

## Results of *BIO-GEL* organic fertilizer field tests on corn

Experimental site – Kherson Region, Skadovsk district, Institute of Rice, NAAS, Ukraine, field No 5 of crop rotation under irrigation.

1. Soil-climatic zone – southern steppe of Ukraine.
2. Soil: dark chestnut alkaline combined with saline (30-50%), pH (water) of soil solution in a layer of 0-40 cm – 7.8; total salt content – 0.205 %; humus content (according to Tyurin) – 2.03 %; mobile phosphorous forms (according to Machigin) – 3.79 mg/100 g soil; potassium exchange forms (according to Machigin) – 25.6 mg/100 g soil; easily hydrolyzed nitrogen (according to Tyurin-Kononova) – 4.07 mg/100 g soil.
3. Crop: corn, *Rava* (FAO 500) variety bred by the Institute of Grains, NAAS.
4. Precursor: winter wheat + buckwheat after harvest.
5. Seeding rate: 95000 grains/ha, date of sowing – 01.05. 2017. Sowing was performed by the CПЧ-8 wide-row seeder, space between rows being 70 cm.
6. Agrotechnology used: common for corn cultivation in the southern steppe of Ukraine under irrigation (the main cultivation is plowing to the depth of 20-22 cm). The fertilizers used are N<sub>120</sub>P<sub>60</sub>, 300 kg/ha ammonium sulfate and sulfate ammophos during presowing cultivation. Chemical protection against weeds: *MaisTer* herbicide, 150 g/ha, + *BioPower* antistress agent, 1.25 l/ha (27.05.2017 at the 3-4 true leaves stage) and spraying against pests with *Borey Neo* insecticide, 0.15 l/ha + *Abacus* fungicide, 1.5 l/ha (24.06.2017). 4 vegetative waterings were carried out, the total irrigation rate being 2200 m<sup>3</sup>/ha.
7. Test schedule and terms of preparations use:
  - control (integrated plant protection IPP);
  - IPP + seed treatment with *BIO-GEL*, 1.5 l/t (15 % concentration) – 29.04. 2017.
  - IPP + seed treatment with *BIO-GEL*, 1.5 l/t (15 % concentration) – 25.04.2017 + plants spraying at the 5-6 leaves stage with *BIO-GEL*, 1.5 l/ha (0,75 % concentration) – 02.06. 2017.
  - IPP + seed treatment with *BIO-GEL*, 1.5 l/t (15 % concentration) – 25.04.2017 + plants spraying at the 5-6 leaves stage with *BIO-GEL*, 1.5 l/ha (0,75 % concentration) – 02.06.2017 + plants spraying at the 8-9 leaves stage with *BIO-GEL*, 1.5 l/ha (0,75 % concentration) – 27.06. 2017.
8. Test type: the size of sown area – 5.6×10 m<sup>2</sup>, discount area – 1.4×10 m<sup>2</sup>. Three times repeated tests. Systematic disposition.
9. Equipment used – manual knapsack sprayer. Working liquid consumption according to the specified concentration in the test scheme.
10. Methods of registration: Yield registration according to test variants was made on September, 14, 2017 by the method of continuous ears harvesting on the discount area and their threshing by a mechanical device. Crop data are given according to standard indicators (100% purity, 14% humidity).

11. Test results and analysis: as a result of field tests (within the range of cultivation variants used in the experiment) there has been confirmed the positive effect of *BIO-GEL* on plants productivity after presowing corn seeds treatment with *BIO-GEL*, the rate being 1.5 l/t (15% concentration) (table 4.1). Spraying corn plants with *BIO-GEL* at the stage of 5-6 and repeated spraying at the stage of 8-9 true leaves did not result in considerable yield increase, it being inessential, within error (+0.9 and +1.5 c/ha) compared to the variant in which *BIO-GEL* was used only for seed treatment.

Table 4.1 Corn yields depending on *BIO-GEL* use at different corn vegetation stages, c/ha

№	Experiment variant	Repeatability			On average	Increase compared to control	%
		I	II	III			
1	Control	92.9	97.6	100.0	96.8	-	-
2	<i>BIO-GEL</i> 2, 1.5 l/t (seeds)	109.5	114.3	110.5	111.4	+ 14.6	15.1
3	<i>BIO-GEL</i> 2, 1.5 l/t (seeds) + <i>BIO-GEL</i> 2, 1.5 l/ha (5-6 corn leaves)	112.6	116.0	108.3	112.3	+ 15.5	16,0
4	<i>BIO-GEL</i> , 1.5 l/t 2 (seeds) + <i>BIO-GEL</i> 2, 1.5 l/ha (5-6 corn leaves) + <i>BIO-GEL</i> 2, 1.5 l/ha (8-9 corn leaves)	104.3	114.3	120.0	112.9	+ 16.1	16.6

HIP<sub>05</sub> 7.7 c/ha

12. Conclusions and recommendations: in order to increase corn productivity in the southern steppe of Ukraine under irrigation it is advisable to use presowing seed treatment with *BIO-GEL*, the rate being 1.5 l/t (15% concentration) and the cost of seeds per hectare being not more than 20 UAH.

13. The proceeds from the sale of additional 15.1 c corn make 4530 UAH, the price being 3 UAH/kg. Thus, for each UAH invested in *BIO-GEL* the contingent profit makes 227 UAH.