AgroLife Scientific Journal - Volume 3, Number 1, 2014
ISSN 2285-5718; ISSN CD-ROM 2285-5726; ISSN ONLINE 2286-0126; ISSN-L 2285-5718

RESEARCH ON THE INFLUENCE OF POST-EMERGENT HERBICIDES APPLIED AT DIFFERENT STAGES ON OLT AND GENEROS CORN HYBRIDS UNDER THE CONDITIONS OF MOARA DOMNEASCA

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Abstract

The paper presents the results obtained at the Didactic Farm Moara Domneasca - Ilfov County, on a reddish preluvosoil on Olt and Generos corn hybrids, during the period 2011-2013, following the application of herbicides at several stages.
The results obtained bring an important contribution in clarifying the best period for the application of herbicides on corn hybrids, the factor which must be taken into account in establishing the best moment to apply herbicides: the hybrid's precocity, its development phenophase, the weed development phase, the evolution of the climatic conditions or all these aspects in their integrality.

Keywords*: efficacy, EWRS scale, time of application, postemergent herbicides, problem weeds, selectivity.*

INTRODUCTION

Corn represents the main growing plant, being cultivated for the last years on surfaces which exceed 3-3.5 million hectares. This has also made the preoccupation for large and quality productions to be at the same level. One of the problems faced by the Romanian agriculture in this stage is represented by weed. Its maintenance below a level which could not produce damages any longer was and will be the permanent concern of the researchers in the field and not only.
The exaggerated disintegration of the land surfaces in our countries has made impossible to achieve many of the technological links specific to corn growth (crop rotation, asolament, specific tillage), and the level of weed encroachment as a number of weeds per surface, as well as a number of annual and perennial monocotyledonous and dicotyledonous species is very high, sometimes reaching infestation levels of 70-80% (Sarpe, 1986; Popescu, 2009).
The main research aim was and is to find the most efficient methods to control weed, in order to eliminate it from the competition with corn for the vegetation factors and to obtain high productions, of good quality, in accordance with the hybrids' biological potential, without affecting the biodiversity and the environment (Sarpe, 1987; Barlea et al., 1985; Popescu 1995, 2002, 2009; Penescu et al., 2001).
The experiment was organized at Moara Domneasca and was mainly aimed at establishing the best options to control annual and perennial dicotyledonous weeds, by applying herbicides on three different stages during the vegetation period, as well as establishing the optimal moment to apply those herbicides, depending on the corn development phenophase as well as on the development phase of weeds.
The application of herbicides in post-emergence on the corn crop produces effects especially when phenoxiacetic herbicides of the type 2.4-D, 2.4- D + dicamba, MCPA are applied, different dereglations at the level of growing meristems, finally affecting the mechanical resistance of corn and finally leading to its fall.

MATERIALS AND METHODS

The experiment was organized during the period 2011-2013, at the Didactic Farm Moara Domneasca, on a reddish preluvosoil with a humus content of 2.5%, a pH of 5.5-6.2 and a clay content of 38%. Two corn hybrids were tested, Olt and Generos respectively, created at INCDA Fundulea. 6 herbicides were used in the test, applied on 3 moments, namely on phase 2-3 leaves period I, 4-6 leaves period II, considered as the optimal age and 8-10 leaves period III.

The experiment was bifactorial, with corn hybrids (factor A) and herbicide application ages (factor B), laid in randomized blocks, in 4 repetitions, with a parcel surface of 25 m^2.

Factor A graduations were:

a_1- Olt hybrid;

a_2- Generos hybrid.

Factor B graduations were:

b_1: Untreated, undrawn sample (M1);

b_2: Untreated, mechanical cultivations (3) and manually (3) (M2);

b_3: Dicopur D (2.4-D 600 g/l) applied 1 l/ha;

b_4: Dicopur Top (2.4- D 344 g/l + dicamba 120 g/l) applied 1 l/ha;

b_5: Buctril Universal (bromoxynil 280 g/l + 2.4- D 280 g/l) applied 1 l/ha;

b_6: Mustang SE (2.4-D 300 g/l + florasulam 6.25 g/l) applied 0.6 l/ha;

b_7: Cambio EC (bentazon 320 g/l + dicamba 90 g/l) applied 2 l/ha;

b_8: Tomigan 250 EC (fluroxypir 250 g/l) applied 0.8 l/ha.

A quantity of 250-300 l/ha of water was used in treatments. After the application of herbicide treatments, there were observation made with regards to the selectivity level (%) at 7, 14 and 28 days after the treatment and the degree and level of weed control (%), at 7, 14, 28 and 56 days after the treatments. The experiment was treated pre-emergent in order to control monocotyledon weeds with herbicide Guardian 900 EC based on acetochlor, in a dose of 2 l/ha. For the untreated drawn sample, 3 mechanical cultivations were performed between rows and 3 manual cultivations per row. Corn planting was carried out as follows: in 2011, on the 26.04, in 2012 on the 17.04 and in 2013, on the 20.04.

RESULTS AND DISCUSSIONS

a. Weed species present in the experiment

From the observations, we can draw the conclusion that the corn experiment was strongly infested with annual (69%) and perennial (31%) dicotyledonous weeds (Table 1). This aspect highlighted the efficiency of the herbicides applied depending on their content in active substance and their ranking. The fact that we had a very strong level of weed infestation is also due to the fact that the three years of experiment, with the exception of 2012, when the months of July, August and September were extremely dry, the other two years, 2011 and 2013 were normal from the point of view of rainfall. We can notice that near 60% of the weed encroachment with annual dicotyledonous weeds was represented by weed species, namely *Amaranthus retroflexus*, *Chenopodium album*, *Xanthium strumarium* and *Matricaria maticaroides*, and for the perennial ones, the predominant were *Polygonum aviculare*, *Cirsium arvense* and *Convolvulus arvense*. The encroachment differences can be very well noticed from the charts below.

b. Selectivity of herbicides applied on corn

The notes regarding the selectivity of herbicides applied at the three times, on the two hybrids, are presented in table 2. The selectivity of herbicides was achieved by using the EWRS system (European Weeds Research Society) on a scale ranging from 1 to 9, where 1 represents 100% selectivity and 9 means compromised crop. The intermediate marks show the selectivity percentage of each herbicide.

The average results for the three years of experiments, and for both corn hybrids reveal the following:

- when herbicides were applied in age I, on corn phase of 2–3 leaves, the phytotoxic effects were manifested by the products Dicopur D, Dicopur Top, Mustang and Cambio. The effects were visibly manifested by gnarled leaves, bent plants (as because of the wind), with the herbicides Dicopur D and Dicopur Top, the decoloration of leaves by the appearance of whitish stains with the Cambio

herbicide. These effects will vanish after 14, 56 days respectively;
- the application of herbicides in age II, at 4-6 leaves, considered as the optimal age, achieved the best level of selectivity, less the Mustang herbicide, which manifested a phytotoxicity level even at this age.
- applied in age III, when corn has 8-10 leaves, the corn plants have around 25-30 cm in height, the phytotoxic effect was very strongly manifested at both hybrids, bent plants, gnarled, whitish leaves, plants bent from the root as well as from the half. The effect was extremely obvious with the products Mustang, Dicopur D, Dicopur Top and Buctril Universal.

Table 1. Weed species present in the experiment carried out at Moara Domneasca 2011-2013

No.	Annual dicotyledonous	Weeds		No.	Perennial dicotyledonous	Weeds	
		Nr/m^2	%			Nr/m^2	%
1.	*Amaranthus retroflexus*	14	20	1.	*Cirsium arvense*	4	13
2.	*Chenopodium album*	10	15	2.	*Convolvulus arvensis*	4	13
3.	*Xanthium strumarium*	10	15	3.	*Sonchus arvensis*	3	10
4.	*Matricaria matricaroides*	6	9	4.	*Lepidium draba*	3	10
5.	*Papaver rhoeas*	6	9	5.	*Polygonum aviculare*	15	48
6.	*Sinapis arvensis*	5	7	6.	*Rubus caesius*	1	3
7.	*Portulaca oleracea*	4	6	7.	*Sambucus aebulus*	1	3
8.	*Fumaria scheicheri*	4	6		-		
9.	*Hibiscus trionum*	4	6		-		
10.	*Polygonum convolvulus*	3	4		-		
11.	*Stelaria media*	2	3		-		
12.	*Camelina* sp.	1	2				
Total		69	100			31	100

Table 2. Selectivity of herbicides applied on corn (Moara Domneasca, Average 2011-2013)

No.	Experimental options	Dose l, kg/ha	Cultivated corn hybrid					
			Olt			Generos		
			Observation dates					
			7 days	14 days	28 days	7 days	14 days	28 days
Period I (2 – 3 leaves)								
1	Untreated, undrawn sample	Mt_1	-	-	-	-	-	-
2	Untreated, drawn sample (3 + 3)	Mt_2	-	-	-	-	-	-
3	Dicopur D	1.0	1.5	1.8	1.3	1.4	1.5	1.4
4	Dicopur Top	1.0	1.8	1.5	1.4	1.8	1.5	1.5
5	Buctril Universal	1.0	1.5	1.5	1.4	1.5	1.5	1.5
6	Mustang SE	0.6	2.0	1.5	1.5	2.0	1.8	1.5
7	Cambio EC	2.0	2.5	2.0	1.5	2.0	1.5	1.5
8	Tomigan 250 EC	0.8	1.5	1.2	1.2	1.5	1.2	1.2
Period II (4 – 6 leaves)								
1	Untreated, undrawn sample	Mt_1	-	-	-	-	-	-
2	Untreated, drawn sample (3 + 3)	Mt_2	-	-	-	-	-	-
3	Dicopur D	1.0	1.5	1.5	1.5	1.4	1.4	1.2
4	Dicopur Top	1.0	1.5	1.5	1.5	1.6	1.5	1.5
5	Buctril Universal	1.0	1.5	1.5	1.5	1.4	1.2	1.2
6	Mustang SE	0.6	1.8	1.8	1.8	1.8	1.6	1.5
7	Cambio EC	2.0	1.8	1.5	1.5	1.7	1.5	1.4
8	Tomigan 250 EC	0.8	1.5	1.5	1.5	1.5	1.4	1.2
Period III (8 – 10 leaves)								
1	Untreated, undrawn sample	Mt_1	-	-	-	-	-	-
2	Untreated, drawn sample (3 + 3)	Mt_2	-	-	-	-	-	-
3	Dicopur D	1.0	3.5	3.1	3.0	3.2	3.0	3.1
4	Dicopur Top	1.0	4.0	3.5	3.2	4.2	4.0	3.8
5	Buctril Universal	1.0	2.8	2.0	2.5	2.9	2.7	2.0
6	Mustang SE	0.6	4.0	3.1	2.8	4.1	3.8	3.5
7	Cambio EC	2.0	3.0	2.5	2.1	3.1	2.7	2.5
8	Tomigan 250 EC	0.8	2.5	2.0	1.8	2.7	2.5	1.8

Table 3. Efficiency of the herbicides applied on several species over the weeds in corn crop
(Moara Domneasca, Average 2011-2013)

No.	Experimental options	Dose l, kg/ha	Cultivated corn hybrid									
			Olt					Generos				
			Observation dates									
			7 days	14 days	28 days	56 days	Average	7 days	14 days	28 days	56 days	Average
Period I (2 – 3 leaves)												
1	Untreated, undrawn sample	Mt_1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
2	Untreated, drawn sample (3 + 3)	Mt_2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
3	Dicopur D	1.0	6.5	7.5	7.5	7.5	7.3	6.4	7.6	7.4	7.5	7.2
4	Dicopur Top	1.0	7.5	8.2	8.4	8.2	8.1	7.6	8.4	8.4	8.1	8.1
5	Buctril Universal	1.0	7.5	8.1	8.2	8.2	8.0	7.5	8.2	8.0	8.1	8.0
6	Mustang SE	0.6	7.4	8.3	8.4	8.5	8.1	7.3	8.4	8.2	8.0	7.6
7	Cambio EC	2.0	7.0	8.0	8.0	8.0	7.75	7.3	8.1	8.2	8.3	7.9
8	Tomigan 250 EC	0.8	7.0	7.2	7.2	7.0	7.1	7.2	7.0	6.8	7.0	7.0
Period II (4 – 6 leaves)(OPTIM)												
1	Untreated, undrawn sample	Mt_1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
2	Untreated, drawn sample (3 + 3)	Mt_2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
3	Dicopur D	1.0	7.8	7.9	7.8	7.0	7.4	7.4	7.9	7.8	7.5	7.7
4	Dicopur Top	1.0	7.8	8.5	8.0	8.0	8.2	7.9	8.6	8.4	8.1	8.3
5	Buctril Universal	1.0	7.8	8.2	8.0	7.5	7.9	7.6	8.0	8.1	7.9	7.9
6	Mustang SE	0.6	8.2	8.3	8.5	8.5	8.4	8.2	8.4	8.5	8.1	8.3
7	Cambio EC	2.0	7.0	7.5	7.5	7.5	7.4	7.2	7.0	7.0	6.9	7.0
8	Tomigan 250 EC	0.8	7.2	7.5	7.5	7.0	7.3	7.4	7.0	7.0	7.0	7.1
Period III (8 – 10 leaves)												
1	Untreated, undrawn sample	Mt_1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
2	Untreated, drawn sample (3 + 3)	Mt_2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
3	Dicopur D	1.0	6.0	6.5	6.2	5.8	6.1	6.4	7.0	6.5	6.0	6.5
4	Dicopur Top	1.0	7.2	7.5	7.0	6.1	7.0	7.4	7.8	7.3	7.2	7.4
5	Buctril Universal	1.0	7.0	7.3	7.0	6.5	7.0	7.1	7.2	7.0	6.9	7.1
6	Mustang SE	0.6	7.8	7.9	7.8	7.8	7.8	7.4	7.6	7.8	7.5	7.6
7	Cambio EC	2.0	7.0	6.8	6.0	5.8	6.4	7.2	7.0	6.5	6.4	6.8
8	Tomigan 250 EC	0.8	6.1	6.5	5.8	5.6	6.0	6.2	5.9	5.8	5.4	5.8

This phytotoxic effect will also be revealed during the vegetation period by the abundant growth of adventive roots outside the soil, sometimes attached around the stalk, forming the so-called *"umbrella*" effect but also joint between 4-5 roots like *„goose's foot*". These phenomena will lead to the corn plants' fall, effect manifested with the same intensity on both corn hybrids. The conclusion is that all these herbicides containing as an active substance 2.4-D, dicamba, lead to the intensification of the cellular division process at the level of the roots, as well as at the level of the cells and membrane, thus sensitizing the corn plants.

c. Efficiency of the applied herbicides

The efficiency of the herbicide products applied on the two corn hybrids was achieved by the EWRS system (European Weeds Research Society) using marks from 1-9, the mark 1 representing a 100% effect in weeds control, the mark 9 representing the lack of effect over the weeds.

The results presented in Table 3 reveal the following:

- the best effect of the herbicides over the annual and perennial dicotyledonous weeds was obtained when the products were applied in age II, namely when the corn plants have 4-6 leaves, 8-10 cm in height and the weeds are fully upraised and in the bow phase, 4-5 leaves with a maximum height of 3-4 cm.
- when the herbicides are applied too late, in age III, when the corn plant has 8-10 leaves, the developed weeds have over 10-12 leaves each, have developed stalks, and the control effect is proportional to the development phase.

Among the herbicides, a very good effect in the weed control, when applied in age II (optimal) was noticed, in order, with: Dicopur Top, Buctril Universal, Mustang (even if it manifested an extremely strong phytotoxic effect), Dicopur D, Cambio and Tomigan.

As a conclusion, corn can be treated with this type of herbicides if they are applied only in the phase of 4- 6 leaves. Applied earlier (with a good effect over the weeds, but they are not fully upraised) or later, can lead to serious production losses, as we will see here in after.

d. Effect of herbicides applied at different ages on corn over the productivity elements

The results obtained with regards to the effect of herbicides over the productivity elements on the two corn hybrids, Olt and Generos, were presented in Table 4.

The analysis of the results reveals the following aspects:

- the most "friendly" effect of herbicides over the productivity elements on the two corn hybrids was manifested when they were applied in corn phase of 4-6 leaves. All the productivity elements analyzed, namely the number of corn cobs per plant, the weight of the corn grains per plant, the weight of the corn cobs, TWK, the plants' output and density, had the best values when the herbicides were applied in age II, namely the corn's phase of 4-6 leaves.
- negative and very negative effects were manifested when the herbicides were applied too early or too late, namely in the corn 's phases of 2-3 leaves or 8-10 leaves.
- the hardest effects over the productivity elements were manifested by the following herbicides, in order: Mustang, Dicopur Top, Dicopur D, Buctril Universal, Cambio and Tomigan, especially when applied in the late phase of corn development. The two corn hybrids taken in the studio had a similar behavior, maybe a higher sensitiveness to Olt hybrid as compared to the Generos hybrid, but insignificant.

e. Effect of herbicides applied in different ages over the corn yield level.

The results obtained following the application of herbicides in different ages over the corn yield level are presented in Table 5, will reveal the following:

- the yield level, most similar to the level obtained on the untreated sample, mechanically and manually cultivated (3+3), was obtained when the herbicides were applied in the corn's phase of 4-6 leaves. High yield were achieved in a descendant order in this age II with the herbicides: Dicopur Top 5004 kg/ha on the Olt hybrid (Figure 1) and 5200 kg/ha on the Generos hybrid (Figure 2), Buctril Universal 4996 kg/ha on the Olt hybrid and 4810 kg/ha on the Generos hybrid, Cambio EC 4900 kg/ha on the Olt hybrid and 4850 kg/ha on the Generos hybrid. The other tested products, namely Dicopur D, Tomigan 250 EC, had weaker results, due also to a more reduced spectrum of these products in the dicotyledonous weeds control on the corn.

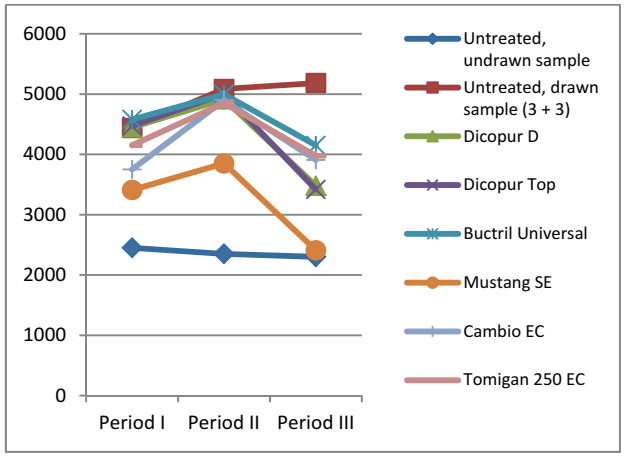

Figure 1. Effect of herbicides applied at different stages on Olt hybrid yield

- the yield levels, distinctly significantly negative and very significantly negative, were recorded when the herbicides were applied too early in the phase of 2-3 leaves, and especially when they were applied in the corn's late phase of 8-10 leaves.
- a very hard effect over the production level when applied very late, was manifested by the herbicides Mustang, Dicopur Top and Dicopur D (Figure 1 and Figure 2).

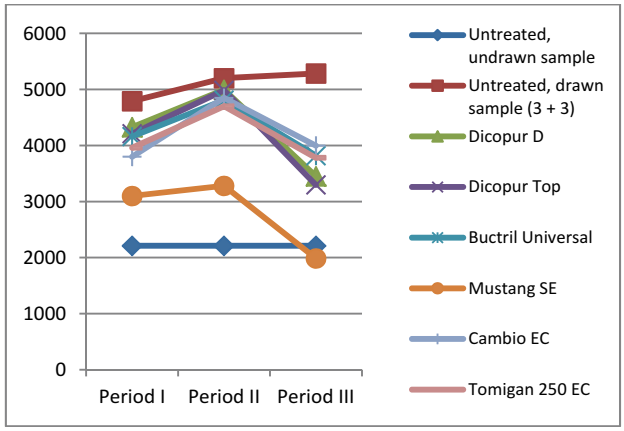

Figure 2. Effect of herbicides applied at different stages on Generos hybrid yield

Table 4. Effect of herbicides applied at different moments, over the productivity indicators
(Moara Domneasca, Average 2011-2013)

No.	Experimental options	Dose 1, Kg/ha	Cultivated hybrid															
			Olt								Generos							
			No. of cobs/ plant	Cob length (cm)	No. of grains/ cob	Cob weigh (g)	Grain weight (g)	η (%)	TWK (g)	Density pl/m^2	No. of cobs/ plant	Cob length (cm)	No. of grains/ cob	Cob weight (g)	Grain weight (g)	η (%)	TWK (g)	Density pl/m^2
Age I (2 – 3 leaves)																		
1.	Untreated, undrawn sample	Mt_1	0.8	16.10	298	167.5	124.5	68.1	274	4.7	0.79	14.75	307	157.0	123.5	68.1	294	4.9
2.	Untreated, drawn sample (3+3)	Mt_2	1.5	21.89	593	200.6	167.74	88.6	440	5.3	1.4	22.15	588	260.5	219.98	80.1	418	5.4
3.	Dicopur D	1.0	1.4	21.19	532	229.6	196.4	85.5	358	5.4	1.4	21.75	405	228.12	188.14	81.4	384	5.3
4.	Dicopur Top	1.0	1.1	18.43	482	191.77	155.4	81.0	278	5.1	1.2	20.19	432	198.15	156.10	80.1	279	5.2
5.	Buctril Universal	1.0	1.4	20.35	457	231.5	198.4	80.2	254	5.2	1.5	21.15	454	240.5	194.91	79.4	310	5.1
6.	Mustang SE	0.6	1.0	18.57	284	196.4	181.7	70.16	201	4.2	1.0	19.51	289	199.18	108.16	68.14	270	4.01
7.	Cambio EC	2.0	1.2	19.55	397	208.5	178.7	74.5	270	4.9	1.3	19.75	390	215.60	186.55	79.18	318	4.9
8.	Tomigan 250 EC	0.8	1.1	21.25	350	205.8	179.6	79.5	268	4.9	1.1	21.81	405	207.40	184.52	81.22	308	5.01
Age II (4 – 6 leaves)																		
1.	Untreated, undrawn sample	Mt_1	0.75	15.75	317	157.0	123.5	78.6	294	5.3	0.8	15.11	321	167.0	129.5	68.1	294	4.4
2.	Untreated, drawn sample (3+3)	Mt_2	1.5	21.79	572	260.98	219.98	84.2	415	5.5	1.4	21.86	581	260.5	219.98	84.2	425	5.3
3.	Dicopur D	1.0	1.3	20.74	564	261.1	229.14	87.7	416	5.6	1.3	20.94	569	261.1	229.98	82.15	420	5.5
4.	Dicopur Top	1.0	1.2	20.10	540	248.1	220.1	85.1	398	5.0	1.25	21.10	541	250.4	228.18	85.2	410	5.4
5.	Buctril Universal	1.0	1.5	21.71	545	267.5	229.3	85.7	441	5.4	1.45	21.75	537	267.4	250.10	85.47	432	5.1
6.	Mustang SE	0.6	1.0	19.7	445	185.98	152.78	82.14	297	4.1	1.1	20.10	496	181.2	175.4	74.31	310	4.2
7.	Cambio EC	2.0	1.5	20.85	557	274.8	220.10	81.6	342	5.4	1.4	20.89	547	268.7	219.18	81.42	405	5.1
8.	Tomigan 250 EC	0.8	1.4	20.56	542	275.6	204.2	82.0	391	5.2	1.42	21.51	549	275.1	214.11	83.15	399	5.1
Age III (8 – 10 leaves)																		
1.	Untreated, undrawn sample	Mt_1	0.75	15.93	248	141.5	120.1	66.5	176	4.3	0.7	13.76	291	157.0	123.5	68.6	294	4.7
2.	Untreated, drawn sample (3+3)	Mt_2	1.5	21.4	576	210.5	180.5	85.7	417	5.3	1.5	21.5	575	260.5	219.98	84.2	418	5.4
3.	Dicopur D	1.0	1.1	18.7	415	178.5	175.4	70.4	286	4.9	1.1	18.5	425	171.5	174.18	70.11	302	4.8
4.	Dicopur Top	1.0	0.85	18.2	396	186.5	154.0	79.6	310	5.2	0.9	17.4	348	168.12	149.14	69.24	298	5.2
5.	Buctril Universal	1.0	1.4	20.5	490	196.4	180.1	80.2	319	5.2	1.35	18.5	474	101.15	196.81	79.15	381	5.1
6.	Mustang SE	0.6	0.75	17.19	218	96.5	63.5	65.8	186	4.1	0.8	18.75	207	87.11	60.41	60.04	148	3.7
7.	Cambio EC	2.0	1.2	19.1	485	204.2	168.1	82.1	290	4.8	1.1	19.7	401	200.14	194.32	80.19	375	4.1
8.	Tomigan 250 EC	0.8	1.3	19.65	494	198.1	163.1	82.3	296	5.0	1.2	19.77	412	204.20	184.21	80.1	310	5.1

Table 5. Effect of herbicides applied at different stages over the yield level of the corn hybrids
(Moara Domneasca, Average 2011–2013)

No.	Experimental options	Dose Kg,l/ha	Cultivated hybrid							
			Olt				Generos			
			Kg/ha	%	Diff/	Signif	Kg/ha	%	Diff	Signif
Age I (2 – 3 leaves)										
1.	Untreated, undrawn sample	Mt_1	2450	53	- 2078	000	2210	46	-2580	000
2.	Untreated, drawn sample (3 + 3)	Mt_2	4438	100	Mt		4790	100	Mt	
3.	Dicopur D	1.0	4450	100.1	12	-	4327	90	-463	0
4.	Dicopur Top	1.0	4470	94	- 268	-	4210	88	-580	0
5.	Buctril Universal	1.0	4580	103	142	-	4160	89	-630	00
6.	Mustang SE	0.6	3410	77	- 1028	000	3100	65	-1690	000
7.	Cambio EC	2.0	3750	85	688	00	3800	79	-990	000
8.	Tomigan 250 EC	0.8	4150	94	288	-	3960	83	-830	000
Age II (4 – 6 leaves)										
1.	Untreated, undrawn sample	Mt_1	2350	45	-2786	000	2210	42	-2990	000
2.	Untreated, drawn sample (3+3)	Mt_2	5086	100	Mt		5200	100	Mt	
3.	Dicopur D	1.0	4914	97	172	-	4994	96	-206	-
4.	Dicopur Top	1.0	5004	98	-82	-	4986	96	-214	-
5.	Buctril Universal	1.0	4996	98	-90	-	4810	93	-390	-
6.	Mustang SE	0.6	3850	76	-1236	000	3281	64	-1919	000
7.	Cambio EC	2.0	4900	96	-186	-	4850	91	-350	-
8.	Tomigan 250 EC	0.8	4850	95	-236	-	4700	85	-500	0
Age III (8 – 10 leaves)										
1.	Untreated, undrawn sample	Mt_1	2300	45	-2884	000	2210	42	-3074	000
2.	Untreated, drawn sample (3+3)	Mt_2	5184	100	Mt		5284	100	Mt	
3.	Dicopur D	1.0	3480	71	-1504	000	3450	65	-1834	000
4.	Dicopur Top	1.0	3418	66	-1766	000	3296	63	-1988	000
5.	Buctril Universal	1.0	4150	80	-1034	000	3818	72	-1466	000
6.	Mustang SE	0.6	2409	46	-2775	000	1986	38	-3298	000
7.	Cambio EC	2.0	3907	75	-1277	000	3998	76	-1286	000
8.	Tomigan 250 EC	0.8	3976	76	-1208	000	3780	72	-1504	000

LSD 5% = 375 kg/ha
LSD 1% = 648 kg/ha
LSD 0.1% = 756 kg/ha

LSD 5% = 398 kg/ha
LSD 1% = 596 kg/ha
LSD 0.1% = 684 kg/ha

CONCLUSIONS

The results obtained during the three experiment years at Moara Domneasca with the two corn hybrids and with 6 herbicides applied at 3 different ages allowed us to draw the following conclusions:

1. The selectivity of herbicides over the corn or the level of tolerance of the corn hybrids to the 6 herbicides applied manifested positively only when they were applied in the phase of 4-6 leaves. Applied too early or too late, in the corn's phases of 2-3 leaves or 8-10 leaves, their negative effects over the corn are visible and quantifiable in the reduction of the production per hectare.
2. The best effect of herbicides applied at different ages over the weeds, on the two corn hybrids, is achieved only when the herbicides are applied at the corn's phase of 4-6 leaves.

Their early or late application can lead to bad effects in weeds' control and implicitly to production decrease.

3. The early or late application of herbicides can lead to the sensitization of the corn plants to fall, due to the interference of these products in the cellular division process.
4. The productivity indicators on the two corn hybrids, Olt and Generos, during the three experiment years, had the best level when the herbicides were applied at the optimal age, namely in the corn's development phase of 4-6 leaves, period II.
5. The best yield was obtained when the herbicide products were applied in the corn's development phase of 4-6 leaves.

When corn exceeds this phase, we can control the weeds selecting products which do not contain 2.4-D, dicamba, MCPA or bromoxynil. Otherwise, the yield will be affected proportionally with the treatment delay over the phase of 4-6 leaves.

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