

Evaluation of the effect of Humic substance types and concentrations on germination and seedling properties of two triticale (*Triticosecale hexaploide* Lart.) varieties

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Abstract

Humic substances as an active part of soil organic matters can improve germination and seedling properties, plant establishment and plant growth. In order to study the effects of different concentrations of Humic and Fulvic acids on germination and seedling properties of two varieties of triticale (*Triticosecale hexaploide* Lart.), a factorial experiment based on a completely randomized design with three replications was conducted at the Special Crops Laboratory of Ferdowsi University of Mashhad during year of 2010. The studied factors included pretreatment concentrations at 4 levels (0, 10, 50 and 250 ml.l⁻¹), triticale varieties at two levels (ET 79-17 and ET 89-15) and Humic substances type at two levels (Humic and Fulvic acids). Germination percentage of triticale was 100%, in all treatments. Results showed that the highest germination rate, radicle and plumule length, radical and plumule dry weight and seedling dry weight of triticale were in 50 ml.l⁻¹ concentration of Fulvic acid and the second variety treatments. Generally, Humic acid pretreatments improved germination rate and seedling properties such as Fulvic acid compare to control. Seed pretreatment with Humic substances had significant effects on germination and seedling criteria of triticale.

Keywords: Fulvic acid, Germination rate, Humic acid, Soil improvement

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Evaluation of germination behavior of kochia seed (*Kochia scoparia* L. Schard.), under different temperatures and salinity stress levels

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Abstract

Kochia (*Kochia scoparia* L. Schard) is an annual, halophyte and drought resistant plant that can be irrigated with saline water and a valuable source for forage under drought and saline ecosystem. In order to evaluate the germination characteristic of kochia under different temperatures and salinity stress levels, an experiment was conducted at Physiology Lab of Ferdowsi University of Mashhad, Iran during year of 2009. The experiment was conducted in a completely randomized design with four replications. Treatments included nine levels of salinity (0, 5, 10, 15, 20, 25, 30, 35 and 40 dS.m⁻¹) using NaCl and eight temperature levels (5, 10, 15, 20, 25, 30, 35 and 40°C). Analysis of variance showed that the different levels of temperature and salinity stress had significant effects ($p \leq 0.05$) on percentage of germination, mean germination time, germination index, dry weight and length of seedling and interaction between temperature and salinity stress had the same effect. The highest percentage of germination was in 25°C and in control levels that didn't show any significant effect with 5 and 10 dS.m⁻¹. The shortest mean germination time observed at 25°C (20.1, 21.1 and 11.1 days in three primary treatments) and the highest one observed in 35 dS.m⁻¹ at 10°C. The highest germination index (20.37) occurred at 25°C and in control level. Also, by increasing in salinity level, dry weight and length of seedling decreased. Anyway, based on the results of the present study, kochia is able to germinate in different salinity levels and has a high ability to recover itself.

Keywords: Germination index, Germination percentage, Mean germination time

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Effect of planting date and crop density of autumn wheat (*Triticum aestivum* L.) on density and biomass of weeds

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Abstract

Weeds in wheat (*Triticum aestivum* L.) fields have always been a big problem in Iran and worldwide and must be managed by non-chemical especially cultural methods. A field experiment as factorial based on a randomized complete block design with four replications in a 1000 m² field in Research Farm of Shirvan College of Agriculture was conducted during 2007-2008. Treatments included wheat densities of 400, 600 and 800 plants.m⁻² and planting dates of 1st of Nov., 20th of Nov., and 1st of Dec 2007. The results represented that the presence of *Rapistrum rogosum*, *Phalaris* spp., *Descurainia sophia*, *Alopecurus myosurides* and *Hordeum murinum* dominance. Delay in planting of wheat increased relative density of weeds. The lowest relative frequency of weeds was observed in planting date of 1st of November. Increase in crop density significantly decreased weed biomass, while it showed little effect on weed density trend. Effect of planting date was also significant on weed biomass. The highest weed biomass occurred in the planting date of Dec. the 1st. In conclusion, delay in planting of wheat create more chance and space for weed establishment, and therefore planting dense (600 plants.m⁻²) and early in season of wheat is recommended for lower weed damage.

Keywords: Cereals, Cultural methods, Weed management, Weed relative frequency

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Survey of composition and abundance of weeds in irrigated wheat (*Triticum aestivum* L.) fields in South Khorasan province

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Abstract

The present study was conducted to quantify the density and abundance of weeds in wheat fields of South Khorasan province during 2010 and 56 species of weed from 16 plant families were identified in 240 farms of eight towns around this province. The most families in number of species were pertaining to Poaceae, Asteraceae and Chenopodiaceae with 15 (26.79%), nine (16.7%), six (10.71%) and six (10.71%) species, respectively. The most frequencies were related to yarrow (*Achilla biebersteinii* L.) by 37.38% from the Asteraceae family, hoary cress (*Cardaria draba* L.) from Brassicaceae family by 28.3% and common lambsquarters (*Chenopodium album* L.) from Chenopodiaceae family by 37.47%. Hoary cress, common lambs quarters, bermuda grass (*Cynodon dactylon* L.), camelthorn and prostrate knotweed (*Polygonum aviculare* L.) were allocated the highest average density of the weeds with 1.38, 1.31, 1.29, 1.27 and 1.04 plant.m⁻², respectively. The most abundant of weeds were camelthorn, common lambsquarters and yarrow. The highest and the lowest diversity were related to Qaen city with 29 species and Birjand City with 13 Species, respectively.

Keywords: Abundance Index, Diversity, Frequency, Shannon–Wiener Index, Uniformity

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Effect of different nitrogen fertilizers and various mulches rates on yield and yield components of garlic (*Allium sativum* L.)

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Abstract

In order to investigate the effects of nitrogen application rates and different planting beds on yield and yield components of garlic (*Allium sativum* L.), a field experiment was conducted as split plot based on a randomized complete block design with four replications at the Agricultural Research Station, Azad University of Torbat-e-Jam, Iran, during 2009-2010. Three Nitrogen application rates (0, 50 and 100 kg.ha⁻¹) and seven planting beds (20 and 40 t.ha⁻¹ manure, 20 and 30 t.ha⁻¹ sand and 5 and 10 t.ha⁻¹ wheat straw and control) were allocated to the main and the sub plots, respectively. Results indicated that the simple effects of nitrogen application rate and planting bed were significant ($p \leq 0.05$) on the leaf dry weight, bulb number, economical yield, biological yield and HI of garlic. Also, the interaction between nitrogen application rate and planting bed had not significant effect. By increasing in 50 and 100 kg Nitrogen ha⁻¹ enhanced economical yield of garlic up to 15 and 20%, respectively. The highest garlic economical yield was observed in 40 kg manure (1085.4 g.m⁻²) and the lowest was for control (723.5 g.m⁻²). There was a positive correlation between leaf weight and bulb number with economical and biological yield of garlic. It can be concluded that the agronomic operations enhanced growth characteristics and bulb number of garlic. It seems that increase economical and biological yields of garlic was due to improvement of its growth characteristics and bulb numbers.

Keywords: Bulb number, Manure, Mulch

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Effects of planting methods on morpho-physiological traits, yield and yield components of forage corn (*Zea mays* L.) cultivars in saline condition

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Abstract

In order to study the effects of planting pattern on yield and yield components in different cultivars of forage corn (*Zea mays* L.), an experiment was conducted at saline conditions ($EC=6.43 \text{ dS.m}^{-1}$) of Dasht-e-Malhe, Neyshabour during growing season of 2009-2010. Nine treatments and two furrow planting and furrow bed planting as main plots and three cultivars (KSC 704, ZP 644 and NS540) as sub plots as split plot based on RCBD (Randomized complete block design) were evaluated with three replications. Criteria such as plant and ear height, number of leaf.plant⁻¹, number of row/ear, number of kernel.row⁻¹, stem diameter, day to tasseling, day to anthesis, anthesis-silking interval (ASI), ear diameter and length quality index, number of ear.plant⁻¹, protein percentage and forage yield of corn were measured. The results showed that the significant differences between planting methods and corn cultivars for forage yield and most of measured traits. The highest forage yield (49.13 t.ha^{-1}) was belonged to raised bed planting method and KSC 704 corn variety. Superiority of raised bed planting than other methods can be related to its superiority in many of measured traits like plant height, ear no. plant, ear length and ear diameter of corn.

Keywords: Forage yield, Planting method, Salinity

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Evaluation of duck efficiency as a biocontrol agent on weed density and diversity in rice-duck farming (*Oryza sativa* L.)

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Abstract

In order to evaluate the effect of ducks number on weeds diversity and density in paddy fields, an experiment was conducted at Sari Agricultural Sciences and Natural Resource University during growing season of 2011-2012. Experiment was arranged in split plot based on complete randomized block design with four replications. Main factors were duck number at three levels (consisting of control, 400 and 800 ducks.ha⁻¹) and sub plots were three contrast cultivars (including Tarom as a traditional, and Shirodi and Ghaem as improved cultivars). Results of ANOVA showed highly significant differences between ducks, cultivars and ducks × cultivar interaction in terms of weeds density including nutsedge (*Cyperus* spp. L.), common Water-plantain (*Alisma plantago-aquatica* L.), barnyard grass (*Echinochloa crus-galli* L.), duckweed (*Lemna minor* L.), azolla (*Azolla pinata* R.Br.) and paddy yield. Accordingly, the lowest weed density and diversity were recorded at 800 and 400 ducks.ha⁻¹, respectively. Among rice cultivars Tarom and Ghaem had the minimum and the maximum weeds density and diversity. The highest nutsedge density (67 plant.m⁻²) was related to Ghaem cultivar in control (without duck) plots as much as 97% higher than 800 ducks.ha⁻¹. Maximum paddy yield was observed in 800 ducks.ha⁻¹ in Shirodi (5.3 t.ha⁻¹), Ghaem (4.3 t.ha⁻¹) and Tarom (3.6 t.ha⁻¹) as much as 23, 7 and 20% higher than those cultivars in 400 ducks.ha⁻¹, respectively. Finally, in the current research conditions using 800 ducks.ha⁻¹ and Tarom cultivar resulted the best performance because of the lowest weed diversity and density as compared to other treatments.

Keywords: *Azolla*, Barnyard grass, Duck weed, Nutsedge, Paddy yield

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Physiological responses of fennel (*Foeniculum vulgare* L.) to water limitation

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Abstract

Two field experiments were conducted at the Research Farm of the Faculty of Agriculture, University of Tabriz, Iran during 2009-2010 and 2010-2011, to evaluate the response of fennel (*Foeniculum vulgare* L.) landraces to limited irrigation. Experiments were arranged as split plot based on randomized complete block design in three replications with irrigation treatments (Irrigation after 60, 90, 120 and 150 mm evaporation from class A pan) in main plots and landraces (Hamdan, Ezmir and Gaziantep) in subplots. Chlorophyll a, Chlorophyll b and Proline contents, soluble carbohydrates, relative water content and leaf water potential of fennel were recorded at flowering stage. The results showed that the all traits of fennel were significantly affected by limited irrigation. Chlorophyll a, chlorophyll b, relative water content and leaf water potential decreased by 30, 24, 27 and 41%, but proline and soluble carbohydrate increased by 41 and 23%, respectively, due to water deficit. Ezmir and Hamdan were more drought tolerant than Gaziantep land race. Therefore, fennel plant uses osmoregulation by increasing proline and soluble carbohydrate in order to tolerate water limitation.

Keywords: Chlorophyll, Leaf water potential, Relative water content, Proline, Soluble carbohydrate

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