

AREI potato field trial

A field comparison of potato treatments under the reported Paroli trial conditions.

Full text and tables in the selected language. Automatic translation with terminology and numerical checks; not a certified translation. Author statements, including disputed claims, are retained. Editorial notes are separate.

Editorial note

The report states that the yield difference was not statistically significant; this is not evidence of disease control or fertilizer replacement.

[NanoImport — Editorial note ↗](#)

APP “Institute of Agricultural Resources and Economics”

STENDE RESEARCH CENTRE

„Impact of organic products on potato growth, yield and quality”

Researchers:

MSc in Agriculture, Solveiga Maļeckā,

Research assistant Margita Damškalne

APP “Institute of Agricultural Resources and Economics”

Stende Research Centre

Dižstende, 2025

The purpose of the trial:

To compare the effects of organic product doses on potato yield and quality in agroclimatic conditions of Kurzeme.

1. Test methodology and conditions

Table 1.1

Test methodology and conditions

Table 1

Test site	AREI Stende Research Centre	AREI Stende Research Centre
Commissioning client	JikoEnt	JikoEnt
Name	„Impact of organic products on potato growth, yield and quality”	„Impact of organic products on potato growth, yield and quality”
Location	SCL crop sequence field No. 10	SCL crop sequence field No. 10
Crop	Potatoes	Potatoes
Variety	‘Paroli’	‘Paroli’
Treatment	Controls without NPK	Controls without NPK
Treatment	ChitoHumus 0.1 L ha-1 without NPK (C1)	ChitoHumus 0.1 L ha-1 without NPK (C1)
Treatment	ChitoHumus 0.2 L ha-1 without NPK (C2)	ChitoHumus 0.2 L ha-1 without NPK (C2)
Treatment	Control with NPK	Control with NPK
Treatment	ChitoHumus 0.1 L ha-1 with NPK (C1)	ChitoHumus 0.1 L ha-1 with NPK (C1)
Treatment	ChitoHumus 0.2 L ha-1 with NPK (C2)	ChitoHumus 0.2 L ha-1 with NPK (C2)
	ChitoHumus 0.3 L ha-1 with NPK (C3)	ChitoHumus 0.3 L ha-1 with NPK (C3)
Soil type	Velené podzolēta surface-cut light moraine sandstone	Velené podzolēta surface-cut light moraine sandstone
Soil characteristics	6.2 pH, organic matter content 2.0 %, K2O 199 mg kg-1, P2O5 180 mg kg-1	6.2 pH, organic matter content 2.0 %, K2O 199 mg kg-1, P2O5 180 mg kg-1
Soil treatment	Autumn crop in spring ploughed and deepened 22.05.2025., following the principle of the only difference	Autumn crop in spring ploughed and deepened 22.05.2025., following the principle of the only difference
Pre-plant	Papaver	Papaver
Basic fertilizer	Complex mineral fertilizer YM NPK 11-11-21 450 kg ha-1 I before planting in variants with NPK, handmade	23.05.2025.
Topsoil	Calcium nitrate N25 kg ha-1 (N15%, Ca 26%) or 166 kg ha-1 in variants with NPK, handmade	09.07.2025.
Foliage fertilizers	KaSe 3.0 L ha-1 (K2O 25%, S 17%) in treatments with NPK; KaSe 3.0 L ha-1 (K2O 25%, S 17%) + Multiple 0.5 L ha-1 (Mg 4.57%, Mn 16.0%, Cu 5.98%, Zn 4.57%) in treatments with NPK, applied with a hand-operated sprayer.	04.07.2025. 02.08.2025.
Seed	Provided by the Performer	Provided by the Performer
Planting	With planting machine (4 rows) KORA 4H (~30 balls per 10 m long furrow x 4 rows)	23.05.2025.
Care of volumes	Field measurement according to the test scheme, pruning and AAL application	
Kodne	-	

Herbicide	Fenix 3.0 L ha ⁻¹ (acloniphen 600 g L ⁻¹) before germination	03.06.2025.
Fungicide	Infinito 1.5 L ha ⁻¹ (propamocarb, 523.8 g L ⁻¹ ; propamocarb hydrochloride, 625 g L ⁻¹ ; fluopicolid, 62.5 g L ⁻¹) with tractor sprayer 31 AE with tractor sprayer; Infinito 1.2 L ha ⁻¹ with ritch sprayer; Infinito 1.2 L ha ⁻¹ 65-67 AE with ritch sprayer; Infinito 1.2 L ha ⁻¹ + Conclude AZT 250 0.5 L ha ⁻¹ (azoxystrobin 250 g L ⁻¹) with a ritch sprayer;	02.07.2025. 12.07.2025. 22.07.2025. 02.08.2025.
Insecticide	Carnadine 0.12 L ha ⁻¹ (acetamiprid, 200 g L ⁻¹) in conjunction with fungicide Delmetros 0.05 l ha ⁻¹ (deltamethrine 100 g L ⁻¹) on Colorado baboons with backpack sprayer	02.07.2025. 07.08.2025.
Organic product	Used 2x per season with a ritch sprayer (25-30 cm plants - 31-33 AE and first flower buds)	04.07.2025. 12.07.2025.
Area	30 m ² (3.0x10 m) - 4 places	30 m ² (3.0x10 m) - 4 places
Number of variants	6	6
Repeats	4	4
Number of fields	24	24
Area to be counted	15 m ² (1.5x10 m) - 2 internal grooves	15 m ² (1.5x10 m) - 2 internal grooves
Phenological observations	Sprouting, Sprouting of the roots AE, Sprouting of tuber stems (flower pump type) 50-51 AE	15.06.2025. 26.06.2025. 12.07.2025.
Recording / observations	Number of trees in the area to be counted; In each iteration, before harvesting, 1 stem is dug out to analyze the tuber in 3 main fractions;	09.07.2025. 24.09.2025.
Harvesting	3-4 weeks after leaf harvesting with a two-row potato digger two middle furrows, determining the yield of each field by hand	25.-26.09.2025.
Data processing	Microsoft Excel using single-factor variance analysis with iterations.	Microsoft Excel using single-factor variance analysis with iterations.
Report	Methodology and conditions of the experiment, characteristics of meteorological conditions during the vegetation period, results and their brief description.	Methodology and conditions of the experiment, characteristics of meteorological conditions during the vegetation period, results and their brief description.

*Selection of fertilizer and AAL is determined by the Institute's procurement.

2. Trial design

Table 2							
IV							

III							
II							
I							
	NPK	NPK C1	NPK C2	C1	C2	0	C3

3. Description of meteorological conditions

Table 3.1

Description of meteorological conditions,

2025. (Sende HMS data)

Table 3												
Ten-day period	Mean air temperature, °C	Mean air temperature, °C	Mean air temperature, °C	Mean air temperature, °C	Mean air temperature, °C	Mean air temperature, °C	Total precipitation, mm	Total precipitation, mm	Total precipitation, mm	Total precipitation, mm	Total precipitation, mm	Total precipitation, mm
ten-day period	I	II	III	Monthly mean	Long-term mean	± from long-term mean	I	II	III	Monthly total	Long-term value	Relative to long-term value, %
March	5.1	1.3	4.9	3.8	0.1	3.7	4.1	6.8	4.3	15.2	38.5	39
April	3.2	11.1	7	7.1	5.8	1.3	4.9	47.4	11.3	63.6	38.1	167
May	6.3	8	12.7	9.0	11.1	-2.1	4.3	58.8	1.4	64.5	46	140
June	14.2	14.1	14.2	14.2	14.7	-0.5	25.8	21.2	16.9	63.9	71.4	89
July	16.5	19.3	19.3	18.4	17.3	1.1	25.4	2.2	102.1	129.7	78.1	166
August	17.2	16.5	13	15.6	16.6	-1.0	21.9	9.9	55.2	87	83.4	104

Characteristics of meteorological conditions in the 2025 growing season

The average spring temperature in Latvia in 2025 (March-May) was 6.9 °C, which is 1.0 °C above the seasonal norm, thus becoming the 10th warmest spring in the history of observations (since 1924). Stands 1.0 °C above normal. The lowest air temperature this spring (−10.4 °C) was recorded in Alūksne on March 17, while the highest air temperature was +28.4 °C in Skryje. The average air temperature in Latvia was above normal for almost all of March, except for a few days in the middle of the month. Following the two-and-a-half-week heat wave that began in late February, the first half of March was particularly warm. Warm weather conditions continued in the second half of March, as a result of which March with an average air temperature of +3.8 °C was 3.6 °C warmer than normal and became the 2nd warmest March in the history of observations. In early April, the spring weather continued, but after a few days the air temperature dropped and a week-long cool period began. In the middle of the month, the air temperature increased rapidly, reaching a maximum on April 18. The average air temperature in Latvia on 18 April was 17.9 °C, which is 11.8

°C above the normal for this date. Despite cool periods and even recorded minimum air temperature at the end of the month, April with an average air temperature of +7.4 °C was 1.3 °C warmer than the monthly norm. On the other hand, May was cool throughout the country. The average air temperature in Latvia was below normal for almost the whole month, on some days even about 5 °C below normal. In the first half of May, the average air temperature was even lower than in the warm periods of March and April. The average air temperature in Latvia in May was +9.4 °C, which is 2.0 °C below the monthly norm, making May the coldest month in this century.

The total precipitation in spring in Latvia was 147.5 mm, which is 20% above the seasonal norm (123.1 mm). The lowest precipitation was in Vičaci (54.5 mm), while the most rainfall-rich spring was in Madona, where the total precipitation amount was 280.9 mm (105% above the norm). Stands 1.7% of the norm. March with 24.0 mm was the only spring month that was drier than normal (35% below normal). In April, the precipitation amount in Latvia reached 39.2 mm, which is 9% above the norm, while May was the wettest spring month with a total precipitation of 84.7 mm (68% above the norm). In mid-May, prolonged rain was recorded almost throughout Latvia. In Kurzeme, the western Vidzeme and the central regions of the country, the amount of precipitation was relatively low until the end of May, while in Latgale, Sēlija and Eastern Vidzeme, the rain continued, as a result of which May was very wet in these regions. In Madona, where it rained more than 3 times the May norm, this was the wettest May in the history of observations.

Snow was not a frequent phenomenon this spring – in March the average snow cover thickness in Latvia did not reach 1 cm, while in the other months it was 0 cm. In the first days of March, snow cover of up to 8 cm in thickness remained at some stations in the east of the country, but it soon faded. Short-term snow cover in the eastern part of the country also formed in mid-March and early April, but it fell everywhere within one or two days. Snowfall without snow cover formation was observed in the middle of May.

The average air temperature of the calendar summer (June–August) in Latvia was +16.4 °C, which is 0.3 °C below the seasonal norm, thus becoming the coldest summer since 2017. The lowest air temperature this summer (+2.4 °C) was observed in Zosēni on August 21, while the highest air temperature was +32.4 °C, which was recorded on July 3 in both Mersrags and Riga. In Stendē, Latgale and Priekulī 0.2°C below normal. In the first half of June there were periods with average air temperature above and below normal, while in the second half of the month the average air temperature in the country was below normal, as a result of which June with an average air temperature of +14.5 °C was 0.7 °C colder than normal. At the beginning of July, air temperatures increased rapidly, reaching a peak on 3 July, when daily maximum air temperature records were set at 23 monitoring stations. In the following days in the 1st ten-day period of July the average air temperature fluctuated, some days being several degrees below normal, but in the 2nd and 3rd ten-day period the air temperature increased and the remainder of July was steadily above normal, in Ainaži even a week-long heat wave was registered, and on the night of 20 July a tropical night was observed in Mersrags. The average air temperature in July was +18.9 °C, which is 1.1 °C above normal. In August, the weather was mostly cooler than normal, although some days were warm. The 3rd ten-day period of the month was particularly cool – the average air temperature for several days was even below +12.0 °C, which is about 4.0 °C below normal. Although the air temperature increased at the very end of August, August with an average air temperature of +15.9 °C was 1.0 °C colder than normal and became the coldest in this century (including 2012).

The summer of 2025, with a total rainfall of 272.6 mm, was 22% wetter than the normal (222.6 mm), becoming the wettest summer since 2016. Only at some stations the summer was drier than normal. However, in most of Latvia this summer was wetter than usual, especially in the eastern part of the country. In Gulbene the summer was the wettest with total precipitation of 414.0 mm or 88% above the station seasonal norm. In Stendē 20%, Rēzekne 25%, Dobele 15%, Priekule 26% above the norm.

The beginning of June was very humid throughout Latvia, in many observation stations in the 1st ten-day period the amount of precipitation was twice or even three times greater than the ten-day period norm, and on average the ten-day period was 123% wetter than the norm. In the 2nd and 3rd ten-day period of June, rainfall was less in most of the country, but in the eastern part of the country, especially in eastern Vidzeme and Latgale, rainfall was frequent. The first two days of July were without precipitation throughout the country, and also on 3 and 4 July significant precipitation (at least 1 mm) was observed only at selected stations. However, after that the wet weather returned, the most precipitation was observed in eastern Vidzeme and Latgale. On July 9–11, 85.4 mm of rain fell in Madona, which already exceeds the station's monthly norm of 67.4 mm. However, also elsewhere in Latvia days with intense precipitation were observed in July – in Kalnciems on July 16 (51.1 mm), in Liepāja on July 20 (39.3 mm), in Stendē on July 23 (39.1 mm). At the end of July and the beginning of August a lot of precipitation was observed in the middle of Kurzeme and Zemgale – especially on 30 July, when the precipitation in Dobele, Kuldīga and Stendē exceeded 30.0 mm, and in Saldus 52.9 mm fell during the day. The night to 1 August was also rainy, in Riga the precipitation amount reached 41.7 mm, while on 4 August in Gulbene it fell 49.4 mm in two hours. In the middle of August, rainfall ceased in most of the country, while at the end of August rainy weather returned to Kurzeme and the surroundings of Riga.

June and July were both wet. In June, the total precipitation in Latvia reached 91.1 mm, which is 30% above the norm, and in July – 107.0 mm, which is 41% above the norm. August with 73.9 mm was the only summer month that was drier than normal (4% below normal), albeit only slightly.

4. Results

Table 4.1

Yield of the potato variety 'Paroli', SPC, 2025.

Table 4							
Treatment	Yield, t ha ⁻¹	against K, t ha ⁻¹	against K, %	number of hopes, avg.	Avg. kg from field	Weight of one wax, avg. kg	against K, %
NPK	47.24			38	71.03	1.875	
NPK C1	49.33	2.10	104.4	36	73.40	2.060	109.9
NPK C2	47.67	0.43	100.9	34	71.48	2.079	110.9
NPK0	35.33			35	53.39	1.515	
NPK0 C1	36.87	1.54	104.3	35	55.47	1.568	103.5
NPK0 C2	30.96	-4.38	87.6	36	46.52	1.297	85.6
NPK0 C3	32.83	-2.51	92.9	35	49.31	1.394	92.0
RS0.05	3.76	3.76	-	-	-	-	-

Table 4.2

Yield quality of the potato variety 'Paroli', SPC, 2025.

Table 5					
Treatment	Starch in product, %	against K, %	Starch in dry matter, %	Starch yield, t ha-1	against K, %
NPK	10.27		63.93	4.85	
NPK C1	12.86	125.2	68.54	6.34	107.2
NPK C2	14.72	143.3	78.9	7.02	123.4
NPK0	12.72		69.15	4.49	
NPK0 C1	12.97	102.0	76.9	4.78	111.2
NPK0 C2	12.66	99.5	75.03	3.92	108.5
NPK0 C3	12.78	100.5	74.35	4.20	107.5

In general, this is not a potato harvest year. The yield was mostly affected by weather conditions. The season was too wet in some stages, but potatoes need four millimeters of moisture a day. However, the harvest was good. High yields would be above 50-60 tons of tubers per hectare. Higher yield was obtained when using NPK fertilizer and bioproduct at a dose of 0.1 L ha-1 (increase by 4.4% compared to control). Without using basic fertilizer yields are 25-35% lower. No significantly higher yield than control was found in any of the variants. The average weight of one wax was 9.9-10.9% higher when using NPK fertilizer and bioproduct at 0.1 L ha-1 and 0.2 L ha-1.

Table 4.3

Table 6									
Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale	Rating of economic traits of potato (Solanum tuberosum L.) varieties on a 9-point scale
Parameters	Balles	Balles	Balles	Balles	Balles	Balles	Balles	Balles	Balles
Parameters	1	2	3	4	5	6	7	8	9
Parameters	Very low	Very low	low	low	medium	medium	high	high	very high

Starch content in tubers, % (estimated for medium and late varieties)	< 10,0	10,0-12,0	12,1-14,0	14,1-15,0	Vid. 15.1-17.0	17,1-18,0	18,1-19,0	19,1-20,0	> 20,0
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‘Paroli’ – variety potatoes are early, yellow peel and flesh. Oval. Smooth skin. Medium-sized tubers. Resistant to cockroaches, viruses and nematodes (Ro1). Slightly floury, tender consistency, used for baking and cooking. The starch content in potatoes this year was low (10.27%-14.72%), evaluable with 3-4 points (see table 4.3). Higher starch content was obtained when using NPK fertilizer and bioproduct at a dose of 0.1 L ha⁻¹.

This year, the crop was damaged by the larvae of the owl (*Argotis* spp.) and wireworms (*Agriotes* spp.), and many potatoes were affected by tuber rot (*Xanthomonas* spp.).

Table 4.4

Potato seed analysis (4 seeds), Stendes PC, 2025.

Table 7												
Treatm ent	Food	Food	Food	Seed	Seed	Seed	Non-standar d harvest or Small	Non-standar d harvest or Small	Non-standar d harvest or Small	Damag ed	Damag ed	Damag ed
Treatm ent	Large fraction (>80g) > 55 mmm diam.	Large fraction (>80g) > 55 mmm diam.	Large fraction (>80g) > 55 mmm diam.	Medium fraction (40-80g) - 35-55 mm diamet er	Medium fraction (40-80g) - 35-55 mm diamet er	Medium fraction (40-80g) - 35-55 mm diamet er	Small fraction (<40g) - 35 mm diam.	Small fraction (<40g) - 35 mm diam.	Small fraction (<40g) - 35 mm diam.	at the end counts small weight	at the end counts small weight	at the end counts small weight
Treatm ent	Mass, kg	%	Numbe r, pcs	Mass, kg	%	Numbe r, pcs	Mass, kg	%	Numbe r, pcs	Mass, kg	%	Numbe r, pcs
NPK	0.570	9.0	2	2.580	40.8	25	2.300	36.4	13	0.870	13.8	7
NPK C1	0.670	17.3	4	1.240	32.0	18	0.240	6.2	12	1.720	44.4	19
NPK C2	1.220	36.1	6	1.720	51.0	22	0.130	3.9	8	0.305	9.0	4
NPK0	3.110	67.8	23	1.090	23.7	19	0.215	4.7	16	0.175	3.8	1
NPK0 C1	2.230	42.0	13	1.980	37.3	24	0.090	1.7	6	1.010	19.0	7
NPK0 C2	0.380	9.5	3	1.300	32.6	17	0.135	3.4	8	2.175	54.5	21
NPK0 C3	0.705	17.6	4	1.945	48.7	23	0.270	6.8	13	1.075	26.9	8

Table 4.5

Potato seed analysis (4 seeds), Stendes PC, 2025.

Table 8					
Treatment	Total tubers, pcs.	Total weight, kg	Fraction of tubers, kg	Commodity bumb. share in yield, %	Average mass of the tubers, g
NPK	47	6.320	3.150	49.8	0.117
NPK C1	53	3.870	1.910	49.4	0.087
NPK C2	40	3.375	2.940	87.1	0.105
NPK0	59	4.590	4.200	91.5	0.100
NPK0 C1	50	5.310	4.210	79.3	0.114
NPK0 C2	49	3.990	1.680	42.1	0.084
NPK0 C3	48	3.995	2.650	66.3	0.098

Summary

The trial yields were good, equivalent to previous years yields of this variety and compared to the control higher yield was obtained in the variant, using NPK fertilizer and bioproduct with a dose of 0.1 L ha⁻¹. In most cases, yields were equivalent to controls.

Without using basic fertilizer yields are 25-35% lower.

The starch content in potatoes is low (10.27%-14.72%). The earliest starch content in the product and starch yield was obtained in the variant using NPK fertilizer and bioproduct at a dose of 0.2 L ha⁻¹.

For objective evaluation of the bio-product, the trials need to be continued, because one year results give an incomplete picture of the effects of the investigated products in different agroclimatic conditions.

Field trials manager

Solveiga Maļeckā

08.01.2026.