



Effects of Clopyralid Mixed with Other Herbicides on Weeds and Yield of Sugarbeet (*Beta vulgaris*)

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Abstract

An experiment was conducted to evaluate the efficacy of clopyralid mixed with other herbicides weeds and sugar beet (*Beta vulgaris*) in 2008 at experimental field of research center of agricultural and natural resources research center of Khorasan Razavi. Experimental design was completely randomized block with three replications. Treatment were included doses of 350 and 500 ml.ha⁻¹ Clopyralid in combination with phenmedipham (5000 ml.ha⁻¹), phenmedipham+ desmedipham+ ethofumesate (4000 ml.ha⁻¹), chloridazon (4000 g.ha⁻¹), met amitron (4000 g.ha⁻¹), triflurosulfuron-methyl (60 g.ha⁻¹), haloxyphop-R-methyl (750 ml.ha⁻¹) and sethoxydim (2500 ml.ha⁻¹) along with full season hand weeding. Results showed that at the dose of 500 ml.ha⁻¹ in mixed with 300 ml.ha⁻¹ clopyralid had best weed control. Rate of 500 ml.ha⁻¹ clopyralid in Combination by phenmedipham, phenmedipham +desmedipham+ ethofumesate and chloridazon without significant difference were best control treatments. However phenmedipham had lowest toxicity since combination of this herbicide at dose of 500 ml.ha⁻¹ clopyralid was suggested with regard to ecological and economic aspect. The combination of 500 ml.ha⁻¹ clopyralid with haloxyphop-R-methyl and Sethoxydim were best treatments to control grasses, specifically *Cynodon dactylon*. Maximum root yield were obtained at combination of clopyralid dose of 500 ml.ha⁻¹ with chloridazon, haloxyphop-R-methyl, phenmedipham+desmedipham+ethofumesate, phenmedipham, and sethoxydim. A linear relationship was observed between sugar beet root yield and percentage of weed control.

Keywords: Herbicide combination, Betanal, Betanal Progress, Goltix, Gallant super, Lontrel, Nabu-s., Pyramin, Safari

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Evaluation of Tomato Cultivars Resistance to Root-knot Nematode (*Meloidogyne javanica*) in Greenhouse Conditions

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Abstract

Root-knot nematodes (*Meloidogyne* spp.) are one of the most important parasitic nematodes of tomato in the world and Iran as well. *Meloidogyne javanica* is the most widespread nematode in the tomato fields of Khorasan Razavi province. In order to evaluate the resistance, 12 tomato cultivars with two initial inoculation level of 5000 and 15000 eggs and larva of nematode in 1 kg soil have been used. The following parameters such as gall index, number of egg masses, final population, tomato root and stem weight were determined. In final rating of cultivars reaction, the two factor, gall index (GI) and reproduction factor (RF) were used. Result showed that Mobil cultivar was resistance in two levels of infection. Royal RS and King Rock cultivars showed hypersensitive reaction when infected by 5000 egg and larvae of nematode in the soil but they were susceptible while inoculation level increased to 15000 eggs and larva. The other cultivars were susceptible. In order to determine changes of total phenol level in tomato cultivars roots, 4 cultivars were selected. Sampling were daily measured by spectrophotometer within 12 days. Then total phenol calculated at microgram /gram root. Results indicated that total phenol of tomato cultivars and their blanks were significantly different ($p \leq 0.05$) with control. The total phenol noted in resistance varieties was more than susceptible varieties.

Keywords: Tomato cultivars, Susceptibility, Root-knot nematode, Resistance, Total phenol

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Evaluation of resistance caused by Arbuscular Mycorrhizal Fungi against Root Knot Nematode (*Meloidogyne javanica*) in Tomato (*Lycopersicon esculentum* Mill.).

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Abstract

In this research the effect of two species of Arbuscular Mycorrhizal Fungi, *Glomus mosseae* and *Glomus intraradices* on root knot nematode, *Meloidogyne javanica* was investigated and in different treatments the effects of this interaction on parameters of plant growth, nematode infection and mycorrhizal development were evaluated. Shoot fresh and dry weight significantly increased in mycorrhizal treatments and root fresh and dry weight increased significantly in nematode treatments. These changes may be related to plant growth promotion and induction of resistance against nematode by AMF and also increase of root weight because of gall induction by nematode infection. The parameters of nematode disease including number of galls and eggsacs significantly reduced in mycorrhizal treatments compared to nematode treatments that shows reduction of attack and inhibition of nematode propagation. In mycorrhizal frequency there is not significant difference between treatments that confirms root knot nematode has not inhibitory effect on mycorrhizal development. In mycorrhizal density we have significant difference between treatments of two AMF, that shows *G. mosseae* has a higher colonization ability and this demonstrate that lower ability of *G. intraradices* in control of nematode infection parameters may be related to low colonization percentage. Totally this experiment shows that we can use AMF as a biological control agent to control of root knot nematode and promotion of plant growth.

Keywords : Arbuscular Mycorrhizal Fungi, Root Knot Nematode, Tomato, Resistance

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Using Isobolographic Analysis for the Evaluation of Additive, Synergism and Antagonism Effects in Binary Mixture of Glyphosate and Clopyralid on *Acroptylon repense* Control

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Abstract

Mixing herbicides is an essential for weed management strategy of reduce herbicide using and reducing the risk of side-effects and costs of herbicides. Therefore, to study the effect of clopyralid and glyphosate and their mixtures on *Acroptylon repense* control, a field trial was conducted as split plot based on a completely randomized block design with 35 treatments (as dose-response arrangement) and three replications in Golmakan, Khorasan Razavi, Iran in 2007. Five mixtures ratios were as main plots and doses of the ratios were as sub-plots. Treatments included five mixture ratios (100:0%, 75:25%, 50:50%, 25:75% and 0:100%) of glyphosate and clopyralide. Glyphosate alone at doses of 0, 1, 2, 3, 5, 7 and 10 l ha⁻¹, clopyralid alone at doses of 0, 100, 200, 300, 500, 700 and 1000 ml ha⁻¹, plus mixtures ratios of the two herbicides doses as 75%:25%, 50%:50% and 25%:75%, respectively. Herbicides were sprayed by Matabi sprayer with cone nozzle and by considering 400 l ha⁻¹ herbicide solution. Mixture of herbicides followed CA model and showed additive effects on *Acroptylon repens*. Clopyralid at doses of 700 and 1000 ml ha⁻¹ and glyphosate at doses of 7 and 10 l ha⁻¹ showed complete control of *Acroptylon repense*. By increasing the clopyralid ratio in mixtures (75% clopyralid + 25% glyphosate) the control of *Acroptylon repense* remarkably increased in comparison with other mixing treatments.

Keywords: Dose- response, Herbicide mixture, Clopyralid, glyphosate, Reduce herbicide dose

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Comparison of Advanced Wheat Lines and Cultivars Resistance to Sawfly (*Cephus pygmaeus*)

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Abstract

In order to performance this project, 16 number of advanced lines and varieties of wheat which received from SPII section was evaluated to studying wheat resistance to wheat stem sawfly in Kurdistan Agricultural research station in Qamlo. The study was based on complete randomized block design with 4 replications. In period of two years the different stage of growing of wheat's lines and pest was studied. Comparison of two years mean by means of Tukey method showed that seven's variety had the highest (3.75%) whereas sixteen's variety (sardary) had the lowest infestation by sawfly. Also comparison of thousand seed weight (TSW) between the infected and uninfected heads determined that six's variety by 6.17 g reduction had the highest and nine's variety by 1.33 g had the least reduction in TSW. In addition the results showed that seven's variety by the number of 7 fallen bunches had the highest and sixteen's variety by attention to its dominant in the region and to be control plant in this study by 3 fallen bunches had the lowest loses. In this study also the study of relationship between morphological characteristics such as number stem in bush, number node in stem, stem diameter, hardness and softness, to be empty or solid and smooth or coarse of stems was recorded and relation of each factor with the amount of bushes infestation studied and revealed that past's worms prefer the thick stems.

Keywords: Wheat, Resistance, Advanced varieties; Stem sawfly (*Cephus pygmaeus*)



Intraspecific Aggressive Behavior of the Subterranean Termite *Microcerotermes diversus* Silvestri (Isoptera: Termitidae)

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Abstract

Microcerotermes diversus is an extremely destructive structural wood pest in Khuzestan province, Southwest Iran. A better understanding of basic termite ecology is necessary in order to search for alternative termite control methods. The aim of this study was to investigate intraspecific aggressive behaviors among four colonies of the subterranean termite, *M. diversus* collected from two different locations in Ahwaz, Iran. Termite interactions over 24 h were examined in paired combinations of castes (soldiers versus soldiers, soldiers versus workers, and workers versus workers). Highest and lowest mortality were observed in paired combinations of soldiers versus workers and soldiers versus soldiers from different colonies, respectively. Termite agonistic behaviors indicated that interactions between different colonies within a species, as well as between different castes within a colony, are variable. Interactions between colonies of *M. diversus* from the same geographic area are complex, and these interactions could influence termite control strategies and because intra- and interspecific agonistic behavior could influence termite foraging patterns. Therefore, it can be suggested that intercolony aggression can be used to delineate the foraging territories of *M. diversus* colonies.

Keywords: Agonistic behavior, Intra-specific, *Microcerotermes diversus*

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Study of Seasonal Changes of *Lobesia botrana* (Lep: Tortricidae) and Effect of Concentrations of Sexual Pheromone and Grape Variety on Attraction of Adults in Kurdistan Province

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Abstract

Lobesia botrana causes heavy damage on grape in Kurdistan province and Iran every year. Because of damage of this pest on grape varieties in Kurdistan province, this research was conducted with prepared delta traps and lures by Swedish Agricultural University. Results showed that the pest has three generations in every year. The flight peak of adult moths was assessed in 2011-2012. The flight peaks were 30th May, 27th June and 11th August in Sanandaj, 20th May, 14th July and 19th August in Saghez, 23th April, 3th July and 20th September in Sarvabad town (Marivan). Also, population density of adults (in Sanandaj, saghez and Sarvabad), effect of different concentrations of sexual pheromone (in Marivan) and effect of grape variety (in Saghez) on pest adults was compared. There was significant difference between populations of the pest adults in Sanandaj, saghez and Marivan. Among the sexual pheromone concentrations of 0.01, 0.1 and 1 mg, concentration of 1 mg had the most attractiveness on Adults of *Lobesia botrana*. There was significant difference on attractiveness of the pest adults between grape varieties of Askari, Rashe, Farhki and Bidaneh ghermez.

Keywords: *Lobesia botrana*, Flight peak, Pheromone concentration, Grape variety, Kurdistan

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Investigation of Nutsedge (*Cyperus* spp) Seed Bank and Seedling Relationships Using Geostatic Relations

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Abstract

A field experiment was conducted to investigate the spatial distribution of nutsedge (*Cyperus* spp) during rice growing season using geostatic in 2011 at Sari Agricultural Sciences and Natural Resources University. At the first field was divided into 36 grids (2.5×2.5 meter) after the final preparation. Grid intersection points were determined and marked. All samples were taken from these points during the crop season. The sampling from seed banks was performed in two stages before the field preparing and after the rice harvesting. Also weed density were determined using square quadrat (50×50 cm) in three different dates during the growing season. All data were transferred to the RockWork99 software for drawing maps of weed and seedling distribution. The results showed that the highest amount of weed population was belong to nutsedge. There was strong and medium spatial correlation as spherical and exponential variogram model between weed and seedling nutsedge at all stages of sampling. Meanwhile, the weed seed bank was patches with different sizes and densities according to spatial distribution maps. Seed bank patchy pattern at the beginning of season was in accordance with seed bank at the end of season and seedling germination pattern. Therefore the seed bank maps can be used as information database of seedling germination. The results of this study showed that spatial distribution monitoring in soil depth (0-10, 10-20 and 20-30 centimeters) can be a valuable tool for prediction of weed behavior and increases our understanding about dynamics of weed populations.

Keywords: Sampling depth, Soil, Spatial distribution, Spatial relationship

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Evaluation of the Effectiveness of Fipronil Insecticide in Control of *Chilo suppressalis* Walker in the Paddy Field

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Abstract

Long –term use of some of insecticides on rice striped stem borer (*Chilo suppressalis* Walk.) and for the reason the urgency of use of new suspension insecticide an experiment carried out, in paddy fields under condition at Rice Research Institute in Rasht, Iran. Treatments were as follow; 1-Fipronil G in first generation 2-Fipronil G. in second generation 3-Fipronil SC in first generation 0.5 lit. 4-Fipronil SC in second generation 0.5 lit. 5-Fipronil SC in first generation 1 lit. 6-Fipronil SC in second generation 1 lit. and Control. This experiment was conducted with randomized complete block design (RCBD) in 3 replications. Indexes of measurement were included D.h% , W.h%, the alive larvae percentage before & after the first and the second of pest and yield. The results indicated that the lowest rate of D.h at first generation was with granular 20kg. and suspension one lit. per ha. with 5.63, 5.57 percent, respectively. Also, in the second generation, the lowest rate of W.h showed in Fipronil G with 3.64% and SC 1 and 0.5 lit/ha with 4.24 ,4.96%, respectively. The yield of treatments, control except had not significant in 1% level. The highest of insecticidal efficiency in first generation, related to in fipronil granular 53.84 and SC (1 and 0.5 lit/ha) with 45.29 and 44.75, and in second generation, observed with formulations of granular and SC 1 lit/ha with 56.55 and 56.15 % ,respectively. Therefore, when we confronted with population increasing SSB, we can use Fipronil SC (1 lit/ha) in second generation.

Keywords: Rice, *Chilo suppressalis*, Fipronil, Chemical Control

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Investigation of Dormancy and The Effect of some Environmental Factors on Germination of Junglerice (*Echinochloa colona* (L.) Link.) Seeds

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Abstract

Junglerice, C4 plant and thermo-live of Poaceae family, is one of the most serious grass weed in the tropics and subtropics. To determine methods for breaking dormancy, characterizing cardinal temperatures and investigating the effect of salinity and drought on junglerice seeds germination four separate experiments were conducted in the laboratory. Results showed that the junglerice seed dormancy is physical and 10 minutes treated with sulfuric acid (95-97%) is the good way to break dormancy. Germination was occurred in temperature range 10 to 45 °C. Based on the results of the five parameters beta model, cardinal temperatures (minimum, optimum and maximum), were determined 3.7, 3.28, and 46 °C, respectively. Junglerice tolerance to salinity was high, hence the concentrations of 223 and 400 mM NaCl, were 50 and 9% germination, respectively. It was very sensitive to drought, so with exposing to the concentrations of -0.43 and -0.6 MPa showed 50 and 0 germination percent, respectively. Due to germination in wide range of constant temperatures, it could be concluded that it is likely that it could be invasive to other regions, especially tropics and subtropics. Apparently, It able to compete with crop in the saline and wet conditions. Although, due to the low germination percent in recovery test after salinity treatments, its invasion will be difficult in saline areas.

Keywords: Cardinal temperatures, Drought, Salinity, Physical dormancy

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Evaluation the Effects of Sowing Date, Cultivars and Herbicides on Different Weed Species and Soybean (*Glycine max* L.) Yield

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Abstract

To evaluate the effects of sowing date, cultivars and herbicides on weed species control and soybean yield, a strip split plot layout in a randomized complete block design with three replications was conducted in Dasht-e-Naz Company Sari-Iran, in 2008. Treatments included two planting dates (planting June 7th and 27th), soybean cultivars (BP, JK, 032, 033 and Sahar) and herbicide applications (1 - ethalfloralin pre-planting (3 lit/ha) 2 - ethalfloralin pre-planting (3 lit/ha) + metribuzine (700 g/ha) as simultaneously application 3- ethalfloralin pre-planting (3 lit/ha) + metribuzine pre-emergence (700 g/ha) 4 –bentazon post emergence (3 lit/ha) 5 - trifluralin pre-emergence (3 lit/ha) + bentazon post emergence (3 lit/ha) and 6 – the weedy check). Results showed dry weight of velvetleaf (*Abutilon theophrasti*), wild melon (*Cucumis melo*) and night shade (*Solanum nigrum*) decreased with delay planting. On the other hand, bermuda grass (*Cynodon dactylon*) and pigweed (*Amaranthus retroflexus*) had less dry weights in early planting. All soybean varieties in delayed planting date resulted in reduction of weeds dry weight but in early plantingm, soybean yield was 28% higher than the late planting. Ethalfluralin + metribuzin treatments as pre-planting and pre-emergence, reduced grass and broadleaf weeds dry weight in early and delayed planting dates respectively. By this mean, dry weight of weeds reduced in total the highest yield of soybean were achieved. BP, Sahar and JK produced 3505, 3480 and 3472 kg/ha yield respectively in weedy conditions.

Keywords: Planting date, Soybean varieties, Herbicide, Weeds dry weight

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Biological Control of the Citrus Nematode (*Tylenchulus semipenetrans*) by Antagonistic Fungi in Greenhouse Condition

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Abstract

In order to biological control of the the citrus nematode, *Tylenchulus semipenetrans*, soil and root samples were collected from citrus orchards in east of Guilan and west of Mazandaran. The juveniles were extracted from soil while eggs and females from roots. To isolate the antagonistic fungi, suspension of eggs and juveniles were cultured separately on water agar media containing streptomycin. The identified fungi were *Paecilomyces lilacinus*, *Fusarium oxysporum*, *Acremonium strictum*, *Fusarium solani* and *cladosporium cladosporioides*. To determine fungal antagonistic activities on citrus nematode, fungal treatments were evaluated in greenhouse conditions. Fungal nematicidal properties were compared with Fenamiphos (Nemacur) as a systemic nematicide belonging to organophosphate group. Two indices including the number of female per gram root and population of juveniles in 100gr soil were recorded. Results indicated that all fungi isolates had suppressive effect on *T. semipenetrans*. Compared Means revealed that *P. lilacinus* and *A. strictum* had the most effects on reduction of nematode population. *C. cladosporioides* showed the minimum effect on nematode control. Evaluation the time of inoculation showed that inoculating nematode 20 days after adding fungi had better results than other treatment. Among fungal species *P. lilacinus* and *A. strictum* were more effective than other species. However, *Fusarium solani* and *F. oxysporum* showed good effectiveness.

Keywords: Slow decline, Integrated management, Citrus nematode, Parasitic fungi

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The Effects of Different Photoperiods on Life Table Parameters of Dried Fruit Mite *Carpoglyphus lactis* (L.) (Acari: Carpoglyphidae)

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Abstract

Dried fruit mite, *Carpoglyphus lactis* L. not only to being one of the serious and economic pests of some stored products, but also to be 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 baker's yeast under laboratory conditions at three photoperiods including full darkness, full light and 16 : 8 (L : D), 70±5 relative humidity in 30 °C, based on age-stage, two-sex life table theory. Eighty eggs with the same age used at the beginning of trials as a cohort group and a fertility life table was constructed by following the cohort until the death of all individuals. The intrinsic rate of increase (r), finite rate of population increase (λ), the generation time (T) and the net reproductive rate (R_0) in full darkness were 0.55 day⁻¹, 1.74 day⁻¹, 8.27 day and 100.9 offspring, in full light were 0.43 day⁻¹, 1.54 day⁻¹, 8.8 day and 44.31 offspring and in 16 : 8 (L : D) were 0.5 day⁻¹, 1.65 day⁻¹, 9.04 day and 92.4 offspring, respectively. Significant difference was observed between intrinsic rate of increase (r), finite rate of population increase (λ) and the mean generation time (T) in three photoperiods. But no significant difference was observed in net reproductive rate (R_0) and gross reproductive rate (GRR) for the mentioned photoperiods. The results of this study can be used for optimization in mass rearing *C. lactis* as alternative hosts for rearing of predatory mites applying this prey.

Keywords: Two-sex life table, Intrinsic rate of increase, Fecundity, Developmental time

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Effect of Reduced Doses of Foramsulfuron and Different Sowing Density on Corn (*Zea mays* L.) Yield and Weed Biomass

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Abstract

In order to study the effect of reduced doses of foramsulfuron and different sowing density on corn yield and weed biomass an experiment was conducted using split plot arrangement based on randomized complete block design with three replications at Research Field of Ferdowsi University of Mashhad, in 2011. Main plots were weed management methods including four levels of reduced doses of foramsulfuron herbicide (0, 50, 75, 100% of recommended dose (2 l.ha⁻¹, OD 22.5%) and complete weeding (weed free treatment) and sub plots including four corn densities (5, 7, 9, 11 plant.m⁻²). Also, each plot was divided into two parts, the upper part of each plot was considered as unsprayed control (zero dose herbicide). Results showed that herbicide application and increasing corn density reduced weeds dry weight significantly ($P \leq 0.01$). Minimums of weed dry matters (621.42 g.m⁻²) related to treatment of reduced dose (75%) where reduced 48.2% comparing with weedy check treatment. According to the results, herbicide application and increasing corn density comparing to the weedy check treatment affected corn biological and grain yield significantly ($P \leq 0.01$). The differences between reduced and recommended doses with weed free control were significant but the corn yield in recommended dose with reduced doses treatments were not affected significantly. Also, these traits, increased significantly ($P \leq 0.01$) by increasing corn density. As a result, increasing of corn density, through increasing corn competitive ability, can reduced damage of weeds and the amount of herbicide.

Keywords: Equip, Competition, Sulfonylurea, Weeds control, Dry weight

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Brief report
Survey of Wild Mustard (*Sinapis arvensis*) Canopy in Competition With Wheat (*Triticum aestivum*)

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Abstract

In order to study effects of competition between wild mustard and wheat an experiment was conducted coinciding with additive series on form of randomized complete block with three replication and six wild mustard densities (0, 4, 8, 12, 16 and 32 plant m⁻²). In this experiment mustard pure stand was witness; three time sampling was conducted in 134, 155 and 177 days after planting and wild mustard canopy layered from the base in 20 centimeter interval. Wild mustard in mixed stand allocated more dry matter to stem, petiol and leaves in upper layers of the canopy than pure stand that it seem effect of wheat canopy on red to far red ratio caused change in wild mustard canopy distribution in direct to increase competition and more light absorption.

Keywords: Wild mustard, Competition, Canopy

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Brief report

Identification and Distribution of *Onion yellow dwarf virus* by Serologic and Molecular Methods in North and Razavi Khorasan Provinces

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Abstract

In order to detect *Onion yellow dwarf virus* in Khorasan province in Iran, onion samples from major onion growing regions where collected in spring and summer 2010. To determine the distribution of the virus, samples were randomly taken from onion fields in vicinity of Mashhad, Chenaran, Quchan, Torbate Heydarye, Neyshabur, Bardaskan, Gonabad, Fariman, Faruj, Shirvan, Bojnourd and Ash khane have been tested by DAS-ELISA method. Leaf samples showing mosaic, yellowing, rolling symptoms and complexity associated with dwarf onion bulbs glands were collected. Infection of samples with *Onion yellow dwarf virus* were confirmed using DAS-ELISA and RT-PCR tests. Total RNA was extracted from infected samples using RNX™ (plus) kit. To perform RT-PCR test cDNA was made and then PCR test was carried out. 1.5% Agarose gel electrophoresis of PCR products resulted in a fragment of 291 bp from CP of the virus. Amplified fragment were then sequenced. The virulence of the virus in greenhouse on three *Chenopodium* species (*Chenopodium album*, *C. quinoa*, *C. amaranticolor*) was confirmed. The results showed that onion field in Chenaran, Gonabad and Neyshabour infected with *Onion yellow dwarf virus* but no infection in other places.

Keywords: Onion yellow dwarf virus, Detection, host range, DAS-ELISA, RT-PCR

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Brief report
Comparison of Quantity and Quality of Different DNA Extraction Methods for
***Lysiphlebus* Species by Spectrophotometer**

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Abstract

DNA extraction with an appropriate quality and quantity is the first step in molecular identification of some group of insects that their identification morphologically is difficult and dependent on a particular life stage, size or gender. Selection of a suitable protocol is a key factor to provide a pure DNA. In this study quality and quantity of five extraction methods used in entomological laboratories were compared, including: CTAB, Phenol- chloroform, EST, Lysis buffer and Chelex methods. The quality and quantity of the extracted DNA was measured using spectrophotometer. Analysis of variance showed significant differences among the five methods. Results indicated that the Chelex method as a simple, available, the least time-consuming and less hazardous technique yielded the highest amount of DNA as a consequence it is suggested for *Lysiphlebus* spp. DNA extraction.

Keywords: Spectrophotometer, DNA, Chelex, *Lysiphlebus*

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