Si4Crop: REPORT: FIELD RESULTS

To develop a strategy for improving the efficiency of applied silicon fertilizers and enhancing the uptake of essential micro- and macroelements in key agricultural crops, micro-experimental field trials were established at the experimental plots of the Agricultural Advisory Service Zrenjanin, located in Zlatica, over two consecutive growing seasons (2023-2024).

The study was conducted on a carbonate chernozem soil (pH 8.2) during the autumn of 2023. The *Sacramento* wheat variety was sown on October 25, 2023, on plots measuring 12.5 m² (with five independent plots per treatment), following a maize in crop rotation system.

Two different doses of silicon fertilizer (K_2OSi_3) were applied, along with potassium compensation (KCl) from the silicon fertilizer, to assess their impact on growth, development, yield (Table 1), and the accumulation of essential micro- and macroelements, including silicon in wheat grains (Table 2). The silicon fertilizer was applied on December 28, 2023, in lower (50 kg/ha) and higher (150 kg/ha) doses as a fine powder, with three foliar applications (April 12, April 25, and May 10, 2024) at a dose of 1 mM silicic acid (700 L/ha). A control group (without silicon application) was also monitored. Harvesting took place on June 26, 2024.

Table 1. Yields obtained from wheat cultivation with no silicon fertilizer added (Control) and with the addition of silicon in the form of potassium silicate (K_2OSi_3) at doses of 50 kg and 150 kg/ha.

Treatments	Yield kg/ha
Control (0 кg Si)	5551
50 кg Si / ha	6010
150 кg Si / ha	5740

Table 2. Nutritional status of zinc (Zn), iron (Fe), molybdenum (Mo), and silicon (Si) in wheat grains without the addition of silicon fertilizer (Control) and with added silicon in the form of potassium silicate (K_2OSi_3) at doses of 50 kg and 150 kg/ha.

Treatments	Zn (mg kg^{-1})	Fe (mg kg^{-1})	Mo (mg kg^{-1})	Si (mg kg^{-1})
Control (0 кg Si)	9.8	28	0.57	508
50 кg Si / ha	12.2	30	0.66	703
150 кg Si / ha	11.8	33	0.67	511

In 2024, at the same location and with the same objective of evaluating the effects on growth, development, yield (Table 3), and the accumulation of essential micro- and macroelements, including silicon in the grains (Table 4), a field trial was carried out on maize.

The *DKC 5709* hybrid was sown on plots of 14 m² (5 independent plots per treatment) with wheat as preceding crop. Fertilization was carried out in two stages: first in November (November 24, 2023) with 300 kg/ha (15:15:15), and again in April (April 16, 2024) with 17 kg/ha (Urea). The corn was sown on April 25, 2024.

Silicon fertilizer was applied on May 15, 2024, in two doses (50 kg/ha and 150 kg/ha) as a fine powder, along with three foliar applications (July 5, 2024, July 12, 2024, and July 19, 2024) at a dosage of 1 mM silicic acid (700 L/ha). A control group (without added silicon) was also monitored in the same experimental plots. Harvesting took place on September 4, 2024.

Table 3. Yields obtained under corn cultivation with no silicon fertilizer (Control) and with added silicon in the form of potassium silicate (K_2OSi_3) at doses of 50 kg and 150 kg/ha.

Treatments	Yield (кg / ha)
Control (0 кg Si)	3825
50 кg Si / ha	4182
150 кg Si / ha	4193

Table 4. Nutritional status of zinc (Zn), iron (Fe), molybdenum (Mo), and silicon (Si) in maize grains under cultivation conditions without the addition of silicon fertilizer (Control) and with added silicon in the form of potassium silicate (K_2OSi_3) at doses of 50 kg and 150 kg/ha.

Treatments	K (mg kg^{-1})	Fe (mg kg^{-1})	Zn (mg kg^{-1})	Si (mg kg^{-1})
Control (0 кg Si)	4840	16	6.3	996
50 кg Si / ha	5700	20	8.6	1366
150 кg Si / ha	6350	21	9.5	1797