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Effect of Maister and Altima Herbicides Application beside Different Sources of Nitrogen on Weed Populations of Two Maize Cultivars

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ABSTRACT

This study was performed to evaluate different weeds control methods (hand weeding, Maister OD and Ultima) and nitrogenous fertilizers (calcium nitrate, ammonium sulfate and ammonium nitrate) on growth and yield of two maize cultivars (4015 and 703) and weeds biomass. According to the results, among weeds control methods; the highest seed yield (8.2 t ha^{-1}) obtained from hand weeding as compared with control. Ultima had no effect on seed yield but with application of Maister OD seed yield increased up to 17.2%. Weeding augmented seed yield via increase of 100-seeds weight and seed number, while Maister OD only increased seed number. Dry weight of corn leaves affected by hand weeding had significant increase about 26.5%. Hence, it seems that both corn and weeds in the field are nitrate friend plants that application of nitrate fertilizers with growth augmentation in corn and weeds will cause to more interference. In this research, hand weeding was the most desirable method of weeds control and herbicides performance had no sufficient efficiency in augmentation of seed yield.

KEYWORDS: corn, weeds, nitrate fertilizer, cultivar.

1. INTRODUCTION

Corn is C4 plant which cultivate widely all over the world due to high potential of production. Studies show that 25 up to 30 numbers of weeds which cultivate in corn fields and make problem in the world are included annual and perennial weeds. Weeds control in corn fields will vary which is different depends on density, cultivation type, relative time of emergence, weather conditions and other factors. Although, corn is not weak competitor but weeds must be controlled for appropriate yield in corn (Gholami, 2014). Use of herbicides is one of the most important methods for weed control in the last 30 years (Najafi and Ghadiri, 2012). But use of herbicides as an efficient tool for weeds control lead to environmental degradation and increase number of resistant weeds to pesticides (Ganizade et al., 2011). Rimsulfuron is such new herbicide and very effective for broadleaf weeds (Najafi and Ghadiri, 2012). Radiovjoich et al. (2012) also stated that Nicosulfuron is such herbicide which is applied for control of annual and perennial weeds in corn fields. Research has shown that composition of Nicosulfuron and Rimsulfuron with commercial name of Ultima can be more effective for weeds control in corn fields (Zand et al., 2009).

Many weeds are consuming high amounts of nitrogen and therefore limit fertilizer nitrogen for plant growth. Weeds limit amount of available nitrogen for crop plants, but weeds growth increases at high levels of nitrogen fertilizer. Also, amount of nitrogen content in soil is the most important factor which affecting critical period of weeds control (Jalali et al., 2012). Plants use various forms of nitrogen. Nitrate and ammonium are the main forms of nitrogen fertilizer which are consumed by plants. Urea is another form of nitrogen fertilizer which is used by plants. Urea enters into plants directly or in the form of nitrate or ammonium. Urease is responsible enzyme for urea hydrolysis and ammonium production. Ammonium assimilation requires little energy; therefore it seems to be preferred by plants. However, ammonium is toxic for some plants. Existence of ammonium in agricultural soils is because of nitrogen fertilizer effect, nitrogen cycle and pollution. The excess ammonia can affect species composition. Various studies have demonstrated that diverse forms of nitrogen fertilizer affect differently on growth and yield of plants. Number of plants such as corn, wheat, tobacco and bean prefer nitrate form to ammonium form. These plants suffer from pure form of ammonium around their roots. But the plants that have low sensitivity to toxicity of ammonium prefer ammonium form to nitrate form (Hojaji and Goya,

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2014). The purpose of this study was to evaluate effect of nitrogen fertilizer type and weeds control method on weeds competition, growth and yield of maize.

2. MATERIALS AND METHODS

The experiment was performed in Khoda Afarin County with 202 meters above sea level located in north of East Azerbaijan Province with distance of 230 km from center of province. The experiment was carried out in form of factorial based on randomized complete block design with three factors in three replications. The studied factors were weeds control methods (hand weeding, Maister OD and Ultima) and nitrogenous fertilizers (calcium nitrate, ammonium sulfate and ammonium nitrate) and two maize cultivars (4015 and 703).

After preparation of planting map, operations of land preparation and creation of streamlet and ridges were carried out. In late June, corn seeds were sown at depth of 4cm and with distance of 20cm on ridges which had 60cm space apart from each other. In order to certitude for emergence in each location, two seeds were used. First irrigation was carried out 2 days after planting and subsequent irrigations were applied once per 5 days. Fertilization was done in two stages (14 July and 10 August).

For soil analysis, soil samples were collected from 6 points of field at depths of 0-30cm. After decomposition, soil physical and chemical conditions were as follows:

Table 1. The result of soil analysis test

Soil texture	%clay	% silt	Sand %	Absorbable Potassium (P.P.M)	Absorbable Phosphorus (P.P.M)	Total nitrogen %	Organic carbon (%)O.C	Percentage of neutral materials T.N.V	Saturation Soil acidity pH	Electrically conductive Ec(ds/m)
Sandy loam	%12	%21	%67	294	53.22	0.115	2.24	17.25	7.87	1.84

In this investigation, studied fertilizers were included: potassium nitrate, ammonium sulfate and ammonium nitrate with amounts of 800, 570 and 350 kg/ha, respectively. Each fertilizer was applied in two stages. One third of each fertilizer was used before planting and its remnant was used in stage of plants with 6-8 leaves. Weeding was done from the beginning of growth period up to maturity. Studied herbicides were applied at six-leaf stage of corn. Foliar spray was carried out on weeds and before sunrise. In order to better absorption of herbicides, some dishwashing liquid was mixed with herbicide solution. Consumption amounts of Ultima and Maister OD herbicides were 175 g/ha and 1.5 lit/ha, respectively.

For measurement of evaluated traits, five maize plants were selected and studied traits were measured. Before taking samples, chlorophyll index was measured using chlorophyll meter (SPAD) Model (Opti-sciences-ccm-200-USA) in plants of each pot; so that, one leaf selected from bottom, middle and top of plants for measurement. This trait was notated for each plot, separately.

Statistical analyses were performed for the data obtained from the measured traits. Duncan's multiple range test at 5% probability level was used for mean comparisons. Excel software was used for drawing charts. Correlation and regression analysis were done using SPSS software.

Variance analysis of studied traits showed that weed control method had significant effect at 1% probability level on plant height, leaf area, shoot dry weight, number of seeds per ear and seed yield, also weed control method had significant effect at 5% probability level for 100-seeds weights. Nitrogen fertilizer type had significant effect at 1% probability level for plant height and shoots dry weight; also nitrogen fertilizer type had significant effect at 5% probability level on leaf area, seed yield and chlorophyll index. Interaction of weed control methods×nitrogen fertilizer type had no significant effect in any of the traits (Table 1).

In this study, cultivar had significant effect on shoot dry weight and harvest index at 1% and 5% probability levels, respectively. Effect of weeds control method in cultivar was significant at 5% probability level from the view point of shoot dry weight. Interaction of nitrogen fertilizer type × maize varieties was significant at 5% probability level for plant height. Three-way interaction of weed control method × nitrogen fertilizer type × cultivar was significant at 1% probability level for number of seeds per ear and also was significant at 5% probability level for leaf area (Table 1).

Variance analysis of studied traits in weeds demonstrated that weed control method had significant effect at 1% probability level for number of Echinochloa crus-galli, Echinochloa crus-galli biomass, number of Amaranthus, Amaranthus biomass, number of Solanum nigrum, Solanum nigrum biomass and

total biomass of weeds. Also, nitrogen fertilizer type had significant effect at 1% probability level for number of Echinochloa crus-galli, Echinochloa crus-galli biomass, Amaranthus biomass, Solanum nigrum biomass and total biomass of weeds. Interaction of weed control method × nitrogen fertilizer type was significant at 1% probability level for Solanum nigrum biomass and total biomass of weeds and also this interaction was significant at 5% probability level for number of Echinochloa crus-galli. The effect of cultivar on number of Amaranthus was significant at 5% probability level. Interaction of weed control method×cultivar was significant at 5% probability level for number of Amaranthus. Interaction of nitrogen fertilizer type×cultivar was significant at 5% probability level for Solanum nigrum biomass. Three-way interaction of weed control method× nitrogen fertilizer type× cultivar was significant at 5% probability level for number of Amaranthus (Table 2).

Table2: Analysis of variance for the studied traits in maize

Sources of variance	Degree of freedom	Plant height	Leaf area	Dry weigh of shoots	Number of seeds per ear	100-seeds weight	Seed yield	Harvest index	Chlorophyll index
Replication	2	222.184	49.128	0.075	7435.601	6.668	1.296	11.977	9.313
Control method	3	2652.513**	90514.328**	13.905**	34373.337**	16.955*	20.217**	39.033	26.084
Type of nitrogen fertilizer	2	1742.097**	19855.554*	9.067**	12048.56	4.568	6.023*	3.285	52.062*
Type of nitrogen fertilizer× Control method	6	292.651	9266.927	0.351	7450.196	3.384	2.111	18.956	12.903
Cultivar	1	121.94	316.262	13.090**	1705.282	0.781	0.681	168.973*	0.161
Control method×cultivar	3	133.959	3708.844	2.661*	1965.238	8.677	1.034	43.155	5.473
Type of nitrogen fertilizer× Cultivar	2	997.677*	11537.42	0.129	4755.121	1.129	1.693	16.38	1.377
Type of nitrogen fertilizer× Cultivar× Control method	6	153.964	16607.694*	0.65	14571.159**	6.029	4.056	60.259	11.315
Error	46	265.201	5479.849	0.705	4333.669	4.623	1.775	30.383	11.013
Coefficient of Variation (%)		9.22	11.56	10.25	18.63	7.81	19.59	12.24	13.07

* and ** significance at %5 and %1 probability levels, respectively

3. Plant height of Corn

In this study, plant height was affected by fertilizer type. Mean comparisons for plant height affected by nitrogen fertilizer in different cultivars showed that the maximum plant height was obtained in cultivar 703 and in treatment of ammonium nitrate but there was no significant difference between treatments of ammonium sulfate and calcium nitrate from the view point of plant height. In cultivar 703, at ammonium nitrate treatment; plant height was 193cm which was higher up to 10.9% in treatment of calcium nitrate and 16.2% in ammonium sulfate. No statistically significant difference was found in cultivar 4015 among nitrogen fertilizer treatments (Table 5). The results showed that response of maize varieties to treatments of nitrogen fertilizer was different from the view point of plant height. Various surveys have shown that numerous cultivars respond differently to different types of fertilizers (Faisal et al., 2013). Some researchers reported difference in morphological and physiological characteristics of maize roots is the main reason for the difference in response of maize cultivars to various fertilizers (Mi et al., 2010).

The results of this study demonstrated that weeds control in form of mechanical and chemical cause to significant increase in plant height as compared with control treatment. But, mechanical control of weed led to greater augmentation in plant height of corn. In mechanical control of weeds, plant height was 189cm which as compared with control treatment was 18.1% higher. Application of Ultima and Maister OD herbicides increased plant height up to 11.2% and 11.2%, respectively (Table 6).

Weeding was done during growth period, so the farm during experiment were kept free of weeds, while in the case of chemical control; all weeds were not affected by weeds control method. Undoubtedly, mechanical control would be desirable for weeds. In similar studies by other researchers found that mechanical control is the most effective way. Tahir et al (2009) in their study about effect of mechanical and chemical control of weeds showed that weeding caused the greatest increase in plant height of corn, although chemical methods also caused significant augmentation in plant height, but the effect of weeding was more.

4. Leaf area of corn

Mean comparisons for leaf area affected by weeds control method and nitrogen fertilizer type in maize varieties showed that application of foramsulfuron had no effect on leaf area. Also depend on studied cultivar and type of nitrogen fertilizer, treatment of weeding and Ultima herbicide application caused significant augmentation in leaf area. In terms of weeding at treatments of calcium nitrate and ammonium sulfate in cultivar 703 and in the case of ammonium nitrate application in cultivar 4015, significant increases were obtained in leaf area as compared with control treatment. In terms of weeding at treatments of calcium nitrate and ammonium sulfate in cultivar 703 and in the case of ammonium nitrate application in cultivar 4015; leaf area was higher up to 28.1%, 27.8% and 50.4%, respectively as compared with control treatment. Therefore, in terms of weeds absence, cultivars showed different responses to fertilizers. But in the case of Ultima herbicide application in cultivar 4015 at treatments of calcium nitrate and ammonium nitrate and at treatment of ammonium sulfate in cultivar 703, significant augmentation was found for leaf area. These three treatments increased leaf area of corn up to 30.6%, 40% and 31.2% as compared with control treatment (Table 3). In general, depend on other factors such as type of nitrogen fertilizer and cultivar, weeds control will have desirable effect on leaf area of corn. Corn has high competitive power against weeds. But in early stages of plant growth, this plant is sensitive to weeds competition (Karimmojeni et al., 2010). The differences in corn cultivars from the view point of response to weeds competition have been reported. Hassan et al (2010) found in their study that some varieties of corn affected by weeds competition, had no reduction in leaf area, while others showed significant decrease in leaf area. At this probe, in terms of control treatment and application of Maister OD; no significant differences were observed among nitrogen fertilizer treatments from the view point of leaf area. The highest leaf area was obtained in cultivar 4015 and in the case of weeding and application of ammonium nitrate which had no significant difference with treatment of cultivar 4015 and calcium nitrate and treatment of cultivar 703 and ammonium nitrate. Therefore with consideration to the results of this study, it seems that in terms of weeds absence; ammonium nitrate is favorable form for studied cultivars. But in competitive conditions, there was no priority between fertilizers from the view point of leaf area which it seems that one of the major reasons for this response is more competition of weed with corn for ammonium nitrate in comparison with other forms of nitrogen fertilizer. The studies have shown that weeds such as rye absorb higher amount of ammonium nitrate as compared with other forms of nitrogen fertilizer (Kayo et al., 2011).

5. Shoot dry weight of corn

In this study, three factors of cultivar, weeds control method and type of nitrogen fertilizer had significant effects on shoot dry weight (Table 1). Mean comparisons for interaction of weed control method × corn cultivars showed that in terms of control treatment and application of foramsulfuron, there were no significant differences among cultivars from the view point shoot dry weight. In treatment of weeding and application of Ultima, shoot dry weight in cultivar 703 was more than cultivar 4015. Ashagrh (2014) in the study on different varieties of corn showed that cultivars were different from the view point of shoot dry weight. These researchers reported that one of the reasons for this difference between cultivars from the view point of biomass production is differences in photosynthetic performance of various cultivars. According to the results of this study, weeding treatment caused to significant increase in shoot dry weight of both studied corn. In weeding treatment; biomass of cultivar 4015 and cultivar 703 were 8.5gr and 10.2gr per plant, respectively which were higher up to 25% and 35.1%, respectively as compared with control treatment. In terms of Ultima application, significant increase in shoot dry weight was obtained only in cultivar 703. With application of Ultima, shoot dry weight of corn increased up to 20.2% as compared with control treatment. But different results were obtained with application of Maister OD. With using Maister OD, significant augmentation was obtained in cultivar 4015, but there was no alteration in biomass of cultivar 703. With application of Maister OD, shoot dry weight of corn increased up to 19.1% as compared with control treatment (Table 4). NabiZadeh et al (2013) investigated application of Nicosulfuron and Foramsulfuron herbicides on corn. These researchers found that the most effective method of weeds control was weeding also they observed that there were no significant differences from the view point of weeds control efficiency in case of herbicides application.

In this study, significant differences were obtained among fertilizer treatments from the view point of shoot dry weight. With mean comparisons for shoot dry weight affected by nitrogen fertilizer type was observed that in treatments of ammonium nitrate and calcium nitrate with 8.5g, shoot dry weight was

more than ammonium sulfate treatment. There was no significant difference between treatments of calcium nitrate and ammonium nitrate from the view point of shoot dry weight (Table 7). In different plants, effects of nitrate and ammonium fertilizers on plant biomass have been studied and were obtained similar results. Sezlak (2013) in their study showed that use of nitrate fertilizers caused further augmentation in maize biomass as compared with ammonium fertilizer.

6. Number of seeds per ear of corn

In this study, the largest number of seeds per ear of corn with amount of 524 was obtained in treatment of weeding and calcium nitrate and in cultivar 4015. The lowest number of seeds per ear of corn with amount of 255 was related to control treatment, ammonium sulfate and in cultivar 4015. Therefore, there was significant difference among cultivars from the view point of seeds number per ear. In terms of control treatment and application of herbicides, no significant difference was found between treatments of nitrogen fertilizer type and cultivars from the view point of seeds number per ear. At weeding treatment, only in cultivar 4015 under the terms of calcium nitrate application; number of seeds per ear was higher than the other treatments (Table 4).

100- Seeds weight

Mean comparisons for 100-seeds weight affected by weeds control method showed that among methods of weeds control, only hand weeding caused to significant increase in 100-seeds weight but use of Ultima and Maister OD had no effect on 100-seed weight. By weeding, 100-seed weight was obtained about 28.7g which was 8.7% higher as compared with control treatment (Table 6). Weeds reduced current photosynthesis of maize plants with several ways and thereby seeds weight decrease with reduction in amount of necessary assimilates for seeds filling. Rastgardany et al (2013) showed that weeds interference reduces 100-seeds weight in maize which one of the main reasons is decrease in absorption of required nutrients such as nitrogen. On the other hand, weed interference reduces leaf area. In the study by Saeed et al (2012), it was observed that weeds declined leaf area of corn up to 33%.

Chlorophyll Index

In this probe, chlorophyll index affected by nitrogen fertilizer treatments had no significant alteration (Table 1). According to the results; among treatments of nitrogen fertilizer, the maximum amount of chlorophyll index was related to treatments of calcium nitrate and ammonium nitrate. There were no statistically significant differences between these two treatments. Chlorophyll index in treatment of ammonium sulfate was lower than treatments of ammonium nitrate and calcium nitrate (Table 7).

Seed Yield

In this study, weeding and application of Maister OD caused significant increase in seed yield but application of Ultima had no effect on seed yield. The highest seed yield with 8.2 tons/ha was obtained in terms of weeding which was 44.3 tons more than control treatment. Therefore, complete control of weeds caused augmentation about 2.4 tons/ha for seed yield. In this study, use of Maister OD also led to significant increase in seed yield, but augmentation amount affected by this herbicide was significantly lower as compared with weeding. In case of Maister OD application, seed yield was obtained about 6.8 tons/ha which was 17.2 higher than control treatment (Table 6). Kandil and Kurdi (2011) in the investigation about effect of different methods of weed control on corn yield, observed that hand weeding caused increase in yield as compared with used herbicides. These researchers reported that one of the major reasons for this subject is lack of complete control for weeds during growth and negative impact of herbicides on corn growth.

In this study, the highest seed yield with amount of 1.7 tons/ha was obtained in treatment of ammonium nitrate which had no significant difference with calcium nitrate treatment. In treatment of ammonium sulfate, seed yield was 6.2 tons/ha which was lower up to 0.9 tons as compared with ammonium nitrate (Table 7). It seems ammonium nitrate produces higher yield toward ammonium sulfate but ammonium nitrate had no priority as compared with calcium nitrate. Several similar studies showed that for crop production, nitrate fertilizers are more favorable as compared with ammonium fertilizers. Sezlak (2013) in the study found that seed yield in treatment of ammonium nitrate was greater than ammonium sulfate.

Table 3: Mean comparisons of the studied traits under influence of weeds control method and type of nitrogen fertilizer in maize varieties.

			Leaf area	Number of seeds per ear
Control	Calcium nitrate	4015	562.1 ef	276.1 cde
Control	Calcium nitrate	703	587.0 ef	379.2 bcde
Control	Ammonium sulfate	4015	513.4 f	255.9 e
Control	Ammonium sulfate	703	535.2 f	298.4 bcde
Control	Ammonium nitrate	4015	563.3 ef	394.9 bcd
Control	Ammonium nitrate	703	626.1 bcdef	272.0 cde
Weeding	Calcium nitrate	4015	690.8 bcde	524.1 a
Weeding	Calcium nitrate	703	752.9 ab	393.3 bcd
Weeding	Ammonium sulfate	4015	600.5 def	340.4 bcde
Weeding	Ammonium sulfate	703	684.4 bcde	413.1 b
Weeding	Ammonium nitrate	4015	847.7 a	396.4 bcd
Weeding	Ammonium nitrate	703	754.4 ab	400.8 bc
Nicosulfuron	Calcium nitrate	4015	734.8 abcd	268.6 de
Nicosulfuron	Calcium nitrate	703	651.7 bcdef	291.4 bcde
Nicosulfuron	Ammonium sulfate	4015	590.4 ef	373.5 bcde
Nicosulfuron	Ammonium sulfate	703	749.4 abc	272.2 cde
Nicosulfuron	Ammonium nitrate	4015	739.1 abcd	394.6 bcd
Nicosulfuron	Ammonium nitrate	703	576.4 ef	366.4 bcde
Foramsulfuron	Calcium nitrate	4015	607.7 cdef	397.4 bcd
Foramsulfuron	Calcium nitrate	703	600.1 def	340.1 bcde
Foramsulfuron	Ammonium sulfate	4015	627.3 bcdef	303.2 bcde
Foramsulfuron	Ammonium sulfate	703	564.2 ef	372.6 bcde
Foramsulfuron	Ammonium nitrate	4015	578.9 ef	373.0 bcde
Foramsulfuron	Ammonium nitrate	703	624.7 bcdef	381.6 bcde

Table 4: Mean comparisons of the studied traits under influence of weeds control method in maize varieties.

		Dry weight of shoots
Control	4015	6.833 e
Control	703	7.411 de
Weeding	4015	8.522 bc
Weeding	703	10.02 a
Nicosulfuron	4015	7.522 de
Nicosulfuron	703	8.967 b
Foramsulfuron	4015	8.189 bcd
Foramsulfuron	703	8.078 cd

Table 5: Mean comparisons of the studied traits under influence of nitrogen fertilizer type in maize varieties.

		Plant height
Calcium nitrate	4015	181.4 ab
Calcium nitrate	703	174.2 b
Ammonium sulfate	4015	168.8 b
Ammonium sulfate	703	166.6 b
Ammonium nitrate	4015	176.0 b
Ammonium nitrate	703	193.2 a

Table 6: Mean comparisons of the studied traits under influence of weeds control method

	Plant height	100-seeds weight	Seed yield
Control	160.5 c	26.47 b	5.800 c
Weeding	189.9 a	28.75 a	8.261 a
Nicosulfuron	178.1 b	27.79 ab	6.317 bc
Foramsulfuron	178.2 b	27.16 b	6.833 b

Table 7: Mean comparisons of the studied traits under influence of nitrogen fertilizer type.

	Dry weight of shoots	Seed yield	Chlorophyll index
Calcium nitrate	8.550 a	6.979 ab	26.29 a
Ammonium sulfate	7.483 b	6.238 b	23.70 b
Ammonium nitrate	8.546 a	7.192 a	26.21 a

Table 8: Mean comparisons of the studied traits under influence of weeds control method and type of nitrogen fertilizer in maize varieties.

			Number of Amaranthus	convolvulus arvensis biomass
Control	Calcium nitrate	4015	15.80 a	24.10 ab
Control	Calcium nitrate	703	15.93 a	24.23 ab
Control	Ammonium sulfate	4015	15.97 a	17.30 cd
Control	Ammonium sulfate	703	14.40 a	15.50 de
Control	Ammonium nitrate	4015	16.60 a	20.87 bc
Control	Ammonium nitrate	703	12.50 ab	27.67 a
Nicosulfuron	Calcium nitrate	4015	7.033 cde	12.53 efgh
Nicosulfuron	Calcium nitrate	703	4.033 cde	9.233 gh
Nicosulfuron	Ammonium sulfate	4015	6.933 cde	12.97 efg
Nicosulfuron	Ammonium sulfate	703	8.067 cd	13.67 def
Nicosulfuron	Ammonium nitrate	4015	7.433 cde	9.767 fgh
Nicosulfuron	Ammonium nitrate	703	12.67 ab	12.67 efgh
Foramsulfuron	Calcium nitrate	4015	3.600 de	12.27 efgh
Foramsulfuron	Calcium nitrate	703	3.000 e	8.700 gh
Foramsulfuron	Ammonium sulfate	4015	8.567 bc	9.167 gh
Foramsulfuron	Ammonium sulfate	703	3.733 de	9.233 gh
Foramsulfuron	Ammonium nitrate	4015	7.800 cd	12.87 efg
Foramsulfuron	Ammonium nitrate	703	2.867 e	8.467 h

Table 9: Mean comparisons of the studied traits under influence of weeds control method and type of nitrogen fertilizer.

		Number of Chenopodium album	Number of convolvulus arvensis	Solanum nigrum biomass	Total biomass of weeds
Control	Calcium nitrate	16.58 b	5.767 a	19.68 b	167.7 b
Control	Ammonium sulfate	10.98 c	5.533 a	15.42 c	141.6 c
Control	Ammonium nitrate	21.53 a	5.400 a	25.10 a	197.2 a
Nicosulfuron	Calcium nitrate	8.383 cd	3.583 b	13.83 c	75.47 e
Nicosulfuron	Ammonium sulfate	4.133 e	2.767 c	12.97 c	68.43 ef
Nicosulfuron	Ammonium nitrate	8.967 cd	3.417 b	14.33 c	95.38 d
foramsulfuron	Calcium nitrate	9.867 cd	3.533 b	13.55 c	63.70 ef
foramsulfuron	Ammonium sulfate	6.267 de	2.667 c	12.70 c	58.15 f
foramsulfuron	Ammonium nitrate	9.450 cd	3.333 b	13.53 c	72.25 ef

Table 10: Mean comparisons of the studied traits under influence of nitrogen fertilizer in maize varieties

		Solanum nigrum biomass
Calcium nitrate	4015	17.84 a
Calcium nitrate	703	13.53 b
Ammonium sulfate	4015	13.67 b
Ammonium sulfate	703	13.72 b
Ammonium nitrate	4015	16.86 a
Ammonium nitrate	703	18.46 a

Table 11: Mean comparisons of the studied traits under influence of weeds control method in maize varieties.

		Number of convolvulus arvensis
Control	4015	5.389 b
Control	703	5.744 a
Nicosulfuron	4015	3.144 c
Nicosulfuron	703	3.367 c
foramsulfuron	4015	3.300 c
foramsulfuron	703	3.056 c

Table 12: Mean comparisons of the studied traits under influence of weeds control method.

	Chenopodium album biomass	Amaranthus biomass	Number of Solanum nigrum
Control	65.13 a	46.86 a	11.91 a
Nicosulfuron	22.37 b	24.18 b	7.967 b
foramsulfuron	14.08 c	22.31 b	8.056 b

Table 13: Mean comparisons of the studied traits under influence of nitrogen fertilizer type.

	Chenopodium album biomass	Amaranthus biomass
Calcium nitrate	28.61 b	34.60 a
Ammonium sulfate	32.79 b	20.34 b
Ammonium nitrate	40.19 a	38.41 a

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