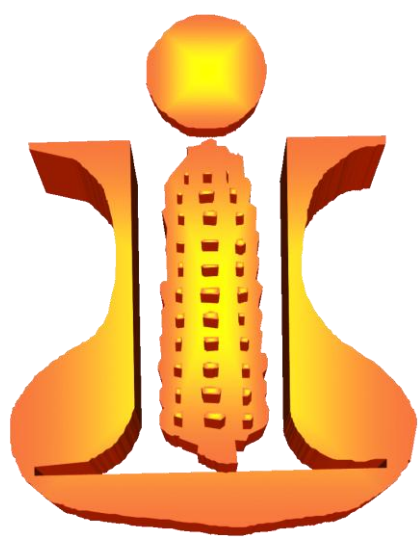


THE SENSITIVITY OF MAIZE LINES TO DIFFERENT HERBICIDES

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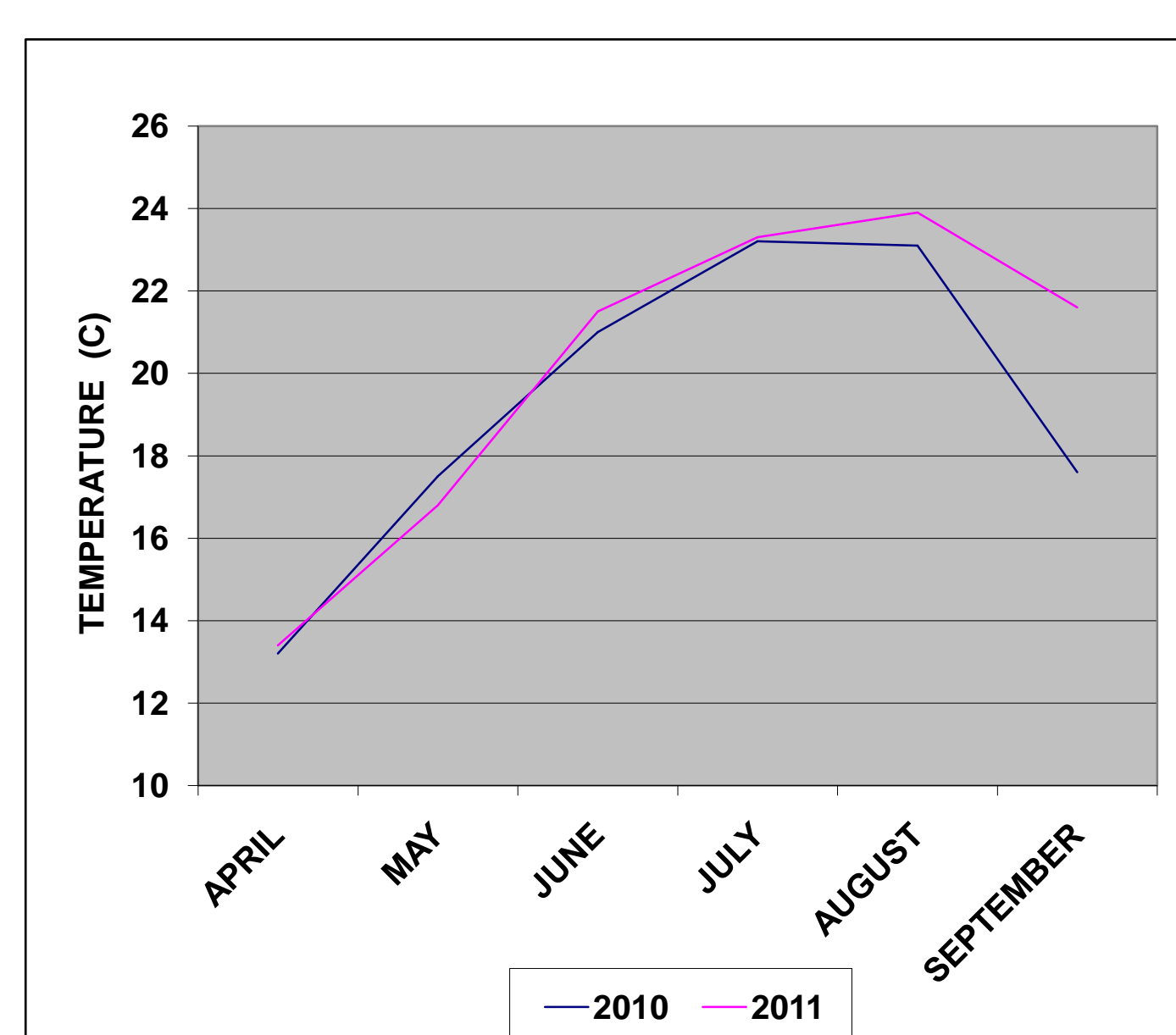
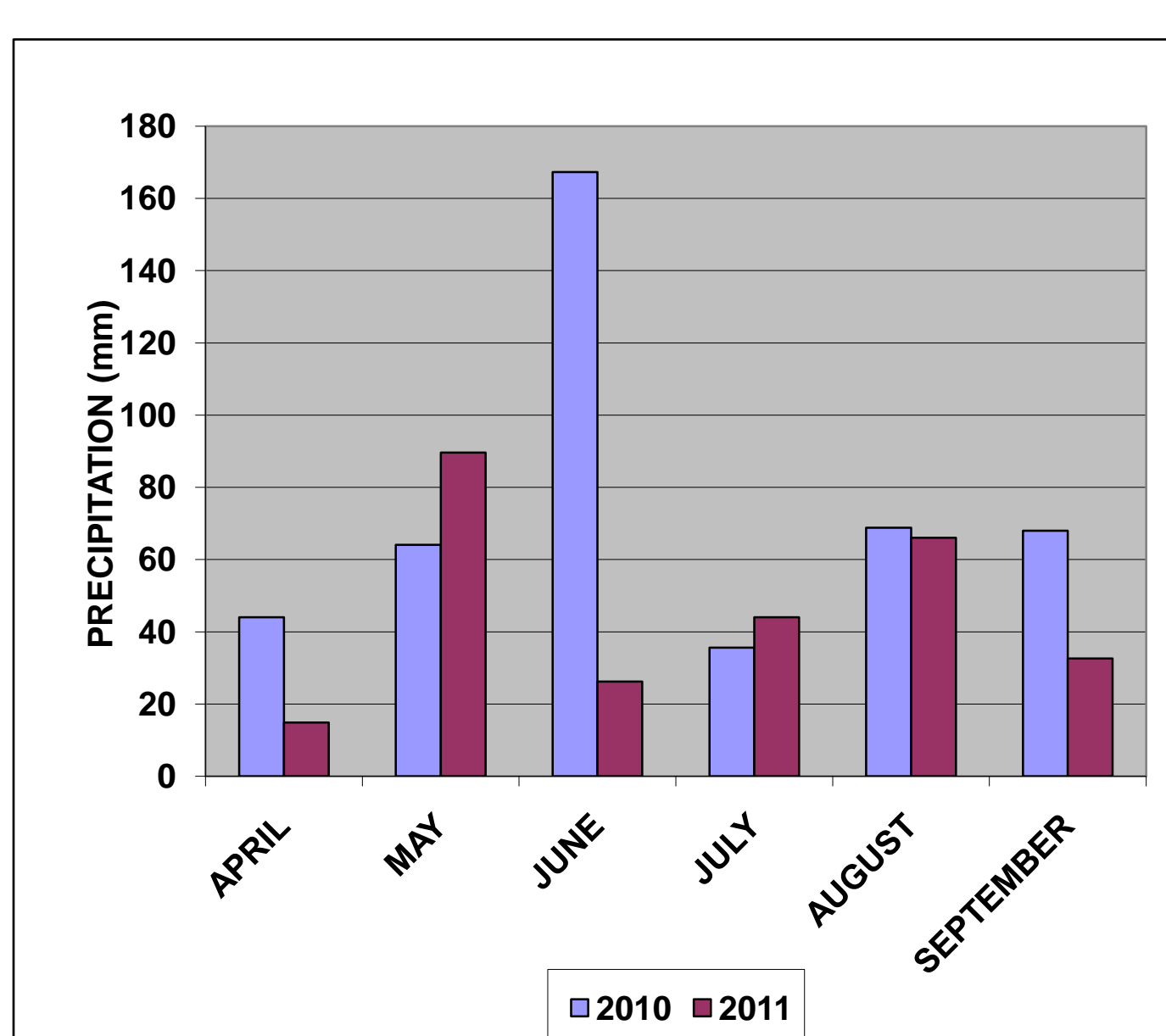
Introduction

The technology of maize production involves the use of herbicides, especially in the seed crop. Seed crop is characterized by slow growth and smaller habit, unlike the hybrid crop. Such a spatial arrangement creates a microclimate conditions particularly favourable to weed growth. The introduction of sulfonylurea herbicides has led to the solution of the problem with narrow-leaved weeds in maize crop, but also created many problems after the application. Seed maize crop is generally more sensitive to herbicides than hybrids, and using of sulfonylurea could lead to higher phytotoxicity. The herbicide effect starts immediately after the absorption. The aim of trial was to observe the effects of herbicides on five maize lines, parental components of commercial ZP hybrids.

Material and methods

Experiment was set up in the experimental field of the Maize Research Institute, "Zemun Polje", during 2010 and 2011. Wheat was a preceding crop in both years. Impacts of 4 herbicides: mesotrione (H2), topramezone (H3) rimsulfuron (H4) and foramsulfuron (H5) on 5 maize lines (L1-L5) were observed in the trial, as well as in control (H1). All herbicides were applied at recommended doses at the 5-6 leaf stage of maize. EWRC values were measured: at 21 and 35 days after the herbicide application. EWRC was estimated according to EWRC scale. Samples for measuring of the soluble protein content were collected 48h after herbicide application. Their content was determined after drying at 105 °C by method of Lowrey et al. (1952). Maize grain yield was measured after harvesting. Obtained data were statistically processed by ANOVA and differences between means were tested by the least significant difference test (LSD test).

Meteorological data



Results

Maize lines show different sensitivity to the applied herbicides, according to obtained EWRC values. Generally, mesotrione and topramezone caused small damages on all maize lines in the form of bleach sheets. On the other hand, sulfonylurea herbicides were more aggressive in both years, especially on L1 which expressed the severe phytotoxic symptoms (Table 1).

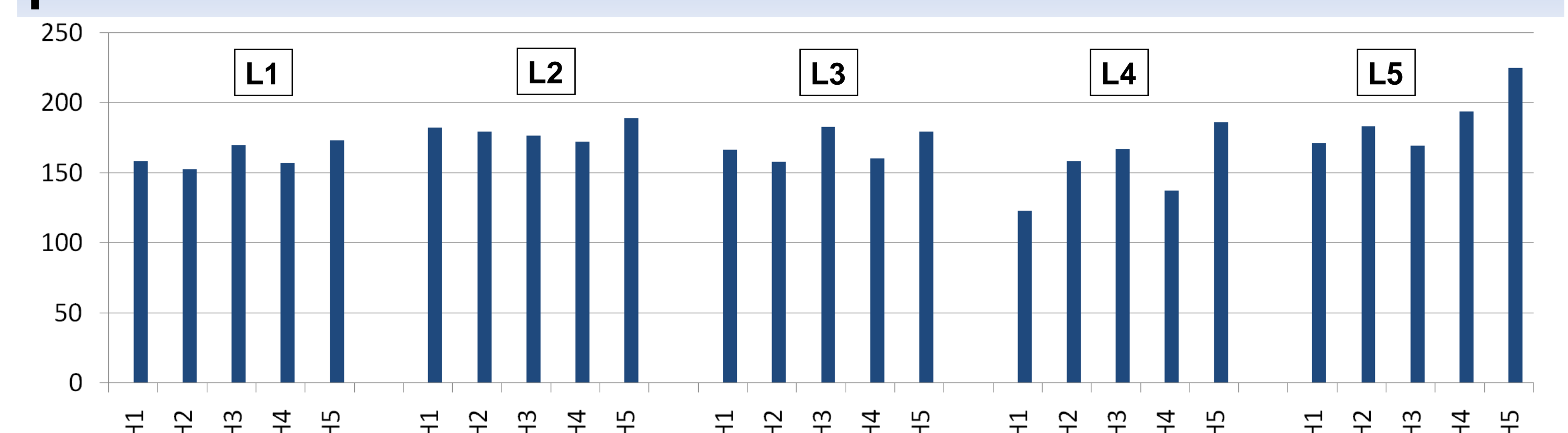
Table 1. EWRC values

	2010. Evaluation I						2010. Evaluation II					
	L1	L2	L3	L4	L5	Average	L1	L2	L3	L4	L5	Average
Mesotrione	1	1	1	1	1	1	1	1	1	1	1	1
Topramezone	1.25	1.25	1	1.25	1	1.15	1	1	1	1	1	1
Rimsulfuron	3	2	2	2	2.25	2.25	3.25	1	1	1	1	1.45
Foramsulfuron	4.25	2.25	2.25	2	2	2.55	4.25	1	1	1	1	1.65
Average	2.37	1.62	1.56	1.56	1.56		2.37	1	1	1	1	

	2011. Evaluation I						2011. Evaluation II					
	L1	L2	L3	L4	L5	Average	L1	L2	L3	L4	L5	Average
Mesotrione	1.5	1.5	1.75	1.25	1.5	1.5	1.5	1.25	1.5	1	1.5	1.35
Topramezone	1.5	1.5	2	1.25	1.5	1.55	1.5	1.5	1	1	1.5	1.31
Rimsulfuron	2.5	2	2.25	2.75	2.5	2.4	3	2	2	2	2	2.2
Foramsulfuron	2.5	2.5	3	3	3	2.8	2	2	2.5	2	2	2.1
Average	2	1.87	2.25	2.06	2.12		2	1.69	1.75	1.5	1.7	

The content of soluble proteins varied among the treatments. The highest values of soluble proteins were observed L5 in control and all treatments. The increase of soluble proteins, induced by foramsulfuron was observed in all maize lines, compared to control. Rimsulfuron, as sulfonylurea herbicide, too, caused the increase of soluble proteins, but only in L5. According to observed results, susceptibility of maize lines to herbicides can be explained by increasing trend of soluble protein content (Figure 1).

Figure 1. The influence of applied herbicides on soluble protein content



Herbicides mesotrione, rimsulfuron, and foramsulfuron significantly decreased the average yield of maize lines for both years. Among all applied herbicides, only topramezone provided insignificant decrease of grain yield. All lines, treated with sulfonylureas had a lower average yield than the control, while L1 turned out to be the most sensitive with the lowest yield (Table 2).

Maize grain yield, Average 2010/11

	L1	L2	L3	L4	L5	Average
H1	1.52	2.79	6.17	5.72	3.07	3.85
H2	1.5	2.46	5.67	5.17	2.99	3.56*
H3	1.43	2.45	5.92	5.82	3.22	3.77
H4	1.1	2.25	5.38	4.46	2.7	3.18**
H5	1.21	2.55	5.13	5.11	2.78	3.35**
Average	1.35	2.5	5.65	5.28	2.95	