Intercropping Fenugreek *(Trigonela Foenum Graecum L)* On The Faba Bean *(ViciaFaba)* To Reduce The Incidence Of *(OrobancheCrenata)*.

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Abstract: Grain legume production in the Mediterranean Area is threatened by the holophrastic plant *Orobanchecrenata*, to which little Resistance is available in affected crops. Control strategies have centered around agronomic practices and the use of herbicides, although success has been marginal. Several authors have described fenugreek as a suitable crop for intercropping with legumes, reducing the infection level o*f Orobanchecrenata*; however, there is an important lack of experimental data and of a systematic research of the mechanisms involved in the reduction of parasitic infection**.** Two field trials were carried out at Malawi Research Station, Minagovernorate during 2012/2013 and 2013/2014 seasons, to evaluate intercropping fenugreek on the two varieties of faba bean (partially resistant to *Orobanchecrenata* Infection), and to study the best rate of fenugreek reduce the incidence of *Orobanchecrenata* and increased seed yield faba bean. Experimental design used was a split-plot with three replicates. Results showed clear attachments of Orobanche*crenata* on fenugreek roots and this is the first report of this fetid broomrape infecting fenugreek. The level of infection was very low number of broomrape/plot compared to solo percentage 53.49%, 45.83% (Giza-3) and 50.81%, 36.38% (Giza-843) and also decreasing in the incidence of weight of *Orobanchecrenata* kg /plot when intercropping fenugreek on faba bean crop and also it grew beans for solo percentage 57.26%, 51.75% (Giza-3) and 42.70%, 30.63% (Giza-843) in the two seasons respectively. On the other hand seed yield / fed, of faba bean with fenugreek was increased by 45.34%, 38.73 %(Giza-3) and 63.96%, 79.03 % (Giza - 843) in the two seasons, respectively. From the obtained results intercropping fenugreek on faba bean rate of 20% (8kg/fed), 40% (16kg/fed) and 60% (24kg/fed) of solo under two methods of agriculture sowing broad casting of fenugreek and sowing seeds it between ridge with two varieties of faba bean. Finally Sowing fenugreek seeds drill between ridge faba beans variety Giza- 843 at rate of 40 % (16 kg/fed) of sole crop Led to a decline in *O. crenata* resulting increasing of seed yield ard / fed on faba bean Compared to monoculture. Recommended as a beneficial intercropping arrangement of fenugreek on the faba bean to reduce the incidence of *Orobanchecrenata* in Medial Egypt conditions.
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Introduction :

Fetid broomrape (*Orobanchecrenata*) is a parasitic plant that has been recently described as an agricultural problem in legume crops in Egypt. Various Orobanche species are weedy and cause severe education in the yields of many important crops. The seeds of these parasitic weeds may remain dormant in the soil for many years until germination is stimulated by the release of a chemical signal from a host plant. In order to determine the effects of fenugreek root exudation the induction of *Orobanchecrenata*. Orobanche species exert their greatest damage prior to emergence and the majority of field losses therefore occur before diagnosis of infection. A wide variety of approached physical, cultural, chemical and biological have been explored against root parasites, but most of them are ineffective, or insufficiently selective to the majority of susceptible crops. The intimate connection between host and parasite also hinders efficient control by herbicides. Unfortunately, in many crops no resistant varieties have been produced to date. Control strategies based on a single treatment are often only partially or inconsistently effective and are affected by environmental conditions. Overall, control strategies to date have not proven to be as effective, economical and applicable as desired **(Parker, 1991; Joel, 2000; Joel et al., 2007).** Current means for controlling parasitic weeds are focusing on reducing the soil seed bank, preventing seed set and inhibiting seed movement from infested to no infested areas. Rotation into non-host crops is generally the only valid recommendation for farmers, but this option is not always acceptable due to the importance of the host crops for the economy and incomes of subsistence farmers. There are some reports of potential 'trap crops' or 'false. An alternative is the mixed cropping or intercropping. Intercropping is regarded as an ecological method to manage pests, diseases and weeds via natural competitive principles

that allow for more efficient resource utilization **(Liebmanand Dyck (1993), Monica et al. (2008)** showed that decrease of *O. crenata* infection due to an allelopathic interference on the parasitic inhibition of *O. crenata* seed germination by allelochemicals released and fenugreek roots is suggested as the mechanism for reduction of *O. crenata* infection.

Fenugreek *(Trigonellafoenum-graecum L.)* is a self pollinated, small-seeded annual legume that has been used since ancient times for pharmaceutical, human food and animal feed purposes. Historically, fenugreek is one of the oldest known medicinal plants, used in Greece, Egyptian, Chinese and Arab medicine **(Petropoulos, 2002).**

Fenugreek contains 28% mucilage occurs in the endosperm 22% protein, carbohydrate 50%, 16% fixed oil, vitamins, saponin and two alkaloids, tregonlline and chorine. On the other hand, fenugreek roots have been suggested to inhibit O. crenata germination, resulting in reduced infection of legumes when intercropped with the plant **(Bakheit et al., 2002a; Evidente et al., 2007; Fernandez-Aparicio et al., 2008).**

Intercropping is a method facilitating simultaneous crop production and soil fertility building. There is a renewed interest in intercropping linked to the need forreducing nitrogen cost and soil erosion. Intercropping is already used in regions of Africa as a low-cost technology of controlling the broomrapes (**Oswald *etal*., 2002).**Recently it has been demonstrated that intercrops with cereals or with fenugreek or berseem clover can reduce *O. crenata*infection on faba bean and pea due to allelopathic interactions (**Fernandez-Aparicio*et al*., 2010)**. This has been confirmed in subsequent study, in which trigoxazonane was identified in the root exudates of fenugreek which may be responsible for the inhibition of O. crenata seed germination **(Evidente*et al.*, 2007).** Also, he reported that Egyptian clover had been proposed as a trap crop for *Orobanche*. In contrast, however, **(Khalaf,1994)** concluded that intercropping faba bean with fenugreek did not cause and decrease in *Orobanche*infestation, though he reported that Egyptian clover, which is only rarely infested by *Orobanche*, may be used as a trap crop. **(Bakheit et al,2002b)**. Revealed that Intercroppingfaba bean with each of lupine, fenugreek and Egyptian clover markedly reduced the *Orobanchecrenata*Forsk. Infestation of faba bean. The number of branches, the height of the first pod, the number of pods, the seed yield of faba bean and the number and weight of *Orobanche*spikes were significantly affected by the intercropping treatments, but these had no significant influence on plant height, straw yield or 100-seed weight for faba bean. Intercropping faba bean with each of lupine, fenugreek and Egyptian clover increased the faba bean seed yield; consequently the economic return was also increased.This addition to increasing seed yield /fed in faba bean intercropping fenugreek on sole in the two seasons. It seemed that increased or decreased proportion of intercropped fenugreek with lentil affected biological yield of fenugreek negatively. The reduction was due to declining of mutual co-operation. In a research on intercropping of fenugreek and Ajowan, different cropping arrangements had significant effect on biological yields of both crops (Amri et al.,2009, **Mirhashemi*et al*., 2009 and Shirzadi et al.2011)**.

Relative resistance of faba bean plant to *Orobanche* as measured by the percentage of seed yield per plant under infestation of that of the most resistant cultivar Giza- 843 were found to be under the control of genes with mainly additive effects with partial dominance for greater yield **(Nagat, 2006)** and that was in accordance with the conclusions of **(Attia, 1998, Saber et al. 1999 and 2001). (Hassanien et al., 1998)** indicated that (Giza-843) had medium tolerance in pot experiments based on the *orobanche*incidencewhile other varieties were highly susceptible. In artificial and natural infestations in the field at Giza- 3, it was found that both Giza- 429 and Giza- 843 were partially tolerant.

Intercropping of fenugreek and lentil may increase, decrease or have no effect on yield components of each crop depending on spatial arrangements of intercrops. 2:2 ratios of fenugreek and lentil intercropping showed higher values of significant traits in both crops compared to monoculture and other intercropping arrangements and was known as the best cropping arrangement of the experiment. Moreover, 2:2 ratios had the highest land equivalent ratio, gross return, net income and Relative value total which indicated the economical advantage of this spatial arrangement.**(Shirzadi et al., 2011).** The value of land equivalent ratio (LER) in the oat-lenti-intercropping was 1.29, which means that it is a real advantage of this kind of crop system compared with oat and lentil raised in monoculture **(Dusa and Gheorghe, 2009**).

The objective of this study is to investigate the effect of intercropping fenugreek on the two varieties of faba bean (partially resistant to *Orobanchecrenata* Infection), and the best rate of fenugreekreduce the incidence of *Orobanchecrenata* and increased seed yield faba bean under Middle Egypt conditions.

Material and methods

A field yield trials were conducted at Mallawi Agricultural Research Station, Minia Governorate, ARC, during two successive winter seasons 2012/2013 and 2013/2014 in a highly and naturally infested field with *Orobanchecrenata.* The purpose of this investigation to study the impact of intercropping

fenugreek (Giza 30) on faba bean rate of 20% (8 kg/fed), 40% (16kg/fed)and 60% (24kg/fed) of sole fenugreek under the two methods agriculture sowing broad casting and drill of fenugreek and sowing seeds it between ridge beans on yield, yield components and aphid infestation rate of two faba bean cultivars (Giza-3 sensitive to incidence on *Orobanchecrenata)* and Giza-843(partially resistant on *Orobanchecrenata)*. These experiments were laid out split-plot design with three replicates. The sub –plot area was 10.5 m^2 (1/400 fed) consisting of 5 ridges, each of ridge 60 cm in width 3.5 m^2 in length.

The following treatments were studied:

A: Methods of agriculture fenugreek and varieties: (main plots)

A1-Sowing seeds drill between ridge faba beans with variety Giza-3

A2- Sowing seeds broad casting ridge fababean of plots with variety Giza-3.

A3- Sowing seeds drill between ridge faba beans with variety Giza-843.

A4- Sowing seeds broad casting ridge fababean of plots with variety Giza-843.

B-Seeding rate of fenugreek intercropping with faba bean (Sub plots):-

B1- Faba bean 100% + fenugreek 20% of sole crop (8 Kg /fed).

B2- Faba bean 100% + fenugreek 40% of sole crop (16 kg / fed).

B3- Faba bean 100% + fenugreek 60% of sole crop (24 kg /fed).

Sole fenugreek 40 kg /fed (Giza- 30).

Sole faba bean Giza- 3 and Giza-843.

Sole a solid of fenugreek and faba beans were also included in each replication for comparison and determination of the competitive relationships, calculated the yield advantage of crops, total income and net return fed-1. The agricultural practices were applied as recommended. Sowing was (5/11 and 7/11), harvesting date (8/4 and 11/4) in the first and second seasons, respectively.

The record data:

faba beans: At harvest, ten plants were randomly selected from the inner ridges to estimate plant height (cm), number of branches, pods and seeds/plant, 100-seed weight (gm) and seed weight/plant (gm). Seed yield (ard /fed) was determined from the yield data of the plot, then the data were Transformed to the unit of ard/fed. Degree of O.*crenata*infestation represented by number and dry weight of spikes, and other attributes were measured.

Fenugreek: At harvest, ten plants were randomly selected from the inner ridges to estimate plant height (cm), number of pods and seeds/plant, 1000-seed weight (gm) and seed weight/plant (gm). Seed yield (ard/fed) was determined from the yield data of the plot, then the data were Trans formed to the unit of ard/fed.

Chemical analysis

Faba bean and fenugreek seeds were carefully cleaned and freed from dirt, stones, chips and other extraneous material, then ground to pass through a 0.4 mm screen for proximate analysis. Nitrogen, protein (nitrogen% x 6.25), Potassium and potassium determined according to**AOAC.(2000)**.

Competitive relationships and yield advantage:

Land Equivalent Ratio (LER) according to **Willey (1979).**

$$LER= \frac{Yab}{Yaa} + \frac{Yba}{Ybb}$$

Where: yaa= pure stand yield of species a

ybb= pure stand yield of species b

yab= mixture yield of a (when combined with b)

yba = mixture yield of b (when combined with a)

Aggressivity (Agg) according to **Mc-Gilchrist (1965).**

$$A_{ab}= \frac{y_{ab}}{y_{aa} \times Z_{ab}\%} \; - \; \frac{y_{ba}}{y_{bb} \times Z_{ba}\%}$$

Gross retun:-

--Single faba bean= yield faba bean x price faba bean L.E.

--Single fenugreek = yield fenugreek x price fenugreek L.E.

--Total return of intercropping cultures = price of faba bean yield + price of fenugreek yield (L.E.)

--To calculate the total return, the average of faba bean yield and fenugreek yield price presented by **Agriculture Statistics (2013 and 2014)** seasons were used.

--The total income fed.-1 was calculated for each treatment in Egyptian pounds using the average farm rate of the two seasons, for faba bean of L.E. 770 ardab-1, for fenugreek yield of L.E.640 ardab-1.

--Net profit fed -1: The net profit of faba bean and fenugreek yield was calculated using the followed formula: NP = (YxP – Tc). Where NP is the net profit (L.E.fed.-1), Y the yield (ardab fed.-1), P the yield price (L.E. ardab-1), and TC is the total costs (L.E.fed-1) **(Younis et al., 1991**).

-- The proper statistical analysis of data was done according to **Gomez and Gomez (1984)**. The differences between means of the studied treatments were compared using least significant difference (LSD) at 5% level.

Results and discussions

1-Effect of intercropping and agriculture method on:

1-1) Faba bean

Data presented in Table (1) revealed that the intercropping fenugreek on faba bean had affected significantly on all characters under study in the two

seasons and combined except number of pods / plant in the first season and plant height in the second season were not significantly affected by effect of methods of agriculture fenugreek with varieties faba bean. The higher values of all previous characters were recorded with sowing fenugreek seeds drill between ridge faba beans in both seasons. Seed yield / fed with sowing fenugreek seeds drill between ridge faba bean varieties Giza-843 was increased by26.99 and 37.54% than sowing broad casting of plots with variety Giza-3 in combined, respectively. Pure stand or sole of faba bean scored the lowest value of seed yield ard / fed with two studied varieties comparison intercropping faba bean on fenugreek in the both seasons and combined. The seed yield /fed of faba bean for sowing fenugreek seeds drill between ridges was higher than sowing broad casting of plots which might be due to the increase in, number of branches, pods and seeds/plant, 100-seed weight (gm) and seed weight/plant (gm). Low availability of light for a component crop in the mixtures reduced the photosynthetic rate and growth rate and competition between faba bean and fenugreek plants when sowing broad casting of plots, finally leading to a drastic reduction in grain yields of component crops. This addition to increasing seed yield /fed in faba bean intercropping fenugreek on sole in the two seasons. It seemed that increased or decreased proportion of intercropped fenugreek with lentil affected biological yield of fenugreek negatively. The reduction was due to declining of mutual co-operation. In a research on intercropping of fenugreek and Ajowan, different cropping arrangements had significant effect on biological yields of both crops (**Mirhashemi*et al*., 2009) and(Shirzadi et al.2011)**.

1-2) *Orobanchecrenata*

Intercropping fenugreek on faba bean has led to positive sole in number of *O.crenata* / plot and weight of *O. crenata* / plot kg. It could be noted from the combined analysis (Table1) that the sowing seeds fenugreek drill between ridge faba beans decreased number of *O. crenata* 46.25%, 32.36% of pure stand of variety Giza-3and Giza-843, respectively. Analogous values for weight of orbanche spikes/ plot (kg.) representing 50.26%, 27.21% compared with pure stand of varieties Giza-3 and Giza-843, respectively. The lowest values of number and weight of orbanche spikes were recorded when sowing seeds fenugreek drill between ridge fababean Giza- 843. This result might be to that sowing seeds fenugreek drill between ridge faba beans have best than sowing seeds fenugreek broad casting of plots. Roots in the ring and quantity at the fenugreek intensive cultivation in the belly of the line for sowing faba bean. The aforementioned finding is correlated with those recorded by **(Liebmanand Dyck 1993, Monica et al. 2008 and Mohd and kamran. 2012**) showed a decrease of *O. crenata* infection due to anallelopathic interference on the parasitic life cycle at the level of germination. Inhibition of O. *crenata* seed germination by allelochemicals released by fenugreek roots is suggested as the mechanism for reduction of *O. crenata* infection.

2) Effect of intercropping and seeding rates on:

2-1) Faba bean

The tabulated results in Table (2) indicated that seeding rate of fenugreek had not significant effect on plant height (cm), number of pods in the two seasons and combined, number of branches, 100-seed weight (gm) in the first season also seed yield / plant (gm) in the second season. These characters recorded higher values when intercropping fenugreek rate 40 % (16kg/fed) of sole where given seed yield / fed 8.33 and 8.22 ard/fed in the two seasons respectively .

2-2) *Orobanchecrenata*

Data presented in Table (2) show effect of intercropping fenugreek on faba bean and its impact on number and weight of *O. crenata* were significant in the two seasons. These characters recorded less value whenintercropping fenugreek rate 60 % (24kg/fed) of sole where given no of *O. crenata*127.67, 135.67and weight of *O. crenata*, 0.99, 1.04 kg / plot in the two seasons respectively. It could be notied from comined analysis (Table 2) that increasing intercropping from 20% to 40% and 60% of sole fenugreek with faba bean decreased number of orbanche spikes / plot and weight of orbanche spikes / plot (gm) by 194.50, 150.83,126.67 and 1.54, 1.31, 0.99 respectively. Happened as a result Veadh amount fenugreek of 20 to 60 % that fell *O. crenata* The low level of *Orobanche* infection (remained at its underground stage) on fenugreek did not lead to visible damage and marked losses in grain yield **Moze et al. (2009**). Only recently has it been found that arbuscularmycorrhizalhyphal branching is induced by plant sesquiterpenes, which is the same signal,required for Orobanche and Striga seed germination (**Akiyama et al., 2005).** Assuming that the signal required for Orobanche germination also has an ecological role in Rhizobium symbiosis, the fact that the host species interact.

3) Effect of intercropping and varieties on:

3-1) faba bean

The results appeared that Giza- 843 had the highest number of plantheight (cm), number of branches, pods and seeds/plant, 100-seed the results appeared that Giza- 843 had the highest number of plant weight, seed weight / plant (gm) and seed yield /fed in the two seasons. Plant height and number of branches/plant are important characters since they reflected plant vigor, which may lead to high yield. On the other hand seed yield / fed, of faba bean with fenugreek was increased by 45.34%, 38.73 %(Giza-3)

and 63.96%, 79.03 % (Giza - 843) in the two seasons, respectively.

3-2) *Orobanchecrenata*

Results indicated that decreasing in the incidence number of broomrape/plot for solo percentage 53.49%, 45.83% (Giza-3) and 50.81%, 36.38% (Giza-843) and also decreasing in the incidence of weight of *O. crenata* kg /plot when intercropping fenugreek on faba bean crop and also it grew beans for solo percentage 57.26%, 51.75% (Giza-3) and 42.70%, 30.63% (Giza-843) and in the two seasons respectively**.(Hassanein et al., 1998)** indicated that (Giza-843) had medium tolerance in pot experiments based on the *orobanche* incidencewhile other varieties were highly susceptible. In artificial and natural infestations in the field at Giza-3, it was found that both Giza- 429 and Giza- 843 were partially tolerant.

Relative resistance of faba bean plant to *Orobanche* as measured by the percentage of seed yield per plant under infestation of that of the most resistant cultivar Giza- 843 were found to be under the control of genes with mainly additive effects with partial dominance for greater yield **(Nagat, 2006)** and that was in accordance with the conclusions of **(Attia, 1998, Saber et al. 1999 and 2001).**

Concerning number and weight of *O. crenata, data in Table 1 a2 showed* that intercropping fenugreek on faba bean variety Giza-843 at rate 60% (24kg/fed) 0f sole with sowing fenugreek broad casting of plots given less injury of *O. crenat*a *So as to* increase rate fenugreek intercropping of faba bean led to increase resistance beans for *O. crenata* but there was a decline in seed yield ard / fed as a result of competition on the light and food for increase plant density on plot.

3) Effect of interaction.

All studies characters were not significant except number of pods / plant in the second season also, seed yield/ plant, no and weight of *O. crenata*in the two seasons and combined so interaction effect between methods of agriculture and varieties(A) with seeding rate of fenugreek (B) in Table(3). The minimum seed yield ton / fed was record at sowing fenugreek broad casting of plots at rate 60 % (24kg/fed) 0f sole faba bean Giza- 3 (5.08 and 4.67 ard / fed) in the two seasons respectively. These findings revealed that the best intercropping system with respect to seed yield ard / fed appeared to be sowing seeds fenugreek drill between ridge faba beans Giza- 843 at rate 40 % (16kg/fed) of sole.

4-Fenugreek

4-1) Effect 0f methods of agriculture fenugreek and varieties .

The data in Table (4) showed that plant height (cm), 1000-seed weight (gm), seed yield/plant (gm) and Seed yield ard / fed was significant in the two seasons. On the other hand no of pods / plant had not significant in the two seasons. All character studied increase on sowing seeds drill between ridge faba beans except plant height. Seed yield (ard/fed) of sowing seeds drill between ridge faba beans was higher than sowing broad casting of plots record 3.45, 3.56 and 3.20,3.30 ard / fed in the two seasons respectively. This may be due to the competition exists among plants for nutrients and moisture at dense populations. The obtained results of pods and seed yield / plant are harmony with those obtained **by (Abd El-Aziz, 1987. El-Wakil, 1987.andTuncturk& Celen,2005).**

4-2) Seeding rate of fenugreek

in Table (4) had significant on all studied characters in the two seasons and combined, except plant height and number of pods on the second season. The maximum seed yield ard / fed was recorded at seeding rate 60% 0f sole fenugreek 4.77, 4.80 ard / fed in the two seasons respectively. Such effect may be attributed to that in dense plant population more competition exists among the plants for light, resulting in taller plants for light, resulting in taller plants searching for light through the elongation of internodes. These results are in accordance with those obtained by **(Tuncturk& Celen,2005) .**

The minimum seed yield ard / fed was recorded at intercropping fenugreek on varieties faba bean Giza- 3. There was a reduction in seed yield for a Giza-3 than Giza- 843 short due to lack of resistance to Orabanche.

4-3) Effect of interaction.

All studies characters were not significant except plant height and seed yield ard / fed in the second seasons.). These findings revealed that the best intercropping system with respect to seed yield ard / fed appeared to be sowing fenugreek seeds drill between ridge faba beans variety Giza 843 rate of 40% (16kg/fed) of sole fenugreek.

5- Chemical analysis:

5-1) Faba bean.

Regarding the evaluation faba bean varietirs under the intercropping conditions, data in Table(5&7) reveled that variety of faba bean intercropped with fenugreek had significant effect on all character under study in the two seasons and combined. The maximum percentage of protein, phosphor and potassium with faba bean variety Giza-843 compared Giza-3 and sole in the two seasons and combined. The faba bean variety Giza-843 protein % between from (27.01% and 28.88%) in the two seasons**.** As well as increased variety Giza-843 under intercropping the percentage of protein content 8.89 % compared with sole faba bean Giza-843.

Results of quality traits of intercropping seeding rate of fenugreek with faba bean are presented in Table (5&7). Results showed that intercropping of fenugreek on faba bean had a significant effect on quality characters of faba bean protein %, phosphor % and

potassium % and calcium % in the two seasons and combined. It could be noticed from combined analysis (Table 8) that intercropping fenugreek rate 60 %(24kg) on faba bean recorded the highest values of protein% (29.70), potassium %(0.57) and calcium % (1.55) compared with intercropping rates 20%,40% and sole of fenugreek. When intercropping fenugreek rate 20 % (8kg), 40 % (16kg) and 60 % (24kg) on faba bean increased the protein % percentage (2.68 %, 8.69 %, and 18.99 %) compared with sole faba bean.

The results might be due to that inter-specific competition between fenugreek and faba bean especially under the highest population density of fenugreek (seeding rate 60 % (24kg) was the highest than intercropping seeding rate of fenugreek 20 % and 40 %,consequently effect of intercropping fenugreek on quality traits and yield of faba bean was the highest .

Effect of interaction**.** All studies characters were significant except potassium % in the second seasons, phosphor % in the two seasons and combined .These findings revealed that the best intercropping system with respect to quality traits appeared to be intercropping fenugreek on faba beans variety Giza-843 rate of 60% (24kg/fed) of sole fenugreek. The rhizosphere is a complex environment where roots interact with physical, chemical and biological properties of soil, and is influenced by the presence and activity of root (**Richardson et al. 2009andZhang and Li, 2003)** indicated below-ground interactions and rhizosphere effects between intercropped crops play an important role in the advantage effect of intercropping.

5-2) Fenugreek .

The studied fenugreek chemical constituents, including, protein %, potassium % and calcium %. Results in Table (6&7) demonstrated that intercropping fenugreek with varieties faba bean had insignificant effect on all quality characters of fenugreek in the two seasons except protein % in the second seasons and combined. It could be noticed from combined analysis variety under intercropping conation scored the highest values of protein %, potassium % and calcium % (27.49, 0.72 and 1.47) of fenugreek under intercropping condition were scored with variety faba bean Giza- 843**.** As well as increased variety Giza-843 under intercropping the percentage of protein content 4.44 % compared with sole faba bean Giza-843.

With regard to intercropping patterns of fenugreek with faba bean, results in Table (6&7) pointed out that intercropping patterns of fenugreek on faba bean had significant effect on quality characters of chemical analysis in the two growing seasons and combined. It could be noticed from combined analysis(Table7) that intercropping fenugreek 60 % (24kg) of sole on faba bean recorded the highest values of protein %(27.01), phosphor %(0.81) and potassium %(1.61) as well as the lowest value of all studied characters with sole faba bean compared with intercropping patterns of fenugreek on faba bean.

Significant interaction was found between varieties (V) and intercropping patterns (B) of fenugreek on faba bean with regard to protein % in the first season, phosphor % in the second season and all characters except potassium % in the combined. The highest values of protein % were (29.35 and 27.66%) obtained by intercropping fenugreek 60 % (24kg) of sole on faba bean with variety faba bean Giza-843 in the two seasons respectively. Similar findings were reported by **(Poi et al., 1991 and Abdelgani et al., 1999)**

6- Competitive relationships.

Data in Tables 8 revealed the values of competitive relationships and yield advantages for two methods of sowing fenugreek on two faba bean varieties for three seeding rate of fenugreek. The results showed that intercropping fenugreek with faba bean resulted in an advantage in land equivalent ratio (LER). The value of LER is greater than one ; which means increasing the land productivity per/ unit area The highest value of LER are 3.32 obtained by sowing seeds fenugreek dirll between ridge faba bean Giza-3 rate 40% (16 kg / fed) of sole, while The lowest value was 1.54 scored from sowing seeds fenugreek broad casting of plot faba bean Giza -843 rate 60% (24 kg / fed) of sole. Reaching to LER higher than one in the treatment indicated increasing of productivity per unit area in comparison with monoculture of fenugreek and lentil. It seems that the proportion of both crops in LER Increasing was the same. The value of land equivalent ratio (LER) in the oat-lentil intercropping was 1.29, which means that it is a real advantage of this kind of crop system compared with oat and lentil raised in monoculture **(Dusa and Gheorghe, 2009**).

The data in the previous Tables showed that the highest values (±1.61and ±2.44) of Aggressivity (Agg) were negative (dominated) for fenugreek and positive (dominant) for faba beans in an intercropping fenugreek rate 40 % of sole (16 kg / fed) on Giza -3 with sowing seeds drill between ridge faba bean in the two seasons, respectively. Due to the low plant density of fenugreek so it was a few influence the beans and negative (dominated) while the beans Due to its high density it is positive (dominant) for faba beans. These results of competitive relationship and yield advantage are in agreement with those obtained by **(Shirzadi et al., 2011, Dusa and Gheorghe, 2009).**

7-Economical evaluation and net profit:-

It is evident from data in Table 6 that the intercropping fenugreek with faba bean led to increase total income and net profit LE/fed compared with pure stand of faba bean and fenugreek. The results indicated that the lowest values of total income and net profit (463LE/fed) was recorded when sowing seeds

fenugreek dirll between ridge faba bean Giza-3 rate 20% (8 kg /fed) of sole,while, the highest values (5178LE/fed) obtained when sowing seeds fenugreek drill between ridge faba bean Giza-843rate 40% (16kg/fed) of sole. These results are in a good agreement with those found by **(Seran and Brintha, 2009 and Shirzadi et al., 2011).**

Table (1): Yield and yield components of faba bean as affected by sowing methods of fenugreek intercropping with faba bean varieties in during 2012 / 2013, 2013 / 2014 seasons and combined.

Dry weight of Orbanche spikes / plot (kg.)	Number of Orbanche spikes / plot	Seed yield (ard/fed)	100-Seed Weight (gm.)	Seed yield /plant (gm.)	No of branches /plant	No of pods plant	Plant height (cm.)	Methods of fenugreek intercropping with faba bean varieties
2012 / 2013								
1.89	213.33	6.66	54.09	27.93	2.24	9.20	88.20	Drill Giza -3 (A1)
2.24	245.00	5.78	47.60	24.72	1.73	7.97	83.50	Broad casting Giza-3 (A2)
0.34	63.89	8.88	64.52	31.76	2.72	10.39	100.96	Drill Giza 843 (A3)
0.64	107.11	8.09	63.40	27.64	2.22	9.50	99.11	Broad casting Giza-843 (A4)
0.16	18.85	0.75	6.91	1.36	0.22	N.S	7.27	L.S.D at 5 %
3.79	450.00	2.82	55.20	24.20	3.13	12.80	93.90	Sole Giza – 3
1.34	200.00	5.36	62.70	25.60	4.20	16.70	110.60	Sole Giza- 843
2013 / 2014								
2.03	226.00	6.69	74.33	27.92	3.03	8.44	95.40	Drill Giza -3 (A1)
2.32	255.44	5.62	65.88	25.00	2.64	6.64	90.92	Broad casting Giza-3 (A2)
0.47	76.89	8.06	76.74	32.63	3.31	13.09	108.67	Drill Giza 843 (A3)
0.67	126.33	7.59	71.97	28.44	3.04	13.47	103.21	Broad casting Giza-843 (A4)
0.14	13.05	0.40	5.07	1.66	0.27	3.75	N.S	L.S.D. at 5 %
4.00	500.00	2.32	75.50	25.10	4.10	12.10	109.70	Sole Giza – 3
1.60	235.00	6.18	77.30	26.50	4.20	14.60	118.50	Sole Giza- 843
Combined								
1.96	219.67	6.67	64.21	27.93	2.64	8.82	91.80	Drill Giza -3 (A1)
2.28	250.22	5.70	56.74	24.86	2.19	7.36	87.21	Broad casting Giza-3 (A2)
0.40	70.39	8.47	70.63	32.19	3.02	11.74	104.81	Drill Giza 843 (A3)
0.65	116.72	7.84	67.69	28.04	2.63	11.70	101.16	Broad casting Giza-843 (A4)
0.09	11.71	0.37	3.82	0.96	0.16	2.08	7.32	L.S.D. at 5 %
3.90	475.00	2.57	65.35	24.65	3.62	12.45	101.80	Sole Giza – 3
1.47	217.50	5.77	70.00	26.05	4.20	15.65	114.55	Sole Giza- 843

Table (2): Yield and yield components of faba bean as affected by seed rate of fenugreek intercropping with faba bean varieties During 2012 / 2013, 2013 / 2014 seasons and combined.

Dry weight of Orbanche spikes / plot (kg.)	Number of Orbanche spikes / plot	Seed yield (ard/fed)	100-Seed Weight (gm.)	Seed yield /plant (gm.)	No of branches/plant	No of pods plant	Plant height (cm.)	Seeding rate of fenugreek (B)
2012 / 2013								
1.54	194.50	7.36	56.24	28.26	2.25	9.57	90.93	Faba bean 100%+ fenugreek 20% (B1)
1.31	150.83	8.33	58.61	29.10	2.31	9.05	95.23	Faba bean 100%+ fenugreek 40% (B2)
0.99	126.67	6.37	57.36	26.68	2.13	9.50	92.66	Faba bean 100%+ fenugreek 60% (B3)
0.08	15.46	0.65	N.S	0.96	N.S	N.S	N.S	L.S.D at 5 %
3.79	450.00	2.82	55.20	24.20	3.13	12.80	93.90	Sole Giza – 3
1.34	200.00	5.36	62.70	25.60	4.20	16.70	110.60	Sole Giza- 843
2013 / 2014								
1.65	208.50	6.68	70.70	28.79	2.58	9.33	99.96	Faba bean 100%+ fenugreek 20% (B1)
1.42	169.33	8.22	75.59	28.75	2.95	10.32	97.23	Faba bean 100%+ fenugreek 40% (B2)
1.04	135.67	6.08	70.40	27.96	3.49	11.66	101.47	Faba bean 100%+ fenugreek 60% (B3)
0.08	14.18	0.51	3.80	N.S	0.37	N.S	N.S	L.S.D. at 5 %
4.00	500.00	2.32	75.50	25.10	4.10	12.10	109.70	Sole Giza – 3
1.60	235.00	6.18	77.30	26.50	4.20	14.60	118.50	Sole Giza- 843
Combined								
1.59	201.50	7.02	63.47	28.53	2.42	9.45	95.45	Faba bean 100%+ fenugreek 20% (B1)
1.37	160.08	8.27	67.10	28.93	2.63	9.68	96.23	Faba bean 100%+ fenugreek 40% (B2)
1.01	131.17	6.22	63.88	27.32	2.81	10.58	97.06	Faba bean 100%+ fenugreek 60% (B3)
0.06	10.10	0.40	2.71	0.86	0.24	N.S	N.S	L.S.D. at 5 %
3.90	475.00	2.57	65.35	24.65	3.62	12.45	101.80	Sole Giza – 3
1.47	217.50	5.77	70.00	26.05	4.20	15.65	114.55	Sole Giza- 843
Dry weight of Orbanche spikes / plot (kg.)	**Number of Orbanche spikes / plot**	**Seed yield (ard/ fed)**	**100–Seed Weight (gm.)**	**Seed yield /plant (gm.)**	**No of branches /plant**	**No of pods plant**	**Plant height (cm.)**	**Seeding rate of fenugreek (B)**

Table (3): Yield and yield components of faba bean as affected by seed rate of fenugreek intercropping with faba bean varieties and methods of agriculture in during 2012 / 2013, 2013 / 2014 seasons and combined.

Weight ofOrbanche spikes / plot (kg.)	Number of Orbanche spikes / plot	Seed yield / plant (gm.)	Weight ofOrbanche spikes / plot (kg.)	Number of Orbanche spikes / plot	Seed yield / plant (gm.)	No. of pods / plant	Weight ofOrbanche spikes / plot (kg.)	Number of Orbanche spikes / plot	Seed yield /plant (gm.)	Treatments	
										Seeding rate of Fenugreek (B)	Methods of agriculture with varieties (A)
Combiend			2013 / 2014				2012 / 2014				
2.28	257.50	29.07	2.35	256.00	28.83	6.17	2.20	250.00	29.30	20% of sole fenugreek (b1)	Drill (A1) Giza- 3
2.03	218.33	26.50	2.10	223.33	25.80	7.07	1.97	213.33	27.20	40% of sole fenugreek (b2)	
1.57	183.17	28.21	1.63	189.67	29.13	12.10	1.51	176.67	27.30	60% of sole fenugreek (b3)	
2.80	319.17	25.63	2.81	326.67	26.73	8.33	2.78	311.67	24.53	20% of sole fenugreek (b1)	Broad casting (A2) Giza- 3
2.39	238.33	24.47	2.44	243.33	23.63	5.27	2.34	233.33	25.30	40% of sole fenugreek (b2)	
1.65	193.17	24.48	1.70	196.33	24.63	6.63	1.60	190.00	24.33	60% of sole fenugreek (b3)	
0.47	78.17	31.90	0.53	84.67	31.13	8.50	0.40	71.67	32.67	20% of sole fenugreek (b1)	Drill (A3) Giza- 843
0.41	68.50	34.52	0.49	76.00	35.07	15.33	0.34	61.00	33.97	40% of sole fenugreek (b2)	
0.33	64.50	30.17	0.38	70.00	31.70	15.43	0.29	59.00	28.63	60% of sole fenugreek (b3)	
0.83	151.17	27.50	0.90	157.67	28.47	14.33	0.77	144.67	26.53	20% of sole fenugreek (b1)	Broad casting (A4) Giza-843
0.63	115.17	30.22	0.67	134.67	30.50	13.60	0.60	95.67	29.93	40% of sole fenugreek (b2)	
0.50	83.83	26.41	0.44	86.67	26.37	12.47	0.55	81.00	26.47	60% of sole fenugreek (b3)	
0.11	20.21	1.73	0.15	28.36	3.02	4.94	0.17	30.92	1.92	L.S.D.at 5 % (AxB)	
3.90	475.00	24.65	4.00	500.00	25.10	12.10	3.79	450.00	24.20	Sole faba bean Giza3	
1.47	217.50	26.05	1.60	235.00	26.50	14.60z	1.34	200.00	25.60	Sole faba bean Giza 843	
Weight ofOrbanche spikes / plot (kg.)	**Number of Orbanche spikes / plot**	**Seed yield / plant (gm.)**	**Weight ofOrbanche spikes / plot (kg.)**	**Number of Orbanche spikes / plot**	**Seed yield / plant (gm.)**	**No. of pods / plant**	**Weight ofOrbanche spikes / plot (kg.)**	**Number of Orbanche spikes / plot**	**Seed yield /plant (gm.)**	**Treatments**	
										Seeding rate of Fenugreek (B)	**Methods of agriculture with varieties (A)**

Table (4): Yield and yield components of fenugreek as affected by sowing methods of fenugreek intercropping with faba bean varieties in during 2012 / 2013, 2013 / 2014 seasons and combined.

Seed yield (ard/ fed)	Seed yield /plant (gm.)	1000 Seed Weight (gm.)	No of pods plant	Plant height (cm.)	Seed yield (ard/ fed)	Seed yield /plant (gm.)	1000 Seed Weight (gm.)	No of pods plant	Plant height (cm.)	Seed yield (ard/ fed)	Seed yield /plant (gm.)	1000 Seed Weight (gm.)	No of pods plant	Plant height (cm.)	Methods of fenugreek intercropping with faba bean varieties (A)
Combiend					2013 /2014					2012 /2013					
3.32	5.12	14.21	23.71	71.00	3.20	4.68	13.89	23.21	66.89	3.45	5.55	14.52	24.20	75.11	Drill Giza -3 (A1)
3.11	4.62	13.20	22.95	82.51	3.08	4.56	12.91	22.81	80.89	3.13	4.67	13.49	23.93	84.12	Broad casting Giza-3 (A2)
3.48	5.77	15.11	24.94	74.47	3.30	5.22	15.20	24.43	71.00	3.65	6.31	15.02	25.46	77.93	Drill Giza 843 (A3)
3.21	5.18	14.36	24.31	87.07	3.14	5.13	14.26	24.24	87.52	3.28	5.23	14.46	24.37	86.61	Broad casting Giza-843 (A4)
0.10	0.24	0.57	0.83	2.40	0.14	0.41	0.91	N.S	5.26	0.15	0.34	0.89	N.S	1.15	L.S.D at 5 %
8.69	5.49	15.15	34.13	65.30	8.65	5.42	14.90	33.50	60.50	8.72	5.56	15.40	34.75	70.10	Sole fenugreek
Seeding rate of fenugreek (B)															
Combiend					2013 /2014					2012 /2013					
1.66	5.32	14.85	24.59	74.90	1.57	5.09	14.73	24.12	74.08	1.74	5.55	14.96	25.07	75.71	Faba bean 100%+ fenugreek 20% (B1)
3.38	5.26	14.51	24.17	78.93	3.17	5.03	14.39	23.75	76.50	3.60	5.48	14.63	24.59	81.37	Faba bean 100%+ fenugreek 40% (B2)
4.79	4.94	13.30	23.48	82.45	4.80	4.58	13.07	23.16	79.14	4.77	5.29	13.53	23.81	85.76	Faba bean 100%+ fenugreek 60% (B3)
0.09	0.19	0.35	0.64	4.79	0.17	0.34	0.63	N.S	N.S	0.09	0.17	0.38	0.69	0.78	L.S.D at 5 %
8.69	5.49	15.15	34.13	65.30	8.65	5.42	14.90	33.50	60.50	8.72	5.56	15.40	34.75	70.10	Sole fenugreek

Table): Economic analysis of methods of agriculture and varieties under seeding rate of fenugreek and competitive relationships (average of two seasons).

Aggressivity (Agg) A fabaAfenu	Land equivalent ratio (LER)			Net profit (LE/fed)	Total Expenditure (LE/fed)	Total Income (LE/fed)	Income (LE /fed)		Crop yield(ton/fed		Treatments	
	LER	fenugreek	Faba Bean				Fenugreek	Faba bean	Fenugreek	Faba bean	Seeding rate of Fenugreek (B)	Methods of agriculture with varieties (A)
+1.91 -1.91	2.74	0.19	2.55	463	4582	5046	1688	5044	1.67	6.55	20% of sole fenugreek (b1)	Dirll Giza-3(A1)
+2.74 -2.74	3.32	0.39	2.93	3326	4662	7988	2182	5806	3.41	7.54	40% of sole fenugreek (b2)	
+2.19 -2.19	2.87	0.56	2.31	2954	4742	7696	3130	4566	4.89	5.93	60% of sole fenugreek (b3)	
+1.45 -1.45	2.30	0.18	2.12	640	4582	5222	1018	4204	1.59	5.46	20% of sole fenugreek (b1)	Broad casting Giza- 3(A2)
+2.42 -2.42	2.99	0.36	2.63	2567	4662	7229	2016	52.13	3.15	6.77	40% of sole fenugreek (b2)	
+1.62 -1.62	2.43	0.53	1.90	1939	4742	6681	2931	3750	4.58	4.87	60% of sole fenugreek (b3)	
+0.53 -0.53	1.61	0.16	1.44	2901	4582	7483	1107	6376	1.73	8.28	20% of sole fenugreek (b1)	Dirll Giza-843(A3)
+0.88 -0.88	1.89	0.20	1.69	5178	4662	9840	2355	7484	3.68	9.72	40% of sole fenugreek (b2)	
+0.52 -0.52	1.71	0.42	1.29	4184	4742	8926	3212	5713	5.02	7.42	60% of sole fenugreek (b3)	
+0.49 -0.49	1.75	0.40	1.35	2474	4582	7056	1050	6006	1.64	7.80	20% of sole fenugreek (b1)	Broad casting Giza-843 (A4)
+0.87 -0.87	1.76	0.19	1.57	4412	4662	9074	2106	6969	3.29	9.05	40% of sole fenugreek (b2)	
+0.40 -0.40	1.54	0.38	1.16	3408	4742	8150	3014	5136	4.71	6.67	60% of sole fenugreek (b3)	
----	1.0	--	1.0	-2723	4502	1979	--	1979	--	2.57	Sole faba bean Giza 3	
----	1.0	--	1.0	-59	4502	4443	--	4443	--	5.77	Sole faba bean Giza 843	
----	1.0	1.0		3006	2556	5562	5562	--	8.69	---	Sole fenugreek	

Table (5): Effect of seed rate of fenugreek intercropping with faba bean varieties and methods of agriculture on protein %, phosphor % and potassium % of faba bean seeds in during 2012 / 2013, 2013 / 2014 seasons.

Potassium %	Phosphor%	Protein %	Nitrogen%	Potassium %	Phosphor%	Protein %	Nitrogen%	Seeding rate of fenugreek (B)	Varieties of faba bean
2013 /2014				2012 /2013					
1.28	0.41	25.54	4.09	1.11	0.36	24.41	3.91	20% of fenugreek(b1)	Giza- 3 (V1)
1.34	0.50	26.75	4.28	1.25	0.49	25.07	4.01	40% of fenugreek(b2)	
1.48	0.57	28.63	4.58	1.39	0.51	27.26	4.35	60% of fenugreek(b3)	
1.18	0.31	25.06	4.10	1.05	0.30	23.47	3.76	Sole Giza-3	
1.54	0.51	27.51	4.40	1.38	0.46	25.07	4.01	20% of fenugreek(b1)	Giza-843 (V2)
1.64	0.60	29.53	4.73	1.45	0.54	27.19	4.35	40% of fenugreek(b2)	
1.71	0.62	31.57	5.05	1.61	0.59	31.35	5.02	60% of fenugreek(b3)	
1.37	0.38	26.91	4.31	1.15	0.35	24.41	3.91	Sole Giza-843	
1.32	0.45	26.49	4.24	1.20	0.41	25.05	4.01	Giza-3	Mean (V)
1.56	0.53	28.88	4.62	1.40	0.48	27.01	4.32	Giza-843	
1.41	0.46	26.52	4.24	1.24	0.41	24.74	3.96	B1	Average (B)
1.49	0.55	28.14	4.50	1.35	0.51	26.13	4.18	B2	
1.59	0.59	30.10	4.82	1.50	0.55	29.30	4.68	B3	
1.27	0.35	25.98	4.16	1.10	0.33	23.94	3.83	Sole faba bean	
0.04	0.02	0.30	0.05	0.02	0.02	0.33	0.05	V	L.S.D.at 5 %
0.05	0.03	0.42	0.07	0.03	0.02	0.46	0.25	B	
N.S	N.S	0.59	0.95	0.04	N.S	0.65	0.11	VxB	

Table (6):Effect of seed rate of fenugreek intercropping with faba bean varieties and methods of agriculture on protein %, phosphor % and potassium % of fenugreek seeds in during 2012 / 2013, 2013 / 2014 seasons.

Potassium %	Phosphor%	Protein %	Nitrogen%	Potassium%	Phosphor%	Protein %	Nitrogen%	Seeding rate of fenugreek (B)	Varieties of faba bean
2013 /2014				2012 /2013					
1.35	0.56	22.60	3.62	1.33	0.70	24.54	3.93	20% of fenugreek(b1)	Giza- 3 (V1)
1.51	0.67	23.38	3.74	1.47	0.73	25.32	4.05	40% of fenugreek(b2)	
1.58	0.78	24.57	3.93	1.54	0.80	26.47	4.24	60% of fenugreek(b3)	
1.19	0.49	21.63	3.46	1.17	0.57	22.97	3.68	Sole Giza-3	
1.49	0.69	26.41	4.23	1.41	0.74	27.94	4.46	20% of fenugreek(b1)	Giza-843 (V2)
1.59	0.75	27.16	4.35	1.51	0.80	28.75	4.60	40% of fenugreek(b2)	
1.68	0.80	27.66	4.43	1.65	0.86	29.35	4.70	60% of fenugreek(b3)	
1.24	0.54	25.32	4.05	1.22	0.62	27.32	4.37	Sole Giza-843	
1.41	0.62	23.04	3.69	1.38	0.70	24.82	3.97	Giza-3	Mean (V)
1.50	0.69	26.63	4.26	1.45	0.75	28.34	4.53	Giza-843	
1.42	0.62	24.50	3.92	1.37	0.72	26.24	4.19	B1	Average (B)
1.55	0.71	25.27	4.04	1.49	0.76	27.03	4.33	B2	
1.63	0.79	26.11	4.18	1.59	0.83	27.91	4.47	B3	
1.21	0.51	23.47	3.76	1.19	0.59	25.14	4.02	Sole faba bean	
N.S	N.S	0.02	N.s	N.S	N.S	N.S	N.S	V	L.S.D.at 5 %
0.04	0.01	0.47	0.08	0.04	0.02	0.28	0.05	B	
N.S	0.02	N.S	N.S	N.S	N.S	`0.39	0.07	VxB	

Table (7):Effect of seed rate of fenugreek intercropping with faba bean varieties and methods of agriculture on protein %, phosphor % and potassium % of faba bean seeds and fenugreek seeds in combined.

Potassium %	Phosphor%	Protein %	Nitrogen%	Potassium %	Phosphor%	Protein %	Nitrogen%	Seeding rate of fenugreek (B)	Varieties of faba bean
Combined fenugreek				Combined faba bean					
1.34	0.63	23.57	3.77	1.19	0.38	24.97	4.00	20% of fenugreek(b1)	Giza- 3 (V1)
1.49	0.70	24.35	3.90	1.29	0.49	25.91	4.15	40% of fenugreek(b2)	
1.56	0.79	25.52	4.08	1.43	0.54	27.94	4.47	60% of fenugreek(b3)	
1.18	0.53	22.30	3.57	1.12	0.30	24.27	3.88	Sole Giza-3	
1.45	0.71	27.17	4.34	1.46	0.48	26.29	4.21	20% of fenugreek(b1)	Giza-843 (V2)
1.55	0.77	27.95	4.47	1.54	0.57	28.36	4.54	40% of fenugreek(b2)	
1.66	0.83	28.50	4.56	1.66	0.60	31.46	5.03	60% of fenugreek(b3)	
1.23	0.58	26.32	4.21	1.26	0.37	25.66	4.10	Sole Giza-843	
1.39	0.66	23.93	3.83	1.26	0.43	25.77	4.12	Giza-3	Mean (V)
1.47	0.72	27.49	4.40	1.48	0.50	27.94	4.47	Giza-843	
1.39	0.67	25.37	4.06	1.32	0.43	25.63	4.10	B1	Average (B)
1.52	0.73	26.15	4.18	1.42	0.53	27.13	4.34	B2	
1.61	0.81	27.01	4.32	1.55	0.57	29.70	4.75	B3	
1.20	0.55	24.31	3.89	1.19	0.34	24.96	3.99	Sole faba bean	
0.05	0.04	0.88	0.15	0.02	0.03	0.60	0.0 9	V	L.S.D.at 5 %
0.03	0.01	0.24	0.04	0.06	0.02	0.26	0.04	B	
N.S	0.02	0.34	0.08	0.04	N.S	0.36	0.09	VxB	

Conclusion

This study revealed that intercropping of fenugreek may increase effect on yield components of each crop depending on spatial arrangements of intercrops. Finally Sowing fenugreek seeds drill between ridge faba beans variety Giza- 843 rats of 40 % (16 kg /fed) of sole Led to a decline in *O. crenata* increasing of seed yield ard / fed on faba bean and protein% Compared to monoculture. Recommended as a beneficial intercropping arrangement of fenugreek on the faba bean to reduce the incidence of *orobanchecrenata* in Medial Egypt conditions.

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