

**EFFECT OF DIFFERENT PLANTING DATES ON THE GROWTH AND YIELD OF GREEN BROAD BEANS (VICIA FABAL)**

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**Abstract**

The experiment was conducted in the fields of the College of Agriculture, University of Kirkuk/Al-Sayada for the season 2021-2022. To study the effect of different planting dates on the growth and yield of the local broad bean cultivar (using three planting dates (the first date 10-11-2021, the second date 11-25-2021, and the third date 10-12-2021) The experiment was designed according to the completely randomized designs, with three replicates, and the traits were studied (plant height, number of branches, number of pods, number of seeds pod, weight of one pod, weight of 100 grains, length of pod, biological yield and total grain yield). The results of the research indicate that when planting barley on the first date on 10/11/2021, led to a significant increase in each of the traits: plant height, number of branches, number of pods, the weight of one pod, the weight of 100 grains, The length of the pod, the biological yield and the total grain yield, so we recommend planting the local cultivar of barley at the planting date 11/10/2021 under the conditions of Kirkuk province.

**Keywords:** planting dates, broad beans, *Vicia faba.L*, Agriculture.

**Introduction**

*Vicia faba.L* is one of the main winter leguminous crops that is characterized by its high protein content (25-40)%. It is also rich in iron, calcium and phosphorous 7 mg, 100 mg and 391 mg / 100 g in the seeds of the three elements, respectively, as well as vitamins B3, B2, B1, and A. Note that the green seeds' content of the aforementioned vitamins is higher than the dry seeds (Hebblethwaite, 1983). Which made it one of the sources of green protein, and thus it constitutes an important part of the diet of people, especially those with limited income. As well as its importance in improving soil properties through the process of fixing nitrogen in the soil (Kandil, 2007). Broad beans are spread as an important food crop in the Middle East and are included in addition to human use in the manufacture of animal feed, as well as used as green organic fertilizer in poor soils, in addition to its biological effect resulting from the activity of Rhizobia bacteria (Chafi, Bensoltan 2009). Hadley et al. (1983) and Ellis et al. (1988) suggest that temperature regime and day length can be controlled by changing the planting date and (Abdalla and Fischbek, 1987) explained that with the increase in the day/night temperature to 23/30°C, the height of the plant and the dry weight of the plant increase compared to the 10/15 or 15/20°C degrees. (Leach, 1978) confirmed that photosynthesis in broad beans was at its maximum when the temperature was raised from 15 to 30 ° C, but at a temperature of 30 ° C and above,

the dark respiration increases with the increase in temperature.(Murshedy-EL, 1996) in the Giza region in Egypt showed that the decrease in productivity when delaying or early in planting reached 29 and 42.5%, respectively.The early planting in mid-October gave taller plants and more branches/plant than the other two dates (early in mid-October or late in December 17). Ageeb et al (1987) found that delaying the planting date from October 10 to November 7 led to an increase in yield due to a reduction in plant losses due to reduced root rot.(Nassif, 2002) in Egypt indicated that (soil temperature, air and relative humidity) significantly affected plant height, number of branches/plant and harvest index in all studied broad bean inputs.Planting on 15/11 gave higher productivity than early planting in the first half of October, while the opposite was true for plant height and number of branches/plant. (Abdulaziz, 2007) found that under the conditions of the Syrian coastal region, for the Cypriot cultivar, the early date 11/15 gave a higher number of branches/plant and century length than the later date 12/15 .This was explained by the fact that the early date led to an increase in the number of internodes and a shorter length compared to the late planting, and this thing stimulated the lateral buds to grow as a result of the early arrival of photosynthesis products and thus the increase in the number of lateral branches, in addition to that the productivity decreased at the late date due to the decrease in the number of plants remaining at harvest . (Hassan, 2002, 1995) indicated that with the increase in temperature from the optimum temperature, photorespiration - and to a lesser degree dark respiration - increases to a greater degree than the rate of increase in photosynthesis, especially in three-carbon plants, including beans, as 50% of the food processed by metabolism Photorespiration is consumed by respiration due to the high rate of photorespiration. In Syria, Al-Othman and Al-Assaf (2009) found that delaying the planting date from 10/15 to 5/11 led to a decrease in plant height, an increase in the number of pods and the amount of production per unit area in Karbala, Iraq. It was found (Al-Anbari et al., 2009) that when broad beans were planted on three dates 9/10, 30/9 and 20/10, early planting on 9/10 led to an increase in the leaf area of the plant, the percentage of the leaf, the number of pods, the number of seeds per plant, and the weight of 100 seeds and in Peshawar (Khalil et al., 2010) it was found that they planted the broad beans on eight dates, starting from 9/20 to 27/12, a period of two weeks between one date and another.The experiment aims to assess the response of broad bean plants to the appropriate planting date under the conditions of Kirkuk province

### Materials and Methods

The experiment was conducted in the fields of the College of Agriculture, University of Kirkuk/Al-Sayada, for the season 2021-2022. To study the effect of different planting dates on the growth and yield of broad beans (using three different planting dates, namely (the first date 10-11-2021, the second date 11-25 2021, and the third date 10-10). 12-2021. The experiment was conducted according to the design of the Completely Randomized Design, and with three replicates, the soil was tillage, smoothed and

leveled, divided into furrows, with a width of 75 cm and a length of 5 m, with a distance of 20 cm between furrow. The meter was irrigated, and after a suitable drought, the roses were planted on one side with seeds of a local cultivar, at a distance of 20 cm, and on the other by placing two seeds in the sack that were thinned after two weeks. Cultivation of barley, the local variety, was conducted on three different dates (the first date was 10-11-2021, the second date was 11-52-2021, and the third date was 12-10-2021). Soil and plant service operations were conducted according to what was recommended. The experimental unit included four rosemary. Two times were determined from each experimental unit to take the yield of the green pods. They were harvested at the stage of the fullness of the grains, and from it, the number of pods and pods were extracted and the pods and pods were weighed. As for the other two grains of each experimental unit, their pods were left to mature and dry where they were harvested to extract the seed. At the end of the experiment, ten plants were selected and 100 dry seeds were measured. The seed yield in dunums and the average weight of random plants were calculated from the internal rice of the private plants, and the yield of green pods and the average number of seeds were estimated by the average length of the pod. The results were statistically analyzed according to the design followed, and the averages were tested according to the Duncan's polynomial test at a probability level of 0.5

## Results and Discussion

### 1- Plant height(cm)

Table (1) showed that the first date excelled in the plant height on the other two dates, where it reached 116 cm While the third date gave the lowest plant height with a significant difference of 63 cm. The reason may be due to the long period of plant growth on the first date and exposure to a longer period of illumination and higher temperatures in the early stages of growth compared to the second date. This leads to an acceleration of stem growth and reaching a greater height on the first date, and this is consistent with (Nassif, 2002).

### 2- The number of branches for each plant

Table (1) shows that the first date excelled on the second and third dates in terms of the number of branches per plant, where the number of branches per plant reached 5, while the number of branches decreased on the third date to 1.3 branches. The reason may be due to the fact that the environmental conditions (especially high temperature and lighting) during early cultivation have encouraged the increase of vegetative growth and this is consistent with the results of (EL-Murshedy 1996) and Nassif, 2002) and Abdel Aziz, 2007.

### 3- The number of pods per plant

The above table shows that there are significant differences between the three treatments in traits of the number of pods per plant. The first treatment outperformed

the two treatments that followed them in terms of the number of pods per plant, which amounted to 18.3 pods, and there were no significant differences between the second and third treatments. This may be due to the improper environmental conditions that may lead to flower dropping or fertilization failure, which reduces the number of pods/plants. It is also known that the broad bean is a three-carbon plant in which photorespiration is observed, therefore, at high temperatures, the difference between photosynthesis and respiration is small (Hassan, 1995 and 2002). This is consistent with the results of (EL-Murshedy, 1996)

#### **4- The number of seeds in the pod**

Table (1) indicates that the three dates did not differ significantly in the number of pod seeds.

#### **5- Pod Weight**

The results of the above table indicate that there are significant differences between the three treatments in the characteristic of the weight of one pod. The first treatment excelled on the two treatments that followed them in terms of the weight of one pod, which amounted to 187.3 g, and there were no significant differences between the second and third treatments, and this may be due to the increase in the accumulation of photosynthesis products due to the length of the growth period.

#### **6- Weight of 100 grain**

We note from the results of the above table that there were no significant differences between the first and second dates in the weight of 100 pills, but a significant difference with the third date

This may be due to the increase in the accumulation of photosynthesis products due to the length of the growth period, as well as the appropriate rates of temperature and photoperiod, the accumulation of photosynthesis products and the increase in the weight of the pod.

#### **7- Pod length**

The data in Table (1) showed that there were no significant differences between the first and second treatment and a significant difference with the third date in the pod length traits, the first and second treatment excelled on the third treatment by 10.6 and 10 cm, respectively. While the third date was 9.6 g. The reason for the excelled in this trait is due to the increase in transport and assembly of the dry matter and the delay in the senescence period of the leaves, which leads to an increase in the plant components.

#### **8- Biological yield**

The above table shows that there are significant differences between the first treatment and the second and third treatments, and there was no difference between the second and third dates in the trait of the biological yield. The first treatment excelled in the

two treatments that followed it in this characteristic, reaching 396 g, while the second and third treatments reached 233.3 g and 176 g, respectively. The reason for the superiority in this trait is due to the increase in the transport and assembly of the dry matter and the delay in the senescence period of the leaves, which leads to an increase in the components of the plant and the yield, and thus led to an increase in the biological yield, which is the outcome and the sum of all the parts of the plant (Abu Dhahi and Al-Younis, 1988)

### 9- The total yield

The first date was significantly higher than the second and third dates in terms of the total yield, where the yield on the first date was 733.8 kg per dunum, while the yield on the second and third dates decreased to 134.2 and 38.3 kg per dunum. The reason for the increase in the components of the yield is the number of pods per plant and the average weight of the pod (this was directly reflected in the green yield and the dry grain yield of a single plant and subsequently per unit area, which led to an increase in the total weights of pods and pods.

Table (1): The effect of different planting dates on the growth traits and yield of broad bean crop

Treatments	grain yield	pod length	Weight 100 grain	Pod weight	The number of pod seeds	number of pods	Biological yield	number of branches	plant height
First date 10/11	733.8a	10.6a	316.6a	187.3a	4.6a	18.3a	396a	5a	116a
Second date 11/25	134.2b	10ab	266.6a	75.3b	2a	9.33b	233.3b	2.6b	100a
Third date 10/12	38.3b	9.6b	150b	53b	2a	5.33b	176b	1.3b	63b

The numbers within the same column that carry the same alphabetic letter do not differ from each other significantly according to Duncan's polynomial test at the 0.05 probability level (Al-Rawi 1980)

We conclude from the above that when planting barley on the date 10/11/2021, led to a significant increase in each of the characteristics, plant height, number of branches, and number of pods. The weight of one pod, the weight of 100 grains, the number of seeds per pod, the length of the pod, the biological yield and the total grain yield, so we recommend planting the local variety at the time of planting 11/10/2021.

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