

## Effects of different herbicide treatments for common ragweed control at different phenological stages under field conditions (Hungary)



**Gabriella Kazinczi, Sándor Máté**

Department of Plant Production and Plant Protection, Institute of Plant Science,  
Faculty of Agricultural and Environmental Sciences, Kaposvár University, Guba S. str. 40,  
H-7400 Kaposvár, Hungary; kazinczi.gabriella@ke.hu

DOI 10.5073/jka.2016.455.43

At the experimental area of Kaposvár University (KU) a ruderal area heavily infested with common ragweed was chosen, where small plots (2 x 2 m) were signed. Common ragweed infestation was evaluated before treatments.

Preemergent (PRE) treatments (before germination peak) were carried out on 23.04.2012. Average density: 10-15 common ragweed/m<sup>2</sup>. Common ragweed phenology: BBCH: 05-12.

Postemergent (POST) treatments (at germination peak) were carried out on 18.05.2012. Average density: 40-50 common ragweed/m<sup>2</sup>. Common ragweed phenology varied from cotyledonous-8 leaf stage (BBCH: 09-18).

Weed control efficacy was evaluated 1, 3, 6, 8, 12, and 18 weeks after treatments (WAT).

Treatments were the followings (doses according to the permission documents of herbicides):

Dimethenamid+pendimetalin (PRE) + imazamox (POST)

Fluorchloridon(PRE)

Fluorchloridon (PRE) + oxyfluorfen (POST)

Oxyfluorfen (PRE)

Terbuthylazine (PRE)

Flumioxazin (POST)

Rimsulfuron (POST)

Nicosulfuron (POST)

Foramsulfuron (POST)

Imazamox (POST)

Tribenuron-methyl (POST)

Nicosulfuron + rimsulfuron + dicamba (POST)

Dicamba (POST)

Fluroxypyr (POST)

Bentazon+dicamba (POST)

Mesotrione (POST)

Florasulam+clopyralid+fluroxypyr (POST)

Sulcotrione (POST)

Glufosinate-ammonium (POST)

Tembotrione (POST)

Glyphosate (POST)

Untreated control

Generally, herbicides gave a better weed control effect against common ragweed 3 WAT (Table 1). 12 WAT the efficacy of herbicides drastically decreased. The reasons of uneffectivity were that: 1.

herbicide treatments happened at different phenological stages of common ragweed (BBCH: 05-18), and it is known that majority of leaf herbicides is effective only against very young common ragweed seedlings (until max. 4 leaf stage, BBCH:14). 2. Due to the continuous germination of common ragweed some seedlings emerged only after the POST treatments, so herbicides “did not meet” with the common ragweed plants; common ragweed seedlings “escaped” from the herbicide effect. Generally, PRE+POST combinations gave better results, than PRE and/or POST treatments alone.

ALS inhibitors (imazamox, tribenuron-methyl, nicosulfuron, foramsulfuron) were working efficiently until max. 4 leaf phenological stage of common ragweed (BBCH:14).

Non-selective leaf herbicides (glufosinate-ammonium, glyphosate) were good for older common ragweed control also, but were ineffective for lately-emerged seeds (they did not meet with the common ragweed plant).

Due to the selection pressure of auxin type (dicamba, fluroxypyr) herbicides monocot species were selected (Figure 1).

Majority of leaf herbicides have no long-term effect; lately-emerged common ragweed plants (those ones which emerged after the POST treatments) escaped from the effect of herbicides (common ragweed did not meet with the herbicides) (Kazinczi and Máté 2014) (Table 1).



Figure 1: Effect of dicamba treatment on common ragweed (left: 3 WAT, right: 12 WAT)

Table 1. Weed control efficacy of different treatments on common ragweed

Treatments	Weed control efficacy (%)*	
	3 WAT	12 WAT
Dimethenamid+pendimetalin (PRE) + imazamox (POST)	70	40
Fluorchloridon(PRE)	80	40
Fluorchloridon (PRE) + oxyfluorfen (POST)	95	60
Oxyfluorfen (PRE)	90	40
Terbuthylazine (PRE)	70	20
Flumioxazin (POST)	63	30
Rimsulfuron (POST)	68	10
Nicosulfuron (POST)	65	10
Foramsulfuron (POST)	60	10
imazamox (POST)	65	50
Tribenuron-methyl (POST)	55	20
Nicosulfuron + rimsulfuron + dicamba (POST)	60	10
Dicamba (POST)	90	95
Fluroxypyr (POST)	92	20
Bentazon+dicamba (POST)	95	40
Mesotrione (POST)	98	45
Florasulam+clopyralid+fluroxypyr (POST)	82	10
Sulcotrione (POST)	75	10
Glufosinate-ammonium (POST)	99	10
Tembotrione (POST)	90	10
Glyphosate (POST)	97	70
Untreated control	-	-

\*weed control efficacy: 99-100%:excellent; 95-98%: very good; 90-94%: good; 75-89%: less good; under 74%: not sufficient

## References

Kazinczi G., Máté, S. (2014): Efficacy of single and combined herbicide treatments on common common ragweed at different phenological stages. 4th International Symposium Environmental Weeds and Invasive Plants. Montpellier, France p.166

## Conclusions from the results of 15.5 – 15.8 experiments

Under optimal growing conditions, common ragweed did not seem to be a considerable weed problem in cereals and not even in other dense-sown autumn crops, like oilseed rape.

In maize, a lot of effective herbicides are available for common ragweed control. The efficacy of soil herbicides greatly depends on the presence of precipitation. Among leaf herbicides some sulfonyl-ureas, triketones and auxin type herbicides gave good effect for common ragweed control. Their efficacy depends on common ragweed phenology (the best is cotyledonous-2 leaf, BBCH: 09-12). The phenological stage of maize is also should be taken into consideration; e.g. late-applied auxin type herbicides can cause phytotoxicity on maize.

On uncultivated areas (waste lands, cereal stubbles) - from economic point - the application of non-selective herbicides is suggested. Other reason is that these herbicides can effectively control common ragweed plants even in more developed stages.

Continuous germination of common ragweed during the vegetation period make its control more difficult. Field emergence of common ragweed may occur when the long term effect of soil herbicides has already been ceased. At the same time common ragweeds are present at different phenological stages while most leaf herbicides are effective only against young seedlings. On the other hand, lately emerged common ragweed plants (when emergence occurs after the treatments) "escape" from the effects of postemergent leaf herbicides, regarding that they do not keep in contact with herbicides. So it is suggested to use a herbicide combination in which the soil herbicide (with a long term effect) and a leaf herbicide is combined (Kazinczi and Novák, 2014).

In case if we consider the main purpose of each control method (to prevent pollen and seed production of common ragweed) only 100% weed control efficacy is accepted!

### Reference

Kazinczi, G. and Novák, R. (eds) (2014): Integrated Methods for Suppression of common Ragweed. National Food Chain Safety Office, Directorate of Plant Protection, Soil Conservation and Agri-Environment, Budapest, Hungary