

EFFECT OF SUPPLEMENTAL IRRIGATION AND WEED CONTROL ON CHICKPEA CROP IN ARID REGION ENVIRONMENT

This study was conducted as a field experiment in dry land region in northern of Iraq (Mosul town Sallamiah region) in the fields of botanical production department of Technical Institute. Chickpea (Cicer arietinum) is one of the most important grain crops in arid and semi-arid region of Iraq. In order to study the effect of supplemental irrigation on some botanical properties of chickpea and yield in dry farming environment conditions as a factorial experiment. Supplemental irrigation had significant effect on each plant properties and grain yield increased 22%, weed control by hand weeding also had significant effect on some plant properties and grain yield increased 20%, the interaction between supplemental irrigation and weeding also had significant effect in some plant properties and grain yield increased 38%. Clear from this study the importance of supplemental irrigation and weed control to improve chickpea planting and yield.

Keywords: chickpea, irrigation, weed control, arid region, Iraq

Introduction. Chickpea (*Cicer arietinum* L.) was legume plant belongs Fabaceae family, a herbaceous annual plant which branches from the base. Chickpea is consumed as a dry pulse crop or as a green vegetable with the former use being most common. Seeds average about 20% protein, 5% fat, 55% carbohydrate. Chickpea is a cool season annual crop performing optimally in 70°-80° F daytime temperature. They produce good yield in drier conditions because of their deep tap root heavier rainfall season (over 30 in. annually), chickpea does best on fertile sandy, loam soil with good internal drainage.

Varieties selection in chickpea was very essential factor in increasing of production with following new scientific means in planting.

Chickpea is not very competitive with weeds so they should be planted on fields which have few if any major weed problems, weed control should be used as necessary in chickpea. Early weed competition is more damaging to yield than later emerging weeds [1]. Chickpea, like other annual legumes in a rotation, offers several cropping advantages for the producer.

Cereal crop yields sometimes increase when planted after legumes, because soil nitrogen supply is increased. However, chickpea has a moderately deep rooting system which is effective at extracting subsoil moisture, and because little stubble remains after harvest to trap snow and minimize evaporation, available crop water can be extremely limited following chickpea. Following on chickpea stubble present severe soil erosion risks and should be attempted only if sufficient cereal stubble is present from the year prior to chickpea and if the fallow is managed with out tillage [2].

The irrigation in dry region was a limit factor to success chickpea production, since the rain water not enough to life cycle of chickpea this require to supply plant its necessity from water, that supplemental irrigation in pod formation and seed filling stage produced highest seed yield, also suitable plant density and plant nutrient increased assimilate production and photosynthesis efficiency at seed formation stage [3,4], the aim of this study to

known the effect of supplemental irrigation and weed control in dry region environment on chickpea crop.

Materials and methods. The experiment was conducted in the field of plant production department in technical Institute of Mosul in Iraq (Sallamiah region), the seeds were planting in late date through ten February, select this time because the chickpea was weak tolerant to cold climate, the seeds sowed in plots which area 1m× 2 m, which was smooth local variety, planting distance between rows was 25 cm, with applying the completely randomized block design by three replications, as a factorial experiment, the first factor was two level of irrigation, one depend on only rainfall water and other depend on supplemental irrigation further to rainfall. The second factor was two level of weed control, un weeding and hand weeding being conducted in the 15 April, given the necessity of plant from fertilizers. The aim of this study to find the effect of each treatments levels of two factors on the following characters; plant height, tillers number, number of pods per plant, number of seeds per pod, weight of 1000 seed (gm), grain yield (kg/d). The data should be recorded and analyzed according of design applying and compared the means of treatments due to duncun test on probability level 5% [5].

Results and discussion. The rainfall consider a limit factor to success chickpea farming and other crops which grows in drought regions environment, this quantity of water not able to satisfy chickpea necessity, that require to complete watery deficiency by supplemental irrigation which was one of the aim this study.

Clear from the table 1 the supplemental irrigation had significant effect on all botanical properties and grain yield from only rain water, the yield increased 22% from 189.00 to 248.01 kg/d*. This indicate that supplemental irrigation helped to fill water shortage in growing stages of plant and grow chickpea in suitable water conditions which shared plants to absorption nutrient from soil through growing stages this advocate with [6].

Chickpea is a very sensitive crop to weed competition, which generally in heavy yield loss. The reduction in grain yield may vary form 23-87%

depending on the weed species and their densities. Weeds mainly compete with chickpea and each crops for nutrients, soil moisture and sun light by covering over crop and space. Severity of yield loss depends upon weed infestation, duration of infestation as well as climatic conditions which affect weed and crop growth. Weeds can remove plant nutrients from soil more efficiently than crops, most weed species can grow faster and taller than chickpea and inhibit growing, curtail sun light and affect photosynthesis and plant productivity adversely. Therefore, weeds are of acute importance since effective and proper weed control time will result in higher seed yield of chickpea, the table 2 shows that weed control had more

significant effect on plant properties and yield by comparison the means of treatments with un weeding , the grain yield increased 61 %,from 191.250 to239.767 kg/d, this advocate with [7].

The table 3 shows the effect of interaction between irrigation methods and weed control which had significant effect on plant properties except the plant height, number of seeds per pod, the seeds yield increased 18 % from 165.17 to 212.83 kg/d in rainfall factor and from 217.335 to 266.700 kg/d in supplemental irrigation. This study, it may be concluded that supplemental irrigation and hand weeding were necessary for improve botanical and yield characters in chickpea plant, these results advocates with (8).

Table 1

The effect of irrigation methods on some chickpea characters

Irrigation methods	Plant height(cm)	Tillers number	Pods / plant	Seeds / pod	Weight of 1000 seeds(gm)	yield kg / d
Rainfall	40.067 b	3.25 a	16.56 b	1.35 a	246.83 b	189.00 b
Supplemental irrigation	45.783 a	3.36 a	18.66 a	1.45 a	266.00 a	248.01 a

Table 2

the effect of weed control on some chickpea characters

Methods of weed control	Plant height (cm)	Number of tillers	Pods/ plant	Seeds / pod	Weight of 1000 seeds (gm)	Yield kg / d
Un weeding	46.65 a	2.61 b	14.33 b	1.71 a	229.50 b	191.25 b
Hand weeding	45.61 a	3.95 a	18.40 a	1.88 a	290.35 a	239.76 a

Table 3

The effect of interaction between rainfall, supplemental irrigation on some chickpea characters

Irrigation methods	characters	Plant height (cm)	Tillers number	Pods / plant	Seeds / pod	Weight of 1000 seeds (gm)	Yield kg / d Kg/d
Rainfall irr.	Un weeding	43.90 a	2.10 b	11.60 b	1.40 a	221.67 b	165.17 b
	Hand weeding	41.13 b	3.40 a	18.33	1.50 a	272.00 a	212.83 a
Supplemental irr.	Un weeding	48.30 a	2.33 b	12.67 b	1.13 a	237.33 b	217.33 b
	Hand weeding	46.26 b	3.90 a	18.26 a	1.26 a	282.67 a	266.70 a

d*; donum=50 m× 50 m =¼ acre

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Полевой эксперимент был проведен в засушливых условиях на севере Ирака (город Мосул, область Sallamiah) в ботаническом производственном отделе Технического института. Известно, что нут является одной из важнейших зерновых культур в засушливых и полузасушливых районах Ирака. Цель исследований – изучение влияния дополнительного орошения на некоторые ботанические свойства нута и доходность в богарном земледелии. Орошение имело значительное влияние на свойства растений и урожай зерна увеличился на 22%. Борьба с сорняками, ручная прополка также оказали значительное влияние на свойства некоторых растений и урожайность зерна увеличилась на 20%. Взаимодействие между орошением и прополкой также оказали значительное воздействие на свойства растений и урожайность зерна увеличилась на 38%. Подтверждена важность дополнительного орошения и борьба против сорняков, чтобы улучшить нут и его доходность.

Ключевые слова: нут, орошение, сорняки, аридные условия, Ирак.

Полевий експеримент був проведений в посушливих умовах на півночі Іраку (місто Мосул, область Sallamiah) у ботанічному виробничому відділі Технічного інституту. Нут є однією з найважливіших зернових культур у посушливих і напівпосушливих районах Іраку. Мета дослідження - вивчення впливу додаткового зрошення на деякі ботанічні властивості нуту і прибутковість у богарному землеробстві. Зрошення мало значний вплив на властивості рослин і врожай зерна збільшився на 22%. Боротьба з бур'янами, ручна прополка також зробили значний вплив на властивості деяких рослин і врожайність зерна збільшилася на 20%. Взаємодія між додатковим зрошенням і прополкою була значна, врожайність зерна збільшилася на 38%. Доведена важливість зрошення й боротьби з бур'янами, щоб поліпшити нут і його прибутковість.

Ключові слова: нут, зрошення, бур'яни, аридні умови, Ірак.

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