Evaluate the effects of nitrogen fertilizers on rapeseed under auxiliary materials application

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Abstract

Nitrogen is one of the limiting factors for crop production in the world. However, a large percentage of the fertilizer used in the leaching and evaporation loss, need more material to help illustrate the effect of nitrogen fertilizers better. Studies have demonstrated various sources of nitrogen have a significant effect on its performance. In this study, zeolite, super absorbent polymer, clay compared as an effective material for reducing leaching and gelatin capsules as a barrier to reduce evaporation and fertilizers leaching of nitrogen urea, ammonium sulfate, potassium Nitrate.

To improve the effect of nitrogen fertilizers on the yield of oilseed rape, factorial experiment based on randomized complete block design with three replications was conducted in the Greenhouse of Tarbiat Modarres University. Treatments were auxiliary materials including: control levels, 8 and 4 mL gelatin capsules, zeolite (8 t ha^{-1}), super absorbent polymer (100 Kg ha^{-1}) and clay (to the extent that the clay soil Level 25% required) and without application auxiliary materials. And chemical fertilizers, including urea, potassium nitrate and ammonium sulfate, respectively. The amount of each chemical fertilizers based on the delivery of 40 kg N ha for each pot was calculated in two steps by installments. All treatments were applied to the soil.

In the present experiment there was not a significant difference in the number of seeds per plant between different levels of fertilizers in terms of the on use of auxiliary materials. The results showed that the use of gelatin capsules plus urea and the use of clay without the use of fertilizers had the highest and lowest yield respectively, with 1.6 g difference. The use of gelatin capsules and clay in terms of urea were found highest and lowest percentage of oil, respectively, with 8.8% difference. Zeolites and clay with 0.211 grams difference, urea and potassium nitrate with 0.17 g of oil had the highest and lowest oil yield. It was also found urea fertilizer with zeolite or clay could increase SPAD index values relative to control.

The results of this experiment showed that the use of these substances, especially gelatin capsules, can help to increase the impact of nitrogen fertilizers and yield, especially rapeseed oil to improve performance.

Keywords: Nitrogen, Zeolite, Gelatin capsule, Yield and yield components

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Assessment of Relationship Between Effective Traits on Bolting and Root Yield of Sugar Beet lines for Autumn Sowing

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Abstract

Background and objectives: Due to the gradual warming of the planet, it is expected in the future to replace the spring cultivation of sugar beet by winter ones. However autumn sowing sugar beet in many areas is facing with the risk of bolting and flowering. Modified sugar Beet varieties resistant to bolting for autumn planting are one of the main goals of such initiatives. Excessive flowering stems reduce sugar content, root yield and purity of the raw syrup.

Materials and methods: To study on relationship among bolting, yield performance and morpho-physiological traits including % Bolting, % Sucrose, % Electrolyte Leakage, % Emergence, Growth Status, Growth Uniformity, % Cold Tolerance, Leaf Area, Specific Leaf area, Bolting Height, Root Yield, %Dry Weight, Root Length and Root Diameter. In winter sugar Beet genotypes, 47 Half sib breeding lines with 3 checks, were evaluated in block design in Torogh, Mashhad, Khorasan Razavi, Agricultural Research Center and Natural Resource in 2013-2014.

Results: Result of variance Analysis showed that the effect of genotype on bolting percentage, sugar content, state of growth, cold tolerance percentage, leaf area, height of bolting stem, weight of root, length and root diameter were significant at 1% level. The results of correlation showed that the highest positive correlation between root yield and root diameter (0.784) and the highest negative correlation between bolting percentage and leaf area (-0.537). Stepwise regression analysis revealed that root diameter, cold tolerance percentage, state of growth and height of bolting stem significantly justifies changes of root performance. Height of bolting stem and leaf area were the most important traits that affecting on bolting and among them leaf area had negative effect on bolting. Also the height of bolting stem had negative effect on sugar content among all traits such as weight of dry root, the height of bolting stem and weight of root that influence sugar content. Factor analysis with principal component method showed all the characteristics split to four factors, root performance, bolting, sugar specification and germination that justify 70.88% changes of the total variance.

Conclusion: Cultivars resistant to bolting for autumn sowing sugar Beet breeders is an important goal for us. In general, the results and the nature of the traits can be used in future research results for resistance to bolting germination, bolting, yield and sucrose for a better future studies further considered. Also, the physiological characteristics of cold tolerance can be used.

Keyword: Beta Vulgaris, Resistance to Bolting, Factor Analysis, Stepwise Regression, Correlation

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Evaluation empirical models of competitiv ability of four wheat varieties to Japanese borom (*Bromus japonicus* L.)

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Abstract

Background and objectives: Weed management is one of the effective methods to maintain capacitance of production. Weed density is a quantitative effective factor in competition with crop. Recently, in the management of weed communities, instead complete elimination weed of farm, work to recognition and quantitative assessment of the behavior and effects of weed in crop ecosystems. This requires is knowledge of crop-weed properties during the growing season and their interaction and quantify of the competition. So far, several experimental models to express the relationship between crop yield loss in the presence of weed suggested. These models are used to understand concepts such as the intensity of competition and thresholds of weed control. Hence this study was done in order to assess the competition of various densities Japanese borom weed and four varieties of wheat (Hamun, Hirmand, Bolani and Kalak afghani) and prediction of yield loss using experimental models and compare its performance.

Materials and Methods: This study was carried out to evaluate empirical models of competition, as based on a factorial arrengment using a rarandomized complete blocks design (RCBD) with four replications at field experiment was conducted at the Chah Nimeh field experiment station University of Zabol, in 2014-2015 growing season. In this experiment Hamun, Hirmand, Bulani and Kalak afghani varieties were planted with density of 400 plants m-^{2}. Simultaneously with planted of wheat, Japanese borom (*Boromus japonicus* L.) with densities of zero, 100, 150, 200. 250 and 300 plants m-^{2} were planted. At the end of the growing season, the final harvest of the lower half of each plot was performed by observing the marginal effect and in the area a square meter. To estimate grain yield loss of wheat varieties in different levels of weed density was used of density-yield loss model, one-parameter and two-parameter models of relative weed leaf area and one-parameter and two-parameter models of relative weed dry weight. In this research was used to softwares SAS and Sigmaplot and Excel to analysis of variance and estimation of model parameterse and plot graphs.

Results: Our results based on yield loss models confirmed that biological yield decreased less than grain yield (Grain yield was more susceptible).Obtained relative damage coefficients (q parameter) of one and two-parameter models based on relative leaf area and relative dry matter were indicative of high competitive ability of japanese borom than wheat varieties. Comparison of several empirical yield loss models showed that models based on relative leaf area and relative dry matter of Japanese borom with Minimum regression root mean square error, had more efficiency in predict of wheat grain yield loss in compared with yield loss-density model.

Conclusions: Overall our results of this study showed that Japanese borom weed is exist a strong competitor to wheat varieties. Also addition of weed density reduced grain yield and biological yield wheat varieties investigated linearly. Wheat varieties were different of sensitivity to weed interference. Compare the performance models was suggested excellence of weed relative leaf area and dry weight relative models to density-yield loss model. As a result of these models can be used to a good measure to predict of wheat yield loss in interference with the Japanese borom weed.

Keywords: Model efficiency, Relative dry matter, Relative leaf area, Yeild loss

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Economics estimation of potassium fertilizers and zeolite clinoptilolite in wheat production

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Abstract

Introduction: Wheat production is considered one of the strategic objectives of the governments in view of the importance of wheat to feed a growing population and achieve self-sufficiency in production. Hence, in recent years, the highest acreage is allocated to wheat among crops (5). However, shortcomings such as incorrect use of production factors (Water use, cultivation, fertilizer, pesticide and seed) has resulted lack of good performance. Yield production and farmers' income maybe increased through correct and optimal use of available production factors and improving farm efficiency. Lack of attention to the correct use of limited inputs by farmers and low productivity has caused inappropriate qualitative and quantitative development of wheat production (2).

Materials and methods: The economy estimation of zeolite application for wheat production an experiment was conducted based on combined analysis from two completely randomized block design each of which included five treatments with four replications in research farm of Agricultural and Natural University of Gorgan. Treatments were combined urea fertilizer, potassium sulfate, Di ammonium phosphate at (a) 0, 0, 0, (b) 200, 0, 250, (c) 200, 100, 250, (d) 200, 200, 250 Kg ha^{-1}, respectively and also (e) urea fertilizer + DCD + potassium sulfate + Di ammonium Phosphate at 200, 15, 200 and 250 Kg ha^{-1}. Yield and yield components and also nitrogen, Phosphorous, potassium, calcium and magnesium in grain and straw were determined at harvest. Soil potassium, Ca, Mg, P and N were also measured pre-heading.

Results: Bio-economic analysis show that increasing soil ammonium, nitrate, potassium, calcium and magnesium improved grain and straw yield and increasing soil phosphorous reduced grain yield. Nitrogen fertilizer use efficiency was improved and fertilizer loss was decreased by potassium fertilizer application. Nitrogen and potassium fertilizer use efficiency was improved and fertilizer loss was decreased by zeolite application. Zeolite and chemical fertilizers increased grain and straw yield production and net income during the first three years.

Conclusion: Consumption of 200 Kg ha^{-1} potassium sulfate with zeolite is economically viable and increased grain and straw income, net income and additional income compared to the control in the first three years. Due to the persistence of zeolite in the soil for a long time, the economic efficiency of the use of zeolite increases with the passage of time over the years. The use of zeolite is a long-term investment and even its consumption in the first year is also cost-effective. Zeolite expenditure is amortized over years (e.g. in the periods of 20 years or more). Although the application of 200 Kg ha^{-1} of potassium sulfate and dicyandiamide increased the production of grain and straw, but their high price caused lowers net income and negative effect on added income from wheat production.

Keywords: Wheat, Zeolite, Economy, Potassium, Dicyandiamide

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Effects of mycorrhiza and superabsorbent polymer on some root morphological characteristics and grain yield of chickpea under rain-fed conditions

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Abstract

Background and aim: Researchers and experts interested on legumes in rotation for reducing chemical fertilizers. The use of biological resources instead of chemicals can play an important role in maintaining fertility and soil biological activities; also increased the quality of agricultural products and ecosystem health. Applying mycorrhiza and superabsorbent as factors of preserving water and supplying nutrients for plants are important in dry farming.

Materials and methods: The experiment was conducted in Lorestan province (Noor Abad city) as a split-factorial arrangement based on a randomized complete block design (RCBD) with three replications. Two different chickpea cultivars ('Arman' and 'Azad') were used as the main plot and superabsorbent polymer at three levels (0, 100 and 200 Kg ha^{-1}) and mycorrhiza at two levels (0 and 200 Kg ha^{-1}) were served as the sub-plots.

Finding: Cultivars were not different significantly according to considered traits. Using superabsorbent (200 Kg ha^{-1}) increased biological yield (5.9%), grain yield (9.4%), root length (18.5%), number of nodules (19.7%) and root volume (21.9%). Results indicated that mycorrhiza application improved biological yield (4.7%), grain yield (4%), root length (12.8%), root dry weight (8.3%), and root volume (11.7%). The interaction of superabsorbent and mycorrhiza was statistically significant on biological yield, grain yield, root length, and the number of root nodules of chickpea.

Results: Applying superabsorbent and mycorrhiza increased root traits and grain yield, however, when they were used together, their positive effects on the yield and root traits were more than they were applied separately. Regarding to the water resources shortage in the country, simultaneous using of mycorrhiza and superabsorbent; in addition to improving chickpea yield under rain-fed conditions, can provide bases for organic agriculture, system sustainability, finally more environment health.

Keywords: Mycorrhiza, Superabsorbent, Root traits, Chickpea

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Effects of sowing date and plant density on some of the agronomic traits and di-allyl disulfide oxide (Allicine) content of Garlic *(Allium sativum L.)*

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Abstract

Background and objectives: Garlic *(Allium sativum L.)* is one of the most important plants in Hamadan province. Hamadan province with more than 2000 ha of garlic growing areas ranks first in Iran about 62 percent of garlic of Iran is produced in agronomical farms of this province. Relative efficiency and area under cultivation made this crop as special crop for this region. Main factor affecting yield and other agronomic characteristics are sowing date and plant density. Because of importance of sowing garlic in Hamedan province this research was conducted on sowing date and plant density of garlic.

Materials and methods: In order to evaluate the effects of sowing date and planting density on some of the agronomic traits and Di-allyl disulfide oxide (Allicine) content of Garlic, *(Allium sativum L.),* an experiment was conducted in the growing seasons of successive years of 2012-2013 at the agronomical farms of Hamadan. In this research used garlic as a medicinal herbaceous plant and the treatments were different sowing dates and plant density. The experiment performed as split plot layout based on a complete randomized block design with four replications. The main factor was the sowing date with three levels (7 th october -22 th october- 6 th november) and sub factor was plant density with three levels (40000, 80000 and 120000 plants ha^{-1}). The agronomic traits that studied in this research were bulb diameter, bulb let weight, bulb let length, bulb let diameter, and Di-allyl disulfide oxide (Allicine) Content, and seeds of garlic provided from Hamadan Natural Resources and Agricultural Research Center. Di-allyl disulfide oxide amount was measured by Gas Chromatography (GC).

Results: The results showed that various sowing date and plant density had significant effects on bulb diameter, a clove weight, clove length and diameter and percentage of Allicine. The interaction effects of different sowing date and plant density had significant difference on percentage of Allicine, but no significant effect on other characters was seen. The highest bulb diameter and clove length was obtained from sowing date of 7th October and 120000 plants per hectare and the highest of clove weight and diameter were obtained from the combination of 7th October and 40000 plants per hectare. The results showed that maximum amount of Di-allyl disulfide oxide was obtained from the combination of 6 th November and 40000 plants ha^{-1}.

Conclusion: Based on the result of this experiment, 6th November sowing date with 40000 plants in hectare is suitable to achieve the highest yield and high Di-allyl disulfide oxide (Allicine) Content of garlic as a medicinal herbaceous plant in Hamadan province.

Keywords: Allicine content, Bulblet, Essential oils, Medicinal plants and Yield

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Comparison of two critical nitrogen equations to estimate nitrogen nutrition index for maize in Pakdasht region

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Abstract

Background and objectives: Monitoring nitrogen nutrition index (NNI) during the growing season can lead to improve fertilization management which will cause less damage for environment and water resources. NNI is the ratio between measured nitrogen concentration and critical nitrogen in plants that reveals the status of nitrogen stress during periods of growth. The critical nitrogen concentration in plants can be obtained by critical nitrogen equations. Since determination of these equations is time consuming and costly, the equations which were proposed in other region have being usually used. But the results of the former studies have proved that climate variation, plant varieties and different agricultural managements can cause changes in these equations for new conditions. The main objective of this study was to verify and compare two nitrogen critical equations proposed in France and China, in order to estimate the NNI for maize in the region of Pakdasht.

Materials and methods: Hence, maize (single cross 704) for a season was planted at the farm of Aburaihan College. Treatments set during the growing season based on different nitrogen levels, from low to high, and samples of plant were taken to measure dry matter (W) and the concentration of nitrogen in the plant (% N). They included seven different levels of nitrogen as control (N0), 50(N1), 100(N2), 150 (N3), 200(N4), 250 (N5) And 300 kg of nitrogen per hectare (N6) by urea (containing 46% nitrogen) and were designed by randomized complete blocks in three repetitions. In order to verify these critical nitrogen equations, the procedure which is explained in material and methods was applied. Eventually, for investigating the impact of each equation in estimating NNI, the variation range of calculated NNI and its relation with relative grain yield were obtained and compare with other results.

Result: Generally, the results indicated the nitrogen critical equation which proposed in China was more compatible for Pakdasht region. The nitrogen status of the 14% data was overestimated by Chinese equation while nitrogen status of 21% data was estimated wrongly by the equation proposed for France. The less ranges of calculated NNI based on Chinese equation is other reason that show it's rather accuracy in Pakdasht. Also by calculating NNI based on both equations, during growing season, it was demonstrated periods when treatments were encountered a lack of nitrogen. Finally it was indicated while calculating NNI based on both equation, during growing season, becomes less than 1.11, relative grain yield will decline.

Conclusions: Generally results indicates that the proposed critical nitrogen equation in China was better tools for diagnosing maize nitrogen status in Pakdasht because of the similarity in climate condition. In addition the NNI based on Chinese equation was more compatible for maize (single cross) in Pakdasht climate. However, both equations had more error in comparison of the regions it was developed.

Keyword: Nitrogen nutrition index, Critical nitrogen concentration, Maize, Critical nitrogen equation

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The effect of wind mechanical stress on some morphophysiologic traits of two semi-dwarf and normal wheat (*Triticum aestivum*) cultivars

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Abstract

Background and objectives: Mechanical stresses such as wind stress can have an important role on plants adaptation and ecophysiology. Generally, reducing plant height, leaf area reduction, increased stem diameter; fresh and dry weight loss is the most common reactions of plants against mechanical stresses of wind. Wind blowing could increase respiration, transpiration and reduce the water content, so changes the chemical composition of the cell wall and changes in hormone production of plants. Moreover, by increasing the intensity of the wind stress plants may be face lodging. Lodging impede the flow of water and nutrients needed by plants and prevents the flow of assimilated substrate in photosynthesis to the developing roots or seeds, as a result, kernel filling is impaired. As well as, lodging increases relative humidity in a plant community that lead to mold growth and spread of disease. Many areas of Iran facing with intense winds at the wheat reproduction stage, and due to the erectness of its culm, lodging could be happened. There is enough variation in tolerance of wheat cultivars against wind, therefore the effects of mechanical stress caused by the wind blowing in two wheat cultivars; Rowshan (tall and old) and Sirvan (new and semi-dwarf) were evaluated.

Materials and methods: According to the above cases In order to evaluate the effects of mechanical stress caused by the wind blowing in the wheat, a three-factor factorial experiment in a completely randomized design with three replications was conducted in the experimental greenhouse of Ferdowsi University of Mashhad in 2014. The factors included the wind speed (5, 10 and 15 meters per second) indifferent wind blowing duration (15, 30and45minutes) and two varieties of wheat; Roshan (tall and old) and Sirvan (new and semi-dwarf). For applying the treatments, pots were placed in a special chamber for mechanical wind stress in the same greenhouse.

Results: Results showed that the amount of plant height, plant leaf number, height of first node after treatment applying, plant dry weight, were decreased with the increase of wind speed and wind duration in both the Sirvan and Roshan cultivars, the decrease was less in the Sirvan compared to the Roshan. In both cultivars the greatest amount of above mentioned traits were observed in control treatment without wind. According to the experimental observations, it can be argued that the lodging caused by the wind leads to damage in the plant. It seems that regarding more resistance of the Sirvan against lodging, the cultivar was less affected by damage caused by the wind.

Conclusion: In general, Sirvan compared with Roshan, was less affected by wind stress and decreasing trend of the studied traits on Sirvan was less severe. Sirvan is a semi-dwarf cultivar that is resistant to lodging, that's why it seems that the cultivar was less impressed by increasing the speed and duration of the wind blowing.

Keywords: Loading, Morphological and physiological traits, Wind speed

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Effect of Brassinosteroide on yield potential and yield components of safflower under different irrigation regimes

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Abstract

Background and objectives: Safflower is cultivated for a long time in the past. This plant is tolerant to drought and salinity stress. Since the safflower is one of the important oil seeds crop, so this plant was selected for this study. In Ardebil, safflower not cultivated widely in farms as an useful oilseed crop. It has been decided to conduct an experiment on yield components in rainfed conditions in Ardabil, under application of brassinosteroide and non-consumption it and if appropriate and affordable performance it would be extent to farmers.

Materials and methods: In order to investigate the effect of water deficit stress on some physiological traits of safflower, an experiment carried out as a split plot factorial based on randomized complete block design with three replications in Agricultural Research Station of University of Mohaghegh Ardabili in 2014. The main factor was three irrigation schedules as irrigation after 80, 120 and 150 mm evaporation of the class A pan, and subplots, consisted of three safflower cultivars (Goldasht, Sina and Faraman) and two levels of Brassinosteroid (control and 10^{-7} M).

Results: The results showed that drought stress reduced plant height, harvest index, biological yield, seed yield and seed yield components of safflower. The highest plant height belonged to Sina, and because Goldasht dwarf, had the lowest plant height. In Faraman and Goldasht the highest and lowest number of seeds in Capitol, and number of Capitol in plant obtained respectively. But in thousand seed was the opposite, because of high competition among seeds for the absorption of nutrients and cultivar with the highest number of seeds in capitol and capitol in plant had the lowest seed weight. In seed yield, Sina and Goldasht were in same statistical range, but Faraman had the highest seed yield. In biological yield, Faraman had the highest, and Goldasht the lowest. But in harvest index three cultivar were in one statistical domains. Sina was more Water use efficient than other cultivars in mild and severe stress. Brassinosteroide consumption result, improved plant height, yield component, seed yield, biological yield, harvest index and WUE.

Conclusion: Based on main effects, in cold regions like Ardabil Faraman cultivar had better growth and produced higher capitol in the plant, seed in the Capitol, seed and biological yield. Also Brassinosteroide consumption, result to increase water absorption and improve plant growth, and thereby improve seed yield and biological yield.

Keywords: Brassinosteroide, Cultivar, Drought stress, Safflower

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Effect of some agronomical factors on the critical period of weed control in soybean

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Abstract
Background and objectives: The critical period of weed control (CPWC) refers to a part of crop growing season in which weeds should be removed in order to prevent maximum crop loss due to weed competition. Major factors which can influence the CPWC are planting date, cultivar and crop density. Planting date is impressive on the weed-crop interference. Soybean cultivars are different from the view point of competition with each other. This subject maybe related to competitive or allelopathic characteristics. Crop plant density also has an inhibitory effect on the weed density. There is not a research on these factors in the region.
Material and Methods: This research was done in two separates experiment in a field that located in Sari Dashte naz agronomical company. The first experiment done in split plot factorial and RCBD design with three replications in 2013. Treatments were planting date in two levels (5 June and 24 June) as main factor and cultivar in two levels (033 and Agili) and weeding (with 12 weeding time) in factorial interactions as sub factor. Second experiment with split plot form, two factors in RCB format and three replications operated. First factor was planting density in two levels (31 and 42 p m^{-2}) and second factor was different management (removal and weedy treatments). Treatments were placed in two groups based on soybean growth stages in both study. In the first set, the crop was kept weed-free until the growth stages of emergence, 1-trifoliate, 3-trifoliate, 5-trifoliate and flowering. The beginning and end of the CPWC based on 5% loss of the marketable seed loss, was determined by fitting Logistic and Gompertz equations to the relative yield data representing increasing duration of weed interference and weed-free period for three factors.
Results: According to 5% acceptable yield loss beginning of CPWC for early and late planting date estimated 29 and 359 Degree Day After Planting (DDAP) and ending of CPWC were 1678 and 1258 DDAP. Appropriate sooner opportunity such as irrigation and fertilization in early planting, gave more time to weeds in order to germination and competition with soybean and resulted in become longer CPWC. Mean weed density was 77 plant m^{-2} and dominant species were Velvetleaf, Black nightshade and Redroot Pigweed. The beginning of CPWC was uniform for both cultivars but duration CPWC was longer in Agili. Cultivar 033 had more growth rate and could close sooner canopy. For these reasons its CPWC was shorter. With increasing crop density there was not any CPWC. This finding was described through weed density reduction especially redroot pigweed which required to light for germinating.
Conclusion: Differences in CPWC due to planting date documented in this study highlight the need for a greater understanding of environmental factors affecting competition for limited resources. A practical implication is that early sowing requires more intensive weed management than late, at least in the north-east Iran. On the whole late planting with more density and using 033 cultivar, not only can reduce herbicide dose but also reduce risk injury to the next crop in rotation.

Keywords: Competition, Agronomical management, Yield loss

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Effect of temperature during grain filling stage on some grain quality characteristics of rice in Mazandaran province

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Abstract

Background and objectives: Grain quality (GQ) in rice is one of the most important factors in the pricing and marketability by consumers. Development and production of rice cultivars with high GQ is also important in the breeding programs. GQ is highly affected by genetic and environmental factors such as temperature (T, °C). Therefore, this study aimed to investigate the effect of different local climates on GQ of two different rice cultivars (cvs. 'Tarom Hashemi' and 'Shiroudi') and also to quantify the relationships between GQ with average air temperatures (AAT) during the reproductive stage of rice (from anthesis stage (50% of flowers opened) to harvesting time) at the paddy fields of Babolsar, Amol and Polesefid cities in Mazandaran province.
Materials and methods: Three field experiments were conducted separately based on the randomized complete blocks design with four replications, in the paddy fields of Babolsar (–21 m under sea level, asl), Amol (+24 m asl) and Polesefid (+625 m asl) cities in northern Iran in 2014. All agronomic managements were done based on local recommendations in each region. Moreover, all studied traits were measured in the grain quality laboratory at Rice Research Institute of Iran, Deputy of Mazandaran (Amol) three months after harvesting.
Results: The results indicate that the effects of different local climates were statistically significant on the content of amylose, protein, gelatinization temperature, gel consistency and, grain length and width after cooking (*P*< 0.01). In all traits, the values related to Polesefid were better (with a high GQ) than both Amol and Babolsar which can be resulted in lower T during the reproductive stage, particularly in the grain filling stage. A general equation could describe the relationships between studied traits with AAT as well as. In general, amylose content (1.9 and 0.9 %, respectively), grain length after cooking (0.33 and 0.14 mm, respectively), grain elongation (0.05 and 0.04, respectively) and gelatinization temperature (0.98 and 0.47 °C, respectively) increased linearly per Celsius (°C) increase in AAT in both 'Tarom Hashemi' and 'Shiroudi', respectively. Moreover, protein content (0.8 and 0.4 %, respectively), grain width after cooking (0.06 and 0.08 mm, respectively) and gel consistency (15.2 and 5.2 mm, respectively) decrease linearly per Celsius (°C) increase in AAT in both 'Tarom Hashemi' and 'Shiroudi', respectively.
Conclusion: Based on our findings in this study, GQ variation depended to T can simply be quantified in both cultivars ('Tarom Hashemi' and 'Shiroudi') under different local climates conditions of Mazandaran.

Keywords: Different local climates, Regression analysis, Rice, Grain quality, Temperature

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Alleviatory activities in mycorrhizal tobacco plants Subjected to increasing chloride in irrigation water

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Abstract

Background and objectives: Excessive quantities of chloride in the cured leaf reduce the rate of burn and cause certain adverse effects such as increased hygroscopicity, dinginess, uneven colors and undesirable odors in cured tobacco leaves. Arbuscular mycorrhizal fungi (AMF) are associated with the roots of over 80% terrestrial plant species including halophytes, hydrophytes and xerophytes. AMF have been shown to promote plant growth and salinity tolerance; they promote salinity tolerance by employing various mechanisms. To date, no information is available about the interaction between of AM fungi and high chloride concentration in irrigation water on the agronomical and physiological responses of tobacco.

Material and Methos: Field experiments were conducted in the field research of Payame Noor University, Gorgan, Golestan province, Iran during two years (2012-2013). A factorial randomized block design with four replications on agronomic and chemical properties of Virginia tobacco (cv. K-326, included two mycorrhizal (*Rhizophagus irregularis*) levels (with AM, AM+ or without AM, AM-) and four chloride levels in irrigation water (C1-C4); Chloride was added to the water as $CaCl_2$. The fact that the 10 mg Cl L^{-1} concentration in water is considered very low and without adverse effects on tobacco, leads us to the decision to take this chloride concentration as control.

Results: Mycorrhizal plants had significantly higher uptake of nutrients in shoots and number of leaves regardless of intensities of chloride stress. The cured leaves yield of AM+ plants under C2-C4 chloride stressed conditions was higher than AM- plants. Leaf chloride content increased in linearly with the increase of chloride level while AMF colonized plants maintained low Cl content. AM+ plants produced tobacco leaves that contain significantly higher quantities of nicotine than AM- plants. AM inoculation ameliorated the chloride stress to some extent. Antioxidant enzymes like superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) and glutathione reductase (GR) as well as non-enzymatic antioxidants (ascorbic acid and glutathione) also exhibited decrease with chloride treatment.

Conclusion: Based on the previuos results it is preferable to use irrigation water with chloride concentration below 25 mg L^{-1} since at this level the chloride concentration in the leaves remained around 1%. On the other hand, the chloride level of 40 mg L^{-1} in irrigation water in combination with AMF can be considered as the threshold upper limit. In such high concentrations the use of AMF are recommended, because keep the leaf chloride concentrations around the acceptable level.

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Comparison of wheat yield between common and modern wheat cropping systems using Geographical Information System approach

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Abstract

Background and objectives: One of the important tasks of agronomy is determining those environmental factors limiting crop yield in a given area. To this end, there is no perfect method, because a lot of heterogeneity and interaction between the environment and crop management, that allows statistical analysis does not provide full. One of the methods that can be used to analyze the factors limiting the yield is prioritizing these factors through ranking. The purpose of this research was finding appropriate management practices and recommendations to increase wheat yield in inefficient agroecosystems. For this purpose, wheat yield was compared in common and modern agricultural systems to determine differences in the management of these systems. Because the difference in yield can also resulted from a reason other than differences in farm management, the statusof these systems was also investigated from the perspective of topography, climate, soil, economic and social indices.

Materials and methods: This study was aimed to compare wheat yield in both modern and common wheat fields using Geographical Information System in the Golestan farm lands. For this, 68 and 10 fields were selected for common and modern (Nemoune field) fields respectively in growing season of 2012-2013. In order to investigate on climatic and topographic state of studied area, 51 synoptic and rain-recording stations from Golestan province and 32 synoptic stations including neighbor provinces (Mazandaran, Semnan and North khorasan), and digital elevation model (DEM, 20 m) were used. The information about farm management options and social state of farmers were obtained by personal interview or filling questionnaires.

Results: Fields data analysis showed a significant relation between yield and other factors including irrigation, top dress times of nitrogen, micronutrients application, machinery, variety type, residue management, fungicides application, last summer and autumn rotation, professional education of farmers, and sowing date. Regression analysis results also showed nitrogen quantity in second top-dressing and land cultivation area were as the most important quantitative factors affected wheat yield. Environmental indices assessment revealed that quality of aforementioned factors was better in common fields than modern fields, while yield was higher in modern fields. Based on results, management quality is the most important factor which affects wheat yield, and improved management could enhance the yield in common fields.

Conclusion: So the farms that have good environmental qualities, but poor crop management, there is hope that we can increase the yield per unit area. In this context, improving the management of common agricultural farms can be considered as a long-term program.

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