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Effect of weeding depth on potato productivity under two types of irrigation.

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ABSTRACT

This research was conducted in the field belong to the College of Agriculture and Forestry located in the tourist forest area / University of Mosul / during the autumn growing season of 2023 to show the effect of two irrigation systems: (drip irrigation system and sprinkler irrigation system) and mechanical weeding at two depths (the first depth is 4-6 cm and the second depth is 7-9 cm), then using the split-plot system once within the RCBD design with three replicates, after which the data were recorded and then statistically analyzed according to the design used. The results were as follows: The drip irrigation system led to a reduction in the number of cut bushes and a significant increase in the number of tubers per plant, the yield per plant, the total yield and the net profit compared to the sprinkler irrigation system, as the values of the above-mentioned characteristics in the superior drip irrigation system reached 27.33/m2, 6.50 tubers/plant, 1298.00 g/plant, 81.125 tons/ha and 5483.75 USD/ha. While the mechanical weeding depth of 7-9 cm was significantly superior to the mechanical weeding depth of 4-6 cm in the control percentage, yield per plant, total yield and net profit, as the values of these traits for the superior depth reached 92.00%, 1192.33 g/plant, 74.521 tons/ha and 4848.40 USD/ha respectively for each trait, while the mechanical weeding depth of 4-6 cm led to a reduction in the number of cut bushes compared to the other wedding depth. The interaction of the drip irrigation system with the mechanical weeding depth of 7-9 cm gave results in the traits of yield per plant, total yield and net profit, as the values of these traits reached 1318.33 g/plant/82.396 tons. Ha and 5589.65 USD/ha, respectively, for each trait.

***Keywords*:** Weeds, Soil, Potato, Yield, Cost.

INTRODUCTION

Potato (*Solanum tuberosum* L.) are one of the most important vegetable crops worldwide, a staple food after rice, wheat, and corn. They are one of the world's major crops that belong to the Solanaceae family and one of the most famous vegetable crops, given their importance in human nutrition and food security throughout history, as potatoes contain carbohydrates, proteins and other critical essential elements that provide energy to the human body, in addition to being the fourth most important food crop in the world after rice, wheat and corn, which gives them an essential role in providing food security for millions of people around the world, according to a report by the Food and Agriculture Organization of the United Nations [1], and are rich in nutrients, as fresh potatoes contain 75-80% water, 2.5-3.2% protein, 16-20% carbohydrates, 0.8-1.2% minerals, 0.6% crude fiber, and 0.1-0.2% crude fat. In addition, it contains amino acids such as isoleucine, leucine and tryptophan [2]. Using mechanical weeders helps uproot and cut weeds from their roots. Also, it helps in loosening the root zone and improving growth conditions by reducing competition between weeds and the crop for nutrients in the soil by preparing the soil and improving water drainage, thus improving root growth by improving soil moisture by retaining appropriate amounts of water in the soil, thus improving the distribution of plant roots appropriately, because most of the production losses in potato tubers are due to weed infestation, ranging from 34.4 to 86.0%. Weeds compete with crop plants for nutrients, soil moisture, space and sunlight and are an alternative host for many insect pests and diseases [3]. High weed counts can reduce the chlorophyll content of plant leaves. Weed competition can also affect the quality and nutritional content of potato tubers. The presence of weeds during the growing season reduces tubers' dry matter, protein and starch content, and tuber yield compared to hand weeding. Hand weeding is still the standard method of weed control. However, the high cost and scarcity of manual labor have increased the use of synthetic herbicides. Although synthetic herbicides are very effective in controlling weeds, are inexpensive and have excellent selectivity towards crops, they have some disadvantages, which include environmental pollution, reduced quality of potato tubers and phytotoxicity to crops [4]. Potatoes are grown under different irrigation systems and are important for primary purposes such as fresh consumption, manufacturing and export. Drip irrigation, sprinkler irrigation and surface irrigation are the most common forms of irrigation in the world, as irrigation plays a vital role in reducing the increasing pressure on the land by cultivating unused lands. Each of the three irrigation systems mentioned has advantages and disadvantages. The advantages of the drip irrigation system are that it provides water directly to the roots, which reduces water waste, but the cost is high and requires continuous maintenance. As for the sprinkler irrigation system, water is sprayed into the air to spray the plants. It is an easy-to-install system with broad coverage, but on the other hand, there is more water waste than in the drip irrigation system. It also leads to some physiological damage and the spread of some fungal diseases due to increased humidity in the atmosphere of the plants. While flood irrigation leads to water being submerged in the field for a short period, it is an easy-to-install system, and its cost is low. However, it has some disadvantages, including the rapid waste of water and soil erosion. The previous irrigation systems are the most common. At the same time, there are other less common and used irrigation systems, including Subsurface Drip Irrigation and Micro-Sprinkler Irrigation, where water is sprayed at low pressure. Such irrigation systems are costly [5].

The aim of the research is to know the effect of hoeing depth on the productivity of the potato crop under two types of irrigation, drip irrigation and sprinkler system, by studying some characteristics.

Materials and Methods

The study was conducted in the agricultural fields affiliated with the University of Mosul / College of Agriculture and Forestry / Tourist Forests Area, 3 km northeast of Mosul city, located at latitude 43.07 and longitude 36.23. Random samples were taken from the field soil at 0-30 cm depth to determine the soil texture before planting (Table 1). These samples were analyzed in the central laboratory of the College of Agriculture and Forestry / University of Mosul, as shown in Table 1. The crop was irrigated every 5 days during September and October, while during November, the irrigation was 6 days. Then, irrigation was stopped from early December until the crop was harvested due to rainfall. The irrigation period was 4-6 pm for sprinkler irrigation and 3-6 pm for drip irrigation.

Table (1) The physical properties of soil and soil contents

Physical properties		
Soil contents	Clay	40
	Silt	35.45
	Sand	24.55
Soil texture		Clay Loam
PH		7.2

The planting process of tubers of the Dutch-originated Riviera variety, grade A, produced locally, whose tubers were stored from the spring crop of the same year, which was planted in grade E on 15 / 9 /2023, was carried out using a locally made planter that organizes and calibrates the placement of seeds at a depth of 10-12 cm. The distance between one tuber and another is 0.20 m. The planter works with a cup feeding mechanism that consists of an endless chain in a vertical position equipped with cups, and through its rotating movement from bottom to top inside the feeding box, each cup takes one tuber. The experimental unit included three rows with a length of 25 m, and the distance between one row and another is 0.80 m; thus, the width of the experimental unit is 2.4 m, and treatment area is 60 m^2 (25 m × 2.4 m = 60 m^2). The tubers were planted at a distance of 0.20 m between one tuber and another. Thus, the number of plants for each experimental unit is 375 [(3 rows × 25 m) ÷ 0.20 m = 375 plants].

The study included two factors: the first was the irrigation system (drip and fixed sprinkler irrigation), and the second was mechanical weeding depth at 4 – 6 cm and 7 – 9 cm.

The study included four treatments (2×2 replication = 4 treatments). The experiment was designed in the field with a split-plot system once within the RCBD randomized complete block design and with three replications, where the irrigation system was placed in the main plots (Main Plots) and the depth of mechanical weeding in the secondary plots (Subplots). Then, the tubers were removed at the end of the season on 10 / 2/2024, and the following characteristics were studied:

The studied characteristics: -

1- Number of cut bushes / m^2: -

Calculated by taking a wooden board 50 cm long and 50 cm wide and multiplying it by 2. [12].

2- Control percentage %: - [13].

Calculated as in the equation: -

$$\text{Control percentage \%} = \frac{Weigh\ the\ treated\ bushes\ before\ hoeing\ \frac{m^2}{g} - Weight\ of\ treated\ bushes\ after\ hoeing\ \frac{m^2}{g}}{-Weight\ of\ treated\ bushes\ after\ hoeing\ \frac{m^2}{g}} \times 100$$

3- Number of tubers per plant (tuber/plant): -

Tubers were taken from five plants from each experimental unit and calculated as follows: [13]

$$= \text{Number Of Tubers Per Plant} \frac{\text{Number Of Tubers For Five Plants}}{\textit{The Number Of Tubers From Which The Tubers Were Taken } (5)}$$

4- Average tuber weight (g/g/tuber)

Calculated according to the equation: - [13]

$$Average\ tuber\ weight = \frac{Yield\ rate\ per\ plant\ (g)}{Number\ of\ tubers\ per\ plant (tuber)}$$

5 - Yield of one plant (g/plant): - Calculated as follows: [13]

$$\text{Yield of one plant} = \frac{Weigh\ tubers\ for\ five\ plants}{The\ number\ of\ tubers\ from\ which\ the\ yield\ was\ taken (5)}$$

6- Total yield (ton/hectare) calculated for the same plants in each treatment as follows: [13].

$$\text{Total yield of tuber (ton/hectare)} \quad = \frac{Total\ yield\ of\ tubers\ from\ the\ experimental\ unit\ (ton)}{Experimental\ unit\ area\ (hectare)} \times 1000$$

7- Net profit ($/hectare): [12]

Net profit ($/hectare) = Total revenue (yield) – Total costs

Results

1: Number of cut bushes/m2

Table 2 results indicate that the drip irrigation system outperformed the sprinkler irrigation system in reducing the number of cut bushes/m^2, as the number of cut bushes reached 27.33/m^2 and 42.00/m^2, respectively, for each system. In the effect of mechanical weeding depth, it is noted that the depth of 7-9 cm is significantly superior to the depth of 4-6 cm in the number of cut bushes, as the number of cut bushes at the superior depth reached 36.83/m^2, while the number of cut bushes at the depth of 4-6 cm reached 32.50/m^2.

As for the results of the binary interaction between the irrigation system and the mechanical weeding depth, the results in the table show that the highest value in the number of cut bushes/m^2 reached 44.50/m^2, which was reached in the case of the interaction between the sprinkler irrigation system and the mechanical weeding depth of 7-9 cm, with a significant superiority over all the treatments of this interaction. The lowest value in this characteristic was recorded in the drip irrigation system with a mechanical weeding depth of 4-6 cm, reaching 25.50/m^2.

Table (2) Effect of irrigation system, mechanical weeding depth and their interaction on the number of cut bushes (m^2).

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	25.50 D	29.17 C	27.33 B
Sprinkler irrigation	39.50 B	44.50 A	42.00 A
The average effect of mechanical weeding depth	32.50 B	36.83 A	

* Means with same letter mean no-significant at Duncan's multiple test at ($p \leq 0.05$).

2- Control percentage (%)

Table 3 shows no significant differences between the drip and sprinkler irrigation systems in the control percentage. As for the effect of the mechanical weeding depth on the control percentage, the mechanical weeding depth of 7-9 cm led to a significant superiority compared to the depth of 4-6 cm, as the control percentage reached 92.00% and 89.75%, respectively, for each depth.

As for the two-way interaction between the irrigation system and the mechanical weeding depth in the control percentage, it is noted that there are no significant differences between all the treatments of this interaction.

Table (3) The effect of irrigation system, mechanical weeding depth and their interaction on the control percentage (%).

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	89.50 A	92.00 A	90.75 A

Sprinkler irrigation	90.00 A	92.00 A	91.00 A
The average effect of mechanical weeding depth	89.75 B	92.00 A	

* Means with same letter mean no-significant at Duncan's multiple test at ($p \leq 0.05$).

3- Number of tubers per plant (tuber/plant)

Table 4 shows that the drip irrigation system was significantly superior to the sprinkler irrigation system in the number of tubers per plant, as the number of tubers reached 9.50 and 5.58 tubers/plant, respectively, for each system. As for the effect of the depth of mechanical weeding, no significant differences were recorded in the number of tubers per plant between the two depths of 4-6 cm.

The results of the effect of the bilateral interaction between the irrigation system and the mechanical weeding depth showed that the interaction treatment between the drip irrigation system and the mechanical weeding depth of 7-9 cm was significantly superior to the interaction treatments between the sprinkler irrigation system and both depths of 4-6 cm and 7-9 cm, as the number of tubers per plant reached 6.67 tubers/plant in the superior interaction treatment, while the lowest number of tubers per plant reached 5.50 tubers/plant, which was recorded in the interaction treatment between the sprinkler irrigation system and the mechanical weeding depth of 4-6 cm.

Table (4) the effect of irrigation system, mechanical weeding depth and their interaction on the number of tubers per plant (tuber/plant).

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	6.33 A	6.67 A	6.50 A
Sprinkler irrigation	5.50 B	5.67 B	5.58 B
The average effect of mechanical weeding depth	5.92 A	6.17 A	

* Means with same letter mean no-significant at Duncan's multiple test at ($p \leq 0.05$).

4- Average weight of a single tuber (g/tuber)

Table (5) shows that the characteristic of a single tuber's average weight was not significantly affected by the two single study factors, nor was it significantly affected by all the binary and triple interactions.

Table (5) Effect of irrigation system, mechanical weeding depth and their interaction on the average weight of a single tuber (g/tuber).

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	202.17 A	198.50 A	200.33 A
Sprinkler irrigation	181.33 A	188.83 A	185.08 A
The average effect of mechanical weeding depth	191.75 A	193.67 A	

* Means with same letter mean no-significant at Duncan's multiple test at ($p \leq 0.05$).

5- Yield per plant (g/plant)

Table 6 shows that the drip irrigation system has significantly outperformed the sprinkler irrigation system's yield per plant, as yield per plant reached 1298.00 and 1028.25 g/plant, respectively, for each system. As for the effect of mechanical weeding depth, we note that the depth of 7-9 cm is significantly superior to the depth of 4-6 cm in yield per plant, as yield per plant at the superior depth reached 1192.33 g/g/plant, while yield per plant at the other depth reached 1133.92 g/g/plant.

As for the bilateral interaction between the irrigation system and the mechanical weeding depth, the highest significant value in the yield of a single plant reached 1318.33 g/plant, which was obtained in the case of interaction between the drip irrigation system and the mechanical weeding depth of 7-9 cm. Thus, this treatment outperformed all the treatments of this interaction. At the same time, the lowest value in this trait reached 990.17 g/plant in the case of interaction between the sprinkler irrigation system and the mechanical weeding depth of 4-6 cm.

Table (6) The effect of irrigation system, mechanical weeding depth and their interaction on the yield of a single plant (g/plant).

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	1277.67 B	1318.33 A	1298.00 A
Sprinkler irrigation	990.17 D	1066.33 C	1028.25 B
The average effect of mechanical weeding depth	1133.92 B	1192.33 A	

* Means with same letter mean no-significant at Duncan's multiple test at (p≤ 0.05).

6- Total yield (tons/hectare)

Table 7 shows that the drip irrigation system has significantly outperformed the sprinkler irrigation system's total yield, as the total yield reached 81.125 and 64.265 tons/hectare, respectively, for each system. As for the effect of the mechanical weeding depth, the table shows the significant superiority at a depth of 7-9 cm over a mechanical weeding depth of 6-4 cm, as the total yield value reached 74.521 and 70.870 tons/hectare, respectively, for each depth.

It is also evident in the results of the bilateral interaction between the irrigation system and the mechanical weeding depth in the total yield that the highest value significantly outperformed all the interaction treatments when the drip irrigation system interacted with the mechanical weeding depth of 7-9 cm, where it reached 82.396 tons/ha, while the lowest value for the total yield was recorded when the sprinkler irrigation system interacted with the mechanical weeding depth of 4-6 cm, where it reached 61.885 tons/ha.

Table (7) The effect of irrigation system, mechanical weeding depth and their interaction on the total yield (tons/hectare).

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	1277.67 B	1318.33 A	1298.00 A
Sprinkler irrigation	990.17 D	1066.33 C	1028.25 B
The average effect of mechanical weeding depth	1133.92 B	1192.33 A	

* Means with same letter mean no-significant at Duncan's multiple test at (p≤ 0.05).

7- Net profit ($/ha)

Table 8 shows that the results of the impact of the irrigation system, the drip irrigation system has achieved a significant increase compared to the sprinkler irrigation system in net profit, as the net profit in the two systems reached 5483.75 and 3908.80 $/ha, respectively. As for the impact of the mechanical weeding depth, we note the superiority of the depth of 7-9 cm with a significant increase over the depth of 4-6 cm in net profit in $/ha, as the value of the net profit in the superior depth reached 4848.40 $ /ha. In contrast, the value of the net profit in the other depth reached 4544.15 dollars/ha. The results of the binary interaction between the irrigation system and the mechanical weeding depth show that the highest significant value achieved in net profit was recorded when the drip irrigation system interacted with the mechanical weeding depth of 7-9 cm, and it was significantly superior to all the treatments of this interaction, reaching 5589.65 $/ha, and the lowest value in this characteristic was observed in the sprinkler irrigation system with the mechanical weeding depth of 4-6 cm, reaching 3710.45 $ /ha.

Table (8) The effect of irrigation system, mechanical weeding depth and their interaction on net profit ($/ha)

Irrigation system	weeding depth (cm)		Irrigation system
	6-4	9-7	
Drip irrigation	5377.85 B	5589.65 A	5483.75 A
Sprinkler irrigation	3710.45 D	4107.15 C	3908.80 B
The average effect of mechanical weeding depth	4544.15 B	4848.40 A	

* Means with same letter mean no-significant at Duncan's multiple test at (p≤ 0.05).

** **1 $ = 1320 Iraqi Dinar according to the Dollar Exchange at the Central Bank of Iraq for the year 2023.**

Discussion of the results: -

Based on what was indicated in the results of tables (2-8) related to the effect of the study factors on the studied characteristics, the number of cut bushes decreased significantly when using the drip irrigation system compared to the sprinkler irrigation system, Table 2. This may be because the drip irrigation system is more efficient in distributing water from the drippers to the hills for the potato crop. This leads to concentrating the water droplets and their proximity to the plant. Therefore, the surface area of the soil exposed to drip irrigation is less than the surface area of the soil when using the drip irrigation system, which leads to distributing water homogeneously and close to the plants. Therefore, the plants benefit more from irrigation water, unlike the sprinkler irrigation system, which leads to distributing water over large areas of land and thus the growth of bushes more, which gives more efficiency to the drip irrigation system in reducing the number of bushes and increasing the percentage of control, which allows for reducing competition between the bushes and the crop and thus obtaining the prepared food present in the soil, which reflects on increasing the ability of the roots of the potato plant to benefit from the most significant possible amount of nutrients present in the soil, the effect of which is reflected in increasing the characteristics of The result.

As noted through the results, the drip irrigation system has a moral superiority in the characteristics related to the yield (number of tubers per plant, yield per plant, and total yield) in Tables 4, 6, and 7 compared to the sprinkler irrigation system. The reason for this is that the potato crop is known to be drought-sensitive and requires large amounts of water in hot climates to achieve optimal production, provided that the amounts of water are close to the reach of the roots. This is what the drip irrigation system provides, and this is done by concentrating the roots higher under dripping compared to sprinkler, in which the water is distributed randomly and not concentrated to the root zone [6], which helps in the appropriate supply of water, regardless of the crop's daily requirements, and thus increasing the yield indicators in the drip irrigation system, such as the number of tubers, their weight, and the yield, as indicated by [7], [8], and [9] Because the drip irrigation system delivers water from the drippers to the plant's growth area in the soil directly, slowly and in a controlled quantity that ensures that water enters the soil pores faster through the soil's absorption of water, it also helps to significantly reduce the seasonal evaporation rate because the adoption of drip irrigation can effectively treat water shortages, unlike the sprinkler irrigation system, which leads to the inhomogeneous distribution of water on the ground and the leaves of plants, and thus the small amount of water that plants benefit from for growth, in addition to increasing the number of bushes in the sprinkler irrigation system as mentioned earlier, which compete with the crop for the food in the soil, as well as increasing the fungal diseases that plants are exposed to when using the sprinkler irrigation system, especially in hot weather, as well as physiological damage such as burning the edges of the leaves of plants. All of these reasons lead to a reduction in the yield in the sprinkler irrigation system compared to the drip irrigation system. Also, drip irrigation helps break up the solid soil layer and increase the size of the soil pores, which works to increase the rate of soil absorption of water and increase the speed of water reaching the required depth. The drip irrigation method also delivers water directly and in limited and controlled quantities to the root area and reduces Saturating the soil with water ensures that the soil gets the ideal moisture needed for plant growth and thus maintaining the soil at the appropriate moisture for the soil for a more extended period as a result of the soil retaining the most significant amount of water within the pores, which helps the soil maintain its structure from collapse and maintain the apparent density of the soil at the appropriate limit for root growth in addition to reducing the deviation in the shape of the trench, which leads to increasing the ability of the roots to explore a larger volume of soil and thus deepening the root hairs and increasing the depth of the roots in the soil, so drip irrigation provides continuous and slow use by the roots, which helps in the decomposition of nutrients and increasing their availability in the soil and maintaining the ideal moisture levels needed for plant growth for the most extended possible period as well as providing appropriate ventilation levels in the soil and preventing the erosion of nutrients and reducing the appearance of weeds, which reduces competition for nutrients in the soil and thus increases the number of tubers and their weight and the yield of a single plant and the total yield, unlike the sprinkler irrigation method, which can lead to increased water pressure on the soil and reduce ventilation and root rot and leaching of nutrients from the soil and accumulation of salts and high apparent density as a result of soil clumping, which hinders the deepening of the roots in the soil and reduces the absorption of nutrients needed for plant growth such as phosphorus and nitrogen. And calcium. Although it is indicated that irrigation management is the key to achieving profitable growth in areas suffering from water scarcity and characterized by the nature of saline groundwater, especially areas where rainfall is low and competition for water is high, the results of Table 8 indicated that drip irrigation achieved the highest net profit for potato crops compared to the sprinkler irrigation system because drip irrigation leads to favorable soil moisture conditions in the root zone, which was suitable for good growth and efficient water use, which helps the plant to use moisture as well as nutrients more efficiently, as indicated by [10]. As a result, its effect was reflected in increasing economic profit, which is mainly obtained from increasing the yield and reducing costs because the drip irrigation system is one of the best options in the task of increasing crops, mainly due to competition between different sectors, as water provision will decrease significantly in the future, which poses a serious threat to the sustainability of agriculture, as the study proves that the drip irrigation system is economically viable and environmentally friendly, as indicated by [11].

The results of Tables 2,3 indicated that the number of cut weeds decreased significantly, and the control rate increased significantly when using mechanical weeding of 7-9 cm compared to the weeding depth of 4-6 cm. This is because using mechanical weeders at a greater depth led to uprooting and cutting the weeds from their roots. It also helps in breaking up the root zone and improving growth conditions by reducing competition between weeds and the crop for nutrients in the soil by preparing the soil and improving water drainage, thus improving root growth by improving soil moisture by retaining appropriate amounts of water in the soil, thus improving plant distribution appropriately. It is also noted from the results of Tables (7,6,4) that there is a significant superiority when using mechanical weeding depth of 9-7 cm in the characteristics represented by the number of tubers per plant, the yield per plant and the total yield, due to the effect of mechanical weeding when used, especially in fields that were previously planted with the same crop, which helps the plant to use moisture as well as nutrients in the soil more efficiently, especially in soils ploughed with a subsoil plough. The use of mechanical weeders leads to the planting of the tractor frames, which leads to an increase in the depth of weeding, which leads to uprooting and cutting the roots of the bushes to a greater depth. This reduces the competition between the bushes and the crop when using deep weeding compared to less mechanical weeding, and thus, an increase in productivity from the number and weight of tubers. This is reflected in its effect on increasing the yield indicators and, thus, the moral superiority of the depth of mechanical weeding 9-7 cm represented by the net profit Table (8) compared to the depth of weeding 6-4 cm. This is due to the effect of mechanical weeding on increasing the yield effects from the number of tubers, their weight and the total yield. This will be reflected in increasing the economic profit, which results from increasing productivity and reducing the costs of human effort.

Conclusions

In light of this finding, using a drip irrigation system led to a significant reduction in cut bushes and the number of cut bushes and the yield traits represented by the number of tubers per plant, the yield per plant, the total yield and the net profit compared to the sprinkler irrigation system. The mechanical weeding depth of 4-6 cm was superior in reducing the number of cut bushes compared to the depth of 7-9 cm, while the mechanical weeding depth of 7-9 cm achieved a significant increase in the traits represented by the control percentage, the number of tubers per plant, the yield per plant, the total yield and the net profit compared to the other mechanical weeding depth.

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تأثير عمق العزق في إنتاجية البطاطا تحت نوعين من الري.

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[2]تدريسي في جامعة الموصل , كلية الزراعة والغابات , قسم المكائن والالآت الزراعية

الخلاصة

نفذت هذه الدراسة في حقل كلية الزراعة والغابات الواقع في منطقة الغابات السياحية / جامعة الموصل / خلال موسم النمو الخريفي 2023 ، لبيان تأثير نظامين للري هما : (نظام الري بالتنقيط ونظام الري بالرش) و العزق الميكانيكي بعمقين (العمق الأول 4-6 سم والعمق الثاني 7-9 سم) ، ثم استخدام نظام القطع نظام المنشقة مرة واحدة ضمن تصميم القطاعات العشوائية الكاملة *RCBD* وبثلاث مكررات وبعدها تم تسجيل البيانات ثم تحليلها احصائيا حسب التصميم المستخدم ، كانت النتائج كما يلي أدى نظام الري بالتنقيط الى خفض في عدد الادغال المقطوعة وزيادة معنوية في عدد الدرنات للنبات الواحد وحاصل النبات الواحد والحاصل الكلي وصافي الربح قياسا بنظام الري بالرش ، أذ بلغت قيم الصفات المذكورة أعلاه في نظام الري بالتنقيط المتفوق 27.33/ م^2 ، 6.50 درنة/ نبات ، 1298.00 غم/نبات ، 81.125 طن / هكتار و 5483.75 دولار / هكتار . في حين تفوق معنويا عمق العزق الميكانيكي 7-9 سم على عمق العزق الميكانيكي 4-6 سم في نسبة المكافحة وحاصل النبات الواحد والحاصل الكلي وصافي الربح أذ بلغت قيم هذه الصفات للعمق المتفوق 92.00% ، 1192.33 غم / نبات ، 74.521 طن / هكتار و 4848.40 دولار/ هكتار على التوالي لكل صفة في حين أدى عمق العزق الميكانيكي 4-6 سم أدى خفض في عدد الادغال المقطوعة بالمقارنة مع عمق العزق الاخر . أعطى تداخل نظام الري بالتنقيط مع عمق العزق الميكانيكي 7-9 سم في صفات حاصل النبات الواحد والحاصل الكلي وصافي الربح أذ بلغت قيم هذه الصفات 1318.33 غم/نبات / 82.396 طن. هكتار و 5589.65 دولار / هكتار على التوالي لكل صفة .

الكلمات المفتاحية: أدغال، تربة، بطاطا، غلة، تكاليف.