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Weed competition can cause severe yield reduction in maize cultivation. Since the sixties the large availability of different herbicides has allowed maize growers to reach appreciable increase in the yield per hectare. At present different strategies based both on chemical and mechanical control can be adopted to control weed infestation.

OBJECTIVES

The aim of the study was to compare different weed control strategies currently available in terms of type (chemical, mechanical or a combination of both) that fulfill the requirements of the Directive 2009/128/EC.

MATERIALS AND METHODS

The study was conducted in 2014 at Turano Lodigiano, in the Lombardy Region (Italy) on a field of about 6000 m², with 90 plots of 28 m² each. Plots were completely randomized with three replications for each control strategy. Five weed control strategies were compared: PRE-EMERGENCE, POST-EMERGENCE, PRE+POST EMERGENCE, CHEMICAL (PRE OR POST) + MECHANICAL, MECHANICAL ALONE.

WEED CONTROL STRATEGIES COMPARED

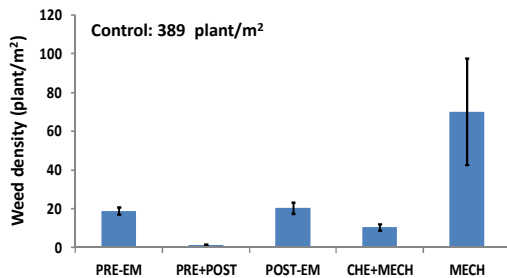
1) CONTROL (absence of weed control)	POST-EMERGENCE	PRE-EMERGENCE	CHEMICAL followed by MECHANICAL
PRE-EMERGENCE followed by POST-EMERGENCE	EARLY POST-EMERGENCE	14) Lumax (4.5 L/ha)	AT PRE-EMERGENCE
2) Primagram Gold (4.5 L/ha) f.b. [Ghibli (1.5 L/ha) + Mondak 21 S (0.8 L/ha)]	7) Adengo (2 L/ha)	15) Primagram Gold (4.5 L/ha) + Sulcogan (1.5 L/ha)	23) Lumax (4.5 L/ha) on the row f.b. 2 ridgings
3) Aspect (2.5 L/ha) f.b. [Ghibli (1.5 L/ha) f.b. Mondak 21 S (0.8 L/ha)]	8) Lumax (L/ha)	16) Aspect (2.5 L/ha) + Merlin Flexx (2 L/ha)	24) Lumax (4.5 L/ha) f.b. 1 ridging
4) Dual Gold (1.5 L/ha) + Sulcogan (1.5 L/ha) f.b. [Ghibli (1.5 L/ha) + Mondak 21S (0.8 L/ha)]	9) Elumis (1 L/ha) + Dual Gold (1 L/ha)	17) Dual Gold (1.5 L/ha) + Sulcogan (1.5 L/ha) + Trek P (3 L/ha)	AT EARLY POST-EMERGENCE
5) Dual Gold (1.5 L/ha) + Merlin Flexx (2 L/ha) f.b. [Ghibli (1.5 L/ha) + Mondak 21S (0.8 L/ha)]	EARLY POST-EMERGENCE f.b. LATE POST-EMERGENCE	18) Dual Gold (1.5 L/ha) + Merlin Flexx (2 L/ha) + Trek P (2 L/ha)	10) Lumax (3.5 L/ha) f.b. 1 ridging
6) Camix (2.5 L/ha) + Stomp Aqua (1.3 L/ha) f.b. [Ghibli (1.5 L/ha) + Mondak 21S (0.8 L/ha)]	12) Camix (2.5 L/ha) f.b. Ghibli (1 L/ha) + Mondak 21S (0.8 L/ha)	19) Adengo (2 L/ha)	11) Adengo (2 L/ha) f.b. 1 ridging
	13) Adengo (2 L/ha) f.b. Laudis (2 L/ha) + Mondak 21S (0.8 L/ha)	20) Camix (2.5 L/ha) + Stomp Aqua (1.3 L/ha)	MECHANICAL
	NOTES	21) Dual Gold (1.5 L/ha) + Sulcogan (1.5 L/ha) + Challenge (2 L/ha)	25) 2 Spring-tooth harrowings f.b. 2 ridgings
	PRE-EMERGENCE: PRIMAGRAM GOLD (S-metolachlor, Terbutylazine); LUMAX (Terbutylazine, S-metolachlor, Mesotrione); DUAL GOLD (S-metolachlor); MERLIN FLEXX (Isoxaflutole, Cyprosulfamide); SULCOGAN (Sulcotrione); TREK P (Pendimetalin, Terbutylazine); CHALLENGE (Aclonifen); ADENGO (Isoxaflutole, Thiencarbazone-methyl); ASPECT (Flufenacet, Terbutylazine); STOMP AQUA (Pendimetalin).	22) Dual Gold (1.5 L/ha) + Merlin Flexx (2 L/ha) + Stomp Aqua (2 L/ha)	
	POST-EMERGENCE: GHIBLI (Nicosulfuron); MONDAK 21 S (Dicamba); ELUMIS (Mesotrione, Nicosulfuron); CAMIX (Mesotrione, S-metolachlor); LAUDIS (Tembotrione, Isoxaflutole-ethyl).		

WEED CONTROL ASSESSMENT

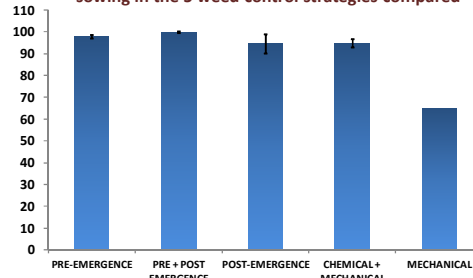
Plant density (plants/m²)
Ground cover (%)
Overall visual efficacy (%)

RESULTS

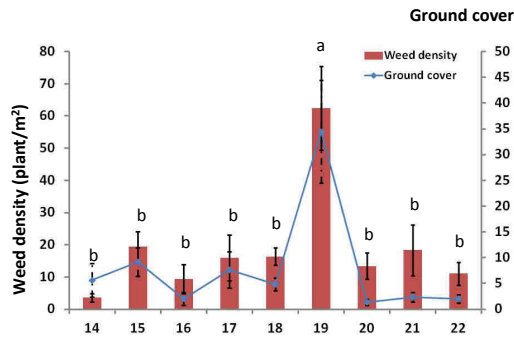
Average weed density per weed control strategy



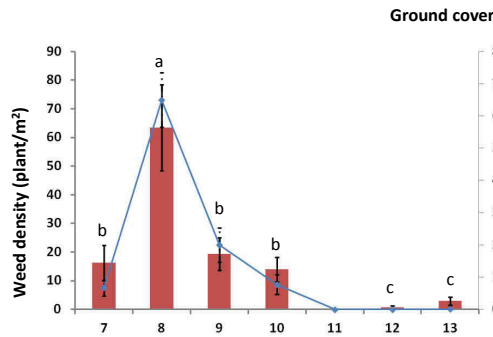
Overall herbicide efficacy (%) measured at 73 days from sowing in the 5 weed control strategies compared



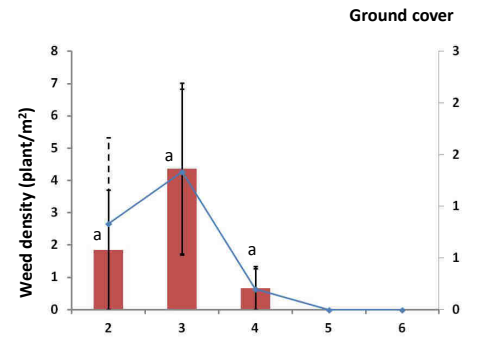
Weed density observed at 56 days from sowing in the plots treated with PRE-EMERGENCE products



Weed density measured at 56 days from sowing in the plots treated with POST-EMERGENCE products



Weed density measured at 56 days from sowing in the plots treated with PRE + POST-EMERGENCE products



MAIN WEED SPECIES

Abutilon theophrasti, *Amaranthus retroflexus*, *Chenopodium album*, *Echinochloa crus-galli*, *Panicum dichotomiflorum*, *Poa annua*, *Portulaca oleracea*, *Setaria viridis*, *Solanum nigrum*

GRAIN YIELD

18,5 t/ha without significant differences between strategies, with the only exception of CONTROL plots (0.53 t/ha) and MECHANICAL plots (3.67 t/ha)

CONCLUSIONS

OVERALL THE CHEMICAL CONTROL SHOWED A HIGH EFFICACY TOWARDS MOST OF THE WEEDS. THE LACK OF EFFICACY SEEN FOR MECHANICAL STRATEGIES WAS MAINLY DUE TO THE INCOMPLETE ACTION OF THE SPRING-TOOTH HARROWING INTERVENTION WHICH LET MANY UNDISTURBED WEEDS ON THE CROP ROW