiting herbicides for control of resistant based on mechanism, resistance based on enhanced metabolism and susceptible wild oat biotypes. In each experiment, biotypes were treated separately by 17 herbicide treatments. To evaluate the effects of treatments, different characteristics including percent damage based on EWRC scores at 30 days after spraying, percent survived plants after spraying relative to before spraying and percent dry and wet weight of individual plants relative to control were studied. Results showed that the susceptible biotypes of wild oat were best controlled by Clodinafop propargyl (0.8 l/ha), Pinoxadane (450 ml/ha), Sulfosulfuron (26.6 g/ha), Sulfosulfuron+Metsulfuron (45 g/ha), Iodosulfuron+ mesosulfuron (350 g/ha), Prosulfocarb (3-4 l/ha) and Isoproturon+diflufenican (2-2.5 l/ha). Tralkoxydem (1.2 l/ha) and Fenoxypop-p-ethyl (1 l/ha) also to some extent could control susceptible biotypes. The best treatments for control of biotype based on enhanced metabolism were Isoproturon+diflufenican and Sufosoforon+metsulfuron. Prosulfocarb and Iodosulfuron+ mesosulfuron also to some extent could control this kind of biotypes. Resistant biotype based on mechanism also were controlled with Pinoxadane, Sulfosulfuron, Sulfosulfuron+metsulfuron, Iodosulfuron+ mesosulfuron (400 g/ha) and Isoproturon+diflufenican. Since AIS inhibitor could not control susceptible wild oat biotypes, it is necessary to repeat this part of experiment again.

Keyword: Herbicide resistance, Wild oat, Resistant based on mechanism, Resistant based on enhanced metabolism

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Investigation on Infection and Distribution of *Beet Yellows Virus* in Razavi Khorasan Province

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Received: 14-2-2009

Accepted: 23-11-2010

Abstract

Beet yellows virus (BYV), the type member of the genus Closterovirus and one of the most economically important yellowing viruses, causes serious losses in sugarbeet. In order to study infection and distribution of *Beet yellows virus* during summer 2007, about 530 samples were collected from beet's fields in Razavi Khorasan province (Fariman, Torbate Jam, Ghoochan, Chenaran, Torbate Heydariye, Kashmar, Neyshabour, Mashhad). Sampling was done in two ways: first, collecting leaves showing symptoms of vein clearing, yellowing and necrotic spots, and the other way, collecting samples randomly to determine distribution. All collected samples were tested by DAS-ELISA and RT-PCR for detection of the virus. PCR products on %1 agarose, the band of 332 bp related to the virus was detected. Results showed that, the highest and lowest infection rates belong to Torbate Heydariye with %17.8 and Neyshabour with %4.8 respectively. Infection was exist in all tested areas with different rates. The average rate of infection of BYV in the province was %10.

Keywords: *Beet Yellows Virus*, DAS- ELISA, RT-PCR

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Study of Peroxidase Enzyme Activity Induced by *Trichoderma harzianum* Bi in Cucumber Seedling and Its Effect in the Control of Root and Foot Rot Caused by *Pythium aphanidermatum*

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Received: 20-3-2009

Accepted: 2-3-2010

Abstract

Pythium aphanidermatum is one of the most important agent of root and foot rot of cucumber, particularly in the warm humid climate. Induction of host resistance by microorganisms or by the synthetic compounds is recently considered as one of the biological control method of disease. *Trichoderma harzianum* Bi is a good candidate for induction of resistance in plant against diseases. The maximum level of resistance of seedlings to *P. aphanidermatum* after inoculation with *T. harzianum* Bi was determined using completely randomized design in greenhouse condition. The results based on the fresh root weight and root rot index of seedlings showed that the maximum level of resistance against *P. aphanidermatum* is induced 7 days after treatment of cucumber seedlings by *T. harzianum*. The variation of peroxidase activity, its isozymes, and the total soluble proteins in root extract induced by *T. harzianum* Bi in cucumber seedlings was determined by colorimetric and native Electrophoresis methods before and after inoculation the seedlings by *P. aphanidermatum*. The results showed that the maximum level of resistance induction in seedlings treated by *T. harzianum* Bi coincide with maximum activity of peroxidase. The peroxidase activity was evaluated by Guaiacol oxidation rate in the presence of H₂O₂ and changing of solution color to orange reddish, measured by the variation of light absorption per min/ mg soluble protein of root extract. The same experiment realized on *T. harzianum* Bi, *P. aphanidermatum* and the combination of two fungi demonstrated that both fungi can influence individually the peroxidase activity, but it is more pronounced and more stable and persistent in the case of seedling inoculation by combination of two fungi in comparison to the control.

Keywords: *Pythium aphanidermatum*, *Trichoderma harzianum* Bi, Root and crown rot, Biological control, Induced resistance, Peroxidase

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Identification and Pathogenicity of Fungi involved in Root and Crown Rot of Wheat in North Khorasan Province (Northeast of Iran)

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Received: 12-5-2009

Accepted: 10-11-2009

Abstract

The root and foot rot of wheat is one of the important disease of wheat over the world. The root and foot rot of wheat observed more frequently in the recent years at Khorasan province (northeast of Iran). For investigation the causal agents, several samples were collected from wheat fields of North Khorasan in 2007 and 2008. Culture of diseased parts of plants on PDA resulted. *Fusarium oxysporum*, *F. solani*, *Bipolaris sorokiniana*, *Phoma* sp., *Coniothyrium cerealis*, *Trichoderma virens* (*Gliocladium virens*), and *Periconia circinata*. Their pathogenicity were tested (except *T. virens*) on wheat (chamran variety) in greenhouse experiments using completely randomized design. The results showed that *B. sorokiniana*, *P. circinata*, *C. cerealis*, and *Phoma* sp. are pathogenic on wheat and decreases the fresh and dry weight of roots and lower parts of stalk ($P = 5\%$). Among them *B. sorokiniana* determined as the principle agent of disease. It was highly pathogenic in both: with and without water stress conditions. The *Fusarium* species were not pathogenic and did not induce the diseases symptoms. The *Gaeumannomyces graminis* var. *tritici* and *F. graminearum* which are generally considered as important causal agents of root and foot rot of wheat in many regions were not isolated from diseased samples. The results indicated that *B. sorokiniana* is the major and principle causes of common root rot of wheat in North Khorasan and probably in other parts of Big Khorasan. This is the first report for this pathogen in the region. Other pathogenic fungi included *C. cerealis*, *P. circinata*, and *Phoma* sp. were also reported for first time as the causal agents of wheat root rot from Iran. They may play an auxiliary or a complex role in root rot of wheat.

Keywords: Common root rot, wheat, *Bipolaris sorokiniana*, *Coniothyrium cerealis*, *Periconia circinata*, *Phoma* sp., Khorasan

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Characterizing Different Taxonomic Groups of *Rhizoctonia* spp. Fungi Associated with Root and Crown Rot on Sugar Beet by Analyses of rDNA-ITS and PCR-RFLP

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Received: 9-6-2009

Accepted: 30-12-2009

Abstract

Isolates of *Rhizoctonia* spp., obtained from sugar beet roots and crowns with dry rot symptoms that had been collected from various sugar beet production regions in Khorasan Razavi province during 2008 and 2009, were investigated in this research. Characterization by conventional techniques and molecular methods using species-specific primers was carried out. Results showed that from 36 isolates, 31 were *R. solani* and 5 were *R. cerealis*. In restriction fragment length polymorphism analysis of PCR-amplified ribosomal DNA internal transcribed spacer region of *R. solani* taxonomic group, isolates of subgroup IC of AG1 were recognized. Of 31 isolates identified as *R. solani*, 17 were AG2-2 IIIB, 12 were AG2-2 IV, and 2 were AG1-IC. Pathogenicity tests on sugar beet cultivar FD0432 revealed that isolates of AG2-2 IIIB and AG2-2 IV were more virulent on root and crown of sugar beet plants compared to AG1-IC and *R. cerealis*. Whereas, isolates of *R. cerealis* had the most virulence on seedlings. This is the first report of characterization and investigating pathogenicity of various subgroups of *R. solani* AG1 and AG2-2, and also binucleate *R. cerealis* isolated from sugar beet in Iran.

Keywords: *Ceratobasidium cereale*, PCR-RFLP, rDNA-ITS, Root and crown rot, Sugar beet, Taxonomic groups, *Thanatephorus cucumeris*

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The Effect of Wheat Residue and Trifluralin Rates (%48 EC) on Weed Specises Composition of Sunflower (*Helianthus annuus*) in Birjand

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Received: 27-9-2009

Accepted: 5-5-2010

Abstract

Leaving crop residues on the soil surface may significantly affect the behavior and activity of herbicides. To probe this effect, a factorial experiment in a randomized complete block design with three replications was conducted using two factors including different rates of wheat surface residue (0, 1250, 2500 and 3750 kg ha⁻¹) and different rates of trifluralin (%48 EC) herbicide (720, 1200, 1680 g ai. ha⁻¹) plus control (without herbicide use) in conducted at Research Field of Agricultural Faculty of Birjand University in summer 2008. Result showed that increasing wheat residue and also trifluralin concentrations reduced the density of Hoary cress (*Cardaria draba*), Red root pigweed (*Amaranthus retroflexus*), Common lambsquarter (*Chenopodium album*) compared to the control during growing season. In contrast, the density of camelthorn (*Alhagi camelorum*) was not influenced by either of experimental factors and their interaction. Moreover, there was a synergistic effect between different rates of trifluralin and residue level of 1250 and also between 1200 g ai. ha⁻¹ of trifluralin and residue level of 2500 kg ha⁻¹ on reducing the density weeds compared to the control. Residue level of 3750 kg ha⁻¹ decreased herbicide efficacy.

Keywords: Mulch, Soil applied herbicide, Weed composition, Sunflower

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Astigmatid Soil Mite Fauna of Alfalfa Fields, Two New Records of Histiostomatid Species for Iran's Mite Fauna and Their Distribution in Northwest of East Azerbaijan Province, Iran

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Received: 12-10-2009

Accepted: 23-11-2010

Abstract

Astigmatic soil mite fauna of alfalfa fields of six regions in Northwest of East Azerbaijan (Soofian, Payam, Zenooz, Marand, Shabestar and Jolfa) was studied at three different times of the year 2006 (mid-May, mid-July and mid-September) based on Nested design. In this study 12 species, 5 genera and 2 families were identified. In general, Shabestar and Zenooz showed highest and lowest mean number of mite/sample respectively, and the maximum average was obtained in mid-July. Acaridae was more frequent compared to Ancoetidae. Among four identified genera of Acaridae (*Tyrophagus*, *Tyroborus*, *Suidasia* and *Rhizoglyphus*) *Tyrophagus* and among its identified species (*Tyrophagus neiswandri* Johnstone & Bruce, 1965, *T. similis* Volgin, 1949, *T. brevicrinatus* Roberston, 1956, *T. longior* (Gervais, 1844), *T. putrescentiae* (Schrank, 1781), *T. perniciosus* Zachvatkin, 1941, *T. palmarum* Oudemans, 1924) *T. longior* was more frequently observed. Only one genus named *Histiostoma* was identified from Histiostomatidae which contained two species, *Histiostoma polypori* (Oudemans, 1914) and *Histiostoma litorale* (Oudemans, 1914) that both of them are new records for mite fauna of Iran and their distribution was not significantly different in studied regions and times of sampling.

Keywords: Acaridae, Alfalfa, Astigmata, East Azerbaijan, Histiostomatidae

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Effect of Two Arbuscular Mycorrhizal Fungi Species on Root Nodulation and Amounts of Some Elements in Soyabean on Salt Stress Condition

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Received: 30-11-2009

Accepted: 23-11-2010

Abstract

Plants are exposed to stressful environmental conditions in the process of growth and development. One of the most important stresses is the salt stress which can limit the plant's growth and yield. Plants symbiosis with arbuscular mycorrhizal fungi in salt conditions can affect the plant's yield as well as growth parameters. The plant's growth in salt stressful conditions might be reduced either through osmotic potential changes due to a reduction in water potential in root environment or through the effect of ions in metabolic processes. The present study aimed to study on effect AM fungi on tolerance of Soyabean against saline stress. In this study, mycorrhizal and nonmycorrhizal plants were treated with 0.1%, 0.2%, 0.3% NaCl solution via irrigate every week. Mycorrhizal treatments were in four levels including: without mycorrhiza, inoculation with *Glomus mosseae*(M1), inoculation with *Glomus intraradices* (M2) and inoculation with both of fungi (M3). Experiments were carried out in randomized block design with four replicates in greenhouse condition. Results of statistic analysis showed significant difference in AMF colonization, nodulation, nodule biomass nitrogen, iron and copper concentration any treatments in different salinity levels ($P \leq 0.05$). In mycorrhizal plants in most of salinity levels, a significant decrease in fungal sporulation could be observed. Results showed that AMF improved the plant's growth in salinity stress by increasing uptake of elements, improving nodulation as well as increasing smotic regulators.

Keywords: Soyabean, Salt stress, Mycorrhizal fungies, Nodulation

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Simulation of Bean (*Phaseolus vulgaris* L.) Yield Loss Caused by Jimson Weed (*Datura stramonium* L.) Interference by Empirical Competition Models

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Received: 19-2-2010

Accepted: 23-11-2010

Abstract

Use of empirical competition models is one of approaches in integrated weed management strategies. In order to investigation of this approach in simulation of yield loss of bean (*Phaseolus vulgaris* L.) caused by jimson weed (*Datura stramonium* L.) interference, an experiment was conducted in National Bean Research Station, in Khomein, in 2007. The experiment design was randomized complete blocks with a factorial arrangement in three replications. Treatments were combination of four different weed densities (4, 8, 12 and 16 plant m⁻¹) and three times of weed emergence (with crop emergence, in first trifoliate leaf stage and third trifoliate leaf stage of bean), with a weed free bean (40 plant m⁻¹) treatment as control. Three empirical competition models based on weed density (WD), relative time of weed emergence (RTW) and relative weed leaf area (RWL) were used in order to simulate crop yield losses. Results showed that the RWL model with highest coefficient of determination ($R^2= 0.90$) and lowest remain mean squares ($RMS= 0.05$) has the best estimation of bean yield loss. The RTW model (with $R^2= 0.89$ and $RMS= 67.43$) was located after it. However the simulation of WD model was acceptable just in separate times of weed emergence. Results also indicated that jimson weed threshold densities based on economic damage (7% of bean yield loss) were 0.84, 1.4 and 2.5 plant m⁻¹ in first to third relative time of emergence, respectively. According to relative damage coefficient parameter in RWL model ($q = 2.59 \pm 0.29$), it was demonstrated that jimson weed was the dominant plant in weed-crop competition system.

Key words: Bean, Competition, Datura, Empirical models, Simulation, Weed

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The Effect of Competition on Foraging Behavior of a Thelytokous Parasitoid, *Lysiphlebus fabarum* (Marshall) on *Aphis fabae* Scopoli

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Received: 22-2-2010

Accepted: 14-7-2010

Abstract

Competition is a phenomenon that influences the size, structure and stability of insect communities, particularly on solitary endoparasitoids species. Although, competition normally incurs costs, it might be adaptive for the surviving individual. To determine which factors affect the patch use strategy of foragers under competition, the effect of previous experience with hosts already-parasitized or conspecific females on proportional time allocation to various behaviors associated with aphid exploitation was studied. To test this, individual *L. fabarum* females onto bean leaf disks infested with *A. fabae* in the laboratory was released and made continuous observations. Females that encountered aphids previously parasitized by a conspecific female prior to testing spent two times longer in host patches (leaf disks with 15 second-third instar of *A. fabae*) than females encountering only healthy aphids, also scored higher levels of activity for all foraging behaviors, number of hosts parasitized and superparasitized. Because of the significant effect of treatment on patch residence time, the incidence or duration of various behaviors was expressed as a fraction of patch residence time and then re-analyzed. Data showed that only incidence of searching and probing behaviors was higher in treatment females than their control counterparts. In the second experiment, females that encountered (90-120 min.) a conspecific prior to foraging behaved no differently in patch residence time, incidence or duration of various behaviors, and the number of aphids parasitized within the patch, than females that did not, suggesting that females did not respond to conspecifics as potential competitors.

Keywords: Competition, Host discrimination, Reproductive allocation, Oviposition behavior, Superparasitism, Broad bean aphid

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Effect of Temperature on Mycelial Growth and Resistant form of the Some Important Phyto-Pathogenic Fungi

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Received: 18-4-2010

Accepted: 23-11-2010

Abstract

Temperature is one of the most important environmental factors affecting on physiological characteristics of fungi. In order to wide host range of *Macrophomina phaseolina* (Tassi) Goildanich, *Verticillium dahliae* Kleb. and *Sclerotinia sclerotiorum* (Lib.) de Bary, become aware from growth rate and productivity of resistant and survival form of these phyto-pathogens in different temperatures is necessary. In this order, present research was carried out with aim survey on effect of temperature on mycelial growth and resistant-form production of some isolates of *M. phaseolina*, *Verticillium dahliae* and *Sclerotinia sclerotiorum* on PDA medium in laboratory conditions as RC Design. In this experiment, various temperature treatments including 10±1, 15±1, 20±1, 22±1, 25±1, 27±1, 30±1, 35±1 and 40±1°C were used. The results showed that effect of the temperatures on growth and resistant-form production of the fungal isolates were significant at levels 5% & 1% by Duncan multiple rang test. The results showed the highest mycelial growth and microsclerotia production at 30 and 35°C of other temperatures. The best temperatures for the mycelial growth and sclerotia production of *S. sclerotiorum* were estimated 25 and 20°C respectively. The results of the effect of the temperatures on *V. dahliae* isolates were different. The optimum growth-temperature for the isolates isolated from olive and almond were calculated 20°C, while optimum growth-temperature and microsclerotia-production for the isolates cotton were calculated 25 and 27°C. It is seem to the growth ability, resistant-form production and survival ability in wide range of the temperatures become one of the most important agents in ecological distribution, pathogenesis and ,finally, wide host range of these pathogens.

Keywords: Temperature, Growth, Resistant-form, *Macrophomina phaseolina*, *Verticillium dahliae*, *Sclerotinia sclerotiorum*

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Evaluating Some Properties of Indian Moth *Plodia interpunctella* Hübner (Lep., Pyralidae) alpha-amylase

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Received: 20-6-2010

Accepted: 23-11-2010

Abstract

Because of relation between digestive enzyme activity and feeding of insects that directly is in relation with the damage of insects; studying digestive enzyme systems is important in finding new control methods based on inhibiting digestive enzyme activity. Recently using transgenic plants containing enzyme inhibitors is important in improving resistance of crops to pests because of safety of them to environment and biological control agents and also side and harm effects of conventional insecticides. Information about properties of digestive enzymes is first step for using their inhibitors as a control method. In this study some properties of *Plodia interpunctella* alpha- amylase including optimum pH; temperatures; stability and enzyme activity in different larval stages were investigated. Insects were reared in controlled condition of $26 \pm 2^\circ\text{C}$; relative humidity of 50% and 16:8 (L:D) h photoperiod. All experiments carried out in 4 replications. Enzyme activity in temperature range of 25- 45°C were studied; the optimum temperature was 37°C for both male and female insects. The least enzyme activity was observed in 25°C. The activity trend for both sexes in different temperatures was same. Alpha-amylase was active in pH ranges of 5-10; and the trend of enzyme activity in different pHs in both sexes was same. Optimum pH for enzyme activity in male and female insects was 5.5. The least enzyme activity for male and female insects was in pHs of 8.5 and 7.5 respectively. Enzyme activity in male and female insects was statistically different and its activity in female insects was more than males. This study also showed that the enzyme was stable in 4°C for 40 days. Enzyme activity in different larval stages was statistically different. The most enzyme activity was observed in 5th larval stage; and differences between enzyme activity in 3rd and 4th larval stages was not significant.

Key words: Alpha-amylase, Indian moth, pH, Temperature, Male and female

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Identification and Differential Distribution Pentatomidae Family (Heteroptera) in West Azarbaijan Province (Iran)

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Received: 26-10-2009

Accepted: 11-8-2010

Abstract

The faunistic study was carried out during 2002-2003 and specimens were collected from 13 cities of the West Azarbaijan province showing a normal distribution of this family. Totally 22 genera and 35 species of Pentatominae and Podopinae subfamilies were collected and identified mainly focusing on male genitalia and some other morphological characters. 30 new species and 1 new species and 1 new genus record from Province and Iran respectively.

Keywords: Heteroptera, Pentatomidae, Podopinae, Pentatominae, West Azarbaijan province

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Introduction of *Holotrichius mesoleucus*, Kiritshenko (Het: Reduviidae) from Iran

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Received: 2-3-2010
Accepted: 15-6-2010

Abstract

Information on Reduviidae species are sporadic and very rare in Iran due to the few survey conducted on this bugs. A study was done to determine the diversity of this family during 2008 - 2009. Several species were collected among them *Holotrichius mesoleucus* (Kiritshenko, 1914) was found to be the species recorded for the first time in Iran. This species was collected from *Avena fatua* in Mashhad region during 2008. It is also important to know that the female of this species is introduced here, is for the first time in the world.

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