EFFECT OF MLG-50™ ON SUGAR BEET BIOMASS

Trials report

Rumokai Experimental Station of the Lithuanian Research Centre for Agriculture and Forestry

Klausučiai LT-70462, Vilkaviškis, Lithuania

2016

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Metereological conditions

In 2016, the average daily temperature in April was + 7.8 °C, or, 0.5 ° C higher than the SCR (standard climate rate). The amount of precipitation in April (56.6 mm) was 1.6 times the SCR. Most of April's precipitation fell in the II and III stages of April (the 11th through the 30th). Therefore, spring seeding at the Rumokai Experimental Station of the Lithuanian Centre for Agriculture and Forestry took place in several stages; on April 10th and 27th and on May 4th, respectively.

May was warm, with an average daily temperature of 15.0 °C, which was 2.0 °C warmer than the SCR. May's total rainfall amount was 45.3 mm (SCR for May is 32.0 mm). However, precipitation in May was unevenly distributed throughout the month. The first ten and last ten days of May were dry. Heavy rains in the middle of May resulted in the formation of a surface crust on the soil in many parts of the growing plots. Therefore, conditions for spring germination and young plant development were not optimal.

June was also a warm month, especially in the last ten days. June had an average daily air temperature of 17.8 °C (the SCR for June is 15.7 °C). The rainfall amount in June totalled 60.2 mm, which is close to the standard climate rate.

The total rainfall for July was 80.5 mm (SCR for June is 72 mm). The rain in July of 2016 was accompanied by strong winds, which wiped out crops. The average daily temperature in July was 18.4 (while the SCR for July is 18.0).

August 2016 was exceptionally rainy, with a total of 104 mm of rain. The winter wheat precrop/cover crop was harvested in August, during which the conditions were unfavorable for harvesting. Moisture and heat in August increased the spread of leaf diseases in sugar beet crops (please see Table 6).

Table 1. Meteorological conditions during plant vegetation periods, Kybartai, 2016.

Month	Air Temperature, °C.					Precipitation, mm.				
	Thirds of the Month.			Avg. per month.	SCR, 1981-2010.	Thirds of the Month.			Total per month.	SCR, 1981-2010.
	I	II	III			I	II	III		
April	8.9	8.4	6.1	**7.8**	7.3	5.0	24.2	27.4	**56.6**	36
May	14.6	12.6	17.7	**15.0**	13.0	6.2	36.7	2.4	**45.3**	32
June	16.3	16.0	21.0	**17.8**	15.7	11.5	28.3	20.4	**60.2**	50
July	17.5	17.7	20.1	**18.4**	18.0	43.0	25.2	12.3	**80.5**	72
August	18.2	15.6	19.0	**17.6**	17.4	39.5	41.7	22.8	**104.0**	81
September	16.7	13.9	11.2	**13.9**	12.8	17.0	0.0	14.8	**31.8**	72

Sunlight—an important factor in the accumulation of sugar in sugar beet roots—was lacking in July and August. (Please see Table 2.) However, higher than average sunlight occurred throughout September, creating more favorable conditions for the accumulation of sugar in sugar beets.

Table 2. Sunshine duration during sugar accumulation period in sugar beets, Kybartai, 2016.

Month, in thirds.		Sunshine, hours.		
		2016	Multiannual average	Deviation
July	I	71	90	-19
	II	61	78	-17
	III	67	94	--27
Totals		199	262	--63
August	I	47	88	-41
	II	55	78	-23
	III	78	79	-1
Totals		180	245	-65
September	I	70	56	+14
	II	78	48	+30
	III	53	47	+6
Totals		201	151	+50

Research conditions

Cover crop (planted, grown and harvested prior to sugar beet planting):

winter wheat.

Fertilization (please see “Research Scheme” below for more specifics):

April 26, 2016
June 14, 2016.

Fertilizers:

0.3 Aminocat (liquid organo-mineral fertilizer, containing amino acids and micro- and macro- elements) liters per hectare;
0.3 liters Razormin (a biostimulant with a rooting effect) per hectare;
0.5 kilograms ETD boron per hectare.

Seeding:

April 27, 2016.

Sugar beet variety:

“Lavenda KWS”.

Distance between seeds:

18.0 centimeters (7 inches).

Herbicides:

May 13, 2016: 1.0 liter per hectare Belveder and 1.0 liter per hectare Goltix.
June 3, 2016: 1.25 liters per hectare Betanal Max Pro and 1.0 liter per hectare Goltix.
June 6, 2016: 1.5 liters per hectare Agil.
June 20, 2016: 1.3 liters per hectare Betanal MaxPro and 20 grams per hectare Caribou.

Insecticides:

June 3, 2016: 0.75 liter per hectare Proteus.

Fungicides:

August 5, 2016: 1.0 liter per hectare Maredo.

Harvest:

October 7, 2016.

Soil:

Calcerous Luvisol (characteristic soil of forested regions) with the following traits: turfy, marshlike, lightweight clay.

Soil agrochemical properties:

pH (KCl): 7.6;
humus: 1.85% of the total organic matter in the soil;
mobile P_2O_5 (phosphorous pentoxide): 173 milligrams of nitrogen per kilogram of soil;
mobile K_2O (potassium oxide): 170 milligrams of nitrogen per kilogram of soil;
mineral nitrogen: 10.53 milligrams of nitrogen per kilogram of soil.

Researched component: MLG-50™ fertilizer, containing organic acids and minerals.

Research scheme

SUBSET A:

Variant One group (CONTROL group)**:**
800 kilograms per hectare NPK 12-11-22 (12% nitrogen; 11% phosphorous; 22% potassium) before seeding.
163 lograms ammonium nitrate per hectare at 4-6 leaves unfolded stage.

Variant Two group (TEST group)**:**
800 kilograms per hectare NPK 12-11-22 before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.
1.0 liter per hectare MLG-50™ at the rosette, or, cover crop stage (aka, stage 3 on the BBCH-scale for beet, just before the flowering stage).

SUBSET B:

Variant Three group (CONTROL group)**:**
800 kilograms per hectare NPK 12-11-22 plus 1.0 liter per hectare MLG-50™ before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.

Variant Four group (TEST group)**:**
800 kilograms per hectare NPK 12-11-22 plus 1.0 liter per hectare MLG-50™ before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.
1.0 liter per hectare MLG-50™ at the rosette, or, cover crop stage (aka, stage 3 on the BBCH-scale for beet, just before the flowering stage).
1.0 liter per hectare MLG-50™ one month before harvesting.

SUBSET C:

Variant Five group (CONTROL group)**:**
800 kilograms per hectare NPK 12-11-22 plus 1.5 liters per hectare MLG-50™ before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.

Variant Six group (TEST group)**:**
800 kilograms per hectare NPK 12-11-22 plus 1.5 liters per hectare MLG-50™ before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.
1.0 liter per hectare MLG-50™ at the rosette, or, cover crop stage (aka, stage 3 on the BBCH-scale for beet, just before the flowering stage).
1.0 liter per hectare MLG-50™ one month before harvesting.

SUBSET D:

Variant Seven group (CONTROL group)**:**
800 kilograms per hectare NPK 12-11-22 plus 2.0 liters per hectare MLG-50™ before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.

Variant Eight group (TEST group)**:**
800 kilograms per hectare NPK 12-11-22 plus 2.0 liters per hectare MLG-50™ before seeding.
163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.
1.0 liter per hectare MLG-50™ at the rosette, or, cover crop stage (aka, stage 3 on the BBCH-scale for beet, just before the flowering stage).
1.0 liter per hectare MLG-50™ one month before harvesting.

Research results

Ten days after seeding, the initial field germination number was calculated. This number shows the seed germination energy. As soon as the crop germinates, the plants are more viable and their development becomes more equal. The final field germination number was calculated one month after seeding the sugar beets. Our researched product, MLG-50™ organic acids and minerals, was amended before plant seeding, but no substantial impact on either initial or on final field germination numbers was found (Table 3). Sugar beet density before harvest ranged from 108.89 to 116.30 thousand plants per hectare. The largest plant densities were found in the Subset D groups, or, Variants Seven and Eight groups, in which 2.0 liters per hectare MLG-50™ were amended before seeding. As a result of applying MLG-50™, plants were stronger and more resistant to unfavorable environmental conditions during vegetation.

Table 3. Sugar beet density, Rumokai, 2016.

Variant		Initial germination, %.	Final germination, %.	Plant density during harvest, thousand pieces per hectare.
One (Subset A)	800 kilograms per hectare NPK (12-11-22); 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	41.4	87.2	111.11
Two (Subset A)	800 kilograms per hectare NPK (12-11-22) before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ (one application, mid-season).	51.6	87.2	109.41
Three (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	42.6	87.4	108.89
Four (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ before seeding x 2 applications (one application mid-season and, the second, a month before harvest).	46.7	89.0	108.89
Five (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	51.8	89.2	109.63
Six (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	50.8	86.25	109.63
Seven (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	52.0	88.0	116.29
Eight (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	44.9	87.5	116.30

The average weight of a single plant root on which MLG-50™ was used—either before seeding or during the growing season—increased, but the increase was not significant (Table 4).

Sugar beet yield ranged from 83.41 to 90.52 metric metric tons per hectare. The greatest sugar beet yield was obtained from the group in which 1.5 liters per hectare MLG-50™ were amended before seeding and in which MLG-50™ was also sprayed twice during vegetation (at one liter per hectare), or, the Variant Six group. Sugar content in beets within the Variant Six group ranged from 18.29 to 18.57%.

The use of MLG-50™ was found to have an upward trend in sugar content, although the sugar content differences are not significant. The largest biological sugar yield was found in the group in which 1.5 liters per hectare MLG-50™ were amended before seeding and in which MLG-50™ was also sprayed twice (at one liter per hectare) during vegetation, or, the Variant Six group.

Table 4. Sugar beet root yield and sugary level, Rumokai, 2016.

Variant		One root weight, kg.	Root yield, metric tons per hectare.	Root yield bonus, metric tons per hectare.	Sugar content, %.	Biological sugar yield, metric tons per hectare.
1 (Subset A)	800 kilograms per hectare NPK (12-11-22); 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	0.750	83.41	-	18.29	15.25
2 (Subset A)	800 kilograms per hectare NPK (12-11-22) before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ (one application, mid-season).	0.814	87.41	4.00*	18.49	16.16
3 (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	0.791	86.08	2.67*	18.29	15.74
4 (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ before seeding x 2 applications (one application mid-season and, the second, a month before harvest).	0.802	87.41	4.00* 1.33**	18.49	16.16
5 (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	0.799	87.56	4.15*	18.50	16.20
6 (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	0.825	90.52	7.11* 2.96***	18.43	16.68
7 (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	0.762	88.59	5.18*	18.49	16.38
8 (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	0.768	89.33	5.92* 0.74****	18.57	16.59

Note: * compared to variant 1; ** compared to variant 3; *** compared to variant 5; **** compared to variant 7.

When converting sugar beet root yield to white sugar (or, to the final product) yield, the final yield quantity depends not only on sugar content, but also on the non-sugar substances (potassium, sodium, alpha-amino nitrogen) that occur in sugar beet crops. These substances reduce the white sugar extraction potential

(by reducing quantity). MLG-50™ did not influence potassium, sodium and alpha amino nitrogen quantities in sugar beets.

The largest white sugar amount was obtained from the group in which 2.0 liters per hectare MLG-50™ were amended before seeding and in which MLG-50™ was also sprayed twice (at one liter per hectare) during vegetation, or, the Variant Eight group.

Table 5. Sugar beet root quality information and white sugar yield, Rumokai, 2016.

Variant		Potassium, millimoles per 100g.	Sodium, millimoles per 100g.	Alpha amino nitrogen, miligrams per 100g.	White sugar, metric tons per hectare.
One (Subset A)	800 kilograms per hectare NPK (12-11-22); 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	3.23	0.19	7.6	13.23
Two (Subset A)	800 kilograms per hectare NPK (12-11-22) before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ (one application, mid-season).	3.43	0.19	8.3	13.95
Three (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	3.56	0.19	8.3	13.51
Four (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ before seeding x 2 applications (one application mid-season and, the second, a month before harvest).	3.57	0.18	8.1	13.92
Five (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	3.27	0.17	7.3	14.08
Six (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	3.54	0.19	7.7	14.37
Seven (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	3.62	0.19	8.3	14.07
Eight (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	3.17	0.17	7.4	14.51

Sugar beet fungal leaf disease occurrences were determined before harvest. Sugar beets were mostly affected by pod spot, ramularia leaf spot, mildew and rust (Table 6). Since pod spot and ramularia leaf spot symptoms and development cycles are very similar and, since the associated treatment methods are identical, these two diseases are categorized into one group ("pod spot") in the table below. This study did not find any significant influence of MLG-50™ on fungal leaf diseases.

Table 6. Sugar beet leaf diseases, Rumokai, 2016.

Variant		Pod spot (cercospora leaf spot and ramularia leaf spot).		Powdery mildew.		Rusts.	
		Spread, %.	Intensity, %.	Spread, %.	Intesity, %.	Spread, %.	Intensity, %.
One (Subset A)	800 kilograms per hectare NPK (12-11-22); 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	96.8	7.50	100.0	45.40	58.4	5.80
Two (Subset A)	800 kilograms per hectare NPK (12-11-22) before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ (one application, mid-season).	98.3	9.70	100.0	48.15	68.4	9.20
Three (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	100.0	17.45	100.0	39.45	71.7	11.40
Four (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ before seeding x 2 applications (one application mid-season and, the second, a month before harvest).	100.0	19.90	100.0	53.25	73.3	10.90
Five (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	96.7	7.85	100.0	47.5	65.0	6.00
Six (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	100.0	13.05	96.7	42.85	46.7	3.40
Seven (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	100.0	10.55	98.4	47.35	71.6	7.50
Eight (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	100.0	8.85	98.4	47.45	71.60	9.40

To calculate the economic effect of different fertilizer levels, sugar content of beet root yields were calculated as the base sugar content root yield (Table 7). As a result of the use of MLG-50™, the income bonus amounts ranged from 65.82 to 181.56 euros per hectare. The biggest economic bonus was obtained from the group in which 1.5 liters per hectare MLG-50™ was amended before seeding and also sprayed twice during vegetation (at one liter per hectare), or, the Variant Six group. (The cost of spraying is not included in the above calculations, since MLG-50™ can be combined with pesticides when spray-applied.)

Table 7. The economic evaluation of the tested fertilizer, Rumokai, 2016.

Variant		Base sugar beet roots sugar content yield, metric tons per hectare.	Yield bonus, metric tons per hectare.	Income for yield bonus, euros per hectare.	Expenses for MLG-50™, euros per hectare.	Income bonus, euros per hectare.
One (Subset A)	800 kilograms per hectare NPK (12-11-22); 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	95.35	-	-	-	-
Two (Subset A)	800 kilograms per hectare NPK (12-11-22) before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ (one application, mid-season).	101.01	5.66	157.40	38.00	119.40
Three (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	98.40	3.05	84.82	19.00	65.82
Four (Subset B)	800 kilograms per hectare NPK (12-11-22) plus 1.0 liter per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ before seeding x 2 applications (one application mid-season and, the second, a month before harvest).	101.01	5.66	157.40	57.00	100.40
Five (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	101.24	5.89	163.80	28.50	135.30
Six (Subset C)	800 kilograms per hectare NPK (12-11-22) plus 1.5 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	104.27	8.92	248.06	66.50	181.56
Seven (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	102.38	7.03	195.50	38.00	157.50
Eight (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	103.68	8.33	231.66	76.00	155.66

Note: base sugar content=16%; purchase price of base sugar content from sugar beets=27.81 euros per metric ton; MLG-50™ cost=19.00 euros per liter. [Prices exclude value-added tax (VAT).]

Research results show that using 2.0 liters per hectare MLG-50™ before seeding and one liter at the rosette growth stage and one month before harvesting increased humus content by 0.65%.

Table 8. Influence of MLG-50 on humus content, Rumokai, 2016.

Variant		pH.	Humus, %.
One (Subset A)	800 kilograms per hectare NPK (12-11-22); 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage.	7.0	2.00
Eight (Subset D)	800 kilograms per hectare NPK (12-11-22) plus 2.0 liters per hectare MLG-50™ before seeding; 163 kilograms per hectare ammonium nitrate at 4-6 leaves unfolded stage; 1.0 liter per hectare MLG-50™ x 2 applications (one application mid-season and, the second, a month before harvest).	7.1	2.65

Conclusions

1. MLG-50™ amended before sugar beet seeding increased yield from 2.67 to 5.18 metric tons per hectare (depending on fertilizer rates). Fertilizers sprayed on plants during vegetation increased sugar beet yield from 0.74 to 4.00 metric tons per hectare. The greatest sugar beet yield was obtained from the Variant Six group, on which 1.5 liters per hectare MLG-50™ were amended before seeding and on which MLG-50™ was also sprayed twice (at one liter per hectare) during vegetation.
2. The greatest quantity of white sugar was obtained from the Variant Eight group, on which 2.0 liters per hectare MLG-50™ were amended before seeding and on which MLG-50™ was also sprayed twice (at one liter per hectare) during vegetation.
3. The maximum income bonus, at 181.56 euros per hectare, was obtained from the Variant Six group, on which 1.5 liters per hectare MLG-50™ were amended before seeding and on which MLG-50™ was also sprayed twice (at one liter per hectare) during vegetation.