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وحماية المستهلك

RESPONSE OF SOME GROWTH TRAITS OF SUNFLOWER CROP TO PLANTING DISTANCES, TRIFLURALIN AND DATURA ROOT EXTRACT.

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ABSTRACT

A field experiment was conducted in the field of College of Agricultural Engineering Sciences - University of Baghdad during the spring season 2021, aiming to study the effect of Datura root extract and Trifluralin on accompanying weeds and some growth traits of sunflower (Flami variety). The experiment was designed in a randomized complete block design (RCBD) in split-plot arrangement with three replicates. The main plots were the distances between rows (60, 75,90) cm, the subplots consisted of four weed control treatments: (T1) Trifluralin application at rate 2.4 L ha^{-1}, (T2) Datura root extract application at 18 L.ha^{-1} M (T3) Trifluralin application at 1.2 L.ha^{-1} + Datura root extract application at 9 L.ha^{-1} , (T4) weedy treatment .

The distance 60 cm recorded lowest dry weight of weeds (89.93 g.m^{-2}), highest inhibition percentage (55.81%), and highest leaf area index (0.46). The distance 90 cm achieved highest plant height, leaf area, crop dry weight, and stem diameter, reaching 195.09 cm, 754.6 cm^{-2}, 241.55 g.m^{-2}, and 2.53 cm, respectively.

The treatment T1 achieved highest of inhibition percentage, plant height, leaf area, leaf area index, dry weight of sunflower plants, and plant stem diameter of 78.37%, 204.29 cm, 805.60 cm^{-2}, 0.43, 265.62 g, and 2.60 cm, respectively.

The interaction effect was significant in the traits under study. The distance 60 cm with treatment T1 achieved low weed dry weight 38.68 g.m^{-2}, high inhibition percentage 81.00 %, and high leaf area index 0.51. the distance 90 cm and T3 achieved high means of plant height, leaf area, dry weight of sunflower plants, and stem diameter, reaching 212.93 cm, 833.90 cm^{-2}, 307.25 g.m-^{2}, and 2.73 cm, respectively. The results confirm the integration between the effect of distance between lines, herbicide, and the extract in improving the crop traits.

Keywords: sunflower, Datura extract, planting distances, growth indicators of sunflower, trifluralin.

[*] **This article is taken from the first researcher's master's thesis.**

استجابة بعض صفات نمو محصول زهرة الشمس لمسافات الزراعة، التريفلورالين ومستخلص جذور الداتورة

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الخلاصة

نفذت تجربة حقلية في حقل كلية علوم الهندسة الزراعية– جامعة بغداد في العروة الربيعة لعام 2021 بهدف دراسة تأثير مستخلص جذور الداتورة ومبيد الترفلان في الادغال المرافقة وبعض صفات النمو لزهرة الشمس صنف (فلامي) . طبقت التجربة وفق تصميم القطاعات الكاملة المعشاة RCBD بترتيب الالواح المنشقة وبثلاث مكررات اذ مثلت المسافات بين الخطوط (60، 75 ، 90) سم الالواح الرئيسة، ومثلت معاملات المكافحة الالواح الثانوية وكالاتي (1T) - معاملة الرش بمبيد الترفلان بمعدل 2.4 لتر هـ$^{-1}$ ، (T2)- معاملة الرش بمستخلص جذور الداتورة بمعدل 18 لتر هـ$^{-1}$ ، (T3) - معاملة الرش بمبيد الترفلان بمعدل 1.2 لتر هـ$^{-1}$+ الرش بمستخلص جذور الداتورة بمعدل 9 لتر هـ$^{-1}$، (T4) المعاملة المدغلة Weedy .

اعطت المسافة 60 سم اقل وزن جاف للأدغال 89.93 غم م$^{-2}$وأعلى نسبة للتثبيط 55.81%، واعلى متوسط لدليل المساحة الورقية 0.46 ، في حين حققت المسافة 90 سم أعلى متوسطات لارتفاع النبات 195.09 سم، والمساحة الورقية 754.6 سم^{2}، والوزن الجاف لنباتات المحصول 241.55غم م$^{-2}$، و قطر الساق 2.53 سم، وحققت معاملة(1T) اقل وزن جاف للأدغال 56.26غم م$^{-2}$ واعلى نسبة مئوية للتثبيط 78.37 %، وأعلى متوسطات لارتفاع النبات 204.29 سم، والمساحة الورقية 805.60 سم$^{-2}$، ودليل المساحة الورقية بلغ 0.43 ، والوزن الجاف لنباتات زهرة الشمس 265.62 غم ، وقطر الساق 2.60 سم،.

كان التداخل معنويا في الصفات قيد الدراسة إذ حققت المسافة 60 سم مع المعاملة 1T اقل وزن جاف للأدغال 38.68 غم م$^{-2}$ ونسبة مئوية عالية للتثبيط 81.00 % ، ودليل مساحة ورقية عال 0.51 ، في حين حققت المسافة 90 سم والمعاملة 3T متوسطات عالية لارتفاع النبات 212.93 سم، والمساحة الورقية 833.90 سم $^{-2}$ والوزن الجاف لنباتات زهرة الشمس 307.25 غم م$^{-2}$، وقطر الساق 2.73 سم، اذ تؤكد النتائج التكامل بين تأثير المسافة بين الخطوط ومبيد الأدغال والمستخلص في تحسين هذه الصفات.

الكلمات المفتاحية: زهرة الشمس، مستخلص الداتورة، مسافات الزراعة، صفات النمو، مبيد الترايفلورالين.

INTRODUCTION

Despite using sunflower seeds in vegetable oil manufacture in Iraq, it still suffers from many production problems, as the productivity per unit area of this crop in Iraq is low compared to the productivity of industrially developed countries. This productivity decline is due to several reasons, including environmental conditions and others related to the cultivation methods and the lack of interest in soil and crop service practices **(Elsahooki, 1994; AL-Rawi, 1983)**. Moreover, the crop is exposed to multiple pests, mainly weeds, that reduce its productivity due to the competition with the crop for various growth requirements, including water, light, and nutrients **(Prostko & Davis, 2009)**. The percentage of yield loss varies according to the type and density of the accompanied weeds **(Sale *et al*., 2008)**.

The results of **AL-Fahdawi (2012)** showed that the herbicide Trifluralin stopped the accumulation of dry weight of the weeds associated with the sunflower crop by 100% and gave the highest height of the crop plants of 145.40 cm compared to the bush treatment that recorded the lowest height of 130.40 cm. The results of **Soliman *et al*. (2014)**; **Singh & Rathore (2015)** found that Trifluralin herbicide reduced the dry weight of weeds compared to the weedy treatment. **El-Delfi & Safi (2023)** stated that the use of herbicides reduced the dry weight of weeds and increased the percentage of inhibition in this weight.

One of the safe strategies proposed for controlling the effects of weeds is to use the allelopathic phenomenon of some plants, such as Datura, to reduce the impact of the weeds. Many researchers have begun investigating weeds with high allelopathic potential as a first step toward using the allelopathic potential to control the weeds. Researchers were able to obtain many weed plants with an allelopathic effect, including the Datura plant, as **Donatus & Ephraim (2009)** indicated that the Datura plant contains the following compounds: flavonoids, phenols, tannins, saponins, and sterols as main phytochemicals, and these compounds can affect the plants treated with them to different degrees. **Al-khaldy *et al*. (2022); Safi *et al*. (2023)** reported that applying with Datura leaf extract exhibited average results close to the effect of herbicides in reducing the dry weight of the weeds and increasing the inhibition percentage of the weed dry weights. However, there is almost a consensus that using the allelopathy phenomenon in weed control cannot reach the high efficiency of manufactured chemical herbicides in controlling and selecting weed plants **(Cheema *et al*., 2013; Nemr & Hammood, 2023(a,b))**, so it is required to increase the efficiency of this phenomenon in controlling weed plants and improving crop productivity. Therefore, in recent years, interest has been directed to the possibility of using the allelopathic phenomenon with low doses of recommended herbicides and administering the field distribution of crop plants to control the weeds and improve crop production in an attempt to reduce the use of herbicides and increase the amount of the allelopathic effect on weed growth, and this is what this experiment aims to achieve.

MATERIALS AND METHODS

A field experiment was conducted in the field of the College of Agricultural Engineering Sciences - University of Baghdad during the spring season of 2021, aiming to study the effect of Datura root extract and the herbicide Trifluralin in controlling the weeds accompanying the sunflower variety, Flami. The experiment was implemented based on the randomized complete block design (RCBD) in a split-plot arrangement with three replicates, where the distances between the rows (60, 75, and 90 cm) represented the main plots and the control treatments represented the sup-plots as follows:

1- The treatment of apply with Trifluralin at a rate of 2.4 L.ha^{-1} (T1).
2- The treatment of apply with the Datura root extract at a rate of 18 L.ha^{-1} (T1).
3- The treatment of apply with Trifluralin at a rate of 1.2 L.ha^{-1} + apply with the Datura root extract at a rate of 9L.ha^{-1} (T3).
4- The Weedy treatment (T4).

All land service practices were carried out, including plowing, soil loosening, and leveling, then dividing the field land into 36 plots of 12 m^2 area each. Urea fertilizer (46% N) was added at a rate of 280 kg/ha in two batches, the first at the stage (B3-B4), and the second batch was added when the plants reached the E1 stage (that is, when the pink bud appeared among the young leaves). **AL-Shamma & Baker (2009).** Sunflower seeds, the variety Flami, were manually sown on March 20, 2021, by placing four seeds in each pit and then thinning them manually to a single plant when the plant produced the fourth leaf (**Elsahooki, 1994**). The Trifluralin herbicide was applyed according to the treatments at a rate of 2.4 $L.ha^{-1}$. At the same time, Datura root extract was applyed at a rate of 18 $L.ha^{-1}$ **(Abdul-Razzaq *et al*., 2012)** using a 16-liter backpack applyer a week before planting and mixing them in the soil. Phenolic substances were also extracted, whose names are listed in Table 1.

Table (1): Phenolic substances resulted from Datura plant extract

No	Name	Con (ppm)
1	Vanillic Acid	12.56
2	Caffeic Acid	18.66
3	P-Coumaric Acid	20.65
4	Salicylic Acid	16.44
5	Ferulic Acid	36.59

*** The analysis was conducted in the laboratories of the Ministry of Science and Technology Studied traits**

First: Accompanying weeds

1. **Type of weeds:** the weeds spread in the experimental land were identified (Table 2).
2. **Weed dry weight ($g.m^{-2}$):** weed plants were cut randomly at the soil surface level of a one-meter square. They were placed in perforated bags and then placed in the oven at a temperature of 70°C until the weight was stable **(Al-Chalabi, 1988).**
3. Inhibition percentage based on the weed dry weight: It was calculated for each treatment according to the following equation **(Ciba-Giegy, 1975)**.

$$Inhibition\ (\%) = \left(\frac{A}{B} - 100 \right) \times 100$$

Where:

A= Weed dry weight at the treatments of weed control

B= Weed dry weight at the weedy treatment

Second: vegetative growth traits of sunflower

1. Plant height (cm): After reaching the final plant height, five plants were chosen randomly from the center rows of each plot. The plant height was measured from the soil surface to the plant disk base, and then the average height of plants was calculated.
2. Leaf area (cm^{-2}): It was according the following equation and as mentioned in **El-Sahokie & El-Idobas (1982)**.

   LA = 0.65 ΣW2

Where LA: Leaf area
$\Sigma W2$: Sum squares of plant leaf width

3. Leaf area index
It was calculated by dividing the leaf area of one plant by the ground area occupied by the plant **(Hunt, 1982).**
4. Plant dry weight (gm.plant^{-1})
After the plants were cut at the soil surface level, they were placed in perforated paper bags prepared for this purpose and heated to 70°C in an electric oven until the weight was stable. Finally, the dry weight was measured using a sensitive scale **(Mauney *et al*., 1978)**.
5. Stem diameter (cm)
It was measured from the middle area of the stem at the inflorescence stage with a Vernier.

STAISTICAL ANALYSIS

The data were collected and tabulated for the studied traits, then analyzed statistically according to the arrangement of split plots by randomized complete block design (RCBD) using the software GENSTAT4, and the arithmetic means of the treatments were compared based on the least significant difference (L.S.D) with a probability level of 0.05 **(Steel & Torrie, 1980).**

RESULTS AND DISCUSSION

First: Effect of different treatments on the sunflower accompanied weeds

Types of weeds (plants m^{-2})

Upon identifying the various weed species accompanying the sunflower crop across all experimental units, several weed types were discovered, as shown in Table 2.

Table (2): Types of weeds found in the experiment site during the spring season of 2021.

NO	Local name	Scientific name	Family name	Life cycle	Type
1	Whitegoosefoet	*Chenopodium album* L.	Chenopodiaceae	Broad-leaf	Annual
2	London rocket	*Sisymbrium irio* L .	Cruciferae	Broad-leaf	Annual
3	Button weed	*Malva parviflora* L .	Malvaceae	Broad-leaf	Annual
4	Wort weed	*Euphorbia helioscopia* L.	Eupharbiaceae	Broad-leaf	Annual
5	Johnson grass	*Sorghum halepense* L .	Poaceae	Narrow-leaf	perennial
6	Purslane	*Portulaca oleracea L.*	Portulacaea	Broad-leaf	Annual

Weed dry weight and inhibition percentage (%)

Results in Table 3 refer to the significant effect of the different treatments and their interaction on the weed dry weight and the inhibition percentage. The distance of 60cm achieved the lowest dry weight and highest inhibition percentage, averaging 89.93g.m^{-2} and 55.81%, respectively. The reduction in weed dry weight in this treatment may be because the high crop density itself reduced the weed density and differed significantly from the other treatments. At the same time, the distance of 90 cm recorded the highest weed dry weight and the lowest percentage of inhibition, reaching 148.82 gm^{-2} and 50.74%, respectively.

The treatment T1 resulted in weed dry weight and inhibition percentage reaching 56.26 g.m^{-2} and 78.37%, respectively, which may be due to the herbicide activity in reducing the weeds and thus decreasing their dry weight and raising the inhibition percentage of the dry weight, compared with the two treatment T2 and T3 that differed significantly, attaining weed dry weight of 90.87 and 76.67g.m^{-2} and inhibition percentage of 65.06 and 70.36%, respectively. In contrast, treatment T4 recorded the highest weed dry weight and lowest inhibition percentage, reaching 255.90g.m^{-2} and 0.00%, respectively.

The interaction between the treatment T1 and the distance of 60cm achieved the lowest weed dry weight and highest inhibition percentage, reaching 38.68g.m^{-2} and 81.00 %, respectively. The weed dry weight and inhibition percentages were 62.70g.m^{-2} and 6.21% for the interaction between T2 and the distance of 60cm and 54.77.m^{-2} and 73.05% between T3 and 60cm, respectively. In contrast, the interaction between T4 and the distance of 90 cm attained the highest weed dry weight, reaching 302.12g.m^{-2} and the zero inhibition percentage.

Second: Effect of different the treatments on some vegetative growth traits of the sunflower plants:

Plant height (cm):

Results in (Table, 3) demonstrate a significant effect of the distance between the rows and the herbicide treatments and their interactions. The distance of 90cm achieved the highest average plant height of 195.09 cm, differing significantly from the other distance treatments, particularly the distance of 60 cm, which recorded the lowest average plant height of 171.01 cm. This difference may be due to the suitable space that provides favorable environmental conditions and the lack of competition between plants for soil nutrients, increasing plant height.

The herbicide treatment T1 attained significantly high plants, averaging 204.20 cm, significantly outperforming the two treatments, T2 and T3, which recorded plant height averages of 172.02 and 193.29cm, respectively. The superiority of T1 may be due to this treatment achieving a low weed dry weight and a high percentage of inhibition in the dry weight of these weeds, as well as the role of the herbicide in affecting the weeds from the beginning of the season, which reduced the competition between the weeds and the crop. In contrast, the weedy treatment T4 gave the lowest average plant height of 161.52cm. The interaction between the distance of 90 cm and the two treatments, T1 and T3, achieved the highest average for the trait above, reaching 212.93 and 202.61 cm, respectively, while the interaction between the treatment T2 and the distance of 90 cm recorded 190.65 cm on average. As for the interaction between the distance of 60 cm and the weedy treatment T4, it exhibited the lowest average for the trait of 145.66 cm.

Leaf area (cm^{-2})

A leaf is an important plant part that intercepts light for photosynthesis performance. Increasing the leaf area will increase photosynthesis until it intercepts most of the incident solar radiation to reach its maximum growth rate **(Essa, 1990).**

Table (3): Effect of different treatments on the traits of sunflower plants and accompanying weeds.

Trait / Treatments		Dry weight for weeds	% for inhibition in weeds Dry weight	Plant height cm	Leaf Area Cm^2	Leaf Area index	The dry weight of sunflower plant (gm)	Steam diameter cm
Distance between the rows cm	60	89.93	55.81	171.01	700.6	0.46717	194.78	2.1383
	75	121.02	53.79	182.70	728.7	0.38858	214.16	2.3325
	90	148.82	50.74	195.09	754.6	0.33533	241.55	2.5333
L.S.D 0.5		3.661	1.780	5.360	8.10	0.004	1.166	0.04333
Control treatments	T_1	56.26	78.37	204.29	805.6	0.43944	265.62	2.6033
	T_2	90.87	65.06	172.02	707.5	0.38633	198.72	2.2511
	T_3	76.68	70.36	193.92	766.6	0.41756	230.19	2.5033
	T_4	255.90	0.00	161.52	632.1	0.34478	172.78	1.9811
L.S.D 0.5		4.395	1.269	3.326	8.66	0.004	0.955	0.04425
60 cm	T_1	38.68	81.00	197.74	778.5	0.51900	241.33	2.4933
	T_2	62.70	69.21	153.66	686.3	0.45767	185.17	2.0000
	T_3	54.77	73.05	186.99	727.3	0.48533	219.73	2.3567
	T_4	203.57	0.00	145.66	610.2	0.40667	132.88	1.7033
75 cm	T_1	55.53	78.80	202.18	804.5	0.42867	248.27	2.5800
	T_2	89.55	65.80	171.74	708.2	0.37800	200.13	2.3333
	T_3	77.02	70.56	192.17	768.2	0.40967	223.00	2.5167
	T_4	262.00	0.00	164.72	633.9	0.33800	185.24	1.9000

90 cm	T_1	74.57	75.32	212.93	833.9	0.37067	307.25	2.7367
	T_2	120.37	60.16	190.65	727.9	0.32333	210.86	2.4200
	T_3	98.24	67.47	202.61	804.4	0.35767	247.85	2.6367
	T_4	302.12	0.00	174.19	652.1	0.28967	200.22	2.3400
L.S.D 0.5		7.061	2.323	6.465	14.18	0.007	1.666	0.07308

*** Note:**
T_1: Treatment of the herbicide Treflan at a rate of 2.4 L h^{-1}.
T_2: Treatment of Datura root extract at a rate of 18 L h^{-1}.
T_3: Treflan at a rate of 1.2 L h^{-1} + Datura root extract at a rate of 9 L h^{-1}
T_4: Weedy treatment

The results in Table 3 indicate that the distance of 60 cm negatively affected the leaf area, producing the lowest leaf area of 700.6 cm^{-2}, compared to the other two distances of 75 and 90 cm, which produced leaf areas of 728.7 and 754.6 cm^{-2}, respectively. This effect may be due to increased competition between plants for the environmental resources necessary for growth, mainly light, which reduces the efficiency of the photosynthesis process **(Elsahookie *et al*., 1988).**

The herbicide treatment T1 achieved the highest leaf area in the plant, reaching 805.6 cm^{-2}, significantly outperforming the other two treatments, T2 and T3, which gave a leaf area of 707.5 and 766.6 cm^{-2}, respectively. This superiority may be due to the low weed dry weight and high weed inhibition percentage achieved by the treatment and the important role of the herbicide Terflan in reducing the number of bushes and their dry weights, which contributed to lowering the weed crop competition, which increased the photosynthesis efficiency, compared to the weedy treatment T4, which gave the lowest leaf area of 632.1 cm^{-2}.

The interaction between the two treatments, T1 and T2, and the distance of 90 cm and between T1 and the distance of 75 cm achieved the highest leaf area, averaging 833.9, 804.4, and 804.5 cm^{-2}, respectively, compared with T2 at the same distances, denoting the role of the integrate between the herbicide and the extract on affecting the weed growth and decreasing their dry weight, and thus enhancing the crop growth through the leaf area increment. In contrast the interaction between T4 (the weedy treatment) and the distance of 60 cm recorded the lowest leaf area average of 610.2cm^{-2}.

Leaf area index

The leaf area index is a measure with morphological significance. Its numerical value refers to the units of leaf area per unit of land the plant occupies. Increasing the leaf area index to the optimum level reflects an increase in the leaf surface area to intercept 95% of the solar radiation reaching the earth's surface, at which crop growth reaches its highest potential **(Essa, 1984).**

Results in Table 3 illustrate a significant effect of the distance between the rows and the weed control treatments, as well as their interaction on the leaf area index. The distance of 60 cm attained the highest value of the leaf area index, reaching 0.467, differing significantly from other control treatments, especially the distance 90 cm, which recorded the lowest average of the trait, reaching 0.334. The increase in the value of the leaf area index with increasing plant density is due to the area of land occupied by one plant at high plant density is small, which raises the average leaf area index despite the decrease in leaf area per plant. The opposite occurs for low plant density **(Otegui, 1997).** This result is consistent with the results of **Bistaghani *et al*. (2012)** who confirmed a positive relationship between leaf area index and plant density.

The treatment T1 attained the highest average of leaf area index, reaching 0.439, differing from the two other treatments, T2 and T3, that recorded 0.386 and 0.417, respectively. This difference may be because of the low weed dry weight and high weed inhibition percentage of this treatment, which contributed to reducing the competition between weeds and the crop, compared with the other treatments, especially weedy treatment T4, which recorded the lowest leaf area index, averaging 0.344. The interaction treatments of the distance of 60 cm with T1, T2, and T3 achieved the highest leaf area index, reaching 0.519, 0.485, and 0.457, respectively, on average. In comparison, the interaction between the distance of 90cm and the weedy treatment (T4) recorded the lowest average of the leaf area index (0.289).

Plant dry weight of sunflower (gm plant^{-1})

Results in Table 3 reveal a significant effect of the distance separating the rows, the weed control treatments, and their interaction on the dry weight of the sunflower plants. The distance of 90cm produced the highest plant dry weight, amounting to 241.55g.plant^{-1}, which may be due to the low competition between the crop plants and the area occupied by a plant, compared to the other treatments, in addition to the plant height increment, resulting in increasing the dry weight value of the sunflower plants, compared with the distance of 75cm, which produced a dry weight of 214.16 g.plant^{-1}. In contrast, the distance of 60cm produced the lowest plant dry weight, averaging 194.78gm.plan^{-1}.

The interaction of T1 with the two distances, 90 and 75cm, achieved the highest average dry weight of the sunflower plants, reaching 307.25 and 248.27 g.plant^{-1}, respectively, followed by the interaction between T3 and the distance 90cm, producing 85.247g.plant^{-1}. The first interaction superiority may be due to the low weed dry weight, high weed inhibition percentage, and high values of the plant height and leaf area values, which are reflected in increasing the dry weight of sunflower plants. In comparison, the interaction of the distance 60cm with the weedy treatment, T4, recorded lowest plant dry weight, averaging 132.88g m^{-2}.

Stem diameter (cm)

Results in Table 3 refer to a significant effect for the different distances between rows, weed control treatments, and their interaction. The distance of 90cm had the highest plant stem diameter, averaging 2.53cm, significantly differed from the other distances, as the 75 cm distance attained a stem diameter of 2.33cm, and the 60cm distance produced the lowest stem diameter of the sunflower plants, reaching 2.13 cm on average. The superiority of the 90cm distance may be due to the broad area that provides favorable environmental conditions and lack of competition among plants for nutrients, increasing the stem diameter.

Using the herbicide treatment, T1, resulted in the highest average stem diameter, reaching 2.60 cm, and significantly differed from T2 and T3, which produced stem diameters of 2.25 and 2.50 cm, respectively. The superiority of T1 maybe because this treatment achieved low weed dry weight and high weed inhibition percentage, as well as the synergistic role between the herbicide and the extract in affecting the weed plants, which contributed to reducing the competition between the crop and the accompanied weeds, which provided the opportunity for the crop growth, compared to the weedy treatment, T4, which recorded the lowest average stem diameter of 1.98 cm.

The interaction between the distance of 90 cm and the two treatments, T1 and T3, resulted in the highest average of the mentioned trait, recording 2.73 and 2.63cm, respectively, followed by the interaction between the distance of 90cm and T2, recording an average plant stem diameter of 2.42cm; in comparison, the interaction between the distance of 60 cm and T4, the weedy treatment, resulted in the lowest value of the trait of 1.70cm on average.

CONCLUSIONS

1. Planting at 60 cm between the lines achieved the highest results in Dry weight for Weeds and % for inhibition in weed dry weight and leaf area index.
2. The herbicide treatment of Trifluralin achieved the best averages in all traits Followed by the treatment of Trifluralin at a rate of 1.2 L h^{-1} + Datura root extract at a rate of 9 L h^{-1} .
3. The interaction between distance 90 cm with the herbicide had the best values for plant Traits.
4. There was integration between the herbicide and the extract in influencing the weed that Accompanied with crop and improved the growth indicator.

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