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## Studying the function of fodder in the mixed farming of millet, Sorghum, sun flower and fodder corn in Damghan

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### ABSTRACT

*In order to study the function of fodder in the mixed farming of sun flower, fodder corn, Sorghum and pearl millet in the climate of Damghan the experiment was performed in form of the randomized completely blocks design with three replication a year in 2011 farming year single crop planting and mixed crop planting in two, three and four planting that the proportion of planting included 25, 50, 75, 100 percents. In this experiment some manners such as the altitude of plant, number of leaves, length of leaf, width of leaf, the dry and fresh function ratio were determined and then the variance analyzing and comparing averages were performed by some extend Duncan test by 5% possibility and finally the collocation co efficiency among the manners were determined by SAS statistics soft ware. The comparison of averages showed that the most fodder function is related to the mixed farming of corn and sun flower with 201.57 tons a hectare and the best dry function was related to the mixed millet corn and sun flower with 54.85 ton in a hectare and the least function was related to the millet 22.26 ton in a hectare and the collocation co efficiency between the width of leaf with the positive fresh function and it was meaningful with the possibility level of one percent. ( $r = 0.64^{**}$ ).*

**Key words :** function, mixed farming, fodder

### INTRODUCTION

In the last thirty years increasing the mass production of agricultural crops has provided a part of ever increasing population and by considering the rapid increasing of population and increasing demands it is predicted that until 2025 the cities population will form two third of the globe's population since this increasing of population with immigrating from rural areas to big cities will make problems the economic balance of environmental balance like pollution, change farms into residential lands, decreasing the action work force in agriculture and so on. Today the matter of permanent development is an insupportable in terminology and developing agriculture is the base for economic development of the country and till the time the barriers of development haven't been removed in this part other sections such as industry will not get a great achievement [10].

According to the existing statistics more than 100 million hectares of the country area is unstable because of about 75 million hectares is under the water erosion, 20 million hectares under the wind erosion and about 6 million hectares which is involved with agriculture is affected by some chemical and physical destructions such as getting salty, evacuation of nourishments, densification, and changing the structure. the permanent and stable agriculture has three main goals 1- food immunity 2-agricultural revenue 3-the preserving the environment [15].

The goals of permanent and stable agriculture are obtained by different ways farming sequence, mixed farming, fighting with weeds, soil preservation, fertilizer and so on. The mixed farming includes farming more than one plant in a piece of land and in a farming year so that the plants in the most of their growing time be beside each other. [8,14].

In fact the increasing of the function is the most important advantage of mixed farming rather than single plant farming. in the mixed farming when the maximum of function is obtained that the plants in the view point of method and amount of usage of natural sources are completely different from each other. These kind of plants are grown beside each other with the different morphological characteristics will be able to use optimally from the environmental factors and consequently the total function will increase in a unit of area [16]. In addition in the mixed farming more area of soil is covered by the aerobic parts and roots of plants and in this way erosion and destruction by water will get the minimum amount [5].

Also by mixed planting we can neutralize the harmful root effects of some plants. For example roots of Sorghum cause the weakening the soil structure while Soya reforms the physical form of soil and keep it soft. So the mixed planting of these two plants has a very important role in preserving soil [18]. in the mixed farming more volume of soil is used and on the other hand the plant remaining which in this kind of farming remain in soil is more and more various. So Homous and other nourishments are made in soil and soil gets more fertile [11]. Also when water is considered as a limiting factor the mixed farming is important in view point of water consumption [4]. Corn is a plant that is farmed with most of other plants and makes much benefit. For example corn with cotton in India Brazil and Nijeria. Corn with castor bean and grains in in Brazil and Mexico and finally planting corn with different beans is one of the most common methods of mixed farming in south America and North of America.

Most researches of mixed farming is concentrated on the beneficence of function and other benefits of mixed farming such as better controlling of weeds , controlling pests , better usages of light and nourishment sources are considered less [16].

Farming the agricultural plants has started in the tropical regions and now is used in many countries of the world like China, India, The United States of America and Mexico. In America Kasava plants sweet potato and the different kinds if Yam are the most important knot plants which are grown by some plant farming in mixed farming method with corn [9]. Mixed plant farming has an important role in increasing agricultural products that this amount is variable between 12 to 22 percents.

The most important and the most direct way for increasing varity in farming ecosystem is mixed farming method that makes the interactive relations possible between single bushes of different plants [4].

The superiority of biologic farming is the result of more efficient usage of sources. Because the mixed details may be different in the view point of growing sources so that when they are farmed together will have a more effective usage in the view point of water and nourishment compared with pure farming in addition the competition of the weeds will decrease because of having a compound of plants with different ecologic residence [3].

An experiment was performed in India in order to the study of mixed farming of peanuts with millet and corn and sorghum and the function of farming was less than a single plant farming method but the most benefit was obtained from mixing to plant corn and peanut [2].

The study on the mixed farming of fodder corn and grain corn showed that the dry product was more than a single product [5].

The mixed planting of corn with other plants will cause increasing of function in the mixed farming because of the completement effects of plants, the better usage of farming sources and neutralizing effects against plants and weeds in the mixed farming [7].

Some plants with converting unsolved compounds in soil into solved form will cause fertility in soil. In order to study the result in this experiment sweet corn ( the main plant) and green bean ( as by plant) in the mixed farming was performed . It is remarkable in this experiment the function of all mixed plantings was higher than pure farming [16].

In a research in order to determine the most favorite pattern of planting mixed corn with beans sold in markets , Hybrid grain corn 70 with the bean kind of university were studied. the obtained results show that all different patterns have superiority over the single plant farming of corn and beans. Considering these results we can prove

that the plant competition in most of patterns and mixed densens were not so much that makes completion. as a result the final function of mixed farming was more in the single farming [16].

Rahmani (2005) in order to compete the fodder function in fodder sorghum and clover and controlling weeds performed an experiment in this way that the orders of pure planting and mixed planting in two increasing and substitute systems are compared and got this result that the dry weight and the number of all weeds in the second harvest is less than the first harvest. The population and living of the weeds in the pure farming of sorghum in addition to the 70 percent of favorite dense is compared to the pure farming of lucern and sorghum has increased very much.

Two farm experiments were performed in order to determine the suitable densens of soya and fodder sorghum in mixed planting. The results showed that the effects of soya and sorghum dense on the function of both kinds have been meaningful. By increasing soya dense up to 40 bushes in a square meter the function of soya showed an increase[20].

Chaiechi and Daryaie studied useful characteristics of mixed planting. the results showed that the treatment 3 to 1 Medicaoge sativa / sorghum had highest qualification for being selected as a superior [13].

In the mixed planting of grain corn with vigna radiata the study f the grain function and details of function because of dense and planting proportion in the grain function and manners including the length of stem, length of panicles, panicles diameter , number of paws , number of grain in panicles, one hundred and the index of harvest showed a meaningful difference [7].

Researchers have designed some methods for measuring the advantage of mixed planting compare with the function of single plant farming. in the research experiment there are separate treatment for mixed planting and pure farming that the function of pure farming.

Also this index shows that how much the function must be added to the pure planting till this amount gets equal to the mixed planting [7].

**The goal of research:** Increasing the fodder function in the mixed farming compared with the single plant farming.

This experiment was done in the complete random blocks with three blocks and in every block 15 experimental sections in for of single plant planting and mixed planting were performed in a farm located 10 kilometers south west far from Damghan the size of plots were 3 by 5 meters and the distance between rows are 60 centimeter and on the rows 8 centimeters which were planted in raw mixed form. In this experiment for plants which were grown were Nuttrifeed Pennisetum americanum cv. , Sorghum bicolor S.c Zea mays 704 and sun flower Helianthus annuus .

From every test unit at the end of growing season , the manners of growing the plant , the function of wet fodder and dry function , length of leaf , width of leaf , number of leaves were measured. Finally the resulted data were determined by the statistical software SAS was processed and the analytic variance and averages comparisons were determined by some extends Danken at the possibility level of 5 percent and the collocation co efficiency of manner was determined.

## RESULTS AND DISCUSSION

The analyze of variance (Table 1) showed that the he manners of plant height , the function of wet fodder and dry fodder , length of leaf, width of leaf , number of leaves in the possibility of 1 percent was meaningful.

**Table 1 the analyzing of manners variance studied I the mixed planting of sun flower, corn , Sorghum and millet.**

S.O.V	df	Mean of Square					
		height plant	fresh weight	weight dry	number leaf	breadth leaf	height leaf
Block	2	1431.71*	4175.21*	91.81*	7.42	13.62*	75.70*
Treatment	14	1541.07**	5529.79**	298.92**	138.77	23.07**	329.79**
Error	28	357.08	1212	108.87	15.28	3.15	14.59
(CV)		17.61	25.99	28.54	21.39	29.41	10.56

\* and \*\*: significant at 5% and 1% levels respectively.

The comparison of averages (table 2) the manners of plant height in the sun flower in separate planting with the average height of 149.52 has the highest height and the least height in the mixed millet, Sorghum, corn with the average 91.11 cm and in another evaluation it has been said that mixed planting with other plants has resulted in increasing function in the mixed planting possibly because of the completing effects of plants and better usage of sources in mixed planting and neutralizing effects against plants, weeds in the mixed planting [6].

The manner of number of leaves in the mixed sun flower and millet with the average of 29.44 leaves for the most and the mixed planting of corn, Sorghum and sun flower least with 12.72 leaves. Also the biggest width of leaf 11.73 cm related to the sun flower planted separately and the least width of leaf related to the separate millet with 1.61 cm.

The longest length was for separate planting of Sorghum with the average length of 54.45 and the least length of leaf was for mixed planting of millet and sunflower 21.29 cm.

In view point of manners the function of wet fodder was the greatest in sun flower and corn 201.57 ton and the least amount of production the function of wet fodder related to the mixed planting of Sorghum and millet 60.63 tons per hectare. Also related to the dry weight of With producing dry fodder in hectare the most dry function is related to the mixed planting of sun flower, corn, millet 54.85 ton in hectare and the least function of dry fodder was for the separate planting of millet 22.27ton and in other sources the study of mixed grain corn and fodder one has shown that the dry planting product has been more than single planting so is adapted to the results of this research.

**Table 2 - The comparison of averages of studied manners in the mixed planting of sun flower, corn, sorghum and millet.**

treatment	height plant (Cm)	number leaf (Cm)	breadth leaf (Cm)	height leaf (Cm)	fresh weight (Tan/ha)	weight dry (Tan/ha)
millet	96.96e	30.625a	1.613g	25.958gf	54.30f	22.267d
Sorghum	127.13abcd	9.521g	3.373feg	54.458a	109.73fdec	33.567bdc
Helianthus annuus	149.59a	20.417bcd	11.735a	15.729h	177.07bac	27.500dc
maize	93.81de	9.250g	5.702fecd	51.844a	190.37ba	40.900bdac
millet+ Sorghum	96.02d	25.948a	2.627fg	40.875cbd	60.63fe	22.917d
millet+ Helianthus annuus	107.10bdc	29.448a	6.790bcd	21.292gh	113.28fdec	26.813dc
Helianthus annuus+Sorghum_	133.10abc	13.625efgd	7.104bc	33.885ed	153.00bdac	37.450bdac
millet+ maize	68.58e	17.135efcd	3.457fegd	37.167ced	101.43fde	28.583dc
maize + Sorghum	137.67ab	10.917fg	5.607efcd	44.635b	117.07fdec	38.500bdac
Sorghum+Helianthus annuus	109.11bdc	13.979efgd	7.859bc	32.318ef	201.57a	40.033bdac
millet+ Sorghum+maize	91.11de	18.569ecd	3.648fegd	42.479cb	124.06bdec	42.511bdac
millet+ Sorghum+ Helianthus annuus	110.81bdc	21.581bc	6.232ecd	30.575ef	164.28bdac	45.654bac
millet+ maize + Helianthus annuus	101.83bdec	21.618bc	6.628becd	33.056e	137.83bdac	54.856a
Sorghum+ maize + Helianthus annuus	116.75bdec	12.722efg	9.710ba	40.323cbd	157.54bdac	52.689ba
Sorghum+ maize + Helianthus annuus+millet	100.02dec	18.656ecd	8.347bc	37.701cebd	146.76bdac	34.025bdc

*Mean followed by similar letters in each column are not significantly different.*

T have the common letters didn't have meaningful differences according to the some extends Duncan test in the possibility level of 5 percent.

**Table 3 -The collocation efficiency of manners studied in mixed planting of sun flower corn, sorghum and millet**

	height plant	number leaf	breadth leaf	height leaf	height plant	weight dry
height plant	1.00					
number leaf	-0.23ns	1.00				
breadth leaf	0.48**	-0.14ns	1.00			
height leaf	0.06ns	-0.57**	-0.31*	1.00		
Fresh weight	0.40**	-0.37ns	0.64**	-0.02ns	1.00	
weight dry	0.31*	-0.32*	0.23ns	0.22ns	0.58**	1.00

*\* and \*\*: significant at 5% and 1% levels respectively.*

The co efficiency table showed that the relation between wet weight with the length of leaf in the possibility of 1 percent was ( $r= 0.64$ ). it means the more extended the width of the leaf is the more function it will have because in this research the goal is the study of fodder function so the manner of width of flower must be noticed and also the of dry function with the wet function in the possibility level of 1 percent was meaningful ( $r=0.58$ ) it mean the more the weight of wet fodder increases the more the weight of dry fodder increases. Also the relation of plant height with ( $r= 0.48^{**}$ ) and with weight of ( $r=0.040^{**}$ ) and positive in the possibility level of 1 percent with the dry weight of ( $r= 0.31^{**}$ ) positive and the possibility level of 5 percent was meaningful.

In this research with increasing the height of plant, the function of fodder increased. So it is suggested that in next research dense be noticed more because increasing the dense possibly the height of plant in mixed planting will be increased and because of it the function of fodder increases. Also the relation between length of leaf with the number of negative leaf and in the possibility level of 1 percent was meaningful it means the more the number of leaves increases the less the surface of leaf will be and the relation of length of leaf with the negative width of leaf was meaningful in the possibility level of ( $r=0.31^{**}$ ) and the relation of dry function with the number of negative leaves and in the possibility level of 5 percent was meaningful ( $r =0.32^*$ ). Because in this research the goal is the fodder function so the decrease of leaf surface and increasing the number of them causes the increase of quality of fodder function. In other sources the important role of some planting in increasing of fodder production causes increasing from 12 to 22 percents and is the most important way for increasing the variety in farming ecosystem of mixed farming. That makes the possibility of making interactive relations between single bushes of plants [4].

In this research considering this point that the city of Damghan has dry and hot climate and on the other hand the growth with the climatic condition and soil of the this area isn't performed well it is supposed that in the mixed planting because of competition between these three plants and shadowing the growing of plants will be better and the production of fodder function will increase in ever unit of surface that with this increase live stock industry will be developed in the area and on the other hand the mixed planting will make better taste of fodder for livestock usage and if one of the planted plants because of every production and function couldn't have correct function and production the other one will compensate its loss and in this way its risk is less than single planting.

So in this research the results got in the mixed planting of sun flower with corn makes more function of production in Damghan and is better than other pure and mixed plantings.

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