CONTEMPORARY AGRICULTURE
SAVREMENA POLJOPRIVREDA
The Serbian Journal of Agricultural Sciences
Srpski časopis za poljoprivredne nauke
Vol. 64, No. 3 - 4, Pp. 206 - 212, 2015.
www.contagri.info
ISSN: 0350-1205 UDC: 63(497.1)(051)-"540.2"
University of Novi Sad, Serbia
Published by Faculty of Agriculture, Novi Sad

**Original scientific paper** **UDC: 661.162.2**

# EVALUATION OF PHYTOTOXICITY AND EFFICIENCY OF DICAMBA IN SUPPRESSION OF BROADLEAF WEED IN THE CORN

*Jelena GOLIJAN* *[1]

***Summary***: *The aim of this work is to define the phytotoxicity and efficiency of dicamba based herbicides (preparation DICAMBA 480 SL) and possiblity of its application for foliar suppression of broadleaf weeds in the corn crops. During 2011, on the location of Zemun Polje is examined efficiency of this preparation through carrying out of field experiments in accordance with the standard EPPO methods. Trial has been carried out on the soil type chernozem. The experiment included 4 treatments: two for efficact (DICAMBA 480 SL 0,5 and 0,7 l/ha), one for phytotoxicity (DICAMBA 480 SL 1,4 l/ha) and one as the standard (PLAMEN 0,7 l/ha). Preparation is applied foliary, when the corn used to have 4-5 leafs, and weeds 2-5 lefs. Dicamba as selective systemic hormonal herbicide from chemical group of the derivates of benzoic acid does not manifest phytotoxicity towards corn, if applied in recommended quantities and within recommended application time. Results of these experiments denoted good efficiency of dicamba (preparation DICAMBA 480 SL).*

***Key words:****weed species, phytotoxic effects, residency, combination of herbicides.*

## INTRODUCTION

Corn (*Zea mays* L.), as well as all grains belong to the ordo *Poales*, family*Poaceae* and genus *Zea*. Comparing with the yield which are realized in agricultural developed countries, yield in our country may be characterized as low. The consequences are of various factors. One of them is weediness of crops. Under the impact of the weed, grain yield and green mass of the corn is reduced. Simultaneously with the mechanical measures are also applied chemical agents for the suppression of weeds-herbicides (Glamočlija, 2006; Kojić, 1985). Understanding the composition and numerous exposures of weed plants represents the basic condition for the selection of herbicides. For the suppression of broadleaf weeds may be applied preparations based on the atrazine, cyanazine, flurochloridone and linuron, and for the suppression of narrow leaf-grass weeds preparations based on EPTC, butilates, vernolate, acetochlor, alachlor, metolachlor and pendimethalin. These herbicides are usually applied when the corn has 1-8 leafs or height of 15-20 cm (Jovanović et al., 2007; Nestorović, 2005; Stefanović and Simić, 2002). If prevailing one-year and perennial broadleaf weeds, then may be used preparations based on the bentazon, 2,4-D, dicamba, fluroxypyr, clopyralid, pyridate and thifensulfuron-methyl (Parađenović et al, 2011; Stefanović and Simić, 2002, Stefanović et al., 2000). Due to achieving more complete efficiency, mostly and frequently used combination of herbicides is consisted of 2, 3 or more active materials or combined application of herbicides in the time of sowing and during vegetation. Dicamba is selective systemic hormonal herbicide from chemical group of derivates of benzoic acid, intended for the foliar suppression of broadleaf weeds (*Ambrosia artemisifolia, Bilderdykia*

[1]Jelena Golijan, PhD student, University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11080 Zemun, Serbia.
[*]Corresponding author: Jelena Golijan, e-mail: helena.ilios@gmail.com,phone: 0631501988.

*convolvulus, Galinsoga parviflora, Portulaca oleracea, Amaranthus retroflexus, Chenopodium spp., Polygonum spp., Solanum nigrum, Sonchus spp., Xanthium strumarium, Abuthilon theophrasti, Datura stramonium*etc.), in the crops, corn and on stubbles. It causes disorder of hormones balance, responsible for elongation and division of the cell, synthesis of the albumins and respiration (Krämer and Schirmer, 2007). It uses the leaf to transfer itself into all parts of the plant. On the weeds occur deformations of plant parts or entire plant (twisting) and withering after ten days.

The aim of this essay is to examine phytotoxicity and efficiency of dicamba (preparation DICAMBA 480 SL) and possibility of application during suppression of broadleaf weeds in the corn crops.

## MATERIALS AND METHODS

Examinations of the preparation DICAMBA 480 SL in the suppression of the weeds and phytotoxicity are carried out during 2012 in the corn crops of the species Mikado, in the location Zemun Polje, pursuant to the standard methods OEPP/EPPO (EPPO standards, 2006). Treatments (table 1) are distributed per type of completely random block distribution (EPPO), in 4 repetitions, whereat the size of experimental parcel was 25 $m^2$. The experiment was carried out during 2012, in the corn crops in the location Zemun Polje (table 2).

***Table 1***. The tested treatments

| Treatments | Quantity per ha | Application time | Comment |
|---|---|---|---|
| Control | - | - | - |
| DICAMBA 480 SL | 0,5 l/ha (5ml/100m²) | post-em | for efficiency |
| DICAMBA 480 SL | 0,7 l/ha (7ml/100m²) | post-em | for efficiency |
| DICAMBA 480 SL | 1,4 l/ha (14ml/100m²) | post-em | for phytotoxicity |
| PLAMEN | 0,7 l/ha (7ml/100m²) | post-em | standard |

***Table 2***. Basic information about the experiments

| | |
|---|---|
| **Location** | Zemun Polje |
| **Crop/Perennial plantation** | Corn |
| **Species/hybrid** | Mikado |
| **Soil type** | Chernozem |
| **Forecrop** | Corn |
| **Sowing time** | 05.04.2012. |
| **Experiment type** | Random block distribution (EPPO) |
| **Size of the basic parcel** | 25 m² |
| **Recurrence number** | Four |
| **Time of application of herbicide**<br>-air temperature (°C)<br>-wind speed (m/s)<br>- cloudiness (%) | 14.05.2012.<br>23<br>0<br>0 |
| **Water quantity (l/ha)** | 300 |
| **Date and evaluation of the effect** | I score: 31.05.2012.<br>II score: 15.06.2012. |

For treatments were carried out: two for efficiency, one for phytotoxicity and one as the standard. Preparation has been applied foliary on 14.5.2012, when corn used to have 4-5 leafs, and weeds 2-5 leafs.Two evaluations of the effect were carried out. First evaluation was on 31.5.2012 (table 4), and second on 15.6.2012 (table 5). Herbicides were applied using back supported sprinkler *FERRUM* 3560 produced in Germany, with Cambridge blue 04-F110 nozzle which creates fan-like spray, using 300 l water/ha.Observation milestone used to be numerous representations of species, followed with sampling the weeds from the area of 1 m²/parcel, using frames.During experiments in 2012, meteorological conditions were satisfactory for more efficient acting of examined herbicide.Statistical analysis: results represent medium value of samples taken from 4 parcels of each treatment and related with the medium value of the samples taken from four control parcels.

## RESULTS

Classification of preparation efficiency is given in percents: weak action (efficiency <75%), satisfactory action (efficiency 75-90%), good action (efficiency > 90%). Phytotoxicity is evaluated visually as per scale 0-100% (0% = without symptoms of phytotoxicity, 100% = complete deterioration of the plants) in the time when efficiency evaluation has been carried out. On the location Zemun Polje it has been determined 15 broadleaf weed species (table 3): *Bilderdykia convolvulus, Chenopodium album, Chenopodium polyspermum, Cirsium arvense, Convolvulus arvensis, Datura stramonium, Helianthus annuus, Hibiscus trionum, Polygonum aviculare, Polygonum lapathifolium, Sinapis arvensis, Solanum nigrum, Sonchus oleraceus, Stachys annua* and *Xanthium strumarium,* according to the obtained results (tables 4 and 5) on the areas of performed examination of efficiency of DICAMBA 480 SL preparation.

***Table 3.*** Representation of weed prior to the application of preparation DICAMBA 480 SL in the corn (mean ± SD)-location Zemun Polje, 14.05.2012.

| PLANT SPECIES | DICAMBA 480 SL 0,5 l/ha | DICAMBA 480 SL0,7 l/ha | PLAMEN 0,7 l/ha | Control |
|---|---|---|---|---|
| | Xj/m² ± SD | Xj/m² ± SD | Xj/m² ± SD | Xj/m² ± SD |
| *Bilderdykia convolvulus* | 2.75 ± 0.96 | 4.25 ± 2.22 | 4.25 ± 1.26 | 2.75 ± 0.96 |
| *Chenopodium album* | 6.75 ± 2.36 | 6.75 ± 2.22 | 15.75 ± 7.41 | 9.25 ± 2.22 |
| *Chenopodium polyspermum* | 2.25 ± 1.26 | 4.00 ± 1.63 | 6.25 ± 2.63 | 3.75 ± 1.26 |
| *Cirsium arvense* | 0.5 ± 0.58 | 1.00 ± 0.82 | 1.50 ± 0.58 | 2.00 ± 0.82 |
| *Convolvulus arvensis* | 0.75 ± 0.5 | 0.75 ± 0.5 | 1.00 ± 0.82 | 2.00 ± 0.82 |
| *Datura stramonium* | 1.5 ± 1.29 | 2.00 ± 0.82 | 1.75 ± 0.96 | 1.25 ± 0.5 |
| *Helianthus annuus* | 1.5 ± 0.58 | 1.25 ± 0.5 | 1.5 ± 1.29 | 1.75 ± 0.96 |
| *Hibiscus trionum* | 4.0 ± 0.82 | 2.75 ± 1.26 | 3.25 ± 0.5 | 3.25 ± 1.89 |
| *Polygonum aviculare* | 0.5 ± 0.58 | 1.00 ± 1.41 | 1.50 ± 1 | 2.75 ± 1.26 |
| *Polygonum laphatifolium* | 3.25 ± 1.26 | 3.00 ± 0.82 | 5.50 ± 2.38 | 3.50 ± 1.29 |
| *Sinapis arvensis* | 1.5 ± 0.58 | 2.25 ± 0.5 | 4.75 ± 2.22 | 2.00 ± 0.82 |
| *Solanum nigrum* | 2.0 ± 1.41 | 2.75 ± 1.71 | 3.00 ± 1.41 | 2.25 ± 0.96 |
| *Sonchus oleraceus* | 0.50 ± 0.58 | 1.00 ± 0.82 | 1.00 ± 0.82 | 1.00 ± 0.82 |
| *Stachys annua* | 0.50 ± 0.58 | 0.75 ± 0.5 | 1.00 ± 0.82 | 0.75 ± 0.5 |
| *Xanthium strumarium* | 6.00 ± 2.94 | 8.50 ± 5.07 | 7.75 ± 3.1 | 10.50 ± 5.92 |

Upon application quantity of 0,5 l/ha, preparation has displayed as follows: a) well efficiency (efficiency >90%) in relation to: *Bilderdykia convolvulus, Chenopodium album, Chenopodium polyspermum* (in second evaluation), *Datura stramonium, Helianthus annuus, Polygonum aviculare* (in the first evaluation), *Sinapis arvensis,Solanum nigrum* (in second evaluation), *Sonchus oleraceus, Stachys annua* and *Xanthium strumarium* (in second evaluation); b) satisfactory efficiency (efficiency 75-90%) in relation to: *Chenopodium polyspermum* (in the first evaluation), *Cirsium arvense* (in second evaluation), *Convolvulus arvensis* (in second evaluation), *Hibiscus trionum* (in second evaluation), *Polygonum aviculare* (in second evluation),*Polygonum lapathifolium* (in second evaluation), *Solanum nigrum* (in the first evaluation) and *Xanthium strumarium* (in the first evaluation) and c) weak efficiency (efficiency <75%) in relation to:*Cirsium arvense* (in the first evaluation), *Convolvulus arvensis* (in the first evaluation), *Hibiscus trionum* (ion the first evaluation) and *Polygonum lapathifolium* (in the first evaluation).

Upon application quantity of 0,7 l/ha, preparation has displayed as follows: a) well efficiency (efficiency >90%) in relation to:*Bilderdykia convulvuls, Chenopodium album,Chenopodium polyspermum, Datura stramonium, Helianthus annuus, Hibiscus trionum* (in second evaluation), *Polygonum aviculare* (in the first evaluation), *Polygonum lapathifolium* (in second evaluation), *Sinapis arvensis, Solanum nigrum* (in second evaluation), *Sonchus oleraceus, Stachys annua* and *Xanthium strumarium*; b) satisfactory efficiency (efficiency 75-90%) in relation to:*Cirsium arvense, Convolvulusarvensis, Hibiscus trionum* (in the first evaluation),*Polygonum aviculare* (in second evaluation), *Polygonum lapathifolium* (in the first evaluation) and *Solanum nigrum* (in the first evaluation).

Preparation DICAMBA 480 SL applied in the quantity of 1,4 l/ha, (for examination of phytotoxicity), did not display phytotoxic effects.

Preparation PLAMEN, which is used as the standard is applied in the quantity of 0,7 l/ha, and it displayed identical efficiency as examined preparation in the very same application quantity.

***Table 4.*** The efficacy of DICAMBA 480 SL in maize (locality Zemun Polje)-I score.

| PLANT SPECIES | I score: 30.05.2012. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Control | DICAMBA 480 SL 0,5 l/ha | | DICAMBA 480 SL 0,7 l/ha | | PLAMEN 0,7 l/ha | |
| | Number/m | Number/m | Efficacy % | Number/m | Efficacy % | Number/m | Efficacy % |
| *Bilderdykia convolvulus* | 3,5 | 0,0 | 100 | 0,0 | 100 | 0,5 | 85,7 |
| *Chenopodium album* | 14,5 | 1,25 | 91,4 | 0,75 | 94,8 | 1,0 | 93,1 |
| *Chenopodium polyspermum* | 5,25 | 0,75 | 85,7 | 0,0 | 100 | 0,0 | 100 |
| *Cirsium arvense* | 3,25 | 1,0 | 69,2 | 0,5 | 84,6 | 0,75 | 76,9 |
| *Convolvulus arvensis* | 3,5 | 1,0 | 71,4 | 0,5 | 85,7 | 0,5 | 85,7 |
| *Datura stramonium* | 3,0 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Helianthus annuus* | 3,25 | 0,25 | 92,3 | 0,0 | 100 | 0,0 | 100 |
| *Hibiscus trionum* | 5,5 | 1,75 | 68,2 | 1,25 | 77,3 | 0,5 | 90,9 |
| *Polygonum aviculare* | 5,25 | 0,5 | 90,5 | 0,25 | 95,2 | 1,5 | 71,4 |
| *Polygonum laphatifolium* | 4,75 | 1,5 | 68,4 | 0,75 | 84,2 | 1,0 | 78,9 |
| *Sinapis arvensis* | 4,25 | 0,25 | 94,1 | 0,25 | 94,1 | 0,5 | 88,2 |
| *Solanum nigrum* | 3,75 | 0,5 | 86,7 | 0,25 | 92,9 | 0,25 | 92,9 |
| *Sonchus oleraceus* | 3,5 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Stachys annua* | 3,0 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Xanthium strumarium* | 12,5 | 1,75 | 86,0 | 1,25 | 90,9 | 1,25 | 90,0 |

***Table 5.*** The efficacy of DICAMBA 480 SL in maize (locality Zemun Polje)-II score.

| PLANT SPECIES | II score: 15.06.2012. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Control | DICAMBA 480 SL 0,5 l/ha | | DICAMBA 480 SL 0,7 l/ha | | PLAMEN 0,7 l/ha | |
| | Number/m² | Number/ m² | Efficacy% | Number/ m² | Efficacy % | Number/m² | Efficacy % |
| *Bilderdykia convolvulus* | 4,25 | 0,0 | 100 | 0,0 | 100 | 0,5 | 88,2 |
| *Chenopodium album* | 17,75 | 0,25 | 98,6 | 0,0 | 100 | 0,0 | 100 |
| *Chenopodium polyspermum* | 6,75 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Cirsium arvense* | 3,5 | 0,75 | 78,6 | 0,5 | 85,7 | 0,5 | 85,7 |
| *Convolvulus arvensis* | 3,5 | 0,75 | 78,9 | 0,5 | 85,7 | 0,5 | 85,7 |
| *Datura stramonium* | 5,75 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Helianthus annuus* | 3,5 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Hibiscus trionum* | 8,25 | 1,25 | 84,8 | 0,75 | 90,9 | 0,5 | 93,9 |
| *Polygonum aviculare* | 6,0 | 1,25 | 79,2 | 0,75 | 87,5 | 0,75 | 87,5 |
| *Polygonum laphatifolium* | 7,5 | 1,5 | 80,0 | 0,75 | 90,0 | 0,25 | 96,7 |
| *Sinapis arvensis* | 4,0 | 0,25 | 93,8 | 0,25 | 93,8 | 0,5 | 87,5 |
| *Solanum nigrum* | 6,25 | 0,5 | 92,0 | 0,25 | 96,0 | 0,25 | 96,0 |
| *Sonchus oleraceus* | 3,5 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Stachys annua* | 3,75 | 0,0 | 100 | 0,0 | 100 | 0,0 | 100 |
| *Xanthium strumarium* | 17,75 | 1,5 | 91,5 | 0,75 | 95,8 | 1,0 | 94,4 |

## DISCUSSION

Dicamba is not phytotoxic for the corn, if preparation is applied in recommended quantities and within recommended application time. Since dicamba degrades relatively fast in the soil (DT-50= 14-28 days), there is no risk for the upcoming plants in the crop sequence (Chu and Wong, 2004; Kah et al., 2007; Cao et al., 2011). It belongs to the group of herbicide compounds which is relatively rinsable in the soil, thus in the soil with the lower contents of humus it may come to the root system of the cultivated plants and display phytotoxic effects (Tomlin, 2010). Compound is phytotoxic for all cultivated broadleaf plants, thus during the application the yawning should be avoided (Wehtje, 2008). Based on the recent application and available literature data, it may be concluded that in our country there was no occurrence of weed species resistance against this compound. According to the data Heap in the world (2009), there are registered 28 resistant biotypes of weeds against herbicides from HRAC group O/4 (synthetic auxins) which also involves derivates of benzoic acid (dicamba). It is to be mixed often with other preparations, due to extension of the activity spectrum against grass weeds, or enhanced action against broadleaf weeds. In groundwork conditions, in the period from 2004-2008, the efficacy of a preparation based on tembotrione and isoxadifen-ethyl, topramezone, topramezone and dicamba, as well as the mesotrione applied after growing of weeds and crophas been researched. In addition, the research included the efficacies of their combinations with products based on foramsulfuron, nicosulfuron, rimsulfuron and cycloxidim in the control of perennial grass weeds *Sorghum halepense* and *Cynodon dactylon*. To extend the spectrum of activity and improve the efficacy in the control of more resistant weed species, acquired results confirm the validity of the common application of some of the previously mentioned products with preparations based on dicamba, terbuthylazine and sulfonylurea. In 2008, based on field data, the phyto-toxicity on maize usually occurred due to the application of herbicides (2,4-D, dicamba, phenoxy-phenoxy herbicides' group) at high temperatures, as well as their application in advanced stages of development of cultivated plants (area of Bačka Topola). Phytotoxicity has been occurring sporadically due to drift (the drift of herbicides on neighboring crops) and non-observance of phenophase stages in crop growth development (in the area of Pančevo).Phytotoxicity has been occurring sporadically due to drift and non-observance of phenophase stages in crop growth development(in the area of Pančevo). Practical application of herbicide combinations to widen the spectrum of activity in stressful conditions can have adverse consequences for the crop, especially when there are differences in the requirements for herbicide wetting agents. The best example is the combination of dicamba with some ALS inhibitors. So as to accelerate the absorption of the herbicide, ALS inhibitors, wetting agents, are added, while dicamba has not been required. Combining these two herbicidal products the translocation of dicamba by corn is being increased as well as the greater the possibility of its maturity to the target site, thus meeting the conditions for the occurrence of damage (Meseldžija et al., 2008). The problem and the complexity of herbicides' selection in maize crop was monitored in experimental trials in 2008 and 2009. The experiment encompassed economically important weed species such as *Xanthium strumarium, Cirsium arvense, Solanum nigrum, Chenopodium album, Convolvulus arvensis, Abuthilon theophrasti, Sorghum halepense* (from rhizomes) and *Ambrosia arthemisiifolia*. The experiment included the application of 43 preparations (a.m. foramsulfuron+iodosulfuron-methyl-sodium+isoxadifen-ethyl, diflufenzopyr+dicamba, nicosulfuron, mesotrione, rimsulfuron+nicosulfuron, rimsulfuron+thifensulfuron-methyl, dicamba, clopyralid, 2,4-D EHE, 2,4-D, sulcotrione, bentazone+dicamba, dicamba+prosulfuron, tembotrione, floramsulfuron, terbuthylazine+bromoxynil, mesotrione+terbuthylazine), and combinations thereof. We found a good efficacy of the herbicide on weed species present (Marisavljević et al., 2009). To test the efficacy of dicamba and herbicide combinations in 2010, the trial was set up at two locations, the first in the village of Popovac-on maize crops and the other in the village Malošište-on the potato crop-by OEPP/EPPO methods. The following herbicides were applied on the maize crop: acetochlor, isoxaflutole, dicamba, fluroxypyr and dicamba+rimsulfuron. The preparations showed high level of efficacy at both sites and the possibility of a successful combat against *Ambrosia artemisifolia* (Milić et al., 2010).Selectivity, efficiency and price of the preparation are crucial criteria upon selection of herbicide, and often may be in contrast i.e. giving advantage to one of these features denies the quality and advantage of another. This problem is largely displayed at so-called "old" herbicides-e.g. herbicides based on 2,4-D and dicamba whereat each delay in application may cause reduction of selectivity while, on the other side, when weeds passed the phase of efficient suppression, these herbicides even then achieve good effect. At the "new" herbicides-like herbicides from the group sulphonylurea-this problem to a certain extent is overcome i.e. application time has been moved in relation to the corn development phase. In so doing, this group of herbicides has largely solved problems of suppression of large number of weeds in the corn-principally grass, as well as broadleaf. Similarly, combining these herbicides with preparations based on a.m. dicamba and 2,4-D improves their efficiency (Marisavljević et al., 2009).

## CONCLUSION

Based on the results of the carried out experiments, the conclusion may be realized that dicamba as selective systemic hormonal herbicide is intended for foliar suppression of broadleaf weeds in the corn crop. In the experiments which has been carried out on the location Zemun Polje during May and June 2012, it has been determined that it displays good efficiency (efficiency >90%) in relation to: *Bilderdykia convolvulus, Chenopodium album, Chenopodium polyspermum, Datura stramonium, Helianthus annuus, Polygonum aviculare,Sinapis arvensis,Solanum nigrum, Sonchus oleraceus, Stachys annua* and *Xanthium strumarium*, and fulfills the application for suppression of broadleaf weeds. Due to improvement of the preparation efficiency, application quantity of 0,5 l/ha may be increased to 0,7 l/ha, whereat preparation shall display satisfactory efficiency in relation to the species that was weakly suppressed (*Cirsium arvense, Convolvulus arvensis, Hibiscus trionum* and *Polygonum lapathifolium*).

## REFERENCES

Cao, M., Sato, S.J., Behrens, M., Jiang, W.Z., Clemente, T.E., Weeks, D.P.:Genetic Engineering of Maize (*Zea mays*) for High-Level Tolerance to Treatment with the Herbicide Dicamba, J. Agric. Food Chem.,59 (11), 5830-5834, 2011.

Chu, W., Wong,C.C.: The photocatalytic degradation of dicamba in $TiO_2$ suspensions with the help of hydrogen peroxide by different near UV irradiations, Water Research, 38 (4), 1037-1043, 2004.

GLAMOČLIJA, Đ.: Specijalno ratarstvo. Poljoprivredni fakultet, Beograd, 2006.

HEAP, I.: International Survey of Herbicide Resistant Weeds. Online, http://www.weedscience.org., 2009.

Kah, M., Beulke, S., Brown, K.: Factors Influencing Degradation of Pesticides in Soil, J. Agric. Food Chem., 55, 4487−4492, 2007.

KOJIĆ, M., ŠINŽAR, B.: Korovi. Naučna knjiga, Beograd, 1985.

Parađenović, S., Matić, L., Dakić, P., Šešić, J., Gajin, D.: Dvogodišnji rezultati suzbijanja korova u kukuruzu herbicidima na području Srednjeg Banata. Radovi sa XXV savetovanja agronoma, veterinara i tehnologa, Beograd, 17 (1-2), 101-109, 2011.

KRÄMER, W., SCHIRMER, U.: Modern Crop Protection Compounds, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, pp. 1169-1170, 2007.

MARISAVLJEVIĆ, D., PAVLOVIĆ, D., DOLOVAC, P.: "Stari" i "Novi" herbicidi za suzbijanje korova u kukuruzu-prednosti i mane. VI kongres o zaštiti bilja sa simpozijumom o biološkom suzbijanju invazivnih organizama, Zlatibor, 23-27.novembar, 1, 131-133, 2009.

MESELDŽIJA, M., KONSTANTINOVIĆ, B., MARISAVLJEVIĆ, D.: Fitotoksično delovanje herbicida u usevu kukuruza u stresnim uslovima. Zbornik rezimea IX Savetovanja o zaštiti bilja, Zlatibor, 16-17, 2008.

MILIĆ, V., PERIĆ, S., ŽIVIĆ, J, VOJINOVIĆ, LJ.: Efikasnost herbicida u suzbijanju *Ambrosia artemisifolia* L. u Nišavskom okrugu. Zbornik rezimea X Savetovanja o zaštiti bilja, Zlatibor, 131-133, 2010.

NESTOROVIĆ, M.LJ.: Ecological and Phytogeographic Characteristics of the Weed Flora of Mirijevo. Acta Phytopathologica et Entomologica Hungarica, 40 (1-2), 79-101, 2005.

OEPP: Guideline for the efficacy evaluation of herbicides (Weeds in maize), OEPP/EPPO Standards for the efficacy evaluation of plant protection products, Herbicides and Plant Growth Regulators, 2006.

ONĆ-JOVANOVIĆ, E., MARKOVIĆ, S., IVANOVIĆ, M.: Suzbijanje korova u kukuruzu nakon nicanja useva. Zbornik naučnih radova Instituta PKB Agroekonomik, 13 (1-2), 67-72, 2007.

STEFANOVIĆ, L., STANOJEVIĆ, M., JOVIN, P., KEREČKI, B., IVANOVOĆ, M.: Reakcija hibrida kukuruza na 2, 4-D herbicid. Pesticidi, 15: 263-270, 2000.

STEFANOVIĆ, L., SIMIĆ, M.: Izbor i vreme primene herbicidnih kombinacija u kontroli dominantnih vrsta korova u kukuruzu. Biljni lekar, 30 (3): 181-186, 2002.

TOMLIN, C.D.S.: The Pesticide Manual, Fifteenth Ed., British Crop Protection Council, Farnham, Surrey, UK, 2010.

Wehtje, G.: Synergism of Dicamba with Diflufenzopyr with Respect to Turfgrass Weed Control. Weed Technology, 22 (4), 679-684, 2008.

# OCENA FITOTOKSIČNOSTI I EFIKASNOSTI DIKAMBE U SUZBIJANJU ŠIROKOLISNIH KOROVA U KUKURUZU

*Jelena GOLIJAN*

**Izvod:** Cilj ovog rada je bio da se utvrdi fitotoksičnost i efikasnost herbicida dikambe (preparat DICAMBA 480 SL) i mogućnost njegove primene za folijarno suzbijanje širokolisnih korova u usevu kukuruza. Tokom 2011.godine na lokalitetu Zemun Polje ispitivana je efikasnost ovog preparata izvođenjem poljskih ogleda u skladu sa standardnom EPPO metodom. Ispitivanje je vršeno na zemljištu tipa černozem. U ogled je bilo uključeno 4 tretiranja: dva za efikasnost (DICAMBA 480 SL 0,5 i 0,7 l/ha), jedan za fitotoksičnost (DICAMBA 480 SL 1,4 l/ha) i jedan kao standard (PLAMEN 0,7 l/ha). Preparat je primenjen folijarno, kada je kukuruz imao 4-5 listova, a korovi 2-5 listova. Dikamba kao selektivni sistemični hormonalni herbicid iz hemijske grupe derivata benzoeve kiseline, ne ispoljava fitotoksičnost prema kukuruzu, ako se primeni u preporučenim količinama i u preporučeno vreme primene. Rezultati ovih ogleda ukazali su na dobru efikasnost dikambe (preparat DICAMBA 480 SL).

**Ključne reči:** korovske vrste, fitotoksični efekti, rezistentnost, kombinacija herbicida.

Received / Primljen: 30.06.2015.
Accepted / Prihvaćen: .22.10.2015.