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ORIGINAL ARTICLE

Investigation of Cycocel and Mycorrhizaa effecting yield and yield components of Peanut planting (*Arachis hypogaea* L.) in different Planting Distances

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ABSTRACT
*In order to investigate the effect of Mycorrhizaa and CCC on peanut yield components of Gill kind in different planting distances, a factorial experiment has been conducted in the form of randomized complete block design in three replications at peanut research Centern of Guilan Province, Astaneh Ashrafieh city in agricultural year of 2012. Experimental factors includes three levels of planting distances (30*30, 40*40, 50*50), two levels of presence and absence of Mycorrhiza, two level of presence and absence of CCC. Results indicated that planting distance influence grain yield, total hollow podfs, ripe pods, the number sub branches and height of main stem and planting distance 40*40 was preferred than 30*30 and 50*50 m2. A significant interaction between CCC and spacing effects on yield were observed and the most amount of yield will be achieved at a distance of 40 * 40 and at the presence of CCC in 1852.56. Also, a significant interaction between Mycorrhiza and spacing effects on yield were observed and the most amount of yield will be achieved at a distance of 40 * 40 and at the presence of Mycorrhiza in 1831.14. CCC decreases the main branches height to 12.52cm and increase the number of tributaries (sub branches) to 0.2cm.*
KEY WORDS: *Peanuts, planting distance, cycocel (CCC), Mycorrhiza, yield, yield components*

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INTRODUCTION

The rate of population growth is now too high and predictions show the population growth rate over the next 40 years will be higher than population growth since the beginning of creation, so it needs high increasing demands to food and agricultural production [1]. Oilseeds cultivation has been a main part of the agriculture in worldwide especially in east since long years ago. Iran is prone land for planting oilseeds so that it has long history in producing some seeds such as safflower, castor and sesame. Peanut is taken as an oil plants. Guilan province is one of the major peanut producing provinces in Iran was provided from this province. In Guilan, it is mostly planted in Astaneh Ashrafiyeh and also along Sepidroud river margin [2].

Peanut or Groundnut is a plant is cultivated in tropical or temperate areas for extracting oil, producing peanut butter and using as dried nuts. Peanut seed has good protein contains and oil. Its protein can play an important role in improving the people nutrition in poor countries. The most peanut consumption in Iran is in the form of dried nuts. Peanut seeds contain 40 to 50% oil, 25% to 35% protein and its shell is used as fuel, compote and cardboard manufacturing. Due to limited arable land in Iran, the best way to increase peanut production is enhancing the performance (yield) in per unit of under-cultivated area by using different farming methods. Using proper planting density for peanut can increase the yield of pods. Selecting optimal bush density according to the climate of the region may cause better establishment,

effective use of light, food and environmental factors. Bush density not only determines the competition for light and nutrients but also controls the division of dried materials between the organs and ultimately increases the yield. The flower part of peanut is yellow colored that is reproduced by auto gamy. If a flower is put at the height of 15 higher than soil level, it cannot reach surface and generate pod. CCC is an ammonium compounds and a material which most widely used to decelerate plant growth particularly in Europe and today are used to control growth of crops [3].

As a result, it can be expected shortening the peanut by using CCC make more flowers will come upon the soil and yield will be increased. Mycorrhiza plays a vital role in plant community structure and is significantly important because of its effect on the development and stability of the soil-plant system [4]. Glomus mosseae decrease the common diseases in peanut such as rosette virus disease (RVD), leaf spot (GLS) which is risk factor for more than 60% of peanut [5]. Arbuscular (endo Mycorrhizaal) create an interaction effect between the lower parts of a plant and plays an important role in the food element chain and stress tolerance [6]. Arbuscular Glomus mosseae (AMF) are important for plant growth since mineral materials has been involved. However, the symbiosis of fungi with the peanut plant is influenced by environmental factors [7]. Peanut farmers in Gilan region do not follow the correct process of plant distance and bush layout. Therefore, to prevent the environmental impact of excessive use of fertilizers, optimum exploitation of land by appropriate plant layout as well as increasing the flourish flowers under the soil for better ingathering, in this research for investigating planting density, CCC consumption, Abscular-vazicular induction effect on peanut yield and yield components had been conducted.

MATERIALS AND METHODS

In order to investigating the effect of planting distances and Mycorrhiza and CCC use in yield and yield components of Gill kind peanut (NC2), experimental factors including planting distance at three levels of (30*30, 40*40, 50*50), two levels of Mycorrhiza (at presence and absence of Mycorrhiza), two levels of CCC (at presence and absence of Cycocel) had been chosen. The plan had been conducted in the agricultural year of 2012, at Gilan province, Astaneh Ashrafieh city with geographical longitude of 49 56`E 37 and 37° 16` with a height 2 meters higher than sea level in the form of factorial experiment with the design of complete random block in three replication. Before conducting experiment in order to verify the physical and chemical properties of soil, the sampling had been done from the depth of 0-30 cm. soil texture was loam (respectively 44, 35.5 and 20.5 percent Selit, sand and clay), pH 7.5, electrical conductivity 0.33dS. m. Based on soil analysis and plant needs, N (nitrogen) was given to soil 80 kg.ha from urea resource as a starter, again 20 Kg on several occasions after the first weeding. The 20 kg. hectare gypsum was used. In order to data analysis SAS and MSTATC applications was used. Comparing has been done by multiple Duncan test. Excel was for diagrams drawing. Data conversion was performed using the SPSS software. Land was plowed with tractors. Then, the clod (hunk) was chopped using disk and cultivator to prepare the land for implementing the plan. In order to implement the plan, some plots were created in dimension of 2*5. The distance between two plots is 80 cm and between the blocks is one meter. After disinfection of seeds by Thiram fungicide in the proportion of two in thousand, planting operations were performed. Peanut planting was conducted in a flat land and dry conditions. The kind used in this study was Gill (NC2).Also, before planting, eradication the weeds were mechanically done and then the rest one in planting row was removed by foka and hand-weeding. Spraying for the plants has been done in the early morning. Glomus mosseae were used in planting time in appropriate distance to the seeds. Measured attributes were seeds, hollowpods, number of ripe (mature) pods, number of tributaries (sub-branch) andheight of mainstem. In order to measure the morphological attributes, 10 bushes were selected randomly from two middleofex perimental plot after full attending, the number of pods in bushes, the number of seeds in pods and pod height has been measured. In order to determine the seed yield, 3 middle row with the height of 2 meter by eliminating 0.5 margins and based on 14% wet-weight of seed from each experimental were measured.

RESULTS AND DISCUSSION

Variance analysis indicated that there is a significant difference between the CCC hormone, Glomus mosseae and planting distance and attributes. There is a significant difference between their interaction and attributes of hollow pods number, number of ripe (matured) pods, number of sub-branches and main stem height (table 1). In comparing the average, CCC application causes increasing the yield up to 1701.8 kg, but by its absence the yields was decreased to 1607.8 (table 2). The yield was increased to 108 kg and became 1708.8 due to presence of Glomus mosseae and was decreased to 1600.7 due to its absence (table 2).Comparison the mean of planting distance indicates significant effect on grain yield. Planting distance of 40*40 was associated by the most yield of grain equal to 1778.2 kg, the planting distance of 30 * 30

showed the lowest yield equal to 1509.9. The performance in planting distance of 40*40 was significantly different to 50*50 and 30*30 distances respectively with 102 kg and 269 kg yields (Table 2).CCC application caused reducing the number of hollow pods and came to 23.72, but in absence of CCC, the number of hollow pods was 29.38 (table 2). Using Mycorrhiza increase the matured (ripe) pods to 183, while in its absence the number of ripe pods became 170; this increasing was more in distance of 40*40 and 50*50 (table 2).CCC increases the number of tributaries so that they were 6.8 by it and 6.6 without it. Cycocel raise the peanut main stem height to 66.33 cm, but in treating without CCC, the main stem height was 78.85 cm. Using CCC increase grain yield rate to 94 kg. Therefore, this hormone is appropriate to yield increasing. Peanuts have grown slowly and its shadow is less than the lower plantings densities. Al-kheil [6] investigated in his research, the effect of Glomus mosseae in soil; he found that these fungi can increase the absorption of mineral and photosynthetic materials which leads to increasing in grain yield. Carrenho., et al [7]) research findings is aligned to this results. The fertility of more flowers will be achieved by CCC. Glomus mosseae can interact in the lower parts of the plant and play an important role in nutrient element cycle and stress tolerance [7]. Increasing the number of matured (ripe) pods in each bush in planting density of 55 in thousand bush to planting density of 148 thousand bush in hectare have been reported [8]. The spraying treatment by CCC can increase the growth period of the sprouts and may increase the number of stems in each bush. Dorodian [9] found that the treatment of CCC with concentration of 2 in thousand can create the most tributaries in bush. Expanding the tributaries may increase the number of ripe pods and so enhance the yield [10,11]. The results indicated that the planting distance of 40*40 Cm in the optimum one. The CCC hormones can decrease the pod height, increased tributaries and finally high yield of peanut. Glomus mosseae may increase the yield component parameters and ripe pod number the ultimately enhance the yields. Since the planting distance interaction and CCC in planting distance of 40 *40 can increase the yield component parameters and ultimately enhance the yields. So peanut can be cultivate in region by planting distance of 40*40 and CCC hormones.

Table 1. Variance analysis of some quantity attributes in peanut in different planting distances of presence and absence of CCC and Mycorrhiza

The main stem height	The number of tributaries	The number of ripe pod	The number of hollow pod	Seed (grain) yield	df	
1.209	0.039	62.528	3.361	5425.284	2	replication
1411.38**	0.321*	2025**	289**	79548.041**	1	Cycocyl
1111.222**	0.36*	1469.444**	64**	10587.822**	1	Mycorrhiza
190.394**	3.61**	1626.778**	54.528**	14794.675	1	Mycorrhiza * CCC
16.096**	0.448**	871.361**	54.528**	220173.133**	2	Planting distance
363.272**	5.554**	772.583**	56.083**	1371.883	2	Planting distance * CCC
229.862**	2.043**	242.528**	83.25**	46926.340 **	2	Mycorrhiza* planting distance * planting distance*
429.301**	9.37**	2835.194**	305.583**	14022.785	2	Mycorrhiza * CCC
2.491	0.064	23.952	3.694	5325.998	22	error
2.17	3.79	2.77	7.24	4.41		coefficient of variation %

Ns ** and* are respectively without significant difference and with significant different at 1 & 5 level.

Table 2. Donkon mean comparison at the level of 5% probability of some quantity attributes and their interaction in peanut

The main stem height	The number of tributaries	The number of ripe pod	The number of hollow pod	Seed (grain) yield	treatment
78.856a	6.594b	184.111a	29.389a	1607.803b	C1
66.333b	6.783a	169.111b	23.722b	1701.818a	C2
67.039b	6.789a	170.222b	25.222b	1600.756b	M1
78.151a	6.589b	183.000a	27.889a	1708.865a	M2
71.342b	6.817a	166.917b	28.583a	1509.933c	d1
73.626a	6.783a	182.917a	26.750b	1778.294a	d2
72.817a	6.467b	180.000a	24.333c	1676.205b	d3
83.683b	6.983b	171.000c	29.667a	1452.362a	C1d1
75.252bc	5.917c	184.667b	32.000a	1704.028a	C1d2

77.633b	6.883b	196.667a	26.500b	1667.020ab	C1d3
59.000e	6.650b	162.833d	27.500ab	1567.503b	C2d1
72.000c	7.650a	181.167b	21.500c	1852.560bc	C2d2
68.000d	6.050c	163.333d	22.167c	1685.390a	C2d3
61.333e	7.067a	165.500c	27.000bc	1392.750b	M1d1
72.367c	6.417b	175.333b	28.167ab	1725.445c	M1d2
67.417d	6.883ab	169.833bc	20.500d	1684.073ab	M1d3
81.350a	6.567ab	168.333bc	30.167a	1627.115b	M2d1
74.885c	7.150a	190.500a	25.333c	1831.143a	M2d2
78.217b	6.050c	190.167a	28.167ab	1668.336b	M2d3

C1 and C2 respectively are absence and presence of CCC. M1 and M2 respectively are absence and presence of Mychorizha, d1, d2, d3 respectively are planting distance of 30*30, 40*40, 50*50

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