Response of Two Corn (*Zea maize L*) Genotypes to Herbicides Application.

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Abstract

An experiment was carried out at the field of Agricultural Collage, Duhok Universityduring spring and fall season 2016, to study the effect of three herbicides with two doses for each herbicide, namely (Amaze 80, 160; Perfect, 120, 140; and Belldozer 120 and 140 ml ha^{-1}) on weeds, Two maize genotypes were used (Sangria and Nawroz). Using factorial experiment with Randomize Completely Block Design (RCBD) with three replicate. The results showed Nawroz genotype was superior in the No. of rows ear-1, No. of kernels row-1 and kernels yield plant-1 (654.8 g) and, also the fall season was superior in some traits than spring season. The herbicides perfect at dose 140 ml ha-1 will be more effective on many broad and narrow leaves weeds yield and component of two maize genotypes by using with factorial experimental arranged in revealed that, 654.8 g and also the fall season was the best than the spring season and Perfect 140 g ha-1 was the more effective in killing the most kinds of weeds.

Key words : Maize, genotypes Perfect, Amaze, Belldozer herbicides.

استجابة تركيبان وراثيان من الذرة الصفراء (*Zea maize L.*) لاضافة مبيدات الادغال

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الخلاصة

طبقت تجربة حقلية في حقل كلية الزراعة جامعة دهوك خلال الموسم الربيعي والخريفي لعام 2016 لدراسة تأثير ثلاثة مبيدات و بتركزين لكل مبيد وهي (Amaze بتركيز 80, 160و Perfect بتركيز 120 و 140 و Belldozer بتركيز120 و 140مليلتر هكتار$^{-1}$) و استعمله تركيبان وراثيان هما Sangira و Nawroz وقعت المعامله في تجربة عاملية بتصميم القطاعات العشوائية الكامله و بثلاث مكررات. أظهرت النتائج تفوق التركيب الوراثي Nawroz على التركيب الوراثي Sangira في عدد الصفوف في العرنوص و عدد الحبوب في الصف و حاصل النبات الواحد اذ بلغ (654.8 غرام) كما تفوق الموسم الخريفي على الموسم الربيعي في اغلب الصفات. اظهر Perfrect و بتركيز 140 مليلتر هكتار$^{-1}$ تفوقاً على بقية المبيدات و كان التأثير فعالاً في قتل او اضعاف العديد من نباتات الادغال الرفيعه و العريضة .

تراكيب وراثية من الذرة الصفراء,مبيدات ادغال, بيرفكت, اميز,بيلدوزر.

Introduction

Chemical weed control has importance key for large scale maize production. Only a few of the many herbicides available to maize can be safely used for weed control of maize genotypes. Herbicides application should eliminate, Weeds and allow maize developing. However herbicides application with some genotypes that are susceptible could lead a slow down in growth and yield reduction (Wych and Schoper 1987). Showed that the herbicides selectivity in no an absolute – property but depends on many factor such the type of the active ingredient, amounts and time of the application, morphological and physiological plant traits, environment, which in combination directly or indirectly effect plant,

while (Bonis et al., 2011). showed that the interaction between herbicides and crops is influenced not only by the active ingredient – genotype relationship but also by the year and by other environmental factor. In Kurdistan regions one of the most problem in corn production by weed which have shown to reduce the yield from 25 – 50 % (Bonis 2011). Chemical weed control is the best method to weed control and quick, more effective and labor saving method than others weed control. Several researches (Correa, et al 1990., Rutta, et al 1991., Everman. 2014. and Vandini, et al 2005) using the chemical weed control method with maize planting. Also Vandini et al., (2005) showed that the time and rates of herbicides was very important for proper controlling of weeds and effectiveness of herbicides can be increased. Several researchers showed that the many herbicides effect on yield and its components of maize. (Dalley. et al .(2006)., Mitchell. et al .(2014). Bruns et al (2012). and Nor wood. 2001.). Several researcher (Bonis. et al .(2015). Berzenyi. and Lap .2001). and Owen, et al. (1993).). studies the effect of planting date on maize and determine the most appropriate planting date for maize production all over the world. Environmental change associated with different sowing date has modifying affection the growth and development of maize plants. Each genotype has optimum sowing date, and the greater of deviation from this optimum (early or late sowing) the greater yield loss. There for, this study was carried out to evaluate the effect of different doses of three herbicides on weed, yield and its componets of maize genotypes planting in spring and fall season.

Materials and Method

A field trial was conducted at field College of Agricultural, Duhok University during spring and fall season 2016. Soil characters and max. and min. temperature was presented in Table (1). was laid out in randomized complete block design (RCBD) with three replicate, the first factor was three selective post – emergence herbicides with two doses for each one and control (Amaze 80, 160 g ha^{-1}, Perfect 120, 140 g h^{-1}, Belldozer 120, 140 g ha^{-1} and control), the second factor was two maize genotype (Sangria and Nawroz), formed 14 treatments the plot size was 5.625 m^2 . Maize genotypes were sown at 15/3/2016 and 22/7/2016 with three rows of 2,5 m longed, 0.75 m apart and 0.25 m within row putting 2 to 3 seeds per hole, the plants was thinning to one plant in hole at an early growth stage. Field fertilized with (N. P. K,27, 27, 0) at 400 kg ha^{-1} as first doses at planting date and 200 kg ha^{-1} of urea (46% N) were added after two weeks after emergence. Herbicides doses were applied two weeks post corn emergence.

Data recorded on weeds density and dry weight from an area of 1 m^2. Five plants were selected from each plot, plant and ear height (cm), leaf area (cm^2), data of 75% tasseling and silking, No. of rows ear^{-1}, No. of kernels row^{-1}, 300 – kernels weight (g) and kernels yield $plant^{-1}$ (g). The data of weeds and crop parameters was analyzed statistically by using Minitab software package (16) subsequently. Duncan Multiple Range Test was used to test the means of treatments at 0.05probabili.

Spring season									
Weather properties					**soil properties**				
Month	Ave. Daily max.tem c^0	Ave. Daily min..tem c^0	Seasonal Relative Humidity RH %	Seasonal Rainful mm	Depth (cm)	Soil texture class	PSD %		
							sand	silt	clay
March	18.81	6.57	70.4	88					
April	25.69	12.24	56.7	40.6	0-30	SIC	4.48	51.52	44.00
May	31.56	14.9	41.4	2.8	30-60	SIC	5.23	46.81	47 .96
Fall season									
July	46.5	39.8	21.8	0.0	0-30	SIC	4.39	45.86	49.75
August	46.3	40.2	20.5	0.0					
September	41.1	29.8	28	0.0	30-60	SIC	5.14	47.0	47.85
October	36.2	18.3	32.3	00					

Table (1) Soil and weather properties for spring and fall season 20

Results and Discussion

Table (2) showed the combination analysis and the table exhibited significant and highly significant effect of season (S) in all studied traits with the exception dry weight of broad and narrow leaved weeds, but the genotypes, showed significant and highly significant effect in No. of broad leaved weeds, dry weight of narrow leaved weeds, plant and ear height, leaf area, days to 75% tasseling and silking , No. of rows ear-1, No. of kernels row-1, 300 kernels weight and kernels yield plant-1. The interaction between Herbicides x Season showed no significant effect for all traits with exception of No. of broad leaves weeds, dry weight of narrow leaved weeds and days to 75% tasseling. Also the interaction between genotypes and season gave no significant effect on all traits except dry weight of narrow leaved weeds, plant height, days to 75% tasseling and silking, No. of rows ear-1, and No. of kernels row-1, while the interaction between Herbicides, genotypes and seasons, (H x G x S,) exhibited no significant effect on all studied traits.

Table (2). Combined analysis for maize genotypes traits during spring and fall seasons 2016.

***, **, indicating significant difference at 0. 05 and 0.01 probability level respectively. H – Herbicide, S – Season. G – Genotype.**

S.O.V	df	MS												
		No. of broad leaved weeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	Plant height (cm)	Ear height (cm)	Leaf area (cm^2)	Days to 75% tasseling	Days to 75% silking	No of. rows ear^{-1}	No. of kernels row^{-1}	300-kernels Weight (g)	Kernels yield $plant^{-1}$ (g}
Block	2	60.1	18.8	5.54	2.0743	1237.9	421.6	6260	7.0	10.2	3.1	18.8	6.4	123
H	6	2002.**	136.5**	449.**	6.678**	136.5	271.**	4435*	7.0**	3.7	3.5**	29.6**	179.**	18425**
S.	1	635.3**	177.1**	28.7	0.1	6694**	931.**	993**	16.3**	15.*	23.**	533.**	1680**	25424**
G.	1	192.0*	13.8	0.5	2.3*	2915**	566.**	23530**	762.**	555.**	344**	567.**	385.**	18464**
H x S	6	76.9*	3.9	3.9	1.5**	87.6	51.7	600	4.5*	3.2	0.6	8.7	36.2	4022
H x G.	6	2.4	12.0	5.0	0.2	51.5	145.9**	1745	2.9	4.5	2.9	14.3	124.**	10838**
S x G.	1	10.0	2.3	0.1	1.9*	1820**	44.2	987	264.**	368.**	4.8 *	45.2*	9.2	4601
H x S .x G	6	23.7	1.3	1.3	0.6	125.3	86.7	462	1.2	1.6	0.6	15.6	16.0	2082
Error	54	30.1	6.3	16.4	0.4	75.5	48.5	1840	1.71	2.2	1.1	10.0	21.9	3452

Table (3) indicates that an interaction between genotypes and herbicides for spring 2016, The minimum No. of broad leaved weeds value which recorded by Sangria genotype with perfect 140 while, the maximum value for the same traits was recorded by Nawroz genotype (69.7) with control treatment. Regarding the effect of genotypes and herbicides on No. of narrow leaved weeds, the results showed that the Sangria genotype recorded the less No. of narrow leaved weeds (15) with Amaze 80 ml ha^{-1}, while, the Nawroz genotype was recorded the largest value (24) for the same trait with Perfect 120 ml ha^{-1}. From this result the Perfect 140 ml ha^{-1} with Sangria genotype gave the least No. of broad and narrow leaved weeds with average (30) and (15,7) respectively. For dry weight of broad leaved weeds, the highest weight was by the combination Nawroz and control treatment while, the lowest value was obtained by combination Nawroz genotype with Amaze 80 ml ha^{-1}. Relying on interaction effects between genotypes and herbicides, for dry weight of narrow leaved weeds the maximum value(3.69) was recorded by combination Belldozer 140 ml ha^{-1} with sangria genotype. Whereas the minimum value (1.43) recorded by the same genotype with perfect 140 ml ha^{-1}. For plant and ear height, with bulldozer 140 ml ha^{-1} and control treatment with values (207.7) and (72.5) cm, Whereas, the Nawroz genotype had the minimum value for plant and ear height with values (176.3) and 50.7cm respectively. The data in the same table displayed that the largest leaf area was recorded by Nawroz genotype with values (583.3) cm^2 at Belldozer 120 ml ha^{-1} while the smallest value (493.3cm^2) was noticed for Sangria with Amaze 160 ml ha^{-1}. Concering days to 75% tasseling and siliking the genotype Nawroz was the earliest for these traits and recorded (44) and (45.7) days with control treatment and Belldozer 120 ml ha^{-1} respectively. The Nawroz genotype superior than Sangria genotype in yield and yield components and recorded (18, 37.7, 67.3 and 451.7) For No.row ear-1 ,No. kernels row-1,300 kernels weight and kernels yield plant-1 with Belldozer 120 ml ha^{-1} and Perfect 140 ml ha^{-1} for 300 kernels weight from the above result the Nawroz genotype and the herbicide Belldozer 120 ml ha^{-1} was superior in the most studied traits. This main the combination of maize genotypes and herbicides Belldozer 140 gave the lowest weed density and this herbicide is capable effectively to kill the broad and narrow leaves weeds. Khatam et al (2013). These results are in agreement with those stat out by Berzenyi. and Lap (2001), Dalley et al.,(2006) and John and Michel,(2010).

Table (3).Effect of interaction between genotypes and herbicides on maize traits during spring 2016.

Genotypes	Herbicide doses (g ha^{-1})	No. of broad leaved weeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	plant height (cm)	Ear height (cm)	leaf area (cm^2)	Days to 75% tasseling	Day to 75% silking	No.of rows ear^{-1}	No.of kernels row^{-1}	300-kernel weight (g)	kernels yield plant^{-1} (g)
G 1	H 0	69.0 a	25.0 a	20.46 a	2.37 ab	192.0ce	72.5a	510.0b	51.7 ab	55.3 a	12.7b	27.0fg	62.3ab	280.0h
	H 1	31.0 e	15.0 d	2.43 b	1.97 b	207.3 a	71.1ab	561.7ab	53.67a	55.3 a	13.7 b	29.0d-g	60.7a-d	277.7h
	H 2	45.7 b-e	23.7 a	3.24 b	2.15 b	195.7bcd	63.1abc	493.3 b	55.0 a	56.3 a	13.3 b	27.3efg	59.0a-d	284.7fgh
	H 3	33.0 de	23.7 a	1.71 b	1.97 b	206.7 ab	53.3 ef	518.3ab	54.7 a	56.0 a	13.7 b	25.3 g	57.0a-d	284.7fgh
	H 4	30.0 e	15.7 cd	3.05 b	1.80 b	204.0 ab	66.1a-d	541.7ab	56.0 a	57.3 a	13.3 b	28.0efg	62.0abc	305.0efg
	H 5	48.7 bcd	22.3abc	1.56 b	2.12 b	199.0abc	63.0a-e	490.0ab	53.3 a	54.7ab	14.0 bc	31.0 c-f	50.3 cd	274.7 h
	H 6	31.0 e	16.0bcd	3.02 b	2.52 ab	207.7 a	67.7a-d	514.0ab	56.0 a	58.0 a	13.3 b	28.0 efg	67.0 a	310.0 ef
G 2	H 0	69.7 a	23.7 a	19.46 a	2.15 b	182.7 e f	60.2b-f	558.3ab	44.0 b	47.0 c	17.3 a	30.7c-f	52.3bcd	443.3 a
	H 1	33.7 de	20.3a-d	1.18 b	1.73 b	177.7 f	57.2def	581.7ab	44.0 b	46.7 c	16.0 ab	32.3b-e	50.00d	325.0 de
	H 2	52.3 abc	22.7 ab	5.08 b	1.53 b	180.0 f	69.7abc	525.0ab	47.7 bc	50.0bc	16.3 a	33.3a-d	49.7 d	375.0 bc
	H 3	35.7 cde	24.0 a	1.72 b	2.05 b	176.3 f	67.2a-d	545.0ab	44.7 b	46.0 c	17.3 a	35.7abc	56.0a-d	393.3b
	H 4	33.3 de	16.7bcd	2.15 b	1.43 b	184.0 ef	50.7 f	508.3 b	44.7 b	46.3 c	17.3 a	37. 3 ab	67.3 a	438.3 a
	H 4	56.0 ab	22.3abc	1.58 b	2.11 b	184.7 def	59.3c-f	583.3 a	43.7 b	45.7 c	18.0 a	37.7 a	53.3bcd	451.7a
	H 6	33.7 de	19.7a-d	3.65 b	3.69 a	179.33 ef	66.4a-d	555.3ab	44.7 b	46.0 c	16.7 a	35.3 abc	55.0bcd	350.0 cd

Means followed by same letter for each column has no significant differences. H 0- Control. H 1- Amaze 80. H 2- Amaze 160. H3 – Perfect 120 H4 – Perfect 140 H5 - Belldozer 120 H6 – Belldozer 140 G 1- Sangria. G 2-Nawroz.

Table (4) Clarified the interconnection effect of genotypes and herbicides on maize traits during fall season 2016. From this table we can noticed that the minimum No. of broad and narrow leaved weeds values (24.7 and 12.7)for sangria genotypes with effect 140 and Amaze 80 g ha^{-1} while, the maximum values (49.3 and 22.0) were recorded by the same genotypes with control treatment and perfect 120 g ha^{-1} . The results in the same table was showed that the nawroz genotypes exhibited the lowest value (0.5 and 0.9) on dry weight of broad and narrow leaved weeds with Amaze 80 and perfect 140 g ha^{-1} this mean that Nawroz genotype was more competitive the weeds. previous study by Bengna et al, (2001) showed similar results. For ear height Nawroz genotype was recorded the minimum (55.1 cm) ear height at Perfect 120 g ha^{-1} while the maximum ear height was obtained by Sangria genotype with value (80.1) cm with Belldozer 140 g ha^{-1}. Regarding the days to 75% tesseling, the Nawroz genotype had the shorted period to 75% tasseling (48 days) with perfect 140 g ha^{-1}, while, the different treatments showed no significant effect on days to 75% silking. For yield and yield components the Nawroz was superior in the all yield component except 300 kernel weight and recorded (20, 40.8, 654.8 g) for No. of rows ear^{-1}, No. kernel row^{-1} any kernels yield $plant^{-1}$ with Perfect 140 and Belldozer 120 g ha^{-1} These result are also confirmed by Shoko and Zivanvic , (2002) and John and Michel,(2010).

Table (4). Interaction effect of genotypes and herbicides on maize traits during fall 2016

Genotype	Herbicide doses (g ha^{-1})	No. of broad leaved weeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	plant height (cm)	Ear height (cm)	leaf area (cm^2)	Days to 75% tasseling	Day to 75% silking	No. of rows ear^{-1}	No. of kernels row^{-1}	300-kernel weight (g)	kernels yield $plant^{-1}$ gm
G_1	H_0	49.3 a	21.0 ab	18.3 a	1.9 bcd	212.2a	71.0 ab	551.4a	50.7 a-d	51.7 a	13.2 e	34.3 a	77.4a	466.ab
	H_1	27.3 c	12.7 c	0.5 c	3.1 abc	205.4 a	75.9 ab	629.5a	51.3abc	53.0 a	14.0de	33.3 a	69.4ab	386.4 b
	H_2	50.0 a	19.3 abc	2.2 bc	1.6 bcd	207.9 a	79.1 ab	565.6 a	52.0ab	53.0 a	13.8de	29.2 a	63.0ab	378.9 b
	H_3	29.0 c	22.0 a	1.1 b c	1.8 bcd	205.9 a	65.3 ab	578.1 a	51.7 abc	52.7 a	14.7bce	35.4 a	64.9ab	423.5 b
	H_4	24.7 c	14.0 abc	2.3 bc	1.5 bcd	210.7 a	72.2 ab	582.8 a	51.3 abc	52.7 a	14.2cde	36.4 a	67.1ab	451.6ab
	H_5	48. 7 a	20.7abc	1.0 bc	1.7 bcd	207.4 a	70.0 ab	596.9 a	52.7 a	53.3 a	14.3cde	35.6 a	62.9ab	365.5 b
	H_6	25.7 c	13.7 bc	2.4 bc	4.8 a	222.7 a	80.1 a	588.2 a	52.0 ab	53.3 a	13.8 de	36.9 a	71.7ab	418.3 b
G_2	H_0	56.3 a	19.7 abc	14.4 ab	1.7 bcd	199.4 a	66.4 ab	606.9 a	48.7 cd	51.3 a	20.0 a	38.9 a	66.5ab	526.8ab
	H_1	30.0c	14.7 abc	0.5 c	2.3 bcd	208.3 a	67.1 ab	644.9 a	49.0 bcd	52.0 a	18.0abc	34.6 a	55.6 b	392.1 b
	H_2	46.0 a b	18.7 abc	4.0 bc	1.0 d	210.7 a	75.2 ab	611.8 a	50.0 a-d	52.7 a	16.6a-e	39.1 a	59.4 b	443.1ab
	H_3	32.3 b c	21.3ab	1.1 bc	1.4 cd	207.5 a	56.1 ab	653.9 a	49.0 bcd	52.7 a	19.1 a	38.6 a	64.7ab	471.1ab
	H_4	27.0c	14.0abc	2.3 bc	0.9 d	199.4 a	55.1 b	587.9 a	48.0 d	51.0 a	18.5 ab	40.8 a	70.6ab	654.8 a
	H_5	49.3 a	21.3 ab	0.8 c	1.5bcd	209.9 a	70.4ab	634.2a	50.0a-d	52.0a	20.0 a	40.5a	64.8ab	529.3ab
	H_6	30.0 c	17.0 abc	3.1 bc	3.5ab	219.6 a	76.7 ab	635.3 a	49.7 a-d	51.3 a	17.6abd	35.0 a	69.3ab	426.0 b

Means followed by same letter for each column has no significant differences. H_0- Control. H_1- Amaze 80. H_2- Amaze 160. H_3 – Perfect 120 H_4 – Perfect 140 H_5- Belldozer 120 H_6 – Belldozer 140 . G_1- Sangria. G_2- Nawroz.

Table (5) Demonstrates interactions effect of genotypes and herbicides on maize traits during spring and fall season 2016. For No. of broad and narrow leaved weeds the minimum value for these traits (28.3 and 13.8) were recorded by Sangria genotype with bulldozer 140 and amaze 80 g ha $^{-1}$ while, the maximum value (63.0 and 23.0) with control treatment . Concerning the dry weight of broad and narrow leaved weeds the maximum value (19.4 and 3.7g) showed by the control treatment because the increase number of broad and narrow leaved weeds in same treatment. The results in the same table showed the maximum plant ad ear height with(215.2 and 73.9 cm) was recorded by Sangria genotypes with Belldozer 140 g ha^{-1} whereas, the Nawros genotype had the minimum height for plant and ear height (191.1 and 52.9 cm) with control treatment and perfect 140 g ha^{-1}. For days to 75% tasseling and silking the Nawros genotype was recorded the short period (46.3 and 48.7 days) for these traits with perfect 140 g ha^{-1}. Regarding the No. of rows ear^{-}, No. of kernel row^{-1}, and kernels yield plant^{-1} the Nawroz genotype was superior for their traits in spring and fall season with Belldozer 120 and perfect 140 g ha^{-1} while, the Sangria genotype gave the height value (69.9) for 300 kernel weight with control treatment . From the above of the results, the Nawroz genotype exhibited high yield and yield components with different herbicides levels the same genotype have less sensitive to herbicide levels.

Table (5). Interaction effect of genotypes and herbicides on maize traits during spring and fall season 2016

Genotype	Herbicide doses (g ha^{-1})	No. of broad leaved weeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	plant height (cm)	Ear height (cm)	leaf area (cm^2)	Days to 75% tasseling	Day to 75% silking	No.of rows ear^{-1}	No. of kernels row^{-1}	300-kernel weight (g)	kernels yield plant^{-1} gm
G 1	H 0	59.2 ab	23.0 a	19.4 a	2.2 b c	202.1ab	71.7ab	530.7a	51.2 bc	53.5ab	12.9 c	30.7 cd	69.9 a	373.1bc
	H 1	29.2 d	13.8 c	1.5 b	2.5 ab	206.4ab	73.5 a	595.6a	52.5 ab	54.2ab	13.8 c	31.2bcd	65.0abc	332.1 c
	H 2	47.8 c	21.5 ab	2.7 b	1.9 bc	201.8ab	71.1 ab	529.5a	53.5 ab	54.7 a	13.6 c	28.3 d	61.0 a-d	331.8 c
	H 3	31.0 d	22.8 a	1.4 b	1.9 bc	206.3ab	59.3 bc	548.2a	53.2 ab	54.3ab	14.2 c	30.4 cd	60.9 a-d	354.1 c
	H 4	30.2 d	14.8 c	2.7 b	1.6 bc	207.3ab	69.2 ab	562.2a	53.7 ab	55.0 a	13.8 c	32.2 bcd	64.5 abc	378.3bc
	H 5	48.7 bc	21.5 ab	1.3 b	1.9 bc	203.2ab	66.5abc	558.5a	53.0 ab	54.0ab	14.2 c	33.3 a-d	56.6 cd	320.1 c
	H 6	28.3 d	14.8 c	2.7 b	3.7 a	215.2 a	73.9 a	551.1a	54.0 a	55.7 a	13.6 c	32.4 bcd	69.3 ab	364.2 c
G 2	H 0	63.0 a	21.7 ab	16.9 a	1.9 bc	191.1 b	63.3abc	582.6a	46.3 d	49.2 c	18.7a	34.8 abc	59.4 cd	485.1 ab
	H 1	23.3 d	17.5 bc	0.8 b	2.0 bc	193.0 b	62.1 abc	613.3a	46.5 d	49.3 c	17.0b	33.4 acd	52.8 d	358.6 c
	H 2	49.2 bc	20.7 ab	4.5 b	1.2 c	195.3 b	72. ab	568.4 a	48.8 cd	51.3 bc	16.4 b	36.2 abc	54.5 d	409.1 bc
	H 3	34.0 d	22.7 a	1.4 b	1.7 bc	191.9 b	61.6 abc	599.5 a	6.8 d	49.3 c	18.2ab	37.1 ab	60.4 bcd	432.2abc
	H 4	30.2 d	15.3 c	2.2 b	1.2 c	191.7 b	6 52.9 c	548.1 a	46.3 d	48.7 c	17.9 ab	39.1 a	69.0 ab	546.6a
	H 5	52.7abc	21.8 ab	1.2 b	1.8 bc	203.2ab	64.9 abc	608.0 a	46.8 d	48.8 c	19.0 a	39.1 a	59.1 cd	490.5 ab
	H 6	31.8 d	18.3 abc	3.4 b	3.6 a	199.4ab	71.5 ab	590.3 a	47.2 d	48.7 c	17.1ab	35.2 abc	62.1 a-d	388.0 bc

Means followed by same letter for each column has no significant differences. H 0- Control. H 1- Amaze 80. H 2- Amaze 160. H3 – Perfect 120 H4 – Perfect 140 H5- Belldozer 120 H6 – Belldozer 140 G 1- Sangria. G 2- Nawroz .

The data in table (6) reveals interaction effect of spring and fall season and herbicides on Maize traits. The greatest number of broad and narrow leaved weeds (63. 3 and 24.3) was noticed at control treatment in spring season which, the lowest number of these traits (25.8 and 13.7) with Perfect 140 and Amaze 80 ha^{-1} in fall season. For the dry weight for broad and narrow leaved weeds (1.1 and 1.2 g) was obtained Perfect 120 and Perfect 140 in fall season but the maximum values 24.3 and 20.0g was recorded by the control treatment, this means the different herbicides effect on broad and narrow leaved weeds in both season. Concerning the plant and ear height, the maximum values (221.1 and 78.4cm) was obtained with Belldozer 140g ha^{-1} in fall season. in the same table the largest leaf area (637.2cm^2) was exhibited with Amaze 160 g ha^{-1} in fall season where was the minimum value (509.2cm^2) was recorded with Amaze 80 g ha^{-1} in spring season .For days to 75% tasseling the earliest tasseling (47.8) obtained with control treatment, these results indicate that the weeds (broad and narrow) comparative with corn plant. For No. of rows ear^{-1}, No of rows^{-1}, kernels yield $plant^{-1}$ the result in the table (5) shows the superiority of fall season than spring season and gave values 17.2, 38.6 and 553.2 g for No. of rows ear^{-1} No. of kernels row^{-1} and grain yield $plant^{-1}$ repetitively with Perfect 140 and Bulldozer 120 g ha^{-1}.The decreasing of kernels yield $plant^{-1}$ in spring season, due to high temperature in flowering season. The same results obtained by Berzsnyi lap,(2001) and Norwood,(2001).

Table (6). Interaction effect of season and herbicides on maize traits during spring and fall season 2016.

Season	Herbicide doses (g ha^{-1})	No. of broad leavedweeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	plant height (cm)	Ear height (cm)	leaf area (cm^2)	Days to 75% tasselin g	Day to 75% silking	No.of rows ear^{-1}	No. of kernels row^{-1}	300-kernel weight (g)	kernels yield plant^{-1} gm
S 1	H 0	63.3 a	24.3 a	20.0 a	2.3 bcd	187.3 e	66.3 abc	534.2bcd	47.8 c	51.2 a	15.0b	28.8e	57.3cde	361.7cd
	H 1	32.3 c	17.7 c-g	1.8 b	1.9 cd	192.5b-e	64.2 bc	571.7 a-d	48.abc	51.0 a	14.8b	30.7cde	55.3 cde	301.3 d
	H 2	49.0 b	23.2 ab	4.2 b	1.8 cd	187.8 de	66.4 abc	509.2 d	51.3 a	53.2 a	14.8b	30.3 de	54.3 de	329.8 cd
	H 3	34.3 c	23.8 ab	1.7 b	2.0 bcd	191.5cde	60.2 c	531.7bcd	49.7abc	51.0 a	15.5ab	30.5 de	56.5 cde	339.0 cd
	H 4	31.7 c	16.2 d - g	2.6 b	1.6 cd	194.0b-e	58.4 c	525.0 cd	50.3 abc	51.8 a	15.3 ab	32.7 a-e	64.7abc	371.7 cd
	H 5	52.3 b	22.3 abc	1.6 b	2.1 bcd	191.8b-e	61.1 c	550.8 a-d	48.5 bc	50.2 a	16.0 ab	34.3 a-e	51.8 e	363.2 cd
	H 6	32.3 c	17.8 c-g	3.3 b	3.1 ab	193.5b-e	67.1 abc	529.7bcd	50.3 abc	52.0 a	15.0 b	31.7 b-e	61.0 b-e	330.0 cd
S 2	H 0	52.8 b	20.3 a-e	16.3a	1.8 cd	205.8abc	68.7 abc	579.1 a-d	49.7 bc	51.5 a	16.6 ab	36.6 a-d	71.9a	496.5 ab
	H 1	28.7 c	13.7 g	0.5 b	2.7 bc	206.9abc	71.5 abc	637.2 a	50.2 abc	52.5 a	16.0 ab	33.9 a-e	62.5 a-d	389.3bcd
	H 2	48.0 b	19.0 b-f	3.1 b	1.3 d	209.3 ab	77.2 a b	588.7 a-d	51.0 ab	52.8 a	15.2 ab	34.2 a-e	61.2 b-e	411.0bcd
	H 3	30.7 c	21.7 abc	1.1 b	1.6 cd	206.7abc	60.7 c	616.0 ab	50.3 abc	52.7 a	16.9 ab	37.0 abc	64.8 abc	447.3abc
	H 4	25.8 c	14.0 fg	2.3 b	1.2 d	205.0a-d	63.7 bc	585.3 a-d	49.7abc	51.8 a	16.3 ab	38.6 a	68.8 ab	553.2 a
	H 5	49.0 b	21.0 a-d	0.9 b	1.6 cd	208.6abc	70.2 abc	615.6 ab	51.3a	52.7 a	17.2 a	38.0 ab	63.9 abc	363.2 cd
	H 6	27.8 c	15.3 efg	2.8 b	4.2 a	221.1 a	78.4 a	611.7abc	50.8ab	52.3 a	15.7 ab	35.9 a-d	63.9 abc	422.1 bc

Means followed by same letter for each column has no significant differences. H 0- Control. H 1- Amaze 80. H 2- Amaze 160. H3 – Perfect 120 H4 – Perfect 140 H5- Belldozer 120 H6 – Belldozer 140 S 1- Spring season. S 2- Fall seas

Table (7). showed the interaction effect of spring and fall season and genotypes on Maize traits. The Sangria genotype exceeded in plant and ear height, leaf area, days to 75% tasseling and silking No. of rows ear^{-1}, No. of kernels rows $^{-1}$,300 kernel weight and kernels yield plant^{1} and record high values for all traits in fall season. Comprise with spring season. The same genotype obtained the lowest values in No. of broad and narrow leaved weeds with values 36.4, and 17.6 and gave low value in dry weight of broad leaved weeds. Also the Nawroz genotype recorded high values for all traits in fall season while, the same genotype recorded low values for the same traits (plant and ear height, leaf area and yield and yield components). The genotype of Nawroz recorded the lowest value in No. of broad (38.7), Narrow (18.1) Leaved weeds, dry of broad (3.7 g) and narrow (1.7 g) leaved weeds.

Table (7). Interaction effect of spring and fall season and genotypes on maize.

Genotypes	Season	No. of broad leaved weeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	plant height (cm)	Ear height (cm)	leaf area (cm^2)	Days to 75% tasseling	Day to 75% silking	No. of rows ear^{-1}	No.of kernels row^{-1}	300-kernel weight (g)	kernels yield plant^{-1} (g)
G_1	S_1	41.2 ab	20.2 a	5.1 a	2.1 a b	201.8 b	65.3 b	522.7 c	54.3 a	56.1 a	13.4c	28.0 c	59.8 b	288.1 c
	S_2	36.4 c	17.6 b	4.0 a	2.4 a	210.3 a	73.4 a	584.7 b	51.7 b	52.8 b	14.0 c	34.5 b	68.0 a	412.9 b
G_2	S_1	44.9 a	21.3 a	5.0 a	2.1 a b	180.7 c	61.5 b	549.3 c	44.8 d	46.8 c	17.0b	34.6 b	54.8 c	396.7 b
	S_2	38.7 bc	18.1 b	3.7 a	1.7 b	207.8a b	66.7 b	625.0 a	49.2 c	51.9 b	18.5 a	38.2 a	64.4 a	491.9 a

Means followed by same letter for each column has no significant differences.
S_1 Spring season, S_2 Fall season, G_1 Sangria and G_2 Nawroz.

The data at table (8). Shows that the interaction between season, genotypes and herbicides on studies traits for spring and fall season 2016. The maximum number of broad leaved weed was recorded with combination S_1 G_2 and G_1 with control treatments and gave (69.7 and **69.0) respective**ly while, the minimum number of the same traits, was the combination S_2 G_I H_4 with value (24.7). Due to number of narrow leaved weeds the combination S_1 G_1 H_0 gave the maximum value (25.0) while the minimum number showed by combination S_2 G_1 H_1 with value (12.7). From the above results, the best combination for the both traits showed with combination S_2 G_I H_4 because this combination gave the minimum value (24.7 and 14.0) compared with the another combination. In the same table the dry weight for broad and narrow leaved weed the treatment S_1 G_1 H_0 and S_2 G_1 H_6 gave the maximum values (20.5 and 4.8 g) whereas, the combination S_2 G_1 H_1 and S_2 G_2 H_2 obtained the minimum values (0.5 ad 1,0 g) for these traits. Concerning the plant and ear height the combination S_2 G_1 H_6 exhibited the highest values (222.7 and 80.1 cm) while the combination S_1 G_2 H_3 and S_1 G_1 H_3 gave the minimum values (176.3 and 53.3 cm) for these traits . For leave area the combination S_2 G_2 H_3 obtained the largest leave area (653.9 cm^2) and the combination S_1 G_1 H_2 gave the smallest value (4933 cm^2). The results in the same table shoud that the days to 75% tasseling and silking the combination S_1 G_1 H6 recorded the earliest days for these traits with **(43.7 and** 45.7) days so that, the genotype (G_2) was the earliest compared with genotype G_1.Regarding for yield and yield components the genotype G_2 was superior in number of rows ear^{-1}, number of kernels row^{-1} and kernels yield $plant^{-1}$ and gave (20, 40.8 and 654.8 g) in fall season with herbicide H3 and H4, while, the genotype G1 recorded the maximum value for 300 kernel weight with value (77.4 g) with control treatment in the same season. These results indicate the genotype G2 was superior in the most yield component and yield $plant^{-1}$ and also the fall season was the best than the spring season, the herbicide H4 was the more effective in kill the most broad and narrow leaved weeds.This main the kind of herbicide, time of application and selected the sutable genotypes is more important to maize production. The researchers Vandini et all., (2005); Dallely et al. ,(2006); Brans et al. , (2012) and Mitchell, (2014) found the same results when studied these traits

Table (8). Interaction effect of season , genotypes and herbicides on maize traits during spring and fall season 2016.

S	G	H.	No. of broad leaved weeds	No. of narrow leaved weeds	Dry weight of broad leaved weeds (g)	Dry weight of narrow leaved weeds (g)	plant height (cm)	Ear height (cm)	leaf area (cm^2)	Days to 75% tasseling	Day to 75% silking	No. of rows ear^{-1}	No. of kernels row^{-1}	300-kernel weight (g)	kernels yield $plant^{-1}$gm
S_1	G_1	H_0	69.0 a	25.0 a	20.5 a	2.4 b-e	192.0b-i	72.5a-e	510.0 bc	51.7b-g	55.3a-e	12.7 h	27.0f	62.3h	280.0de
		H_1	31.0 f g	15.0 dg	2.4 b c	2.0 b-e	207.3a-f	71.1a-e	561.7abc	53.7a-d	55.3a-e	13.7fgh	29.0b-f	60.7b-h	277.7 e
		H_2	45.7b-f	23.7abc	3.2 b c	2.2 b-e	195.7a-i	63.1 a-e	493.3 c	55.0a b	56.3abc	13.3 fgh	27.3def	59.0b-h	284.7cde
		H_3	33.0d-g	23.7abc	1.7 b c	2.0 b-e	206.7a-g	53.3 de	518.3abc	54.7abc	56.0a-d	13.7 fgh	25.3 f	57.0b-h	284.7 cde
		H_4	30.0 fg	15.7c-g	3.1 b c	1.8 b-e	204.0abc	66.1a-e	541.7abc	56.0 a	57.3ab	13.7 fgh	28.0 c-f	62.0b-h	305.0 cde
		H_5	48.7b-e	22.3 a-b	1.6 b c	2.1 b-e	199.0 a-i	63.0 a -e	520.0 abc	53.3a-d	54.7a-f	14.0 e-h	31.0 a b-f	50.3 gh	274.7 e
		H_6	31.0 f g	16.0 b-g	3.0 b c	2.5 b-e	207.7 a-f	67.7 a-e	514.0 bc	56.0 a	58.0 a	13.3 fgh	28.0 c-f	67.0 a-f	310.0 cde
	G_2	H_0	69.7 a	23.7 ac	19.5 a	2.1bde	182.7e-i	60.2 a-e	558.3abc	44.0 i j	47.0g-j	17.3 a-e	30.7 a-f	52.3fgh	443.3 b-e
		H_1	33.7d-g	33.7 d-g	20.3a-g	1.2 c	1.7 cde	177.7h i	75.9 abc	581.7abc	44.0 ij	46.7 hij	16.0 b-h	32.3 a-f	50.0g h
		H_2	52.3abc	22.7 a-d	5.1 b c	1.5 d e	180.0 f-i	69.7 a- e	525.0 abc	47.7 g-j	50.0 f-j	16.3 b-g	33.3 a-f	49.7 h	375.0 b-e
		H_3	35.7 c-g	24.0a b	1.7 b c	2.1 b-e	176.3 i	67.2 a-e	545.0 abc	44.7 hij	46.0 j	17.3 a-e	35.7 a-e	56.0 c-h	393.3 b-e
		H_4	33.3 d-g	16.7 b-g	2.2 b c	1.4 d e	184.0 d-i	50.7e	508.3 b c	44.7 hij	46.3 ij	17.3 a-e	37.3 a-d	67.3 a-e	438.3 b-e
		H_5	56.0 a b	22.3 a- d	1.6 b c	2.1 b-e	184.7 c-i	59.3 a -e	581.7abc	43.7 j	45.7 j	18.0 abc	37.7 abc	53.3 e-h	451.7 b-e
		H_6	33.7 d-g	19.7 a -g	3.7 b c	3.7 a b	179.3ghi	66.4 a -e	545.3 abc	44.7 hij	46.0 j	16.7 a-f	35.3 a -f	55.0 d-h	350.0 b-e
S_2	G_1	H_0	49.3 b-e	21.0 a-f	18.3 a	1.9 b-e	212.2 abc	71.0 a-e	551.4 abc	50.7 c-g	51.7c-g	13.2 gh	34.3 a-f	77.4 a	466.2 bcd
		H_1	27.3 g	12.7 g	0.5 c	3.1 a-d	205.4 a-h	57.2 b-e	629.5 abc	51.3 b-g	53.0b-f	14.0 e-h	33.3 a-f	69.4 a-d	386.4 b-e
		H_2	50.0bcd	19.3 a -g	2.2 b c	1.6 cde	207.9 a-e	79.1 a b	565.6 abc	52.0 a-f	53.0b-f	13.8 fgh	29.2 b-f	63.0 a-h	378.9 b-e
		H_3	29.0 f g	22.0 a-e	1.1 c	1.8 b-e	205.9 a-g	65.3 a-e	578.1 abc	51.7 b-g	52.7b-f	14.7 c-h	35.4 a-f	64.9 a-g	423.5 b-e
		H_4	24.7 g	14.0 efg	2.3 b c	1.5 d e	210.7 a-d	72.2 a-e	582.8 abc	51.3 b-g	52.7b-f	14.7 c-h	36.4 a-e	67.1 a-f	451.6 b-e
		H_5	48.7 b-e	20.7 a -g	1.0 c	1.7 cde	207.4 a-f	70.0 a -e	596.9 abc	52.7a-e	53.3a-f	14.3 d-h	35.6 a -e	62.9 a-h	365.5 b-e
		H_6	25.7 g	13.7 fg	2.4 b c	4.8 a	222.7 a	80.1 a	588.2 abc	52.0 a-f	53.3a-f	13.8 fgh	36.9 a -e	71.7 ab	418.3 b-e
	G_2	H_0	56.3 ab	19.7 a-g	14.4 ab	1.7 cde	199.4 a-i	66.4 a-e	606.9 abc	48.7 e-h	51.3d-h	20.0 a	38.9 a b	66.5 a-f	526.8 a b
		H_1	30.0 fg	14.7 d-g	0.5 c	2.3 b-e	208.3 a-e	67.1 a-e	644.9 ab	49.0 efg	52.0c-f	18.0 abc	34.6 a-f	55.6c-h	392.2 b-e
		H_2	46.0 b-f	18.7 a -g	4.0 b c	1.0 e	208.3 a-e	75.2 a-d	611.abc	50.0 d-g	52.7 b-f	16.6 b-g	39.1 a b	59.4b-h	443.1 b-e
		H_3	32.3 efg	21.3 a-f	1.1 c	**1.4 d e**	207.5 a-f	56.1 cde	653.9 a	49.0 efg	52.7 b-f	19.1 a b	38.6 a b	64.7a-g	471.1 abc
		H_4	27.0 g	14.0 efg	2.3 bc	**0.9 e**	199.4 a-i	55.1 cde	587.9 abc	48.0 f-i	51.0 e-i	18.4 a b	40.8 a	70.6 abc	654.8 a
		H_5	49.3 b-e	21.3 a-f	0.8 c	**1.5 d e**	209.9a-e	70.4 a -e	634.2 ab	50.0 d-g	52.0 c-f	20.0 a	40.4 a	64.8a-g	529.3 a b
		H_6	30.0 f g	17.0 a -g	3.1 bc	3.5 abc	219 b	76.7 abc	635.3 ab	49.7 d-g	51.3 d-h	17.6 a-d	35.0 a -f	69.3 a-d	425.9 b-e

Means followed by same letter for each column has no significant differences.
S_I : Spring season, S_2: Fall season. G_1: Sangria genotype. G_2: Nawroz genotype.
H_0: Control. - H_1: Amaze 80. - H_2: Amaze 160. - H_3: Perfect 120 - H_4: Perfect 140 - H_5: Belldozer 120 - H6: Belldozer

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