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Effect of Foliar Application of Salicylic Acid on Growth and Yield Traits of Corn genotypes (*Zea mays* L.)

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ABSTRACT

This research was conducted at the field crops research station in the autumn season of 2024, College of Agriculture- Tikrit University, Iraq- in the season of 2024 , with the aim of evaluating the Effect of Foliar Application of Salicylic Acid on Growth and Yield Traits of Corn genotypes (Zea mays L.). The experiment included two factors: the first was the spraying of three of concentration of salicylic, and the second involved four corn genotypes. A factorial experiment was applied using a Randomized Complete Block Design (RCBD) .The statistical analysis revealed that the 200 mg·L⁻¹ salicylic acid concentration significantly improved traits such as number of days from planting until 75% male flowering and number of days from planting until 75% female flowering and ear height and individual plant grain yield, and grain yield. Among the genotypes, genotype 777 outperformed others in traits such as ear height, chlorophyll content, number of grains per row, individual plant grain yield, grain yield, and harvest index. Furthermore, the interaction between salicylic acid concentrations and genotypes resulted in significant differences in vegetative growth and yield. The combination of (200 mg·L⁻¹ × genotype 777) and (200 mg·L⁻¹ × genotype Toro) recorded the highest values in Vegetativ growth and yield. Climatic fluctuations have pushed farmers to face agricultural challenges, which encouraged researchers to study the effect of salicylic acid in improving growth and production.

KEYWORDS: Foliar application; Flowering time; Chlorophyll; genotype 777.

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تأثير الرش بحمض الساليسيليك على صفات النمو والحاصل لتراكيب وراثية من الذرة الصفراء (*Zea mays* L.)

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الملخص

أُجريت هذه الدراسة في محطة أبحاث المحاصيل الحقلية بكلية الزراعة - جامعة تكريت، العراق، خلال موسم الخريف لعام 2024، بهدف تقييم تأثير الرش الورقي بحمض الساليسيليك على صفات النمو والحاصل لتراكيب وراثية من الذرة الصفراء (**Zea mays L**.). شملت التجربة عاملين: العامل الأول هو الرش الورقي بثلاثة تراكيز من حمض الساليسيليك، والعامل الثاني يشمل أربعة تراكيب وراثية من الذرة. أُجريت التجربة وفق تصميم العشوائي الكامل بمربعات تامة (**RCBD**) بطريقة العاملين. أظهرت النتائج أن تطبيق تركيز 200 ملغ·لتر⁻¹ من حمض الساليسيليك على الأوراق حسّن بشكل ملحوظ صفات مثل عدد الأيام حتى تفتح 75% من الأزهار الذكرية، وعدد الأيام حتى تفتح 75% من الأزهار الأنثوية، وارتفاع العرنوص، وحاصل الحبوب الحبوب لكل نبات، والحاصل الكلي من الحبوب. ومن بين التراكيب الوراثية، تفوق التركيب الوراثي 777 على الآخرين في صفات ارتفاع العرنوص، محتوى الكلوروفيل في الأوراق، عدد الحبوب في الصف، حاصل الحبوب لكل نبات، الحاصل الكلي، ودليل الحصاد. كما أظهر التداخل بين تراكيز حمض الساليسيليك والتراكيب الوراثية فروقًا معنوية في النمو الخضري وصفات الحاصل. وقد سجلت كل من التوليفتين (200 ملغ·لتر⁻¹ × التركيب الوراثي 777) و(200 ملغ·لتر⁻¹ × التركيب الوراثي **Toro**) أعلى القيم في النمو الخضري والحاصل. إن التقلبات المناخية دفعت المزارعين لمواجهة تحديات زراعية، مما شجع الباحثين على دراسة دور حمض الساليسيليك في تحسين النمو والإنتاجية.

الكلمات المفتاحية: الرش الورقي؛ وقت الإزهار؛ محتوى الكلوروفيل؛ التركيب الوراثي 777.

INTRODUCTION

Corn (*Zea may* L.) is one of the main crops globally , as it comes after rice and wheat in terms of importance in enhancing food security and its value lies in its rich content of proteins, starches, oils in addition to vitamins and vital amino acids, which makes it an important food source, besides its nutritional role is used in various industries such as ethanol production as a biofuel, which contributes to reducing CO2 emissions to reduce environmental pollution, which enhances the sustainability of Natural Resources and contributes to achieving an environmental balance. Corn products also enter the food industries, making it one of the vital elements in the global economy, as well as benefiting from it in several sectors, including the industry (oils, dyes, paper) (Capehart and Liefert , 2017) and (Terefe, and *et*., 2019). During the 2022 fall season, corn production in Iraq reached an genotypes of 496 thousand tons, marking an increase of 121.6 thousand tons compared to the previous year's production of 374.4 thousand tons (Directorate of Agricultural Statistics, 2022). Corn farmers face several challenges that prevent them from reaching optimal productivity levels. Therefore, scientific studies have been conducted to improve corn yield, especially given the increasing annual demand for the crop. Numerous Studies have confirmed that factors such as fertilizers, genotypes, and genetic makeup significantly contribute to yield improvement. Moreover, the ability of maize genotypes to adapt to changing climatic conditions is a critical factor. Among the main elements influencing growth, yield, and quality traits are the genotypes themselves. The interaction between environmental factors, genotypes, and balanced nutrient management—including the application of growth regulators such as salicylic acid—has a substantial impact on plant growth and productivity, as confirmed by recent research and scientific investigations (Maes, 2016). The application of salicylic acid through foliar sparing during the vegetative stage has shown to play a vital role in supporting positive growth. This compound regulates several physiological processes under stress conditions, such as photosynthesis, nutrient uptake by roots, respiration, stomata regulation, and inhibition of ethylene biosynthesis. Additionally, it enhances plant tolerance to salinity by increasing the activity of enzymatic antioxidants (Tufail *et al*., 2013). Salicylic acid has recently been added to the list of recognized plant hormones—alongside auxins, gibberellins, and cytokines—due to its multiple physiological roles in plant growth and development. It is now regarded as one of the naturally occurring plant hormones. The aim of this research is to evaluate the response of different maize genotypes to foliar application of salicylic acid and to assess the interaction between these two factors in enhancing growth and productivity, thereby contributing to improved agricultural practices for achieving maximum possible yield.

MATERIALS AND METHODS

In the fall of 2024, this field experiment was carried out in the northern Salah Al-Din Governorate at the Department of Field Crops' Second Research Station, College of Agriculture, University of Tikrit. Soil preparation involved collecting samples from different areas within the experimental site at a depth of 30 cm. These samples were thoroughly mixed to obtain a representative composite sample. The physical and chemical properties of the soil were then determined through laboratory analysis at the laboratories of the Directorate of Agriculture in Diyala Province.

Table 1. Chemical and physical properties of field soil

Property	**Value**
Soil pH	7.8
Electrical conductivity (EC)	3.2 desimens m^{-1}
Nitrogen (N)	14.2 mg kg^{-1} soil
Phosphorus (P)	8.1 mg kg^{-1} soil
Potassium (K)	133 mg kg^{-1} soil
Calcium (Ca)	45 mg kg^{-1} soil
Sodium (Na)	91 mg kg^{-1} soil
Organic matter	0.82 %
Calcium carbonate ($CaCO_3$)	19 %
Calcium sulfate ($CaSO_4$)	25 %
Clay content	19.1 gm kg^{-1}
Silt content	25.2 gm kg^{-1}
Sand content	53.4 gm kg^{-1}
Soil texture	Mixed sand

Experimental Design and Agronomic Practices

In this experiment, three concentrations of salicylic acid were used: S_0 (control), S_1 (100 mg·L^{-1}), and S_2 (200 mg·L^{-1}). These treatments were foliar-applied to four synthetic corn genotypes: Toro (V_1), Rayal 630 (V_2), 777 (V_3), and 666 (V_4).

The salicylic acid solutions (100 and 200 mg·L^{-1}) were prepared by A solution was prepared with a concentration of (100 and 200) mg L^{-1}. By mixing 1 g of salicylic acid in 5 ml of ethanol alcohol for the purpose of dissolving in 10 liters of water , and 2 g of salicylic acid in 5 ml ethanol alcohol for the purpose of dissolving in 10 liters of water . The first foliar spray was applied early in the morning once plants reached a height of 20 cm, and the second spray was carried out at 50% male flowering. Agronomic operations included two perpendicular disk plowings, followed by land leveling. The field was divided into three replications, each containing 12 experimental units of 9 m² each. Fertilizers were applied in a single dose after plowing and before leveling: triple superphosphate (46% P_2O_5) at a rate of 200 kg·ha^{-1} and urea (46% N) at a rate of 400 kg·ha^{-1}, with nitrogen split into two equal doses—one at planting and the second one month after sowing. Sowing took place on July 20, 2024, by placing three maize seeds per hole spaced 20 cm apart, with four rows per experimental unit and 70 cm spacing between rows. A randomized complete block design (RCBD) with three replications was used, and data were statistically analyzed. Means were compared using The differences between the genotypes s were compared with the Duncan test.To control the corn stem borer (*Sesamia cretica*), diazinon granules (10% active ingredient) were applied at a rate of 4 $kg \cdot ha^{-1}$ once the plants reached 20 cm in height, by placing the pesticide directly on the growing points (Johnson, 1963). At harvest, data were collected from ten randomly selected guarded plants from the middle rows of each experimental unit, after reaching full physiological maturity. The following traits were studied: **Number of days from planting until 75% male flowering (day)** - **Number of days from planting until 75%** female **flowering (day)** - Chlorophyll content (spad) - Number of grains per row (grains. row^{-1}) - Grain yield per plant ($g \cdot plant^{-1}$) - Grain yield ($t \cdot ha^{-1}$ = plant yield × plant density) - Harvest index = (Grain yield / Biological yield) × 100.

* The vegetation density was 66.667 (Plant . $hectare^{-1}$)

RESULTS AND DISCUSSION

Number of days from planting to 75% male flowering *(day)*

The results are shown in Table 2. In spraying of salicylic acid to exceed the concentration of S_2 and gave the lowest average number of days(56.45) days . While S1 and S0 recorded a higher average number of days (57.74 and 57.75) days , respectively, this decrease in the number of days is due to the physiological role of salicylic acid in accelerating vital processes inside the plant, as it contributes to enhancing resistance to environmental stresses (such as drought and high temperatures) by activating antioxidants and regulating the balance of plant hormones . It also has a role in stimulating flowering and reducing the time required to reach maturity, through its possible effect on increasing the production of gibberellins and cytokines, which accelerate the growth of floral tissues. These findings are consistent with those reported by Al-Atawi (2023).The results in the same table also showed that the genotype Rayal630 recorded the shortest number of days (56.44 days), while the genotype 777 had the longest duration (58.77 days). This variation may be attributed to genetic differences among genotypes in the number of days required to reach the male flowering stage, which is influenced by their morphological traits, environmental responsiveness, and differential interactions with temperature and photoperiod. These findings are consistent with the results reported by Nazem et al (2024).There were notable variations in the relationship between genotypes and salicylic acid concentrations. The interaction treatment ($S_2 \times V_4$) resulted in the fewest days necessary for 75% of male flowers to bloom, with 56 days, which was not significantly different from the interaction ($S_2 \times V_2$) that recorded 56.3 days. Meanwhile, the interaction treatments (S_0, $S_1 \times V_3$) produced the highest number of days, reaching 59 days.

Table 2. Effect of salicylic acid concentrations, genotypes, and their Interaction on number of days from planting to 75% male flowering (day).

Genotypes	Salicylic acid concentration (mg. L^{-1})			Genotypes Av.
	0	100	200	
Toro	58 b	58 b	56.33 de	**57.45 b**
Rayal 630	57 cd	56.33 de	56.3 e	**56.44 d**
777	59 a	59 a	57.53 bc	**58.77 a**
666	57 cd	57.66 bc	56 e	**57.22 c**
Concentrations Av.	**57.75 a**	**57.74 a**	**56.45 b**	

Number of days from planting to 75% female flowering (day)

The results presented in Table 3, showed that foliar application of salicylic acid at concentration S_2 resulted in the shortest number of days(60.83 days), while the control treatment (S_0) produced the longest duration, reaching (62.25 days). Salicylic acid stimulates vegetative growth through the production of the florigen hormone, which is responsible for flower stalk formation and contributes to promoting the flowering process and increasing the number of floral buds on the plant (Hassan and Abdul jabbar, 2019). These findings agree with those reported by Saddam and Attiya (2024)..The results in the same table also showed that the genotype Rayal 630 recorded the shortest genotypes number of days (60.89 days), while the genotype 777 had the longest genotypes duration, reaching (63 days). This variation may be attributed to the genetically determined nature of this trait, as well as morphological differences among these genotypes and the presence of distinct genetic factors varying from one genotype to another, which could explain the differences in flowering time among these genotypes. These findings are consistent with those reported by Al-fahad and Al-obaidi (2017). The interaction between salicylic acid concentrations and genotypes showed significant differences, where the interaction treatment ($S_2 \times V_2$) resulted in the shortest genotypes time to female flowering at (60 days), while the interaction treatment ($S_0 \times V_3$) recorded the longest duration, reaching (64 days).

Table 3. Effect of salicylic acid concentrations, genotypes, and their interaction on number of days from planting to 75% female flowering (day).

Genotypes	Salicylic acid concentration (mg. L^{-1})			Genotypes Av.
	0	100	200	
Toro	62 b	62 b	60.33 de	**61.45 b**
Rayal 630	62 b	60.66 de	60 e	**60.89 d**
777	64 a	63 ab	62 b	**63 a**
666	61 cd	61.66 bc	61 cd	**61.22 c**
Concentrations Av.	**62.25 a**	**61.83 b**	**60.83 c**	

Ear height (cm)

As shown in Table 4, the salicylic acid concentration S_2 outperformed the other concentrations, producing the highest ear height of (76.87 cm), while the control treatment (S_0) resulted in the lowest of (67.47 cm). Promotes the accumulation of carbohydrate substances and provides more energy for cellular expansion in the leg (Zamanianjad et al., 2013). From the same table, a significant difference was observed among the genotypes. Genotype 777 recorded the highest genotypes ear height at (87.05 cm), while genotype 666 had the lowest genotypes of (63.81 cm). This variation may be attributed to differences in the surrounding environment as well as genetic variation among genotypes. These findings are consistent with those reported by Ali (2018). The interaction between salicylic acid concentrations and genotypes showed significant differences. The combination ($S_2 \times V_3$) recorded the highest genotypes ear height at (95.03 cm), which was not significantly different from the ($S_1 \times V_3$) interaction, which recorded (91.66 cm). In contrast, the ($S_0 \times V_4$) interaction produced the lowest genotypes ear height at (61.40 cm).

Table 4. Effect of salicylic acid concentrations, genotypes, and their interaction on ear height (cm).

Genotypes	Salicylic acid concentration (mg. L^{-1})			Genotypes Av.
	0	100	200	
Toro	68.60 bc	68.80 cd	76.36 b	**71.25 b**
Rayal 630	63.43 de	66.33 d	69.80 cd	**66.52 c**

777	76.46 b	91.66 a	95.03 a	**87.05 a**
666	61.40 e	72.63 de	66.30 d	**63.81 d**
Concentrations Av.	**67.47 b**	**72.63 ab**	**76.87 a**	

Chlorophyll content (SPAD)

It is noted in Table 5. According to his data, there was no significant difference between the concentrations of salicylic acid in the chlorophyll content.

shows that genotype 777 recorded the highest chlorophyll content of (35.77 spad), while the Toro genotype recorded the lowest value of (33.40 spad). In addition to the cultivars' varying responses to surrounding growth factors, the genetic variation in this trait may be the main reason for the differences in chlorophyll content among the genotypes. This finding agrees with the conclusions of Rajabi Dehnavi et al (2022).The interaction between salicylic acid concentrations and maize genotypes showed significant differences in chlorophyll content. The combination ($S_2 \times V_3$) recorded the highest chlorophyll content at (37.66 spad), while the lowest value was observed in the interaction ($S_0 \times V_1$), which reached (32.25 spad). This variation may be attributed to the synergistic effect between the genetic makeup of the genotype and its responsiveness to salicylic acid application, which enhanced physiological activity in the leaves and consequently increased chlorophyll accumulation. This superiority in interference ($V_3 \times S_2$) is due to the high physiological response of the V_3 genotype to a concentration of 200 mg/L of salicylic acid, which is known for its role in promoting photosynthesis by increasing chlorophyll formation and enhancing the efficiency of the photophosphorylation system. Salicylic acid also contributes to reducing oxidative stress within leaf tissues, prolonging their life and increasing their ability to build chlorophyll, especially in compositions with high genetic efficiency such as(V_3).

Table 5. Effect of salicylic acid concentrations, genotypes, and their interaction on Chlorophyll content (spad).

Genotypes	**Salicylic acid concentration (mg. L^{-1})**			**Genotypes Av.**
	0	**100**	**200**	
Toro	29.39 ab	29.35 ab	31.75 a	**30.13 a**
Rayal 630	26.36 cd	27.32 bc	25.38 cde	**26.35 b**
777	29.35 ab	30.66 a	31.49 a	**30.53 a**
666	23.72 e	23.16 e	24.33 de	**23.73 c**
Concentrations Av.	**27.20 a**	**27.64 a**	**28.21 a**	

Number of grains per row (grain. row^{-1})

The results are shown in Table 6. There was no significant difference between the concentrations of salicylic acid in the number of grains in the row .

From the table itself, there is a significant difference between the varieties, where genotype 777 outperformed others by producing the highest genotypes, reaching (30.53 grains. row^{-1}). However, this did not differ significantly compared to genotype Toro, which produced (30.13 grains. row^{-1}). Genotype 666 recorded the lowest genotypes with (23.73 grains. row^{-1}). These differences may be attributed to genetic variability and environmental factors among the genotypes. These findings are consistent with the results reported by Aziz and Al-Zubaidy (2024).The interaction between salicylic acid concentrations and genotypes showed significant differences. The interaction ($S_2 \times V_1$) resulted in the highest genotypes grains number per row, recording (31.75 grains. row^{-1}), which was not significantly different from the interaction ($S_2 \times V_3$) that produced (31.49 grains. row^{-1}). Meanwhile, the interaction treatment ($S_0 \times V_4$) gave the lowest rate of (23.16 grains. row^{-1}).

Table 6. Effect of salicylic acid concentrations, genotypes, and their interaction on number of grains per row (grains. row^{-1}).

Genotypes	Salicylic acid concentration (mg. L^{-1})			Genotypes Av.
	0	100	200	
Toro	29.39 ab	29.35 ab	31.75 a	**30.13 a**
Rayal 630	26.36 cd	27.32 bc	25.38 cde	**26.35 b**
777	29.35 ab	30.66 a	31.49 a	**30.53 a**
666	23.72 e	23.16 e	24.33 de	**23.73 c**
Concentrations Av.	**27.20 a**	**27.64 a**	**28.21 a**	

Individual plant grain yield (g. plant^{-1})

Statistics in Table 7, indicated that the concentrations differed among themselves. The S_2 treatment of salicylic acid spraying recorded the highest grain yield (133.52 g. plant^{-1}), with no significant difference compared to S_1 (125.74 g . plant^{-1}). Meanwhile, the S_0 treatment resulted in the lowest yield (114.03 g . plant^{-1}). Probably, the production of cereals increased as a result of the physiological action of this acid in combination with other hormones (auxins and cytokines), which made it more efficient in transporting (photosynthetic products and storing them). These findings are consistent with those reported by Bekele et al. (2021).The results in the same table showed that the genotype 777 outperformed the others by achieving the highest genotypes grain yield per plant at

(147.75 g.plant^{-1}). There was no significant difference compared to the genotype Toro, which produced (143.58) g. plant^{-1}). Meanwhile, genotype 666 recorded the lowest genotypes of (89.77 g plant^{-1}). This superiority is attributed to its better performance in most growth and yield traits, in addition to genetic and environmental differences. These findings are consistent with those reported by Al-Ani (2019).The interactions between salicylic acid concentrations and genotypes showed significant differences. The interaction ($S2 \times V_1$) recorded the highest genotypes grain yield per plant at (168.41 g. plant^{-1}), with no significant difference compared to the interaction ($S_2 \times V_3$), which produced (160.65 g. plant^{-1}). In contrast, the interaction ($S_0 \times V_4$) gave the lowest rate of (82.83 g plant^{-1}). This superiority is attributed to the high physiological response of genotypes V_1 and V_3 when sprayed with a concentration of 200 mg/L of salicylic acid, which contributes to the stimulation of vital processes associated with the fullness of cereals and increases their conversion efficiency by activating the process of photosynthesis and improving the transport and distribution of its products towards ear.

Table 7. Effect of salicylic acid concentrations, genotypes, and their interaction on Individual plant grain yield (g . plant^{-1}) .

Genotypes	Salicylic acid concentration (mg. L^{-1})			Genotypes Av.
	0	100	200	
Toro	125.66 cde	136.69 bc	168.41 a	**143.58 a**
Rayal 630	113.25 bcd	125.98 b-e	110.62 ef	**116.61 b**
777	134.39 g	148.22 ab	160.65 a	**147.75 a**
666	82.83 b	92.08 fg	94.40 fg	**89.77 c**
Concentrations Av.	**114.03 b**	**125.74 a**	**133.52 a**	

The grain yield (ton. ha^{-1})

The results of Table (8) showed that the treatment of spraying salicylic acid at a concentration of (S_2) gave the highest grain yield of (8.89 tons. ha^{-1}), followed by concentrate (S_1) with an average of (8.37 tons. ha^{-1}). However, the statistical analysis showed that there was no significant difference between the two treatments, which indicates that the concentrations are 100 and 200 mg.L^{-1} were statistically equivalent in their impact on grain production ,and both outperformed the comparative treatment, with S_0 recording a lower average of(7.59 ha^{-1}), the reason for the increase in the components of the quotient is attributed, as well as the role of silicic acid by increasing the transfer of photosynthetic products from the source to the downstream (Hussain *et al.*, 2009). These results are consistent with those reported by Ibrahim et al. (2016) and Mohamad et al. (2023). The results in the same table showed that genotype 777 outperformed, achieving the highest genotypes yield of (9.84 tons. ha^{-1}), with no significant difference compared to the Toro genotype, which produced (9.56 tons. ha^{-1}). Meanwhile, genotype 666 produced a lower genotypes yield of (5.97 tons. ha^{-1}), likely due to its inferior performance in most growth and yield traits. These results are consistent with those reported Mohammed and Ismaiel (2025). The interaction between salicylic acid and genotypes showed significant differences. The interaction ($S_2 \times V_1$) produced the highest genotypes yield of (11.22 tons. ha^{-1}), with no significant difference compared to the interaction ($S_0 \times V_3$), which produced (10.70 tons. ha^{-1}). Meanwhile, the interaction ($S_0 \times V_4$) resulted in the lowest genotypes yield of (5.51 tons. ha^{-1}).

Table 8. Effect of salicylic acid concentrations, genotypes, and their interaction on grain yield (tons. ha^{-1}).

Genotypes	**Salicylic acid concentration (mg. L^{-1})**			**Genotypes Av.**
	0	**100**	**200**	
Toro	8.37	9.10	11.22	**9.56**
Rayal 630	7.54	8.39	7.37	**7.77**
777	8.95	9.87	10.70	**9.84**
666	5.51	6.13	6.28	**5.97**
Concentrations Av.	**7.59**	**8.37**	**8.89**	

Harvest Index %

The results obtained are indicated from Table (9).The S1 treatment for salicylic acid achieved the highest yield evidence of (42.19)%, followed by the concentration of S2 , which reached (41.85)%, however, the statistical analysis showed no significant difference between the two treatments, indicating that the concentrations are 100 and 200 mg.L^{-1} were statistically equivalent in their impact on the harvest guide, and both outperformed the comparative treatment, with S0 recording a lower average of (36.67)% , The increase in the area and number of leaves, and therefore in the growth of leaves with chlorophyll, explains the excess of (200 and 100) mg/l, this balances the chlorophyll index in the leaves and enhances the efficiency of metabolism , These findings are consistent with the conclusions reached by Ahmad *et al* (2018).Significant differences were observed among the genotypes, with genotype 777 outperforming by producing the highest harvest index of (48.41) %, showing no significant difference compared to the Toro genotype, which recorded (48.22)

%. Meanwhile, genotype 666 gave a lower genotypes harvest index of (23.39) %. This is attributed to two factors: genetic differences between the genotypes and physiological factors affecting the distribution of dry matter between the vegetative and reproductive parts. These results agree with those of Zaki and Ahmed (2023).The interaction between salicylic acid and genotypes showed significant differences. The interaction ($S_2 \times V_1$) produced the highest harvest index of (53.36) %, while the interaction ($S_0 \times V_4$) resulted in the lowest harvest index of (20.43) %.)%. The superiority in the proof of harvest at interference ($S_2 \times V_1$) is attributed to the high efficiency of the V_1 genotypein the investment of treatment with salicylic acid at a concentration of 200 mg/L, which led to an increased conversion of photosynthetic products from vegetative growth to grain, and therefore a higher ratio of Economic to total biological quotient. Salicylic acid is known for its effect in regulating the relationship between vegetative and reproductive growth by improving the absorption of nutrients, reducing environmental stresses, stimulating hormones such as gibberellins and cytokines, increasing the efficiency of physiological conversion within the plant.These results demonstrate the importance of the overlap between the genotype of the genotype and the response to spraying coefficients ،This reinforces the need to recommend the use of specific concentrations of the appropriate genotypeto achieve maximum production efficiency.

Table 9. Effect of salicylic acid concentrations, genotypes, and their interaction on harvest index %.

Genotypes	**Salicylic acid concentration (mg. L^{-1})**			**Genotypes Av.**
	0	**100**	**200**	
Toro	43.11 bc	48.2 abc	53.36 a	**48.22 a**
Rayal 630	38.74 c	45.66 abc	38.39 b	**40.93 b**
777	44.43 abc	49.4 ab	51.41 ab	**48.41 a**
666	20.43 d	25.5 d	24.25 d	**23.39 c**
Concentrations Av.	**36.67 b**	**42.19 a**	**41.85 a**	

CONCLUSIONS:

The results showed that the concentration of 200 mg.L^{-1} ,was among the most effective in enhancing most of the studied qualities, especially vegetative growth and some qualities of the quotient. However , there were no significant differences between the two concentrations (200 and 100 mg / L) in a number of qualities , including (chlorophyll content , number of grains per row , individual plant yield of grains , grain productivity, harvest guide), so they were effective in improving the physiological and productive performance of yellow corn . Cultivar 777 outperformed the others in most growth and yield traits, including ear height (87.05) cm, chlorophyll content (35.77) SPAD, number of per row (30.53) grains. row^{-1}, individual grain yield (147.75) g · plant^{-1}, grain yield (9.84) tons · ha^{-1}), and harvest index (48.41) %.

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