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Effects of Planting Density and Weeding Time on Weeds and fenugreek Dry Mater

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ABSTRACT: In order to study the effect of Plants' Density and Weeding Time on the changes of dry matter of Weeds and fenugreek, an experiment was conducted in the spring of 90 in the research and experimental field atIslamic Azad University ofBirjand. In this experiment fiveweedingtimes weeds(all weeding, 20, 40 and 60daysafteremergence andnonweeding) and threeplant densities(10, 20 and 40plants m^{-2}) in the form of factorial experience in the frame of completely random of blocks projects were evaluated for three times. The result of variance analysis of measured factors (phenotypes and genotypes) showed that the density has affected significantly on dry matter of fenugreek. The effects of weeding time and plant density on dry matter of weeds were highly significant. Increasing the duration of weed presence was subjected to total dry weight increase and enhance of weed control period, was resulted to decreasing of total dry weight of the weeds. Besides increasing the duration of weed presence, was resulted to decreasing of dry matter yield and fenugreek's function. According to the results of this experiment indicated that, planting at 40 plants m^{-2} along with weeding in40 days after planting for reducing weeds competition and improving dry fenugreek seem to be appropriate.
Keywords: Plant density, time weedin, Trigonellafoenumgracum L, Weed.

INTRODUCTION

Environmental stressesaffecting on thedistribution ofdry matterbetweendifferent parts ofacrop plant, so morphologicalflexibilityindry matter partitioning, can increase thecompetitiveabilityof aplant ina range of availableen vironmentalresources.(Crick & Grime, 1987). Todat regarding development of weed resistancetoherbicides andenvironmental impact of their consumption, development of ecological strategies, as a safe and low-cost option for weed management, in order to reduce the use of pesticides is one of the priorities for sustainable agriculture (Dunan, et al., 1995). Increasing crop plant competitiveness as one of the key tools for weed management recognized which is considered stable countries. Methods for the development of agricultural crops competitive capacity and inhibit the growth of weeds or reduce its competitive effects on the crop plants, mainly depends with the preemption of resource consumption, such as water, light and nutrients by crops. (Fernandez, et al., 2002). The first consequence of the presence weed along crop plants is increasing plant population density that causes restrictions for water, food and light, finally reduce performance. The amount of yield loss due to weed interference, depending on the crop plant, weeds, and growing conditions are quite different. Heavy infestation of weeds throughout the entire growing season may lead to a complete loss of crop to crop plants. due yield losses to weeds, their control over the entire period has been an integral part of agricultural operations. (Rashed- Mohassel & Mosavi, 2006). In order to create a balance between crop plant and soil moisture, optimal density is significant. Increased density too much good causes at the beginning of the growing season, soil moisture is depleted. Change plant density can also affect on growth of weeds. So that increase plant competitive power density and as a tool in integrated weed management has been introduced. (Harries & White,2007).

According to Kafi et al. (kafi, et al., 2005) with regard to vegetative growth and area index of aerial organs that Cumin, particularly in the early stages of development makes, control of weeds early enhance the competitive power plant and the final performance is less affected. Williams et al also reported with increasing plant density increase absorption of solar radiation concurrent with the increase in leaf area and thus dry matter accumulation rate increases. In a study by Hossain et al (Hosseini, et al., 2005) was conducted in cumin,

maximum biological performance is achieved when plants during its growth period has faced with a maximum time of absence of weeds whether in first growing season (early season weed growth) or at the end of the growing season (late season weed growth). Bovard and et al (Board et al., 1990) observed With increasing density, continuation of dry weight is always higher. In other words, whatever weed dry matter produced per unit area increases, dry weight of the crop will be reduced proportionally. In general, weeds because more competition for light, water and food has been more successful than crop and will increase their dry weight more rapidly.

Thus, this studywas conductedinconjunction withthe followingobjectives:

Effect of time of weed remove on dry fenugreek.

Determine the most appropriate course that weed control during the period Maximum efficiency and minimal damage to the TF function is taken.

Identification of optimal crop density to overcome weeds.

MATERIALS AND METHODS

The trial in the spring of 1390, in the research and education field of Islamic Azad University of Birjand, Birjand, located at km 5 road - Zahedan was conducted. Land preparation, including plowing, disc, respectively. To strengthening land according to the analysis of soil, fertilizer application was done. This was a factorial experiment in a randomized block design with three replications. Factors studied include weed interference factor in 5 levels(All weed control until the end of the season, the first 20 days after planting, weeding, second stage: 40 days after planting, weeding, stage III: 60 days after planting, weeding, weed control until the end of the season) and density in 3 levels (40, 20, 10) per square meter was considered. Each plot consisted of 4 lines with planting distance of 25 cm. Each plot consisted of 4 lines with planting distance of 25 cm. Double the amount of seed needed for planting was consumed and desired density after 4 weeks after planting were applied. During periods of growth any decline and specific disease groups was observed. To determine the dry matter of weeds, before starting their control each treatment, and also at the end of each growing season Fenugreek experimental plots after removing the edge, 2 square meters randomly chosen and weeds were dried for 48 h at 75 ° C and then weighed. At the end of the growing season, to determine dry matter fenugreek, after remove the marginal effects, area of a square meter of each plot was harvested and dried for 48 h at 75 ° C and dry matter yield per unit area was determined. Statistical analysis using SAS software and comparison of means was performed using Duncan's test.

RESULTS AND DISCUSSION

in this study, five types of weeds, including purslanePortulacaoleracea, crap Acroptilonrepens, Ivy Convolvolusarvensis, Chenopodium album Chenopodium album, SorkhehEchinochloacolonum, TF was observed in field. Sorkheh weed abundance was higher than other weeds. Effect of weeding time on weed dry matter in weeding time was significant (Table 1). Excluding the treatment non- control, highest and lowest dry matter of weeds in weeding time treatment 40 days and 20 days weeding respectively (Figure 1). Less dry matter accumulation in treatment of 20 days weeding indicates that in 20 days after emergence of weeds have not grown or maybe some of them are after this stage green, But the delay in weeding, increase the presence of weeds in a field and therefore increase their dry matter. Chayi chi and Ehteshami (Chaichi&Ehteshami, 2001) in studies with soybean weed competition observed with prolonged periods of weed competition since the beginning of the growing season, found a significant increase in dry weight. And the weight of the dry matter in the treatment of competition all season, from 3/9 grams per square meter at the beginning of the growing season reached 1080 grams per square meter at the end of the growing season. The average dry matter density of weeds under different weed at the time did not differ (Figure 2). With the increasing density Fenugreek, weed dry matter decreased somewhat, apparently high plant population density on the growth of weeds had little effect. The interaction of plant density with weeding time on dry matter of weeds at the time of weeding was significant (Table 1). In treatment 20 days after weed emergence, due to early weeding, weed growth was not affected by plant density. But in treatment 40 days after weed emergence, seems with increasing plant density and canopy development of Fenugreek, more environmental constraints have been created for weeds and as a result of this restriction is more severe in the high densities. But 60 days after emergence weeding in treatment, may in densities of 40 and 20 plants per square meter in effects of competition for light, weed growth is stimulated and this has reduced the weed dry matter. The results show that in high densities due to competition ghosting and TF, weed growth has declined substantially (Figure 3).

Weed dry matterinthe end of theseason, not beaffected by weedtime(Table 1). Mostdry matter of weedsinthe end of theseason was related noweedingtreatment that hadasignificant increasecompared toall

Table 1. Mean square of treatments and their interaction

S.O.V	d.f	Total Dry Matter of Weeds	Weed Dry Matteron Last season	Weed Dry Matter on time weeding	Yield fenugreek	Biomass fenugreek
Replication	2	36664.0	27175.44	78059.19	207.95	394.56
Density	2	78967.87*	6205.45 $^{n.s}$	72290.4*	864.84**	33282.95**
Time Weeding	4	774872.17**	194664.6$^{n.s}$	122740.5**	408.26*	1322.53$^{n.s}$
Time Weeding×Density	8	9980.19 $^{n.s}$	28486.4 $^{n.s}$	13465.36**	236.038*	1954.09$^{n.s}$
Error	28	20386.96	40798	15983.86	110.48	1452.84
(CV %)	-	26.82	34.67	19.78	21.86	13.88

Ns, * and ** none significantly, significantly in 5 % and significantly in 1 %, respectively.

the weeding(Figure1).Removeexistingweedsbyweeding reduce Dry matter accumulation ofweeds and whatever weeding time is closer to the end of the season, dry matter weeds will be less than last season. Meanwhile, Mac Lachlan et al (Mclachlan et al., 1993).

reported that increasingnumber of control decreasesweeddry matterper unit areadramatically. The averagedensitiesdry matterweedat the endoftheseasondidnotdiffer(Figure2). In fact with increasing plant density from 10 to 40 plants per square meter, decreased dry weight of weeds, but this decrease was not significant. Mklachlan and colleagues (Mclachlan et al., 1993) expressed with increased crowding Corn, increases competitive pressure on crop weed which results a reduction in weed biomass. Weed dry matter and dry matter fenugreek was affected by plant density (Table 1). plant densities was directly related to dry matter of TF. In other words, fenugreek seeds with higher density increase crop competitiveness against weeds and weed dry matter per unit area was severely reduced. Seems different reactions in dry matter TF and weed than density, due to environmental factors limitations such as light, moisture and nutrients. (Figure 4). seghatoleslami & Bonakdar, 2009, also emphasized that whit increase Fenugreek plant density, because of the larger leaves and more sunlight produces more dry matter. Both Nezami and colleagues (Nezami et al., 1998) and Bagheri et al (Bagheri et al., 2000) have reported similar results.

Weeding timehad a significant effectonweeddry matterbuthad no effectondry matter TF (Table). Dry matter TF (Table 1). dry matter weeds in competition treatment, throughout the season from 54/1008 g in treatment of 20 days at the beginning of the season to a maximum of 87/1193 grams per square meter in end of the growing season reached (Fig. 5). And this suggests that weeds during the growing season due to more competitive strength in light absorption, water and nutrients, have increased their dry matter quickly. And this Increasing weed dry matter was reduced 32percent dry matter fenugreek. It seems weeds growth before this stage, due to the availability of light and nutrients probably, has a few limitations for Fenugreek.

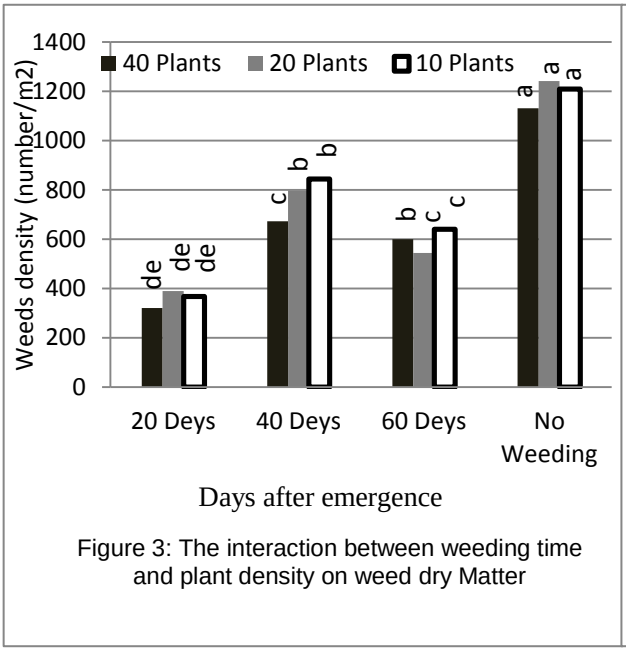

Figure 3: The interaction between weeding time and plant density on weed dry Matter

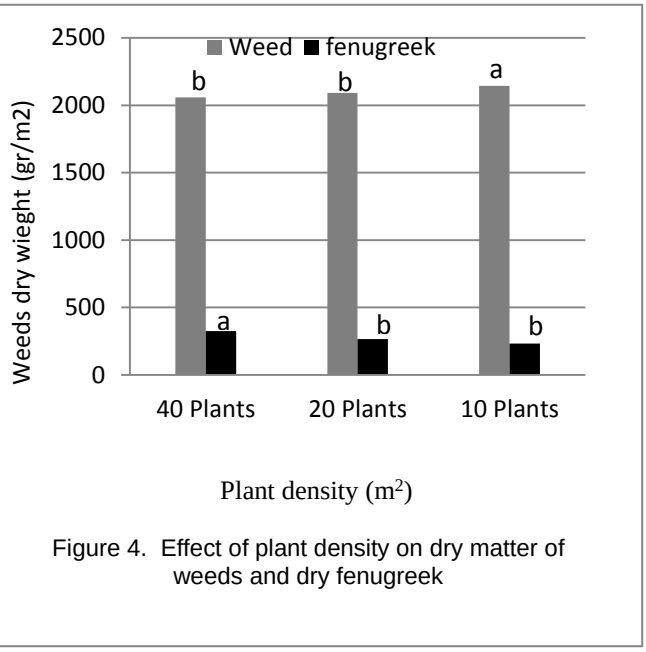

Figure 4. Effect of plant density on dry matter of weeds and dry fenugreek

Effect of weeding and plant density on grain yield was significant (Table 1). Weeding in treatment 20 days after planting Weeding and 40 days after planting Weeding,effectively prevent yield loss from weed competition, so that the grain yield per square meter at 40 days after planting Weeding treatments, 7/13 grams per square meter was lower than all the Weeding treatment. (Figure 6). However, treatment 60 days after Weeding emergence, weed growth nearly completed in product and may eradication of weeds damage to adjacent plant. Rahimi (Rahimi, 1994) has shown that once weed control in cumin, result is far more favorable than untreated control. Weeding in the present experiments a 67 percent increase in TF grain yield that Sksna and Singh findings (Saxena & Singh, 1987) confirms Its. According to environmental consequences of pesticides use in agriculture, fenugreek farm weed management programs on Weeding and other agricultural materials seems logical.

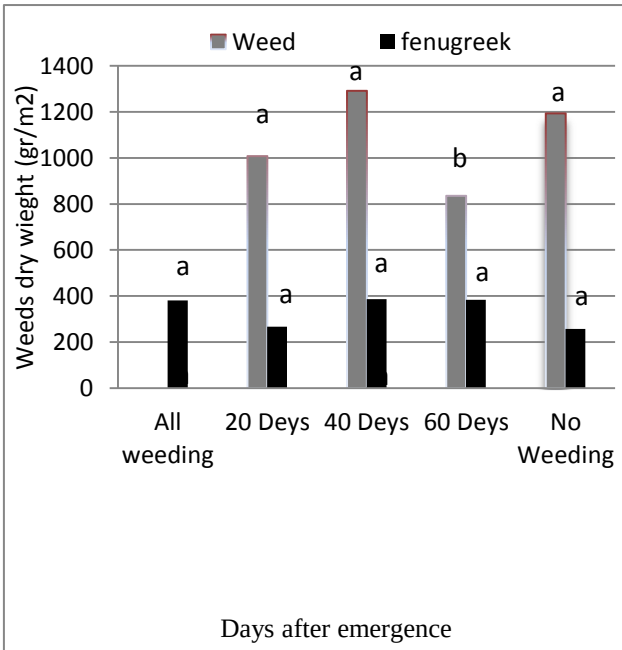

Figure 5. Effect of plant density on weed dry matter and dry fenugreek

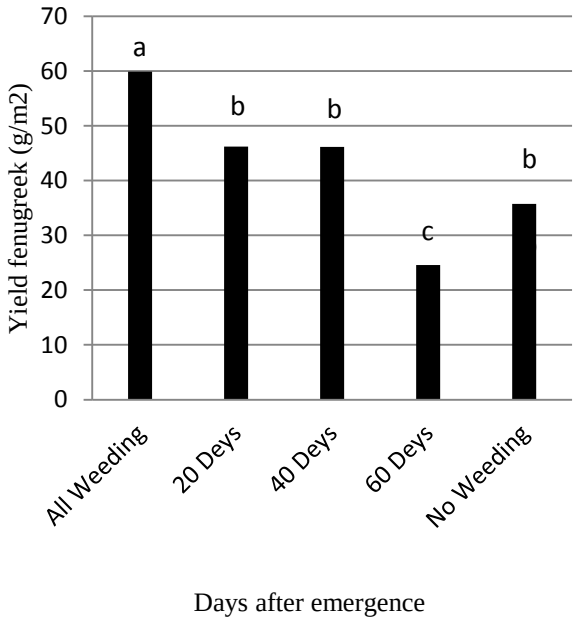

Figure 6. Effect of weeding time on yield fenugreek

With increasingplantpopulationper unit areaincreasedgrain yieldper square meter. So thatthe highestgrain yield was relatedto40 plantsper square meter. Butwith adensity of 20and10 plants per square meter, was a differencesignificant statistically (Figure 7). Also yield of 40 plants per square meter only about 12 grams per square meter was more than treatment 20 and 10 plants persquare meter, soforsaving inseed, 20plants persquare metercanbetreatmentbetter. Goudaet al(Gowda et al., 2006) comparedthe effect of threeplanting(15 × 15, 15 × 30and30 × 30)onTF, showedthat the highestgrain yieldrelated tohighestdensities(up 15 × 15), respectively.Increase ingrain yield inmoredensities inexperimentsSingh andcolleagues(Singh et al., 2005),Yadavet al(Yadav et al., 2000)are observed.

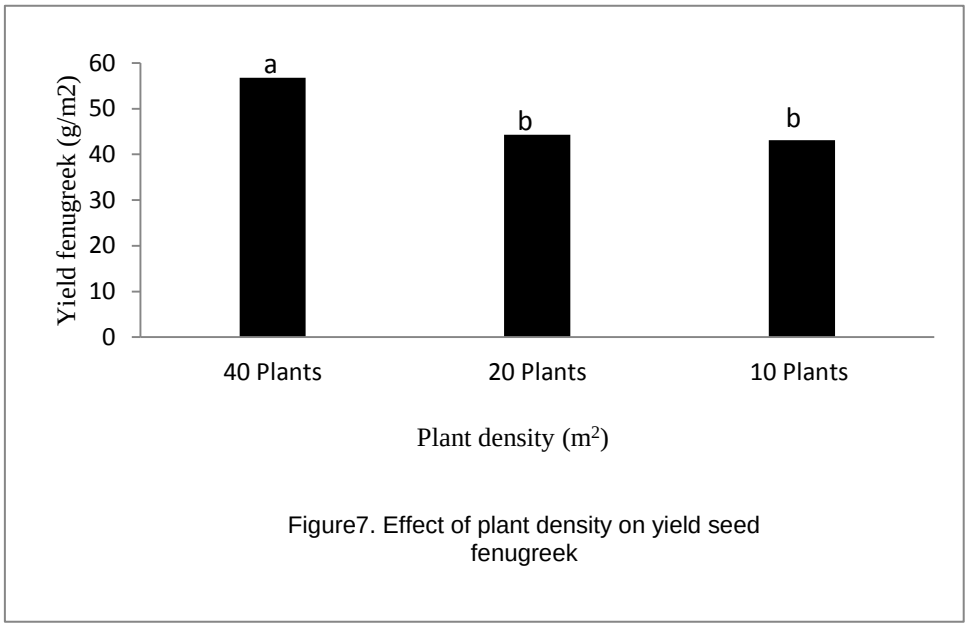

Figure7. Effect of plant density on yield seed fenugreek

Results indicate that treatment 40 days after Weeding emergence has significant impact In reducing weeds dry matter. also increase in plant density has led to an increase in dry matter Fenugreek, but in terms of less use seed and dry matter production relatively appropriate, density of 20 plants per square meter than other densities is preferred. Thus, based on results of this study seems that density of 20 plants per square meter, and weeding 40 days after emergence may be appropriate to reduce weed competition and improve Fenugreek performance.

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