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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۱۵

Detection Phenazine-1-carboxylic Acid Antibiotic in Fluorescent Pseudomonads of Wheat Rhizosphere and Its Effect on Biocontrol of Take-all Disease

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Abstract

Take-all disease caused by *Gaeumannomyces graminis* var.*tritici*(Ggt) is an important disease of wheat in Iran. For biolobical control of this disease,130 strains of Fluorescent Pseudomonads were isolated from rhizospheric soil of wheat in different regions of Khorasan province. Selection the more active strains was released, using dual culture test by Fluorescent Pseudomonads and Ggt on KB and PDA medium. Among them, 21 strains were selected as more active on Ggt showing the inhibited of mycelial growth at the rate of 11.25 up 51.25 %. The PCR technique was completed by using primers PCA2a and PCA3b for detection the gene responsible of Phenazine-1-carboxylic acid production. The result showed that 12 strains of 21 strains contain the Phenazine-1-carboxylic acid gene. The dark green pigmentation or crystalline deposits method was used for testing the expression of phenazine-1-carboxylic acid antibiotic. The results showed that 6 from 12 strains able to produce Phenazine-1-carboxylic acid. In greenhouse experiment the Phenazine-1-carboxylic acid positive strains showed higher ability of biocontrol on Take-all disease than other strains. This strains decreased disease severity at the rate of 77-80%. The comparable results were observed for fresh weight of root and aerial parts of plants. These results showed that Phenazine-1-carboxylic acid which produced by these strains has important role in reducing Take-all disease probably.

Keywords: Biological control, Fluorescent Pseudomonads, *Gaeumannomyces graminis* var.*tritici*, Phenazine-1-carboxylic acid antibiotic, Take-all

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۱۶

Effects of Agricultural Practices on Abundance and Diversity of Spiders in Winter Wheat Fields of Razavi and Northern Khorasan Provinces, Iran

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Abstract

Spiders are one of the most abundant invertebrates in terrestrial ecosystems that have a good potential to pest control in crops. Species richness and abundance of spiders and the effects of different agricultural practices on these predators were studied in winter wheat fields in Shirvan, Mashhad and Gonabad, cities in northeast of Iran. In each region, high and low input fields of winter wheat and a natural system were selected. Sampling was done by sweep net from the surface of plants in the fields and selected area of natural systems. Results showed that species richness of spiders was affected by climatic conditions. With increasing of mean annual precipitation and decreasing of mean annual temperature in studied regions, species richness of spiders increased. Spiders abundance was not affected by climatic conditions and in agricultural systems was higher than natural systems. Abundance of these animals was affected by management of agricultural systems, especially by conservation of trees around the fields. Although species richness of spiders was lower in dry region, but with proper management of agricultural systems, abundance of these animals and useful function of them will increase for pest control.

Keywords: Spiders, Spider's species richness, Spider's abundance, Winter wheat

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Fauna and Population Fluctuations of Spiders (Arthropoda: Araneae) in Rice Fields of Mazandaran Province

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Abstract

Spiders are the powerful and efficient predators in almost all ecosystems which have effective role in different pest control. The fauna of these arthropods was surveyed during 2005-2009, and their population fluctuations and activities were studied in Mazandaran paddy fields in 2005-2006. A total of 53 spider species of 44 genera were collected and identified from paddy fields of Mazandaran province. Of these, five species including, *Dysdera aculeata* Kroneberg, *Harpactea babori* (Nosek), *Pardosa hortensis* (Thorell), *Pardosa paludicola* (Clerck) and *Tedia oxygnatha* Simon were new records for Iran fauna. The results of determining the egg masses' densities on different rice varieties (including, Tarom, Fajr, Khazar, Shafagh, Tabesh, Sahel, Neda, Pouya, and Kadus) indicated that the highest egg density was obtained on the varieties Tarom, Fajr, and Khazar and the lowest one on Tabesh. Also, the egg masses' density was significantly different in different locations of Mazandaran (including, Savadkooh, Babolsar, Mahmood-Abad, Babol, Fereydon-Kenar, Sari, Nour, Amol); the highest population density was observed in Sari and Amol and the lowest density in Nour. The results of population fluctuations of spiders in paddy fields indicated that the population density was increased through the crop season (April-August), but insecticides' application decreases the density severely. Also the population dynamics of spiders was significantly different during the days, and the highest density was obtained in 10 a.m. and 18 p.m. and the lowest was 12 because of warmer weather condition.

Keywords: Population fluctuation, Fauna, Spider, Mazandaran, Araneae

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۱۸

Effect of Water Extracts of *Salvia officinalis* and *Artemisia sieberi* on Seed Germination and Seedling Growth of *Amaranthus retroflexus*

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Abstract

Allelopathic plants, because of reduction in herbicide uses, are important in weed management. The allelopathic effects of sage *Salvia officinalis* and white Wormwood *Artemisia sieberi* water extract were evaluated on germination and seedling growth of Redroot Pigweed *Amaranthus retroflexus* at concentration of 0, 5, 10, 15, and 20% in controlled conditions. ANOVA revealed that the extract concentration has significant effect on root and shoot length, root/shoot length, fresh and dry seedling weights. The significant interaction effect of extract source × concentration was seen on percentage, rate and index of germination. The maximum percent (62.50 %) and rate (10.40 % per day) of redroot pigweed germination were observed at control treatment and the minimum percent (10 %) and rate (1.70 % per day) of germination were obtained from 20 % of sage and white wormwood extracts, respectively. The highest germination index (1.40) was obtained from 5 % extract of white wormwood and the lowest value (0.40) from 20 % extracts of sage and white wormwood. The longest (4.59 and 0.17 cm) and shortest (1.63 and 0.12 cm) root and shoot, and the highest (28) and lowest (13.60) of root/shoot length, the maximum (2.78 and 0.39 g) and minimum (0.11 and 0.02 g) seedling fresh and dry weights were obtained from 0 and 20 % of extracts, respectively. Sage and white wormwood extracts caused in reduction of seed germination and seedling growth of redroot pigweed. Generally, the negative effect of sage extract was greater than white wormwood on studied traits.

Keywords: Allelopathy, Redroot Pigweed, Root, Sage, Shoot, White Wormwood

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۱۹

Interaction Effects between Weed, Sowing Rate, and N Splitting on Yield of Dryland Wheat

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Abstract

To assess the interaction effects of weeds, sowing rate, and N splitting on dryland wheat yield, field experiments were conducted in two years (2007 and 2009) at the College of Agriculture in Shiraz University. The treatments were replicated four times and analyzed as a split- split plot in a randomized complete block. The weedy and weed free were treated as the main plots, the wheat sowing rates treated as the sub plots (100, 120, 140 and 160 kg seed ha^{-1}) and 5 levels (0-1, 1/3-2/3, 1/2-1/2, 2/3-1/3, and 1-0) of N splitting (100 kg ha^{-1}) as the sub- sub plots. Results showed that by interaction between weeds, sowing rates and N splitting, the maximum biological yield (699 kg ha^{-1} and 1449.5 kg ha^{-1} in the first and the second year, respectively) was obtained in weed free, 120 kg seed ha^{-1} sowing rate and N splitting of 1/3-2/3. In the first year by interaction between weeds, sowing rates and N splitting, the highest grain yield (440.07 kg ha^{-1}) was obtained in weed free, 120 kg seed ha^{-1} sowing rate and N splitting of 1/3-2/3 and the lowest grain yield (47.7 kg ha^{-1}) was obtained in weedy plots with 100 kg seed ha^{-1} and N splitting of 0-1. In this study, the highest weed dry matter (367.5 kg ha^{-1} and 160.38 kg ha^{-1} in the first and the second year, respectively) was obtained in sowing rate of 100 kg seed ha^{-1} and the lowest weed dry matter (247.5 kg ha^{-1} and 52.3 kg ha^{-1} in the first and the second year, respectively) was obtained in sowing rate of 160 kg seed ha^{-1}. In 2009, unusually low temperature in reproduction stage adversely affected wheat and led to no grain yield production.

Keywords: Dryland wheat, Nitrogen splitting, Sowing rate, Weed

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۲۰

Effect of Different Directions of Sampling on the Precision Distribution Map of Weeds

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Abstract

Understanding the spatial distribution of weeds would provide good results for the commercial applications of future research programs, development forecast desirable of yield loss and understanding the processes that cause changes in spatial and temporal distribution weeds. In this order an experiment was conducted in 1388 to find the effects of biological interactions, climate and agricultural operations on the spatial distribution weeds of the sugar beet field and change of the angle of Quadrat for sampling weeds. Sampling weed was taken in four-leaf stage of sugar beet by quadrates of (0.2m× 0.4m) in the intersection of (7m×7m) square grids. Quadrates were rotated at 0, 45, 90, 135 degree angles, respectively perpendicular to row plowing and clockwise. Our results showed that weed distribution maps by angle of zero degrees showed highest density of weeds to reach the economic threshold. Also component of the variogram showed that the distribution pattern of weeds changed at different directions. Different types of weeds were every high Dispersion according to sampling angle. Elongation patches direction was dependent on weed management operations performed in the years ago and morphological characteristics of weeds.

Keywords: Biological- economic models, Biology, Weed ecology, KBDSS

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Detection of *Carnation etched ring virus* in Greenhouses of Khorasan Razavi and Northern Khorasan Provinces by ELISA and PCR

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Abstract

In order to investigate the presence of *Carnation etched ring virus* (CERV), samples of carnation (*Dianthus caryophyllus*), Sweet William (*Dianthus barbatus*) and weed plants showing symptoms from greenhouses of Khorasan Razavi and Northern Khorasan provinces were collected in autumn 2009. Polyclonal antiserum was used in order to detection of CERV by Double- antibody sandwich-enzyme linked immunosorbent assay. Results showed that 54 samples (including carnation and Sweet william) out of 250 infected by this virus. In order to propagate the virus, we inoculated it on the indicator plants *Saponaria vaccaria* cv. Pink beauty, *Silen armeria and Dianthus caryophyllus* cv.Joker. Polymerase Chain Reaction (PCR) was carried out using specific primers for coat protein and movement protein genes of CERV. Two fragments of ~1500 bp and ~1000 bp for coat protein and movement protein were amplified by PCR, respectively.This is the first report of occurrence of CERV in greenhouses of Khorasan Razavi and Northern Khorasan provinces.

Keywords: Carnation etched ring virus, Caulimovirus, PCR

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Effect of Sowing Date, Plant Density and Weeds on Soybean (*Glycine max* L.) Growth Indices

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Abstract

To investigate the effects of sowing date, plant density and weeds on growth indices and yield of soybean (*Glycine max* L.) a field experiment was carried out during the spring 2009 at University of Zanjan as a factorial split plot on the basis of randomized complete block design, with three replications. Treatments were including factorial of sowing date in two levels (May, 27; and June, 9) and plant density in three levels (low density (25 plants. m^{-2}), optimum density (33 plants. m^{-2}) and high density (50 plants. m^{-2})) as main plot and weed interference at two levels (control and no control) as sub plot. Leaf area index (LAI), total dry matter (TDM) and crop growth rate (CGR) as growth indices with biological and grain yield of soybean were evaluated. Results indicated that crop canopy was closed earlier with the early sowing and increasing the plant density, that lead to increasing leaf area index and total dry matter. Also the maximum crop growth rate obtained from 50 and 25 plant.m^{-2} plant density and 27 May sowing date. LAI, TDM and CGR reduced in weed interference. The highest grain and biological yield (1283.04 and 2769.36 kg.ha^{-1} respectively) were obtained in first sowing date (27 May) and high plant density (50 plant.m^{-2}) in the absence of weeds.

Keywords: Biological yield, Crop growth rate, Grain yield, Leaf area index, Total dry matter

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Effect of Different Treatments on Dormancy Breaking and Seed Germination of Eastern dodder (*Cuscutamonogyna*Vahl) and African rocket (*Malcolmiaafricana* L.(R.BR.))

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Abstract

Dormancy of Eastern dodder and African rocket seeds makes the controlof them very difficult in orchards and farms. In order to study the effective factors in dormancy breaking of these two weeds species, a factorialexperiment based on CRD with three replications was conducted at the Research Laboratory of Birjand Faculty of Agriculture in 2008 and 2009. Treatments were: control, soaking in sulfuric acid 96% (for 15, 30, 60 and 90 seconds), moist chilling at +1 and -8°C for 15 and 30 days, scarification with sandpaper for 2 minutes, soaking in tap water at room temperature for 36 hours, placing eastern dodder seeds at hotwater (boiling water) for half, 1, 2 and 5mins, incubation of african rocket seeds ingiberelic acid 1 mM and incubation of Eastern dodder seeds after 7 and 11 months and African rocket seeds after 4 and 5 months dry storage at room temperature (25°C). Results showed that placing seed in hotwater, and sulfuric acid as well as scarification with sandpaper had the greatest effect on dormancy breaking of dodder seeds at two light/dark and darkness regimes, thereforehard seedcoat is the most likely causeof Eastern dodderseeddormancy. In the other hand, maximum germination (91.7%) of African rocket seeds was occurred where seeds incubated with GA_3, at light/dark condition. Indicating that the existence of a physiological seed dormancy.

Keywords: Eastern dodder, African rocket, Seed dormancy, Germination, GA_3

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۲۴

Evaluating the Effects of Water Quality and Additive (Ammonium Sulfate) on Glyphosate Herbicide Efficacy on Weed Control

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Abstract

To evaluate the effects of water quality and adjuvant (ammonium sulfate) in glyphosate herbicide efficacy on dry matter reducing of weeds in a barberry garden, a factorial experiment based on RCBD with three replications was carried out at Research Garden of Faculty of Agriculture, University of Birjand in 2010. Experimental factors were water different quality in two levels medium hard with 2950 ppm and hard water with 4774 ppm total soluble concentration) with soft water, glyphosate (roundup) dose in four levels including 2, 4, 6 and 8 lit.ha-1 and using and not using the additive (ammonium sulfate at 6 kg.ha-1). The results showed that raising herbicide dose increased the control percentage of weeds. Application soft water with herbicide had the most control percent and showed significant differences with other waters, So that the most and the lowest control percents was belong to soft water with glyphosate dose of 8 lit.ha-1 and hard water with glyphosate dose of 2 lit.ha-1, respectively. In addition the results showed that application ammonium sulfate with hard water on control percentage had significant .but had more effect on broad leaves species comparing with narrow leaves. Totally the effect of different factors on control percent increased over the time.

Keywords: Broad and narrow leaf weeds, Herbicide carrier, Dry biomass, Water hardness

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۲۵

Effects of Wood Treated with the Entomopathogenic Fungus *Metarhizium anisopliae* Against the Termite *Microcerotermes diversus*

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Abstract

The entomopathogenic fungus *Metarhizium anisopliae* (Metschnikoff) Sorokin, causal agent of green muscardine of insects, is an important fungus in biological control of pests. No reports exist on the impact of this fungus on *Microcerotermes diversus* Silvestri (Iso.: Termitidae) in the world. The present research evaluated efficacy of Strain DEMI001, from Saravan, Iran, against *M. diversus*. The trials included baiting with treated wood under laboratory and field conditions. Bait test was conducted using two methods: a) treated wood versus untreated filter paper, b) treated versus untreated wood. The lowest LC_{50} and LC_{90} values were found with treated wood vs. untreated filter paper, 7.6×10^5 and 2.8×10^6 (conidia/ml), respectively. In addition, the lowest LT_{50} (2.8 days) and LT_{90} (5.1 days) was obtained with 3.5×10^8 conidia/ml in conidial suspension of fungi in this test. In the field trial, after application of fungal pathogen, the average number of termites decreased from 1756 to 691 per wooden block. In addition, the mean wood consumption decreased from 59.75 to 27.81 g. Collectively, these results indicated this tactic (wood treated with the fungus) is effective for controlling *M. diversus*.

Keywords: Treated wood, Entomopathogenic fungus, Biological control, Termite

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۲۶

Faragir Trap: a New Approach for Rodent Pest Control

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Abstract

Poisons and traps are the most conventional methods used in rodent pest control. Because of environmental hazards of poisons, usage of the traps is preferred. In rodent pest control, Multiple-capture traps are more appropriate than single-capture traps. However the formers have not been commercialized in Iran so far. In present study, samples of multiple-capture live-trap were made namely “Faragir’s trap” which was granted by the patent number of 68186 dated 3/1/2011. The trap was constructed by transparent polycarbonate sheet containing two doors, temporary reservoir, capture space and main bait reservoir. For assessment 10 numbers of such traps were set in places having high rodent pest populations for 3 consecutive nights. Of 30 trap-nights, 23 rodents were captured which attained 77 percent of trap success. The Faragir’s trap has lower price, smaller size and easier construction than similar foreign multiple-capture live traps. Also, because of embedding of main bait reservoir, the smell of bait seems to be constantly available for stimulating of rodents. As the new approach in rodent pest control in various places and for rodent biological studies and field sampling, commercialization of this trap is recommended.

Keywords: Multiple-capture live-trap, Traps success, Rodent pest control, Field sampling

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۲۷

Resistance Characterization of Different Oilseed Cultivars of *Brassica* to Mustard Aphid, *Lipaphis erysimi* (Hem.: Aphididae) Under Greenhouse Conditions

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Abstract

The mustard aphid, *Lipaphis erysimi* Kalt, is one of the most severe pests of *Brassica* species in Iran and other tropical regions in the world. Seven cultivars of three *Brassica* species including *B. napus* (cv. Licord, Elite, Okapi, Hyola 401, and RGS003), *B. juncea* (cv. Land race) and *B. rapa* (cv. Park land) were evaluated to study the antixenosis and antibiosis resistance to *L. erysimi* under greenhouse conditions at 25±2 °C, 60±5% RH, and a photoperiod of 16:8 (L: D) h). Results of antixenosis test demonstrated that density of *L. erysimi* at different counting hours (48 and 72 h) was significantly different on examined cultivars ($P < 0.05$ and $P < 0.01$ after 48 and 72 h, respectively). Aphid density on Elite, Okapi, and RGS003 cultivars was significantly higher than that on the other cultivars. In antibiosis test, the results showed that there was a significant difference in aphid life-table fertility' parameters, with the exception of population doubling time (d_t), between different cultivars (Intrinsic rate of increase (r_m): $P < 0.05$; Net reproductive rate (R_o): $P < 0.05$; Mean generation time (T): $P = 0.05$ and Finite rate of increases (λ): $P < 0.05$). The highest aphid r_m was found on Land race cultivar (0.324 female/female/day), whereas the lowest aphid r_m was recorded on Elite (0.278 female/female/day). Our results suggest that Elite, Okapi, and RGS003 cultivars were the most resistant hosts for *L. erysimi* compared to the other tested cultivars. Resistant cultivars identified in this study could be used for management control of mustard aphid.

Keywords: *Brassica*, resistance, mustard aphid, *Lipaphis erysimi*, Iran

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جلد ۲۶، شماره ۲، تابستان ۱۳۹۱، ص. ۲۸

Brief report

First Report of *Endaphis perfidus* Keiffer (Diptera: Cecidomyiidae), as an Endoparasitoid of Pomegranate Aphid (*Aphis punicae* Pass.) in Iran

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Abstract

During a funistic survey of natural enemies of pomegranate aphid (*Aphis punicae* Pass.) in Kashmar region, specimens of an endoparasitoid belonging to Family Cecidomyiidae was collected which identified as *Endaphis perfidus* Keiffer 1896. *Endaphis perfidus* is one of the six species in the genus *Endaphis* in the world that was previously reported from Acer aphid, *Drepanosiphum planatoides* (Schrank) from England, France and Russia. The occurrence of this species in Iran is reported for the fist time. Also, the pomegranate aphid is reported here as the host of this parasitoid for the first time in the World.

Keywords: Aphid, Gall midge, Natural enemies, Pomegranate

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