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Density and germination effect on the tuber and all agricultural properties of potato without using chemical fertilizers in the saline soils of Khuzestan

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Abstract

This study was aimed at evaluating the effect of different planting intervals (density) and germination on the performance and all morphological properties in Khuzestan conditions as factorial in the form of random blocks with three repetitions for one year. Results indicated that the effects of density and germination in addition to the interaction of both factors on all properties is significant at %1 level, which, in the recent case, the interaction of both factors on the number of tubers per plant and number of stem per plant was not significant. Maximum performance and plant height were resulted in the 25cm planting intervals and other properties were resulted in the 30cm planting intervals. In addition, all properties have gained their maximum quantity at the gemmiparous tuber planting condition in the shortest time. Tuber performance has its maximum positive and significant cooperation with plant height (0/929**)

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Introduction

Potato plants are one of the most important crops in the world. Nutritional aspects of social and economic importance of this crop in recent years have been remarkable (Paul, 1985). The crop after wheat, rice and corn, the largest amount of food production has a role in feeding the world's population is food basket (Fabeiro *et al.,* 2001). In recent decades, the use of chemical inputs in agriculture has caused serious environmental problems such as water pollution, loss of quality agricultural products Soil fertility is decreasing (Sharma, 2002), and this factor has led to nutrient plants more inclined towards non-chemical fertilizers done. Bio-fertilizers contain one or more preservatives with a dense population of beneficial microorganism Soil or as metabolic products are available to improve soil fertility and adequate supply of nutrients required by the plant are used in a sustainable agricultural system (Salah Rastin, 2000). Potato plant density per unit area is defined as the number of frequently (Struik *et al.,* 1991). Such factors as the desired plant cultivar, growing conditions, seed weight, harvest time, and will depend on soil fertility (Alimohamadi *et al.,* 2002). Plant potato seed tubers by measures such as size, distance between rows and between plants, plant stem number and arrangement are specified. One of the most important parameters for determining the density of shoot by seed tubers may It is even more of one to three and the number of stems produced per plant depends on the number of stems is produced by the gland. Wurr *et al.* (1990 & 1992) found that increasing plant density, number of tubers produced per plant decreases. The results of the survey Zahadi Aval (1996) with increasing plant density per unit area increased tuber yield. Reduce the time to start sprouting tuber induction is important because this process will prevent delays in the initiation stage of tumor volume (Shahbazi Homonlo, 2003). One reason for the rapid emergence of strong buds has to be on the potatoes (Taek, 1998).

The purpose of this experiment was to obtain the desirable effect of row spacing and seed germination Agria potatoes Spacing in order to achieve maximum performance in normal conditions and use of organic fertilizers with organic fertilizers and manure management. In terms of economic performance in the fertilizer in direct contact with the ground aside contaminate groundwater and cause dangerous complications such as the potato becomes considerably and is the major cause of cancer in humans.

Materials and methods

This study was conducted to evaluate the effect of density on yield and other agronomic traits of germination, planting date, harvest date 08.20.1389 to 14.01.1390 in terms of the use of chemical fertilizers in saline soils (7/3EC =) province and the district with geographical coordinates Hamidieh 8/7/26 48E 4/4/23 21N and 20 m above sea level and texture of clay - loam with a pH 2/7 for a year in a factorial complete block design randomized with three replications. Planting density levels at 20, 25 and 30 cm, and two levels of tuber germination and germination were conducted on Agria potatoes. Average monthly temperature and meteorological parameters during the year are given in Table 1.removing weeds hunk and two disk surfaces was perpendicular to the surface with a trowel and then stack operation packaging design. Overall water was done every two weeks. Control weeds by hand weeding to be done. And traits including tuber yield than the number of tubers per plant and per square meter, plant height, number of stems per plant, number of main stem and per square meter plots deal with the concept of margin of half a meter above the middle and removed Samples were taken down. SPSS and SAS software test data using correlation analysis, analysis of variance and mean comparisons using a Duncan's multiple range tests (significance level of analysis of variance) was used.

Results and discussions

As the population on grain yield and other agronomic traits were significant at the one percent level Indicates significant effect of sowing density on the yield of the final product to ensure the product is Agria potatoes (Table 2). Means comparison showed that the highest seed yield and plant height of 25 cm with an average density of 757/9 tons per hectare have been achieved While the other parameters at their highest densities of

30 cm acquired That could be because more space to grow more food as well as the availability of lower plant density, it is very natural In this regard, the study Zahadi Aval (1996) based on increased plant density increases corresponded well with the results of other studies (Jam, 2007; Hosen Radah, 2005; Zahadi Aval, 1996) based on increased performance and increased with the huge increase in the number of lymph node density in order to increase the number of conflicts The main reason for the increase in density and height of 20 cm above the plants compete to get more solar radiation for photosynthesis, the process the main source for the production of food the main tank, (Tubers) which is And the main reason for this result could be greater lack of necessary food and unloading materials at high densities And while the results based on the weight of the tumor corresponded with increased density. Which leads to the weakening of the plants and their vulnerability in the face of eco-physiological conditions are. The results indicate that the performance of the glands that produce the tubers larger than the density of the fiction market is better but it decreases performance due to reducing the number of nodes per unit area is and thereby reduces the economic justification for the crop that the farmer is Researchers strive to achieve the best compression is to maintain the character and quality of potatoes. Studies (Jam, 2007; Hosen Radah, 2005; Zahadi Aval, 1996) indicates that the total yield increases with increasing density However, in this study due to excessive concentration of reduced access to food plant And the use of chemical additives to produce healthy and organic alternatives It should be noted, however, decreased performance at higher excitation densities Glands in glands in the adjacent higher germination by earlier investigations that ultimately led to the GDD required to reach the results are similar. The total density of 25 cm with a weight of approximately 60 grams of germination glands can be the best offer. Effects of germination on all traits were significant at the one percent level all traits were affected germination and its highest consideration received in the shortest time. Rising 402/1 ton per hectare yield of crop sowing germination lymph glands without affecting seed germination glands showed a significant increase in performance. And it was on the condition that they also spend less time dealing with the final product was about 23 days earlier than the maturity of the product was of germination, This time could be a good opportunity to prepare the ground and add moisture and Food for the next crop harvest delayed planting of seedlings can glands without negative impact Significant reduction in yield due to the above reasons will be next. Mainly because of a significant reduction in the production of all its components, such as the weight and number of tubers and The morphological traits (plant height, number of stems per plant and the number of main stems per square meter) plant in the sprouts in tumors without covers As the entire process of germination delay timely planting of lymph glands in the bud without having to spend time and energy for nucleation and Is growing up in extreme cold (temperatures are very high and record low during the planting plan reduces overall performance in terms of lymph also has gemmate) Met and went to sleep for the winter low shrubs during the winter, They are much stronger than the loss of crop plants with budding glands are And while most of its energy to become germ glands Germination, vegetative growth and vigor just before winter had its strongest. The results of this study with others (Shahbazi Homonlo, 2003; Taek, 1998) corresponded to the statements on this (Table 3). Finally, given that the interaction of the tumor, single bulb weight, plant height, number of main stems per square meter and days to maturity were all significant at the one percent level Each case must be determined that the best results of all traits The best results were implanted under the glands become best buds densities of 25, 30, 25, 30 and 30 cm with an average of 37/10, 119, 33/71, 29 and 155 of the aforementioned characteristics. Since the interaction with the other characters were no significant differences in the interaction of two factors: It can be concluded that the effects are additive and reaction conditions for the germination of different densities are relatively constant (Table 4). The phenotypic and genotypic (Table 5) Maximum tuber yield Positive and significant correlation with plant height (** 929/0) has the effect of increasing photosynthetic capacity and could be one reason for the increase in glands weight was about growing up The glands of the strong stronger

and grow more food to enjoy. Given that most of the initial tuber weight increase is to germinating And then through photosynthesis to provide energy for growth but the primary growth can be a very effective role in promoting the growth andPerformance Resulting in a higher resistance to plant before winter cold for the duration of the project had reached its highest level over the past few years (a very important factor in yield loss) is.

Table 1. Analysis of variance of agronomic traits agria Potatoes.

s.o.v	Df	Product performance	The mean tumor weigh	Number of tubers per plant	Days to reac	The number of main stems per square meter	Number of stems per plant	Height
Repeat	2	0/005 n.s	13/500 n.s	0/514 n.s	0/000	1/167 n.s	0/055 n.s	2/388 n.s
Density	2	6/668**	1449/500**	4/389**	129/500**	580/500**	8/389**	557/388 **
Gland weight	1	8/848**	8844/500**	60/500**	2450/000**	98/000**	2/000**	522/722 **
Density, ×tuber weight	2	0/125**	472/166**	1/167 n.s	75/500**	22/167**	0/500 n.s	55/055**
Error	10	0/006	32/767	0/380	0/000	2/233	0/122	1/122
Coefficient of Variation (%)		0/847	8/119	12/476	0/000	9/539	15/348	1/882

Ns = not significant * = significant difference at 5%level ** = difference is significant at the 1% level.

Table 2. Comparison of mean traits Agria potatoes.

Factor		Performance (Tons per acre)	The mean tumor weight (G)	Number tubers plant	of Days to per maturity	The number main stems square meter	of Number per stems plant	of Height per (Cm)
Density	**20** cm	7/758 c	55/667 a	4/000 b	137/500 c	5/167 c	1/000 c	45/333c
	25 cm	9/757 a	69/167 b	5/667 a	144/000 b	17/167 b	2/500 b	63/500a
	30 cm	9/350 b	86/667 a	5/167 a	146/500a	24/666 a	3/333 a	60/000b
Seedling	Pre-germination	9/654 a	92/667 a	6/778 a	131/000 b	18/000 a	2/611 a	667/61a
	No pre-germination	8/252 b	48/333 b	3/111 b	154/300 a	13/333 b	1/944 b	50/889b

There are other similar letters in each column, like a Duncan's test is significant at the 5% level.

Table 3. Comparison of the average effect of some agronomic traits Agria potatoes.

Density	Seedling	Days to maturity	The number of main stems per square meter	Height (Cm)	The mean tumor weight (G)	Performance (Tons per acre)
20 cm	Pre-germination	122/000 f	5/667 d	47/333 d	71/666 c	8/626 d
	No pre-germination	153/000 c	4/667 d	43/333 e	39/667 d	6/890 e
	Pre-germination	133/000 e	19/332 b	71/333 a	87/333 b	10/370 a
25 cm	No pre-germination	155/000 b	15/000 c	55/667 c	51/000 d	9/133 c
	Pre-germination	138/000 d	29/000 a	66/332 b	119/000 a	9/966 b
30 cm	No pre-germination	155/000 a	20/333 b	53/667 c	54/000 d	8/733 d

There are other similar letters in each column, like a Duncan's test is significant at the 5% level.

Table 4. Correlation coefficients of some agronomic traits Agria potatoes.

	1	**2**	**3**	**4**	**5**	**6**	**7**
1 - Performance	1						
2 - Height	0/929**	1					
3 - Average tuber weight	0/751**	0/736**	1				
4 - The number of tubers per plant	0/798**	0/810**	0/840**	1			
5 - number of stems per plant	0/759**	0/819**	0/686**	0/530*	1		
6 - Number of main stems per square meter	0/754**	0/796**	0/698**	0/498*	0/972**	1	
7 - Days to maturity	-0/396	-0/242	-0/576*	-0/703**	0/029	0/069	1

* And ** significant at 1 and 5 percent, respectively, is.

Conclusions

Note that all parameters are significant at various levels of density and germinationReflects the positive impact of high density with distance 25 cm and germination of tubers in tuber yield increase is a positive factor.

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