

The study the usefulness production garlic, in intercropping with the pea in Gorgan Region

Malihe Noghani¹, Kambiz Mashayekhi², Mohammad Javad Shakouri³, Seyed Javad Mousavizadeh⁴

1. Young Researchers and Elites Club, North Tehran Branch, Islamic Azad University, Tehran, Iran
2. Associated prof department of Horticulture, Gorgan Branch, Islamic Azad University, Gorgan, Iran
3. Young Researchers and Elites Club, Roudsar and Amlash Branch, Islamic Azad University, Roudsar, Iran
4. Young Researchers and Elites Club, Rasht Branch, Islamic Azad University, Rasht, Iran

Corresponding Author email: m.j.shakori62 @gmail.com

ABSTRACT: Intercropping systems based on environment sustain and without basilar alteration in nature with elevated of crops qualify and quality. For this aim, intercropping of garlic and pea investigated in experimental field of Gorgan university of Agricultural Sciences and Natural Resources. Garlic fresh weight, garlic dry weight, leaf dry weight and bulblet number traits were measured in single cropping of garlic and intercropping of garlic and pea and data was analyzed with ttest. Results indicated that the garlic fresh weight, garlic dry weight, leaf dry weight and bulblet number in intercropping of garlic and pea with significant difference are more than in single cropping of garlic. Garlic fresh weight in single cropping elevated from 29.63 to 47.05 g with comparison of garlic and pea intercropping ($p < 0.0001$). Garlic dry weight elevated from 1.45 to 2.119 g, too ($p < 0.0003$). Bulblet number increased from 9.366 to 10.56 ($p < 0.039$). At the end, the values of LER appeared to be greater than 1 under intercropping garlic and pea systems ($LER > 1$).

Key words: intercropping, single cropping, garlic, pea.

INTRODUCTION

In traditional farming, with the two methods to increase the area under cropping and increase production per unit area production increases. But, other method, without bear extra costs, and with the use of water and fertilizer available, you can increase production, Using the system (Intercropping), products. In recent years, with the clarification single cropping farming problems, maintain the stability of agricultural production systems, of more importance, Has been to have. From the solutions increase the stability of production and economic reduce the risks, were caused a single crop cropping, The use of the system (Intercropping) To be. Intercropping means cropping more than a plant, in one piece of land, and in a cropping year, respectively, a plant, at most of your growth, in the proximity of other plant To be. The other hand, natural risks, such as torrential rains, droughts , hurricane, other factors, single-crop on the cropping increase risk are produced.

To reduce the natural risks, and the risk of economic production, especially in small scale cropping the use of system (Intercropping), is useful (Hossain, 2003). From the most important benefits Intercropping, increased production per unit area than single cropping, because of better use of environmental factors, such as light, water and nutrients available in the soil (Banyak and associates 2006).

Including other advantages of intercropping, control weeds. Intercropping, because, plants competition with weeds, growth and development, it will be prevent, and this, despite the lack of herbicide application, to increase production, in this type of the Cultivation system, leading to is (Lieberman and Davis, 2000). Basically mixture of two plants with different root systems, to the optimum use of available resources, leading to (Hossain, 2003). Malangvda, and associates (1995) Intercropping pepper and garlic and onion, Bahara, and associates (1999) Intercropping radish and pea, were investigated. Also, Hossein (2003), intercropping of pea and winter crops, and tomato, and summer crops will be studied. This study will also attempt to use, Intercropping systems, in order to efficient use of water resources, and the soil, and increase the productivity of vegetable crops in the region is the Gorgan. Therefore, the aim of the present study was to investigate the effect intercropping pea on the growth and performance garlic is.

MATERIALS AND METHODS

The present research, On the farm number 1, the Gorgan University of Agricultural Sciences, 87-86 Agricultural year is done. Start of the experiment, on November 86, harvested, and finished in June was 87. To do The present research, of two (*Allium sativum*) and (*Pisum sativum*) was used. To start the experiment, The farm soil, first by the plow, plowed was. All stages of the farming, planting, and harvesting, except section, plowing the land to The traditional way, and by hand and done. Of no type of fertilizer, poison, and herbicide, too before and after the cultivation was not used. After

the plowing and land preparation, farm plot size was. Test, in the two treatment, garlic, and the garlic - pea, a completely randomized design, in 30 repeat was done, and fresh weight, dry weight, leaf dry weight and bulblet number traits in single cropping of garlic and intercropping of garlic and pea were measured. Dimensions, each plot 2 of 2 meter, and the distance between plots, one meter, after the plot size, the land, to mode, atmospheric, and Stack, brought, and then attempted to the implant.

Planting spaces between bulblet in single cropping, 12 cm, were considered. Garlic cubes into the soil so that the seed is high, were planted. Treating Intercropping with the use of (Additive design) was carried out. Thus, Additive design, with the increase of 100% in the optimum density pea, Pure cultivation garlic, was performed.

Both plant concurrently, Were cultured. To enforce intercropping seeds of pea, In between the rows garlic were cultivated. For this action, on the stack, ruck, deep into 3-2 cm, have created, and then the seeds of pea, To the row, and spaced 3.2 cm, were planted (joined in 1381) and then , some soil, on the seeds were poured.

Operations found include weeding, watering and crust forming breaking, in necessary times, was performed. Thus, the practice of weeding, every 3 once a week was performed, but, in mid March, this work once a week, come. Generally, four times also crust forming breaking In the land case research was done. Most Water requirement at the time of flowering and seed formation in the pea, was. Harvesting pea, earlier than the garlic was done. Order to evaluate , intercropping of garlic and pea, or LER (Land Equivalent Ratio) is used, the amount of the division, performance garlic, intercropping with pea, on the garlic performance in pure culture, was obtained (Hussein, 2003):

$$LER = \sum n(Yi / YMi)$$

Performance of plant i, in the intercropping = Yi / YMi - Performance of, plant i in pure culture

The results of the intercropping of the two groups, garlic, and garlic - pea based on and with using the software SAS (2001), was analyzed. t test

RESULTS AND DISCUSSION

Results indicated, a significant difference between single cropping of garlic, with intercropping of garlic and pea, in all the measured parameters was observed (Table 1). the fresh weight, dry weight, leaf dry weight and bulblet number in intercropping of garlic and pea with significant difference are more than in single cropping of garlic. Garlic fresh weight in single cropping elevated from 29.63 to 47.05 g with comparison of garlic and pea intercropping ($p < 0.0001$). Garlic dry weight elevated from 1.45 to 2.119 g, too ($p < 0.0003$). Increase in leaf dry weight, too, from 611/11 to 13/18 g was observed ($p < 0.0001$).

Table 1 . Comparison of measured characteristics, two group , garlic, and garlic with pea, based on t-test

bulblet number	leaf dry weight)g(garlic dry weight) g(garlic fresh weight) g(Source changes
9.366 ^b ±1.84	11.611 ^b ±2.73	1.45 ^b ±0.413	29.63 ^b ±7.04	garlic
10.56 ^a ±2.514	18.13 ^a ±4.73	2.119 ^a ±0.84	47.05 ^a ±11.73	Garlic - pea
-2.11	- 6.53	- 3.87	-6.97	T
0.039	<0.0001	0.0003	<0.0001	Pr>t

Numbers, common have letters in each column are not significantly different

Results Hossain(2003) indicated that has shown that, intercropping pea with coriander with significant difference in coriander dry weight, is. Also, Malanguda and associates (1995), in the assess intercropping pepper with garlic and onion, concluded that the highest pepper dry weight, with comparison intercropping with garlic, is obtained. At the end Bulblet number obtained in single cropping with comparison of garlic and pea intercropping elevated from 9.366 to 10.56 g($p < 0/039$). In the intercropping of pea and winter crops, and tomato, and summer crops performance products, In intercropping, with comparison single cropping, In the all plants, elevated (Hossain, 2003). To evaluate intercropping of garlic and pea, of the LER, or (Land Equivalent Ratio) was used. On this basis, with intercropping of garlic and pea, LER to 12/1 elevated. In fact by using intercropping, garlic product, as much as

12% elevate. Bahara and associates (1999) concluded that with intercropping of radish and pea a much 52/1 elevate.

With intercropping of pea – spinach, pea – radish, pea – lettuce, pea – Potato, LER, respectively 56/1, 54/1, 05/1 and 45/1 was obtained (Hossain, 2003).

Based on the observations of the present research, growth rate weeds In the intercropping of garlic and pea, compared with in single cropping of garlic, was reduced. this reduce competition from weeds, with the main plant that ultimately will lead to increase in LER. The other hand, pea, garlic earlier, ready to be harvested, and in the cropping mix, complementary effect, creates, and income from this type of cropping, increase between 20 to 35 percent (Mazaheri, 1377) . Results indicate this experiment , the effect of increasing pea, fresh weight, dry weight, and bulblet number, and even garlic leaf dry weight, appeared to. Therefore , treatment, intercropping of garlic and pea In the date, time of Plant two plant, Can be, as a treatment for cropping introduced, Because The amount of land equivalent ratio above one (12/1) and increase the performance of the treatment, was obtained. Cause this, also can be a better use of resources growth, increase performance, and control the population, and weed biomass in intercropping with comparison single cropping attributed.

Therefore, with the present results of present study, for vegetable growers, and Saifi, natural risks, and the risk of economic production, resulting from single cropping, reduced. On the other hand, due to the abundance of weeds in Gorgan region, using a intercropping of garlic and pea, for the control, and reduce it to be useful.

REFERENCES

- Appendix Gh. In 1381. Vegetable Working. Printing, publishing of Agricultural Sciences. 384 Page
- Bahara B, Singh GS, Senapati PC. 1999. Biological and economical feasibility of intercropping vegetable crops in rained pigeon pea in Easter Ghat. Indian J. Soil Conser. 27.3: 207-210.
- Banik P, Midya A, Sarkar BK, Ghose SS. 2006. Wheat and chickpea intercropping systemes in additive series experiment: Advantages and Somthering. European. J . Agron. 24: 324-332.
- Hussain SA. 2003. Growth, yield and economic impacts of intercropping in vegetables. phd thesis, NWFP Agriculture University, Peshawar.
- Jana PK, Mandal BK, Prakash O, Chakraborty D.1995. Growth,wateruse and yield of Indian mustard (Brassica-juncea),gram (Cicer-arietinum) and lenti (Lens-culinaris) grown as sole crops and intercrops with 3moisture regimes. Indian Journal of Agricultural Science.65:387-393.
- Liebman M, Davis AS. 2000. Integration of siol, crop and weed management in Low- input farming systems. Weed Research. 40. 27-47.
- Mallanagouda B, Sulikeri GS, Murthy BG, Prathibha NC. 1995. Performance of chile under different intercropping systems and fertility levels. Indian J. Agro. 40.2: 277-279.
- Mazaheri D. In 1377. Mixed farming. Tehran University Press. 262 Page.