Effects of different herbicide treatments on common ragweed on wheat stubble (Hungary)

Gabriella Kazinczi, Sándor Máté, Ferenc Pál-Fám, Ildikó Kerepesi

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

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Small plot (4 x 4 m^2) experiments in four replicates were carried out. The treatments were applied according to BBCH 51 stage of common ragweed plants (end of July, directly before flowering). Evaluation of herbicide efficacy was: 7, 14 and 40 days after treatments (DAT); based on cover% of common ragweed. Six weeks after treatments we determined common ragweed seed production for a unit area. Seeds from the survived common ragweed plants were collected and their viability and germination ability was determined under laboratory conditions. Furthermore number of viable common ragweed seeds for a unit area was also given. Beside these pollen production was also estimated (number of male heads/plant: considering a mean of 17 male flowers per head and of 7148 pollen/male flower; see Reisinger and Szemenyei (2006) (Table 1).

Table 1. Efficacy of herbicides on wheat stubble and the effect of herbicides on the germination, seed viability, pollen and seed production of common ragweed

Treatments (doses according to the permission documents of herbicides)	**Weed control efficacy (%)***	**Germination (%)**	**Seed viability (%)**	**Number of total/ viable seeds /m^2**	**Pollen (million/ m^2)**
	2012	**2012**	**2012**	**2012**	**2012**
glyphosate	100	0	0	0	0
mesotrione	<50	2	89	11040/9826	2255
fluroxypyr	80	4	82	12160/9971	1306
rimsulfuron	<50	3	87	3600/3132	3221
nicosulfuron	<50	5	77	3520/2710	174
dicamba	75	1	77	8320/6406	432
rimsulfuron+nicosulfuron +dicamba	95	2	76	1600/1216	97
imazamox	75	4	84	13280/11155	676
topramesone	100	0	0	0	0
topramesone+dicamba	100	0	0	0	0
glufosinate-ammonium	95	2	62	2080/1290	24
foramsulfuron	<50	1	86	6240/5366	282
tribenuron-methyl	<50	4	83	12640/10491	7294
florasulam+clopyralid +fluroxypyr	85	2	70	2880/2016	537
florasulam+2,4 D	90	1	74	2080/1540	1305
bentazon+dicamba	95	0	76	1720/1307	233
sulcotrione	90	0	86	3040/2614	760
tembotrione	90	4	82	3200/2624	469
untreated control	0	4	86	12480/10732	8341

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

Weed control efficacy greatly varied depending on the treatments (<50-100%), but was similar than in previous experiments. Generally the number of viable common ragweed seeds for a square metre was higher in 2012, then in an earlier experiment (Kazinczi et al. 2010; Kazinczi and Novák, 2014). Glyphosate, topramesone, topramesone + dicamba showed 100% efficacy against common ragweed and resulted no seed and pollen production. The seed viability and number of viable seeds greatly varied due to the different herbicide treatments. No close relation between weed control efficacy, seed and pollen production could be observed; e.g. nicosulfuron and foramsulfuron effect is under 50%, but they reduced pollen production considerably (by 98 and 97%, respectively) as compared to the untreated control plots.

In some cases, when weed control efficacy was "very good" (e.g. in case of glufosinate-ammonium treatment), higher proportions of seed production/pollen production could be observed. This phenomenon may be an effective strategy for ragweed's survival under stress conditions.

Majority of common ragweed seeds were in dormancy during germination tests (germination% varied between 1 and 4%); this was due to the lack of stratification. In spite of low germination rates seed viability was high (between 62 and 89%, depending on herbicide treatments).

References

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