

Effect of Priming and its Duration on Quality of In-pod Seeds Germination and Seedling Vigour of Sainfoin 'Eski' under Laboratory Conditions

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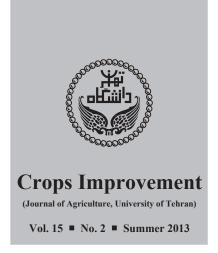
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Abstract

To study the effects of prim ing on seed germ ination traits of sainfoin 'Eski', a factorial in random ized complete block design with three replications was conducted at the laboratory of agricultural research center of Sari in 2011. Treatments consisted of polyethylene glycol (PEG6000) at 5 and 10%, potassium nitrate (KNO₃) at 5 and 10% and potassium chloride (KCl) at 5 and 10% levels and 6, 12 and 24 hours of treatment duration. The most significant interaction of time × priming vigor, root length and germination rate was achieved by prim ing solution containing PEG 10% for 12 hours. The highest germination percentage and total number of seedlings was achieved by 5 and 10% PEG for 6 and 12 hours and the least with a solution of KCl 10% for 6 hours, respectively. The highest shoot length and seedling length was obtained at PEG 10% for 12 hours and the least at KCl 10% for 24 hours. The highest and lowest number of normal seedlings, were observed by a solution of PEG 10% for 12 hours and KCl 10% for 24 hours, respectively. The highest R/S ratio was obtained in a solution of PEG 5% for 6 hours and the lowest ratio was observed in the solution of KNO₃ 10%. The lowest weight ratio of R/S was obtained in a solution of KNO₃ and KCl 10% for 6 and 24 hours and the highest dry weight of R/S in prim ing with PEG 10% for 12 hours.

Keywords: germination and seedling growth, sainfoin, seed priming, time.

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Effects of Foliar Application of P, Zn and Fe on Grain Yield and Yield Components of Chick Pea (*Cicer arietinum* L.)

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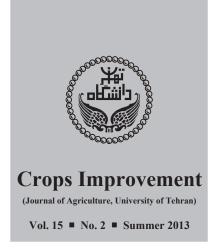
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Abstract

To evaluate the effects of various levels of phosphor ous and foliar application of iron and zinc on grain yield and yield components of chick pea (*Cicer aireintinum* L.), an experiment was conducted on split plot factorial based on randomized complete block design with three replications during 2010- 2011 growth season at the Agricultural College Research Farm , Lorestan University. Factors included phosphorous fertilizer at three levels (P_1 =0 kg/ha, P_2 =100 kg/ha, P_3 =200 kg/ha, soil application) in the main plots. Fe and Zn each at three levels (F_1 , F_2 , F_3 , F_4 , F_5 , F_4 , F_5 , F_5 , F_6 , and F_4 , F_6 and F_7 , F_8 , and F_8 , F_8 ,

Keywords: biological yield, chemical fertilizer, dryland farming, harvest index, nutrients.

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Response of Seed Yield Components, Protein and Oil Content of Soybean (*Glaycine max* L.) Cultivars to Various Sowing Date in Shirvan

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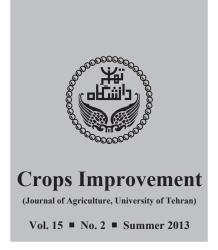
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Abstract

To study the response of yield, yield components, protein and oil content of so ybean cultivars to delay in planting in Shirvan region, an experiment was conducted at Research Farm of the Faculty of Agriculture, Shirvan in 2010. In this study, nine soybean cultivars (Habit, Hack, Black Hack, Cencutry, Cloumbos, Clark, Sahar, Zane and Willams) were evaluated at different sowing dates (20 May, 4 June and 20 June) in factorial experiment based on random ized complete block design with three replications. The results indicated that yield components, protein content and grain yield signi ficantly reduced by delay planting. The first planting (20 May) had the highest grain yield (2338 kg/ha). There were significant differences between soybean cultivars for grain yield and other traits except oil content. Zane cultivar had the highest grain yield. Sahar cultivar had the lowe st grain yield due to the reduced harvest index, increase days to flowering and days to poding. The results indicated that delay in planting causes reduction in grain yield. Zane, Black Hack, and Hack cultivars had the highest grain yield in all planting dates.

Keywords: grain yield, oil, protein, soybean and yield components.

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The Role of Priming and Planting Density on Improvement of Morphological and Physiological Traits of Two Hybrid Maize (*Zea mays* L. Single Cross 704) under Field Conditions

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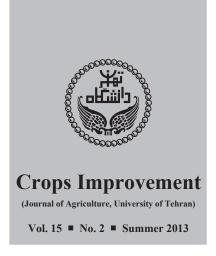
Received: October 20, 2012 Accepted: May 21, 2013

Abstract

To determine the effects of prim ing and plan ting density on im provement of morphological and physiological traits of the two hybrid corns SC (S.C. 704) under double cropping in Sari, a split plot experiment as randomized complete block de sign with four replications was conducted in 2010. Treatments included two densities of 80 and 100 thousand plants per h ectare as the first factor and osmopriming of seeds of two hybrids of corn (S.C. 704), with a solution of 10% polyethylene glycol (6000 PEG), 0.5% potassium nitrate (KNO₃), 2% potassium chloride (KCl), water (hydropriming) and control (without priming) were considered as the s econd factor. The results showed that plant height using the priming solution of 10% polye thylene glycol and 100 thousand plants per hectare density was 33 percent higher than 0.5% potassium nitrate and 2% potassium chloride with the density of 80 thousand plants per ha. Also the forage yield per hectare with the density of 100 thousand plants was 14.42% more than 80 thousand density. Best plant density and priming concentration for leaf area index (LAI), crop growth rate (CGR) and net assim ilation rate (NAR) were the density of 80 thousand plants per hectare and 10% polyethylene glycol. Therefore, it is concluded that adequate forage yield (54730 kg/ha) of the hybrid corn used in this study we re obtained by the density of 100 t housand plants per hectare and 10% polyethylene glycol solution.

Keywords: corn, density, dual cultivated, morphological and physiological traits, priming.

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Effect of Simultaneous Chemical and Organic Fertilizer Application on Plant and Soil Chemical Properties of Barley (*Hordeum vulgare* L. var Turkman) under Water Deficit Irrigation Regimes

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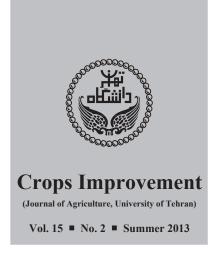
Received: September 26, 2012 Accepted: May 21, 2013

Abstract

To evaluate the effects of fertilizing and deficit irrigation regimes on some chemical properties of soil and plant, an experiment was conducted during 2007 a nd 2008 growing seasons. Experimental design was a split plot based on a random ized complete block design with four replications. The treatments consisted of three deficit irrigation regimes (main plots) and six soil fertilizing systems (sub-plots). The irrigation treatments were included non-stressed, medium stress and severe stress. Fertilizing systems consisted of no fertilizing as control, phosphorous and nitrogen biofertilizers, 100% chemical fertilizer, vermicompost, 50% chemical fertilizer + 50% vermicompost, and 50% chemical fertilizer as the sub plots. Integrated application of chemical and organic fertilizers increased soil P more than the other fertilizing systems. Integrated fertilizers increased plant N in compare with other fertilizing system s. Fertilizers containing vermicompost had more soil organic carbon, nitrogen and phosphorus or plant N and P under water stress rather than the others. Biofertilizer increased soil and plant P content under normal irrigation.

Keywords: barley, biofertilizer, chemical fertilizer, deficit irrigation, vermicompost.

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Effect of Soil Application of Iron and Manganese Sulfate on Quantitative and Qualitative Characteristics of Forage Maize Hybrid Single Cross 704

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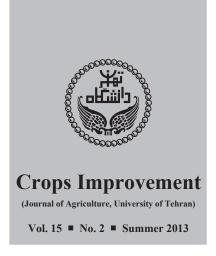
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Abstract

To investigate the effect of different amounts of Fe and Mn on qualitative and quantitative traits of forage maize (*Zea mays* L.) hybrid single cross 704, an experiment was conducted as a factorial in a randomized complete block design with 16 treatm—ents and three—replications at Qaneat city (Southern Khorasan Province) in 2010. Treatments consisted of 4 levels of FeSO 4 (no fertilizer as control and 30, 60 and 90 kg/ha) and 4 levels of M nSO4 (no fertilizer as control and 10, 20 and 40 kg/ha). With increase of Fe and Mn fertilizers, a significant increase was occurred in plant height, leaf number, stem diameter, dry weight (stem, leaf, maize) and dry forage yield. Increased rates to optim—um level (Fe-60 and Mn-20 kg/ha fertilizers according to the soil test), increased the yield, but more fertilizer reduced the quality. Therefore for forage with good quality and qua—ntity, 60 and 20 kg/ha of Fe and—Mn fertilizers, respectively is recommended for this area.

Keywords: dry forage yield, economy, micro element, optimize use fertilizer, soil test.

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Effects of Seed Priming by Salicylic Acid on Wheat cv. Alvand Bread Quality under Late Sowing Condition

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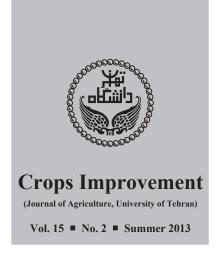
Received: November 11, 2012 Accepted: May 21, 2013

Abstract

To evaluate the effects of seed priming with salicylic acid on quality and baking traits of wheat flour, cv. Alvand, under different sowing dates, a factorial experim ent was conducted on the basis of complete randomized block design. The factors were seed priming with salicylic acid (including untreated seeds or control treatment, 400, 800, 1200, 1600, 2000 and 2400 µM concentrations of salicylic acid) and two sowing dates (23 rd of Oct. and 22 nd of Nov.). Results showed that priming slightly decreased (less than 1%) protein percent compared to control treatment in both sowing dates. It may be due to positive effects of salicylic acid on seed yield and higher accumulation of starch in seeds compared to protein. On the other hand, priming enhanced Zeleny number and loaf volume. Wet gluten, gluten index and seed yield increased by application of seed priming. This was higher in second sowing date compare to the first sowing date. In addition, higher concentrations of salic ylic acid lead to more increment in measured parameters.

Keywords: late planting, priming, quality traits, salicylic acid, wheat.

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Efficiency of Herbicides at Reduced Rates and its Integration with Mulch for Weed Control in Tomato (*Lycopersicon Esculentum*)

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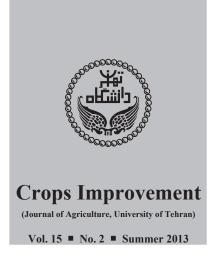
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Abstract

To study the effect of different weed control m ethods in tom ato, an experim ent was conducted as completely randomized block design with three replications at the research farm of University of Tehran (Karaj) in 2008. The treatm ents consisted of post em ergence (at recommended rate) or pre emergence (reduced rate in combination with mulch) application of metribuzin, rimsulfuron and sulfosulfuron, and also different binary com binations of these herbicides which applied post or pre em ergence (in combination with mulch), metribuzi+haloxyfop-methyl, trifluralin+metribuzin, and also mulch alone, weed free and weedy checks. Traits such as weed density and biom ass, tomato fruit yield and biomass were evaluated. The results showed that only post emergence application of sulfosulfuron (92%), sulfosulfuron+rimsulfuron (93%) controlled bindweed effectively. However, all herbicide treatments provided good (m ore than 80%) to excellent (more than 90%) control of redroot pigweed, smooth pigweed and common purslane. Tomato response to rimsulfuron, sulfosufuron and mtribuzin consisted of chlorosis in new terminal growth that recovery occurred after 4 weeks. The results suggest that acceptable control of different weed species in tom at a could be obtained by pre-emergence application of rimsulfuron, sulfosufuron and metribuzin in combination with either mulch or post-emergence herbicide.

Keywords: integrated weed m anagement, metribuzin, mulch, haloxyfop-methyl, rimsulfuron, sulfosulfuron.

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Growth and Nitrogen Use Efficiency Response of Wheat (Triticum aestivum L.) and Wild Mustard (Sinapis arvensis L.) to Increased Nitrogen Levels

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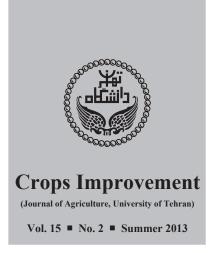
Accepted: May 21, 2013

Abstract

To investigate wheat and wild mustard growth and competition to N levels, an experiment was conducted in Ramin Agriculture and Natural Resources University of Khouzestan, located at 36 km North of Ahvaz. Treatments included planting wheat solely, wild mustard solely, and intercropping wheat and wild mustard in pots. These combinations were exposed to N levels including 0, 60, 120 and 180 kg.ha⁻¹. The results showed that grain yield, dry matter and spike number of wheat increased by increased N levels in sole crop treatment. These traits decreased by N le vels when competing against wild m ustard. Wheat grain and total protein content increased up to 120 kg N.ha ⁻¹ by increased N levels, but decreased while competing against wild m ustard. The highest N apparent recovery by wheat was obtained from sole cropping of this crop and 120 kg N.ha ⁻¹. The lowest rate of this parameter was observed in competition condition against wild mustard and the level of 180 kg N.ha-1. The results showed that wild mustard traits had positive response to increased N levels, regardless to competition against wheat.

Keywords: competition, integrated m anagement, N apparent recovery, N uptake, N use efficiency, wheat.

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Effect of Irrigation Duration and Rootstock on Concentration of some Nutrient Elements in Young 'Thomson Navel' Orange Leaves

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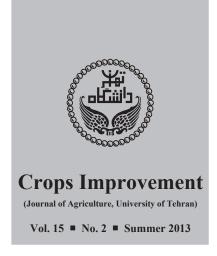
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Abstract

In this study, effect of irrigation duration on concentration of some macro and micro nutrient elements in 'Thompson Navel' orange leaves grafted on three rootstocks was evaluated as a factorial experim ent in completely randomized block design. Factors included rootstocks in three levels (Poncirus trifoliata, Citrus aurantium and Troyer citrange (Citrus sinensis × Poncitus trifoliata)) and irrigation durations in four levels (2, 4, 6 and 8 days). The results showed that rootstocks and irrigation duration can significantly affect scion leaf nutrient elements concentration. With irrigation of two days intervals, the differences among citrus rootstocks for nutrient elements absorption was significant. In two days interval significantly higher coppe r concentrations by sour orange, of irrigation (no stress), concentrations by poncirus and phosphor, nitrogen, iron and zinc by Troyer citrange rootstocks were absorbed as measured in 'Thompson Navel' leaves. In 8 days interval irrigation treatment, significantly higher copper and zinc concentrations by sour orange, nitrogen and potassium concentrations by poncirus and phosphor by troyer citrange rootstocks were measured in 'Thompson navel' leaf as a scion. Overall, all rootstocks used in this study, that are common citrus rootstocks in the North of Iran, did not show any preference in nutrient element absorption at drought stress conditions.

Keywords: citrus, concentration of macro and micro Elements, drought stress.

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Effect of Salicylic Acid on Spring Frost Tolerance of Grape (*Vitis vinifera*) Cultivar 'Bidaneh Sefid'

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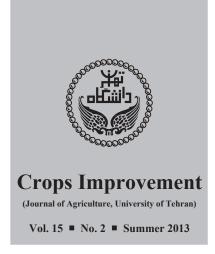
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Abstract

Frost in early spring is one of the lim—iting factors in the production of grape. Chem—icals offer useful approach to reduce low tem—perature-induced damages. Different concentrations of—salicylic acid including: 0 (control), 0.5, 1 and 2 mM were sprayed twice on 10 year-old 'Bidaneh Sefid' grape vines at full bloom stage and changes in leaf soluble carbohy drates, proline and protein levels were measured in the next day morning. Leaf and stem—samples were subjected to low temperatures of 0, -2, -4 and -8°C while flower clusters were exposed to tem—perature of 0, -2 and -4°C for three hours. Salicylic acid at 0.5mM concentration resulted in the highest am—ounts of soluble carbohydrates while the—maximum proline content was observed with 0.5 and 1m—M concentrations. Salicylic acid at 2mM concentration caused a decrease in soluble protein level. Salicylic—acid, low temperature and their interactions had a significant effect on electrolyte leakage of different tissues. Salicylic acid treatments led to a reduction in electrolyte leakage of stem, leaf and cluster sam ples, compared to control. It seems that salicylic acid minimizes the negative effects of low tem—perature with evidence of—less membrane damage by upregulating the accumulation of osmoregulants such as soluble carbohydrates and proline.

Keywords: cold stress, electrolyte leakage, grape, proline, soluble carbohydrates.

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Modeling Seed Aging Effect on Wheat Seedling Emergence in Drought Stress: Optimizing Germin Program to Predict Emergence Pattern

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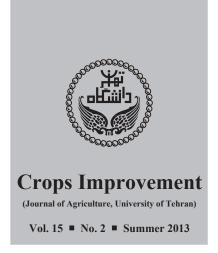
Received: December 26, 2012 Accepted: May 21, 2013

Abstract

There are some computer programs to calculate germ ination related traits such as Germ in which have using problems. The aim of this work was to ad just Germin for calculating germ ination related traits. Seed aging effects on the seedling em ergence was modeled using the optimized Germin. This study was conducted based on completely randomized design in a factorial combination of five seeds aging treatments (0, 48, 72, 96 and 144h accelerated aging periods) and 3 levels of environmental factors. Results indicated that Chapman–Richards function adequately described cumulative emergence in all aging treatments and three environmental conditions. Emergence percentage and rate were decreased by seed aging periods from 145 to 194 °C day. Results showed that observed thermal time for emergence increased as accelerated ageing periods increased and drought stress resulted in increased thermal time. For example, thermal time increased to 240 °C day in 144h accelerated aged seeds in severe drought. Results indicated that with increasing thermal time in optimum condition, thermal time would increase linearly in the drought stress. Optim ized program could calculate germination related traits. Therefore, it is recommended to use the optimized Germin in seed science research.

Keywords: accelerated aging, Chapman-Richards model, Germination, seed aging, thermal time.

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Introduce the Suitable Medium for Asymbiotic Germination of *Epipactis Veratrifolia*

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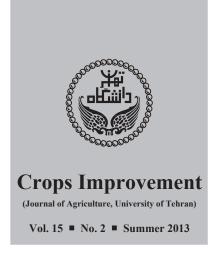
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Abstract

Five different media with two concentrations and kinds of carbohydrates and peptone treatm ents were examined for their effectiveness in promoting asymbiotic seed germ ination of *Epipactis veratrifolia*. Results revealed significant differences between media on seed germ ination percentage and protocorm growth and Fast medium has the best effect on bot h. Carbohydrate treatments had significant effect on seed germination percentage but not on protoc orm growth. Modified Fast medium with 5gr l⁻¹ fructose and 12 gr l⁻¹ sucrose and 2 gr l⁻¹ peptone (MFH2P2) was the best medium for seed germination (49.6%) and Modified Fast medium with 30 gr l⁻¹ sucrose and 2 gr l⁻¹ peptone (MFH1P2) was the best medium for protocorm growth (17.3 mm). Media, carbohydrate and pept one influence seed germination percentage, while media and peptone alone influe nce protocorm growth. In addition, use of *in vitro* culture significantly reduced relatively long period of tim e which is necessary for seed germ ination and protocorm plantlets growth in natural conditions (approximately 2 years).

Keywords: carbohydrate, *in vitro* culture, native orchid of Iran, terrestrial orchid, peptone, protocorm growth.

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Salinity Effects on Some Morphological and Biochemical Changes of Almond (*Prunus dulcis* Mill.)

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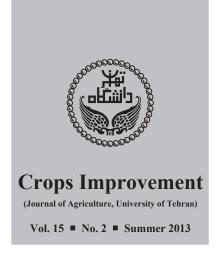
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Abstract

To evaluate morphological and bi ochemical changes of alm ond (*Prunus dulcis* Mill.) under salt stress conditions and determine relationship among accumulation of Na and Cl w ith these traits, an experiment was conducted based on completely randomized design with four treatments including 0 (control), 25, 50 and 75 mM of pure sodium chloride and three replications from 2010 to 2012. The seed of healthy almond genotypes grown in natural saline areas of East-Azerbaijan province were used as the experimental material in this study. Salt treatments were influenced during eight weeks following the growth and appearance of 15 – 20 leaves on each seed ling. The results showed that the threshold of marginal leaf scorch symptoms was in relation with an accumulation of 9–11 mg/g DW Na. Also, mean of free proline content increased from 37.7 to 117.9 μmol.g⁻¹ FW linearly and significantly in parallel with the accumulation of Na and Cl in the leaves. Under sam e conditions, catalase and ascorbate-peroxidase activity increased signi ficantly; however peroxidase activity increased up to 50 m M salinity but decreased subsequently at higher levels of salt.

Keywords: ascorbate peroxidase, catalase, saline areas, sodium chloride, stress.

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Effect of Seed Tuber Size, Nitrogen Rate and Harvest Date on Yield and Yield Components of Potato

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Abstract

A factorial experiment based on a random ized complete block design with three replications was carried out in order to study the effects of tuber size, nitrogen fertilizer and harvest date on yield and yield components of potato. This experiment was conducted in a grower's farm in Uraki village located in Chabahar city, in 2011. In this experiment, the treatments were two levels of tuber size (sm. aller and larger than 35 mm), four levels of nitrogen fertilizer (0, 60, 120 and 180 kg ha⁻¹) and two levels of harvest date (105 and 112 days after emergence). The results of analysis of variance indicated that effects of tuber size, nitrogen rate and tuber size x nitrogen rate interaction effect were significant for all of the studied traits at 0.01 probability level. Effect of harvest date was significant on total tuber yield, number of large tubers, tuber yield and dry matter. The results of this experiment indicated increasing nitrogen up to 120 kg ha⁻¹, increased total tuber number, number of large tubers, tuber yield and dry matter. But using up to 180 kg of nitrogen per hectare reduced these traits. Acc ording to the results of this research, it seems that under our experiments condition, tuber size larger than 35 mm, using 120 kg nitrogen per hectare which harvested 112 days after emergence date of tubers (1 st of April) produced 41500 kg ha⁻¹ tuber which is suitable to gain the highest yield of tubers for planting the 'Sante' cultivar.

Keywords: harvest time, nitrogen fertilizer, tuber size, tuber yield.

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