

**EFFICACY OF HERBICIDES CONTROL OF COMMON RAGWEED
(*AMBROSIA ARTEMISIIFOLIA* L.) IN MAIZE**

**EFEKTÍVNOSŤ HERBICÍDNEJ OCHRANY PROTI AMBRÓZIÍ
PALINOLISTEJ (*AMBROSIA ARTEMISIIFOLIA* L.) V PORASTOCH
KUKURICE SIATEJ**

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Abstract: In the year 2008 was conducted field trials in the south-west region of Slovak Republic. Our aim was to detect the efficacy of five herbicides to control common ragweed (*Ambrosia artemisiifolia* L.) in canopy of maize for grain. In field trial 5 active materials (dimethenamid, mesotrione, rimsulfuron, dicamba, fluorochloridon) were used. Estimation of actual weed infestation and assessment efficiency of applicable herbicides was made according to EWRS score. The most effective preemergence herbicides were fluorochloridon (Racer 25 EC) with efficacy 1-2 and dimethenamid (Spectrum) with efficacy 2-3 after 30 days from application. Less effective were postemergence herbicides with efficacy from 3-4 after 30 days from application according to EWRS score. The recommendation of practical usage of herbicide control of common ragweed for praxis has been elaborated.

Rezumat: V roku 2008 sa realizovali poľné pokusy v juho-západnej časti Slovenskej Republiky so zameraním na zistenie efektívnosti účinných herbicídnych látok v regulácii Ambrózie palinolistej (*Ambrosia artemisiifolia* L.) v poraste kukurice siatej na zrno. Bolo sledovaných 5 účinných látok (dimethenamid, mesotrione, rimsulfuron, dicamba, fluorochloridon). Hodnotenie aktuálnej zaburinenosti porastu a určenie efektívnosti herbicídu bolo roben na základe bodového hodnotenia EWRS. Najúčinnjší bol preemergentný herbicíd fluorochloridon (Racer 25 EC) s účinnosťou 1-2 a dimethenamid (Spectrum) s účinnosťou 2-3 po 30 dňoch od ich aplikácie. Menej účinnými boli postemergentne herbicídy s účinnosťou 3-4 po 30 dňoch od ich aplikácie vzhľadom na EWRS stupnicu. Výstupom z týchto pokusov bolo praktické odporúčanie pre prax.

Key words: *Ambrosia artemisiifolia*, herbicides efficacy, maize

Cuvinte cheie: Ambrózia palinolistá, efektívnosť herbicídov, kukurica siata

INTRODUCTION

Ambrosia artemisiifolia L. (*Asteraceae*) presents a two-sided problem. First, its pollen causes ocular and respiratory allergies that often develop into asthma (DAHL et al., 1999). Secondly, it is also a weed that can cause substantial yield losses (CHOLLET et al., 1999).

In North America, *Ambrosia artemisiifolia* is weedy in grain fields and other cultures. As the plant has high light demand it is especially common in root crops or crops which are planted in rows with space between (vegetables, soybean, tobacco etc.) (BASSETT, CROMPTON, 1975). In Europe, *Ambrosia artemisiifolia* has a 'weedy status' in some (climatic favorable) regions. In all European countries, *A. artemisiifolia* rarely grows in farmland due to its complex climatic needs (HEGY, 1979).

Chemical control of *A. artemisiifolia* became more difficult because its populations have developed resistance to ALS inhibitors in the USA in 1998, to ALS and protox inhibitors in Delaware state in 2005 (PATZOLDT et al., 2001; SOLYMOSI, 2003; BÉRES et al., 2006), to ureas in Canada in 1999 (SAINT-LOUIS et al., 2005) and to glyines (SELLERS et al., 2005).

Resistance to glyphosate (in Missouri State in 2004) was also reports in the USA (BÉRES et al., 2005; MUELLER et al., 2007).

Resistance in the Dunkirk population of *A. artemisiifolia* to triazolpyrimidine sulfonanilide, cloransulam-methyl was confirmed by treating greenhouse-grown seedlings with cloransulam-methyl. ALS (acetolactate synthase) activity assays and DNA sequencing were used to identify the resistance mechanism (PATZOLD et al., 2001).

MATERIAL AND METHODS

The efficacy of five active substances of herbicides to common ragweed (*Ambrosia artemisiifolia* L.) control was detected in the canopy of maize during 2008 cropping period. Trial locality was “Neded” in maize production region in the South-West Slovakia. Trial had 6 treatments in 4 replications and was based on randomized blocks method.

Our treatments were: untreated control, two preemergence herbicides (Dimethenamid, Fluorochloridon) and three postemergence herbicides (Mesotrione, Rimsulfuron and Dicamba). Preemergence herbicides were applied in the maize stage BBCH 0, in dose of 1440 g dimethenamid per hectare; 500 g fluorochloridon per hectare, with 400 l water per hectare. Postemergence herbicides were applied in the maize stage BBCH 14, in dose of 150 g mesotrione per hectare, 10 g rimsulfuron per hectare; 240 g dicamba per hectare, with 400 l water per hectare.

In all treatments were assessed:

0 day after application (DAT): number of *Ambrosia* plants per plot before application

5 days after application: visual estimation of efficacy following the EWRS scale 1-9 in all treatments

15 days after application: visual estimation of efficacy following the EWRS scale 1-9 in all treatments

30 days after application: visual estimation of efficacy following the EWRS scale 1-9 in all treatments; number of surviving *Ambrosia*, description of green sprout in all treatments

45 days after application: number of surviving *Ambrosia*, description of green sprout in all treatments

All required data were summarized into the tables and recommendation of practical usage of herbicide control of common ragweed for praxis has been elaborated.

RESULTS AND DISCUSSIONS

Today a great choice of herbicides is available for *A. artemisiifolia* control in the different crops and non-crop sites (BÉRES et al., 2006; BOHREN et al., 2008). Chemical control of *A. artemisiifolia* become more difficult since the weed developed resistance to atrazine (IGRC, 1987; HEAP, 1997), but resistance to other herbicides means a real threat all over the world (PATZOLDT et al., 2001).

On the base of evaluated data the most effective were preemergence herbicides. Fluorochloridon (Racer 25 EC) had efficacy 1-2 and dimethenamid (Spectrum) 2-3 after 30 days from application according to EWRS score. Less effective were postemergence herbicides with efficacy mesotrione (Callisto 480 SC) 4, rimsulfuron (Titus25 WG) 4 and dicamba (Banvel 480S) 3 after 30 days from application according to EWRS score (Table 1).

After 45 days of treatment number of surviving common ragweed (*Ambrosia artemisiifolia* L.) plants was only one in two treatments fluorochloridon and dimethenamid. In rimsulfuron and dicamba treatments survived two plants of common ragweed. In mesotrione treatment survived only three plants after 45 days.

Table 1

Efficacy of herbicides according to EWRS score

Treatments	5 DAT	15 DAT	30 DAT
Check plot	9	9	9
Dimethenamid	4-5	3-4	2-3
Mesotrione	6	5	4
Rimsulfuron	6	5	4
Dicamba	5	4	3
Fluorochloridon	3-4	2-3	1-2

Table 2

Number of surviving *Ambrosia artemisiifolia* L. plants 30 and 45 days after treatment

Treatments	30 DAT	45 DAT
Check plot	12	12
Dimethenamid	2	1
Mesotrione	3	3
Rimsulfuron	2	2
Dicamba	2	2
Fluorochloridon	1	1

CONCLUSIONS

Common ragweed as invasive weed became serious problem in the maize fields. As our results showed the best chemical control method is preemergence application of fluorochloridon or dimethenamid. Post emergence application of herbicides (mesotrione, rimsulfuron, dicamba) is not so effective than previous one.

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ACKNOWLEDGEMENTS

This paper has been supported by VEGA Project No. 1/0457/08. "Research and Development of Technologies for Sustainable Agricultural Systems".