

*Study of the influence of fertilizers on potato growth and yield*

**Badanie wpływu nawozów na wzrost i plonowanie ziemniaka**

Trial season: 2023/2024  
Trial ID: PL24FERTGOUDENKORREL\_SOLTU  
Research number: 7/2024  
Trial code: AP/24/Z/7/Zł  
Location: Poland

**SPONSOR**  
GOUDENKORREL SPÓŁKA AKCYJNA  
ul. Fabryczna 5,  
87-840 Lubień Kujawski

**REPORT AUTHOR**  
Artur Strzeliński

## UP Poznań, ZD Złotniki

Ocena skuteczności nawozów w uprawie ziemniaka

Trial ID: PL24FERTGOUDENKORREL\_SOLTU  
 Protocol ID: PL24FERTGOUDENKORREL Location: Poland Trial Year: 2024  
 Study Director: Artur Strzeliński Sponsor Contact: Gouden Korrel  
 Investigator: Artur Strzeliński

Trt No.	Treatment Name	Description	Rate	Unit
1	Untreated Check	not treated		
2	Belenus		400kg/ha	
3	Belenus		800kg/ha	

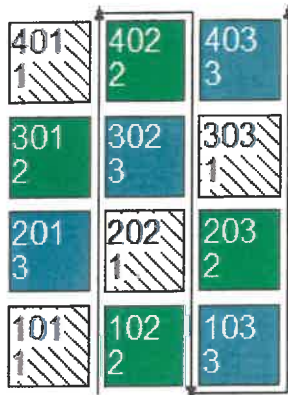
Replications: 4, Untreated treatments: 1, Design: Randomized Complete Block (RCB), Treatment units: Treated 'Plot' experimental unit size, Dry Form. Unit: %, Treated 'Plot' experimental unit size Width: 3 meters, Treated 'Plot' experimental unit size Length: 10 meters, Application amount: 200 L/ha, Mix size: 3 L, Overage: 25%, Format definitions: G-All7.def, G-All7.frm

Product quantities required for listed treatments and applications of trials included in this table:

Amount*	Unit	Treatment Name	Form Conc	Form Unit	Form Type	Lot Code
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### Trial Map Treatment Description

Trt	Code	Description
1	CHK	Untreated Check
2		Belenus 400 kg/ha
3		Belenus 800 kg/ha



Trial Comments

### General Trial Information

Study Director: Artur Strzeliński  
 Investigator: Artur Strzeliński

Discipline: D fertilizer  
 Status: F one year final  
 ARM Trial Created On: Nov-19-2024  
 Initiation Date: Apr-14-2024  
 Completion Date: Dec-2-2024

### Trial Location

Address (Location): UP Poznan  
 City: Złotniki Country: POL Poland  
 State/Prov.: Wielkopolskie  
 Postal Code: 62-002 Climate Zone: EPPONE EPPO North East

Latitude of LL Corner °: 52,490162 N  
 Longitude of LL Corner °: 16,818203 E

### Regulations

Test Facility: Poznan University of Life Sciences ZDD GORZYŃ  
 Conducted Under GLP: No  
 Conducted Under GEP: No

#### Contacts

**Role:** STYDIR study director  
**Study Director:** Artur Strzeński  
**Organization:** UP Poznań ZDURiR Złotniki  
**Address 1:** Wojska Polskiego 28  
**Country:** POL Poland **E-mail:** artur.strzelinski@up.poznan.pl  
**City:** Poznań **Postal Code:** 60-637  
**Role:** INVEST investigator  
**Investigator:** Artur Strzeński  
**Organization:** UP Poznań ZDD URiR Gorzyń  
**Address 1:** Wojska Polskiego 28  
**Country:** POL Poland **E-mail:** artur.strzelinski@up.poznan.pl  
**City:** Poznań **State/Prov:** 30 **Postal Code:** 60-637  
**Role:** SPONSR sponsor  
**Sponsor:** Gouden Korrel

#### Crop Description

**Crop 1:** C SOLTU Solanum tuberosum Potato **BBCH Scale:** BPOT  
**Entry Date:** Nov-20-2024 **Stage Scale:** BBCH  
**Variety:** Red lady  
**Planting Date:** Apr-16-2024 **Planting Rate:** 2200 kg/ha  
**Depth:** 5 cm  
**Row Spacing:** 70 cm  
**Planting Method:** PLANTD planted  
**Planting Equipment:** PP plot planter  
**Seed Bed:** FINE fine  
**Soil Moisture:** GOOD good  
**Emergence Date:** Apr-30-2024  
**Harvest Date:** Sep-23-2024  
**Harvested Width:** 1,4 m  
**Harvested Length:** 10 m

#### Site and Design

**Treated Plot Width:** 3 m **Site Type:** FIELD field  
**Treated Plot Length:** 10 m **Experimental Unit:** 1 PLOT plot  
**Treated Plot Area:** 30,0 m<sup>2</sup> **Tillage Type:** CONTIL conventional-till  
**Replications:** 4 **Treatments:** 3 **Plots:** 12 **Study Design:** RACOBL Randomized Complete Block (RCB)  
**Distance between Blocks:** 0 m  
**Distance between 'Plot' Experimental Units:** 0 m

No.	Previous Crop	Year
1.	HORVS	2023

#### Maintenance

No.	Date	Type	Maintenance Product Name	Rate	Rate Unit	Comment
1.	Apr-16-2024	FERT	Polidap	150	kg/ha	N - 18; P -46 / 100kg
2.	Apr-16-2024	FERT	Saletra amonowa	250	kg/ha	N - 34 / 100kg
3.	May-8-2024	HERB	Bandur 600 SC	3,0	l/ha	
4.	May-8-2024	HERB	Sencor liquid 600 SC	0,75	l/ha	
5.	Jun-4-2024	FUNG	Infinito 687,5 SC	1,5	l/ha	
6.	Jun-11-2024	INSE	Coragen 200 SC	0,0625	l/ha	
7.	Jun-24-2024	FUNG	Cabrio Duo	2,5	l/ha	
8.	Jun-26-2024	INSE	Karate Zeon 050 CS	0,16	l/ha	

#### Soil Description

**Description Name:** Złotniki  
**% Sand:** 66 **% OM:** 1,4 **Texture:** LS loamy sand  
**% Silt:** 21  
**% Clay:** 13 **Fert. Level:** G good  
**pH:** 7

Weather Conditions

Weather Station Name: Złotniki Code: 62-002 Distance: 1 km

No.	Date	Moisture Total	Unit	Min Temp	Max Temp	Temp Unit	Avg % Relative Humidity
1.	Apr-1-2024	1,5	mm	8,2	19,4	C	79,1
2.	Apr-2-2024	0	mm	9,9	13,7	C	77,4
3.	Apr-3-2024	1,7	mm	7,9	11,5	C	76,3
4.	Apr-4-2024	5,9	mm	7,1	17,2	C	84,9
5.	Apr-5-2024	3	mm	10,1	17,7	C	90,5
6.	Apr-6-2024	0	mm	12	20	C	80
7.	Apr-7-2024	0	mm	13,9	20,2	C	77,9
8.	Apr-8-2024	0	mm	13,9	21,7	C	76,3
9.	Apr-9-2024	0	mm	11,2	24,8	C	59,7
10.	Apr-10-2024	0	mm	4,4	17,2	C	69,8
11.	Apr-11-2024	0	mm	9,5	18,3	C	73,2
12.	Apr-12-2024	0	mm	12,6	19,5	C	74,1
13.	Apr-13-2024	0	mm	6,7	16,3	C	65,7
14.	Apr-14-2024	9,4	mm	6,5	11,5	C	72,1
15.	Apr-15-2024	5,7	mm	4,3	10	C	80,7
16.	Apr-16-2024	0,9	mm	2,8	9,4	C	81,5
17.	Apr-17-2024	1,7	mm	1	8	C	80,6
18.	Apr-18-2024	6,3	mm	1,8	8	C	86,6
19.	Apr-19-2024	0,9	mm	1,6	5,4	C	82,3
20.	Apr-20-2024	0	mm	-2	6	C	66,9
21.	Apr-21-2024	0,1	mm	-2	4,3	C	74
22.	Apr-22-2024	0	mm	-4	8,2	C	70,6
23.	Apr-23-2024	0	mm	2,2	10	C	58,8
24.	Apr-24-2024	0,7	mm	-1,6	10	C	76,4
25.	Apr-25-2024	0	mm	0,1	14,4	C	63,5
26.	Apr-26-2024	0	mm	3,9	20,2	C	57,7
27.	Apr-27-2024	0	mm	8	22,2	C	54,3
28.	Apr-28-2024	0	mm	10	24,2	C	59,9
29.	Apr-29-2024	0	mm	11,3	27,6	C	52,6
30.	Apr-30-2024	0	mm	11,3	27,39	C	55,8
31.	May-1-2024	0	mm	11	26	C	46,2
32.	May-2-2024	0	mm	11	26	C	45
33.	May-3-2024	0	mm	12	26	C	52,8
34.	May-4-2024	0	mm	12	27	C	65
35.	May-5-2024	3,2	mm	10,8	24,6	C	72,9
36.	May-6-2024	0	mm	9,8	18,2	C	64,6
37.	May-7-2024	0	mm	7,6	16,5	C	67,3
38.	May-8-2024	0	mm	5	17,5	C	53,4
39.	May-9-2024	0	mm	2,5	19	C	53
40.	May-10-2024	0	mm	6,3	20	C	63,8
41.	May-11-2024	0	mm	10	16	C	70,8
42.	May-12-2024	0	mm	5	20	C	45,7
43.	May-13-2024	0	mm	6	22,4	C	43,1
44.	May-14-2024	0	mm	8	23,5	C	41,4
45.	May-15-2024	0	mm	12	23,4	C	37,8
46.	May-16-2024	0	mm	12	24,4	C	39,3
47.	May-17-2024	0	mm	13	23,7	C	36
48.	May-18-2024	0	mm	10,4	21,9	C	57,2
49.	May-19-2024	24,6	mm	13,9	22,8	C	70,3
50.	May-20-2024	0	mm	11,4	23,6	C	71,8
51.	May-21-2024	0	mm	13,3	26,4	C	65
52.	May-22-2024	0,2	mm	17,3	26,5	C	65
53.	May-23-2024	11,8	mm	16,1	19,9	C	93,1
54.	May-24-2024	8	mm	13,6	22,9	C	78,2
55.	May-25-2024	0	mm	14,3	23,2	C	76,8
56.	May-26-2024	0	mm	14,8	25,8	C	69,3
57.	May-27-2024	0	mm	15,8	26,2	C	64,5
58.	May-28-2024	21	mm	14,1	25,9	C	82,9
59.	May-29-2024	0,2	mm	13,4	22,1	C	76,6
60.	May-30-2024	0	mm	13,1	24,6	C	74,4
61.	May-31-2024	4	mm	16	24,8	C	75,2
62.	Jun-1-2024	2	mm	16,3	25	C	80,4
63.	Jun-2-2024	6,2	mm	16	22,7	C	91,5
64.	Jun-3-2024	0,6	mm	14,6	20,1	C	95,9
65.	Jun-4-2024	0	mm	14,2	22,3	C	76,6
66.	Jun-5-2024	1,3	mm	11,9	24,3	C	73,7
67.	Jun-6-2024	3,1	mm	13,3	21,5	C	76,1
68.	Jun-7-2024	1,3	mm	12,2	19,6	C	79,3
69.	Jun-8-2024	0	mm	10	24	C	68,7
70.	Jun-9-2024	0	mm	14	20,6	C	71

71.	Jun-10-2024	0	mm	12,2	20,9	C	67,8
72.	Jun-11-2024	0	mm	8,2	16,4	C	68,9
73.	Jun-12-2024	0	mm	7,4	19,6	C	71,8
74.	Jun-13-2024	6,8	mm	6,9	17,9	C	85,3
75.	Jun-14-2024	0	mm	6,2	19,2	C	73,3
76.	Jun-15-2024	0	mm	11,9	24,7	C	65,5
77.	Jun-16-2024	0	mm	12,4	25,1	C	76,3
78.	Jun-17-2024	0	mm	13,3	24,6	C	76,5
79.	Jun-18-2024	0	mm	12,4	28,1	C	71,5
80.	Jun-19-2024	12,4	mm	12,2	21,1	C	71,4
81.	Jun-20-2024	0,2	mm	11,2	23,2	C	71,3
82.	Jun-21-2024	1,2	mm	12,5	28	C	71
83.	Jun-22-2024	3,6	mm	13,2	20,4	C	86,6
84.	Jun-23-2024	0	mm	11,6	24,2	C	70,8
85.	Jun-24-2024	0	mm	10,6	25,5	C	67,7
86.	Jun-25-2024	0	mm	14,8	24,6	C	75,3
87.	Jun-26-2024	0	mm	14,2	29,6	C	77,5
88.	Jun-27-2024	0	mm	16,5	32	C	68,9
89.	Jun-28-2024	0	mm	18,3	31,5	C	94,7
90.	Jun-29-2024	0	mm	14,2	31,6	C	75,4
91.	Jun-30-2024	0	mm	20,8	35,6	C	71
92.	Jul-1-2024	4,2	mm	15,7	27,8	C	91,4
93.	Jul-2-2024	0,4	mm	13,5	22,5	C	86,1
94.	Jul-3-2024	0	mm	11,2	21,6	C	79,1
95.	Jul-4-2024	8	mm	10,4	22,3	C	87,6
96.	Jul-5-2024	0	mm	9,7	24,3	C	73,7
97.	Jul-6-2024	2,2	mm	11,1	31,6	C	67
98.	Jul-7-2024	0,2	mm	15,1	25,4	C	70
99.	Jul-8-2024	0	mm	14,1	30,2	C	65,6
100.	Jul-9-2024	0	mm	13,6	33	C	63,9
101.	Jul-10-2024	4	mm	20,3	36,4	C	76,9
102.	Jul-11-2024	0,2	mm	17,6	30,3	C	95
103.	Jul-12-2024	20,4	mm	14,8	31,6	C	90,2
104.	Jul-13-2024	3	mm	15,1	23,6	C	91,5
105.	Jul-14-2024	3,4	mm	15,1	27,1	C	93,5
106.	Jul-15-2024	0	mm	14,2	32,7	C	74,4
107.	Jul-16-2024	0	mm	18,7	34	C	70,6
108.	Jul-17-2024	0	mm	15,4	26,9	C	73,7
109.	Jul-18-2024	0	mm	13,1	27,3	C	78,7
110.	Jul-19-2024	0	mm	12,7	29,8	C	72,3
111.	Jul-20-2024	0	mm	13,9	31,8	C	67,6
112.	Jul-21-2024	0	mm	14	34,7	C	64,1
113.	Jul-22-2024	0	mm	15,8	29,2	C	94
114.	Jul-23-2024	0,2	mm	12,5	28,9	C	72,2
115.	Jul-24-2024	9	mm	15	24,4	C	94,8
116.	Jul-25-2024	0,2	mm	11,8	25,6	C	74,5
117.	Jul-26-2024	0	mm	9,6	29,4	C	68
118.	Jul-27-2024	0,2	mm	13,3	25,9	C	86,4
119.	Jul-28-2024	7,8	mm	13,9	19,7	C	98,3
120.	Jul-29-2024	0	mm	12,2	23,4	C	79,2
121.	Jul-30-2024	0	mm	8,9	29,3	C	74,3
122.	Jul-31-2024	0	mm	11,2	30	C	70,5
123.	Aug-1-2024	0	mm	13,2	29,5	C	69,3
124.	Aug-2-2024	0,2	mm	13,5	23,2	C	93,4
125.	Aug-3-2024	0	mm	13,7	27,1	C	74,8
126.	Aug-4-2024	0	mm	11	25,1	C	89,5
127.	Aug-5-2024	0,2	mm	11	21,9	C	89,7
128.	Aug-6-2024	0	mm	7,6	27,6	C	74,7
129.	Aug-7-2024	0	mm	10,1	30,6	C	70,5
130.	Aug-8-2024	2,2	mm	15,2	24,7	C	91,5
131.	Aug-9-2024	0,2	mm	10,5	28,1	C	78,2
132.	Aug-10-2024	0,2	mm	15	26,3	C	75,3
133.	Aug-11-2024	0	mm	12,3	25,8	C	73
134.	Aug-12-2024	0	mm	10,1	28,2	C	65,7
135.	Aug-13-2024	0	mm	11,9	30,4	C	60,2
136.	Aug-14-2024	0	mm	15,2	31,5	C	40,1
137.	Aug-15-2024	4,8	mm	19,1	32,7	C	53,6
138.	Aug-16-2024	0	mm	16,8	31,7	C	80,3
139.	Aug-17-2024	0	mm	15,7	32,8	C	76,6
140.	Aug-18-2024	0	mm	17,2	33	C	75,6
141.	Aug-19-2024	0	mm	15	25,9	C	82,6
142.	Aug-20-2024	0	mm	12,8	28,1	C	84,3
143.	Aug-21-2024	22,2	mm	13,6	22,8	C	71,8
144.	Aug-22-2024	0	mm	10,9	20,9	C	76,4
145.	Aug-23-2024	0	mm	13,4	27,3	C	62,9
146.	Aug-24-2024	0	mm	13,5	31,3	C	59,4

147.	Aug-25-2024	0	mm	14,8	26,4	C	48,6
148.	Aug-26-2024	0	mm	13	25	C	78,4
149.	Aug-27-2024	0	mm	9,8	26,3	C	89,1
150.	Aug-28-2024	0	mm	14,9	29,1	C	62,4
151.	Aug-29-2024	0	mm	18,2	32	C	75
152.	Aug-30-2024	0	mm	16,5	33,9	C	69,9
153.	Aug-31-2024	2,4	mm	12,8	23,7	C	84,4
154.	Sep-1-2024	0	mm	10,4	24,3	C	63,4
155.	Sep-2-2024	0	mm	10,3	26,8	C	82
156.	Sep-3-2024	0	mm	15,5	31,9	C	69
157.	Sep-4-2024	0	mm	18,3	31,9	C	45,1
158.	Sep-5-2024	0	mm	17,4	30,2	C	42,7
159.	Sep-6-2024	0	mm	15,9	29,9	C	41,6
160.	Sep-7-2024	0	mm	16,3	31,8	C	44,9
161.	Sep-8-2024	0	mm	17,8	31,7	C	50,6
162.	Sep-9-2024	7,2	mm	16,1	22,9	C	83,9
163.	Sep-10-2024	0,2	mm	10,8	20,7	C	94,3
164.	Sep-11-2024	0,4	mm	9,8	19,5	C	92,6
165.	Sep-12-2024	4,6	mm	10,7	13,2	C	100
166.	Sep-13-2024	15,8	mm	9,4	10,8	C	100
167.	Sep-14-2024	0	mm	10,8	16,8	C	89,6
168.	Sep-15-2024	3,6	mm	13,2	16	C	95,2
169.	Sep-16-2024	12,6	mm	14,9	23,1	C	95,4
170.	Sep-17-2024	0	mm	12,6	24,9	C	84,4
171.	Sep-18-2024	0	mm	10,5	25,5	C	83,9
172.	Sep-19-2024	0	mm	10,2	23,4	C	82,9
173.	Sep-20-2024	0	mm	7,2	23,4	C	70,7
174.	Sep-21-2024	0	mm	4,4	24	C	74,4
175.	Sep-22-2024	0	mm	5,5	25,2	C	76,9
176.	Sep-23-2024	0	mm	8,3	21,7	C	83,1
177.	Sep-24-2024	0,8	mm	8,1	23	C	90,2
178.	Sep-25-2024	0	mm	10,8	21	C	90,9
179.	Sep-26-2024	0,6	mm	11,1	17,4	C	98,6
180.	Sep-27-2024	1,8	mm	14	21,6	C	76,4
181.	Sep-28-2024	0	mm	8,6	17,2	C	63,6
182.	Sep-29-2024	0,2	mm	3,5	15,7	C	88,4
183.	Sep-30-2024	0,2	mm	-0,3	14,9	C	81,6

#### Application Description

	A
Date	Apr-16-2024
Start Time	11:00 AM
Stop Time	11:25 AM
Method	SPREAD
Timing	00
Placement	SOIL
Applied By	Dawid wadziński
Entry Date	Nov-20-2024
Air Temperature Start, Stop	5,5; 5,5 C
% Relative Humidity Start, Stop	74; 74
Wind Velocity+Dir. Start	1,2 MPS; N
Wind Velocity+Dir. Stop	1,2 MPS; N
Wind Velocity+Dir. Max	1,2 MPS; N
Soil Temperature	9,4 C
Soil Moisture	GOOD
% Cloud Cover	100
First Moisture Occurred On	Apr-17-2024
Time to First Moisture	1,0 DAY
Amount of First Moisture	1,7 mm
Moisture 1 Week Before Appl.	15,1 mm
Moisture 6 Hours After Appl.	0 mm
Moisture 24 Hours After Appl.	1,7 mm
Moisture 1 Week After Appl.	9,9 mm
Problems with Application?	N; no

#### Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale	SOLTU; BPOT
Days after Emergence	-14
Stage Majority, Percent	00; 100
Stage Minimum, Percent	00; 0
Stage Maximum, Percent	00; 0

**Application Equipment**

	A
Equipment Type	MANSPR
% Coverage	100

**SE Definitions**

	1.	2.
SE Name	CYQ128	
SE Description	% starch in potatoes	
Part Rated	TUBER; -	
Rating Type	CONSTA	
Rating Unit	%	
Rating Min/Max/Interval	0; 100; -	
Sample Size	1 PLOT	
Collection Basis	1 PLOT	
Reporting Basis	1 PLOT	
Calculation	IN	

RESULTS:

Assessed By	Strzeleński	Strzeleński	Strzeleński	Strzeleński	Strzeleński	Strzeleński	Strzeleński	Strzeleński
Rating Date	May-20-2024	May-20-2024	Jun-3-2024	Jun-3-2024	Jun-12-2024	Jun-12-2024	Jun-20-2024	Jun-20-2024
Part Rated								
Rating Type	PHYGEN	VIGOR	PHYGEN	VIGOR	PHYGEN	VIGOR	PHYGEN	VIGOR
Rating Unit	%	%	%	%	%	%	%	%
Rating Min/Max/Interval	0; 100; -	0; 100; -	0; 100; -	0; 100; -	0; 100; -	0; 100; -	0; 100; -	0; 100; -
Sample Size	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT
Number of Subsamples	1	1	1	1	1	1	1	1
Crop Type, Code	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU
Crop Name	Potato	Potato	Potato	Potato	Potato	Potato	Potato	Potato
Crop Variety	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Crop Stage Majority/Min/Max	16; 16; 17	16; 16; 17	25; 25; 25	25; 25; 25	55; 51; 59	55; 51; 59	69; 69; 69	69; 69; 69
Crop Density								
Pest Density								
Rating Timing								
Days After First/Last Applic.	34; 34	34; 34	48; 48	48; 48	57; 57	57; 57	65; 65	65; 65
Trt-Eval Interval	34 DA-A	34 DA-A	48 DA-A	48 DA-A	57 DA-A	57 DA-A	65 DA-A	65 DA-A
Days After Emergence	20 DE-1	20 DE-1	34 DE-1	34 DE-1	43 DE-1	43 DE-1	51 DE-1	51 DE-1
ARM Action Codes								
Number of Decimals								
Trt Treatment	1	2	3	4	5	6	7	8
Rate								
No. Name								
Rate Unit								
1 Untreated Check	0,0na	100,0na	0,0na	100,0na	0,0na	100,0na	0,0na	100,0na
2 Belenus 400kg/ha	0,0na	100,0na	0,0na	100,0na	0,0na	100,0na	0,0na	100,0na
3 Belenus 800kg/ha	0,0na	100,0na	0,0na	100,0na	0,0na	100,0na	0,0na	100,0na
LSD P=.05								
Standard Deviation	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
CV	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Grand Mean	0,00	100,00	0,00	100,00	0,00	100,00	0,00	100,00
Levene's F	0,00*	0,00*	0,00*	0,00*	0,00*	0,00*	0,00*	0,00*
Rank X2								
P(Rank X2)								
Skewness								
Kurtosis								

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Could not calculate LSD (% mean diff) or mean separation letters for columns 1,2,3,4,5,6,7,8,9,10 because error variance is 0.

Mean separation letters are 'na' (not applicable) when error variance is 0



Assessed By	Strzeński Jun-26-2024	Strzeński Jun-26-2024	Strzeński Apr-30-2024	Strzeński Apr-30-2024	Strzeński May-20-2024	Strzeński May-20-2024	Strzeński Jun-12-2024
Rating Date	Jun-26-2024	Jun-26-2024	Apr-30-2024	Apr-30-2024	May-20-2024	May-20-2024	Jun-12-2024
Part Rated							
Rating Type	PHYGEN	VIGOR					
Rating Unit	%	%					
Rating Min/Max/Interval	0; 100; -	0; 100; -					
Sample Size	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT
Number of Subsamples	1	1	1	1	1	1	1
Crop Type, Code	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU
Crop Name	Potato	Potato	Potato	Potato	Potato	Potato	Potato
Crop Variety	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Crop Stage Majority/Min/Max	72; 71; 73	72; 71; 73	12; 11; 14	12; 11; 14	16; 16; 17	16; 16; 17	55; 51; 59
Crop Density							
Pest Density							
Rating Timing							
Days After First/Last Applic.	71; 71	71; 71	14; 14	14; 14	34; 34	34; 34	57; 57
Trt-Eval Interval	71 DA-A	71 DA-A	14 DA-A	14 DA-A	34 DA-A	34 DA-A	57 DA-A
Days After Emergence	57 DE-1	57 DE-1	0 DE-1	0 DE-1	20 DE-1	20 DE-1	43 DE-1
ARM Action Codes				@UPOC[11]		@UPOC[13]	
Number of Decimals			2	2	2	2	2
Trt Treatment	9	10	11	12	13	14	15
No. Name							
Rate							
Unit							
1 Untreated Check	0,0na	100,0na	0,31a	100,00a	0,41b	100,00b	0,51a
2 Belenus 400kg/ha	0,0na	100,0na	0,31a	101,61a	0,41b	99,39b	0,52a
3 Belenus 800kg/ha	0,0na	100,0na	0,32a	103,28a	0,43a	103,65a	0,53a
LSD P=.05			0,017	5,634	0,009	2,105	0,014
Standard Deviation	0,00	0,00	0,010	3,256	0,005	1,217	0,008
CV	0,0	0,0	3,2	3,2	1,2	1,2	1,54
Grand Mean	0,00	100,00	0,313	101,631	0,417	101,012	0,518
Levene's F	0,00*	0,00*	0,706	3,168	0,167	7,226*	1,00
Rank X2							
P(Rank X2)							
Skewness			0,1364	0,4728	0,1535	0,3001	-0,4409
Kurtosis			-0,7695	-0,289	-0,7745	-0,6132	0,2343

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Could not calculate LSD (% mean diff) or mean separation letters for columns 1,2,3,4,5,6,7,8,9,10 because error variance is 0.

Mean separation letters are 'na' (not applicable) when error variance is 0

Assessed By	Strzeliński Jun-12-2024	Strzeliński Jul-10-2024	Strzeliński Jul-10-2024	Sep-29-2024	Sep-29-2024	Sep-29-2024	Sep-29-2024
Rating Date				YIELD; C	YIELD; C	YIELD; C	TUBER; C
Part Rated				YIELD	YIELD	YIELD	COMPR1
Rating Type				kg	T-MET	%UNCK	kg
Rating Unit						0; -; -	
Rating Min/Max/Interval							
Sample Size	1 PLOT	1 PLOT	1 PLOT	14 m2	1 ha	1 ha	1 PLOT
Number of Subsamples	1	1	1	1	1	1	1
Crop Type, Code	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU
Crop Name	Potato	Potato	Potato	Potato	Potato	Potato	Potato
Crop Variety	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady
Crop Stage Scale	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
Crop Stage Majority/Min/Max	55; 51; 59	73; 72; 75	73; 72; 75	99; -; -	99; -; -	99; -; -	99; -; -
Crop Density				0 %	0 %	0 %	0 %
Pest Density				0 %	0 %	0 %	0 %
Rating Timing				harvest	harvest	harvest	harvest
Days After First/Last Applic.	57; 57	85; 85	85; 85	166; 166	166; 166	166; 166	166; 166
Trt-Eval Interval	57 DA-A	85 DA-A	85 DA-A	166 DA-A	166 DA-A	166 DA-A	166 DA-A
Days After Emergence	43 DE-1	71 DE-1	71 DE-1	152 DE-1	152 DE-1	152 DE-1	152 DE-1
ARM Action Codes	@UPOC[15]		@UPOC[17]		T1	@UPOC[20]	
Number of Decimals	2	2	2	2	2	2	2
Trt Treatment							
No. Name	16	17	18	19	20	21	22
Rate							
Rate Unit							
1 Untreated Check	100,00a	0,54a	100,00a	42,92b	30,66b	100,00b	7,04a
2 Belenus 400kg/ha	100,53a	0,55a	100,95a	43,78ab	31,27ab	102,09ab	7,01a
3 Belenus 800kg/ha	102,46a	0,55a	101,89a	44,90a	32,07a	104,62a	5,91a
LSD P=.05	2,716	0,017	3,214	1,303	0,930	3,125	1,152
Standard Deviation	1,570	0,010	1,858	0,753	0,538	1,806	0,666
CV	1,55	1,83	1,84	1,72	1,72	1,77	10,0
Grand Mean	100,997	0,548	100,949	43,869	31,335	102,238	6,653
Levene's F	9,447*	0,706	5,43*	0,185	0,185	2,917	0,804
Rank X2							
P(Rank X2)							
Skewness	0,2911	-0,1364	0,8836	-0,4586	-0,4586	0,5785	0,0476
Kurtosis	-1,1224	-0,7695	0,7247	-0,493	-0,493	-1,2899	0,1066

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Could not calculate LSD (% mean diff) or mean separation letters for columns 1,2,3,4,5,6,7,8,9,10 because error variance is 0.

Mean separation letters are 'na' (not applicable) when error variance is 0

Assessed By	Sep-29-2024	Sep-29-2024	Sep-29-2024	Sep-29-2024	Sep-29-2024	Sep-29-2024	Sep-29-2024	
Rating Date	TUBER; C	TUBER; C	TUBER; C	TUBER; C	TUBER; C	TUBER; C	TUBER; C	
Part Rated	COMPR2	COMPR3	COMPR1	COMPR1	COMPR2	COMPR2	COMPR3	
Rating Type	kg	kg	%	%	%	%	%	
Rating Unit			0; 100; -		0; 100; -		0; 100; -	
Rating Min/Max/Interval	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	
Sample Size	1	1	1	1	1	1	1	
Number of Subsamples	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	C; SOLTU	
Crop Type, Code	Potato	Potato	Potato	Potato	Potato	Potato	Potato	
Crop Name	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady	Red lady	
Crop Variety	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	BBCH	
Crop Stage Scale	99; -; -	99; -; -	99; -; -	99; -; -	99; -; -	99; -; -	99; -; -	
Crop Stage Majority/Min/Max	0 %	0 %	0 %	0 %	0 %	0 %	0 %	
Crop Density	0 %	0 %	0 %	0 %	0 %	0 %	0 %	
Pest Density	harvest	harvest	harvest	harvest	harvest	harvest	harvest	
Rating Timing	166; 166	166; 166	166; 166	166; 166	166; 166	166; 166	166; 166	
Days After First/Last Applic.	166 DA-A	166 DA-A	166 DA-A	166 DA-A	166 DA-A	166 DA-A	166 DA-A	
Trt-Eval Interval	152 DE-1	152 DE-1	152 DE-1	152 DE-1	152 DE-1	152 DE-1	152 DE-1	
Days After Emergence				@UPOC[25]		@UPOC[27]		
ARM Action Codes	2	2	2	2	2	2	2	
Number of Decimals								
Trt Treatment	Rate	23	24	25	26	27	28	29
No. Name	Rate Unit							
1 Untreated Check		28,39b	7,50a	16,42a	100,00a	66,04b	100,00b	17,55a
2 Belenus	400kg/ha	29,39b	7,39a	16,01a	98,62a	67,08b	101,71b	16,91a
3 Belenus	800kg/ha	31,57a	7,42a	13,18b	80,67b	70,28a	106,55a	16,54a
LSD P=.05		1,688	1,163	2,515	14,296	2,766	4,201	2,880
Standard Deviation		0,976	0,672	1,453	8,262	1,599	2,428	1,665
CV		3,28	9,04	9,56	8,88	2,36	2,36	9,79
Grand Mean		29,782	7,435	15,202	93,095	67,798	102,753	16,999
Levene's F		0,436	0,51	0,461	1,54	0,183	3,403	0,574
Rank X2								
P(Rank X2)								
Skewness		0,1272	0,2776	0,028	-0,7048	0,2672	0,8141	0,4599
Kurtosis		-0,8049	-0,9392	0,5889	-0,8144	-1,2174	0,4364	-0,4408

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Could not calculate LSD (% mean diff) or mean separation letters for columns 1,2,3,4,5,6,7,8,9,10 because error variance is 0.

Mean separation letters are 'na' (not applicable) when error variance is 0

Assessed By			
Rating Date	Sep-29-2024	Sep-29-2024	Sep-29-2024
Part Rated	TUBER; C	TUBER; -	TUBER; -
Rating Type	COMPR3	CONSTA	CONSTA
Rating Unit	%	%	%
Rating Min/Max/Interval		0; 100; -	
Sample Size	1 PLOT	1 PLOT	1 PLOT
Number of Subsamples	1	1	1
Crop Type, Code	C; SOLTU	C; SOLTU	C; SOLTU
Crop Name	Potato	Potato	Potato
Crop Variety	Red lady	Red lady	Red lady
Crop Stage Scale	BBCH	BBCH	BBCH
Crop Stage Majority/Min/Max	99; -; -	99; -; -	99; -; -
Crop Density	0 %	0 %	0 %
Pest Density	0 %	0 %	0 %
Rating Timing	harvest	harvest	harvest
Days After First/Last Applic.	166; 166	166; 166	166; 166
Tri-Eval Interval	166 DA-A	166 DA-A	166 DA-A
Days After Emergence	152 DE-1	152 DE-1	152 DE-1
ARM Action Codes	@UPOC[29]		@UPOC[31]
Number of Decimals	2	1	2
Tri Treatment			
No. Name	Rate		
	Rate Unit		
1 Untreated Check	100,00a	14,4a	100,00a
2 Belenus 400kg/ha	97,91a	14,6a	101,38a
3 Belenus 800kg/ha	95,39a	14,5a	101,04a
LSD P=.05	16,020	0,28	1,919
Standard Deviation	9,259	0,16	1,109
CV	9,47	1,11	1,1
Grand Mean	97,768	14,47	100,808
Levene's F	158,809*	0,512	3,094
Rank X2	.	.	.
P(Rank X2)	.	.	.
Skewness	-0,1866	1,2924*	1,0088
Kurtosis	-1,1997	1,1378	0,4019

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Could not calculate LSD (% mean diff) or mean separation letters for columns 1,2,3,4,5,6,7,8,9,10 because error variance is 0.

Mean separation letters are 'na' (not applicable) when error variance is 0

Part Rated

YIELD = yield

TUBER = tuber

C = Crop is Part Rated

Rating Type

PHYGEN = phytotoxicity - general / injury

VIGOR = vigor

YIELD = yield

COMPR1 = commercial product - grade 1

COMPR2 = commercial product - grade 2

COMPR3 = commercial product - grade 3

CONSTA = content - starch

Rating Unit

%, 0, 100, = percent

kg, , , = kilogram

T-MET, , , = ton (metric=1000 kg)

%UNCK, 0, , = percent of untreated check

%, , , = percent

PLOT = total plot

m2 = square meter

ha = hectare

Crop Type, Code

C = EPPO species (Bayer) codes

SOLTU, BPOT, Solanum tuberosum, Potato = US

Crop Stage Scale

BBCH = BBCH uniform plant stages

Crop Stage Majority/Min/Max

16 = 6th leaf of main stem unfolded (>4 cm)

25 = 5th basal side shoot visible (> 5 cm)

55 = Buds of first inflorescence extended to 5 mm

69 = End of flowering in the first inflorescence

72 = 20% of berries in the first fructification have reached full size (main stem)

12 = 2nd leaf of main stem unfolded (>4 cm)

73 = 30% of berries in the first fructification have reached full size (main stem)

99 = Harvested product

51 = First individual buds (1-2 mm) of first inflorescence visible (main stem)

71 = 10% of berries in the first fructification have reached full size (main stem)

11 = 1st leaf of main stem unfolded (>4 cm)

17 = 7th leaf of main stem unfolded (>4 cm)

59 = First flower petals of first inflorescence visible

14 = 4th leaf of main stem unfolded (>4 cm)

75 = 50% of berries in the first fructification have reached full size (main stem)

% = 0-100 index/scale such as ground cover

% = 0-100 index/scale such as ground cover

ARM Action Codes

@UPOC[11] = &100\*@AvgSub([11])/[TUC11]

@UPOC[13] = &100\*@AvgSub([13])/[TUC13]

@UPOC[15] = &100\*@AvgSub([15])/[TUC15]

@UPOC[17] = &100\*@AvgSub([17])/[TUC17]

T1 = [C19]\*10000/14000

@UPOC[20] = &100\*@AvgSub([20])/[TUC20]

@UPOC[25] = &100\*@AvgSub([25])/[TUC25]

@UPOC[27] = &100\*@AvgSub([27])/[TUC27]

@UPOC[29] = &100\*@AvgSub([29])/[TUC29]

@UPOC[31] = &100\*@AvgSub([31])/[TUC31]

## Conclusions:

### General observations

Location: west part of Poland with continental climate. Weather conditions during the trial period were typical for the trial region.

No effects on non-target organisms were observed.

We do not observed phytotoxicity.

The experiment was set up in a field where no fertilization had been applied in previous years.

After applying Belenus fertilizer at a dose of 800 kg/ha, a significantly higher share of medium tubers and a significantly lower share of small tubers was found compared to the control object and a lower dose of Belenus fertilizer (400 kg/ha). No differences were found in the share of large tubers.

Belenus used in dose 400 kg/ha resulted in an increase in yield by 2,09% and Belenus used in dose 800 kg/ha resulted in an increase in yield by 4,62%.

### Statement of compliance

All data in this ARM file represent a true and accurate record of the results obtained.

This report is created electronically using the original data and valid without signature.

### Ogólne obserwacje

Położenie: zachodnia część Polski o klimacie kontynentalnym. Warunki pogodowe w okresie trwania doświadczenia były typowe dla regionu badawczego.

Nie zaobserwowano żadnego wpływu na organizmy inne niż docelowe.

Nie zaobserwowano fitotoksyczności.

Doświadczenie zostało założone na polu, na którym w poprzednich latach nie stosowano nawożenia.

Po zastosowaniu nawozu Belenus w dawce 800 kg/ha stwierdzono istotnie większy udział bulw średnich oraz istotnie mniejszy udział bulw małych w stosunku do obiektu kontrolnego i niższej dawki nawozu Belenus (400 kg/ha). Nie stwierdzono różnic w udziale bulw dużych.

Belenus zastosowany w dawce 400 kg/ha spowodował wzrost plonów o 2,09% natomiast Belenus zastosowany w dawce 800 kg/ha spowodował wzrost plonów o 4,62%.

### Oświadczenie o zgodności

Wszystkie dane w tym pliku ARM stanowią prawdziwy i dokładny zapis uzyskanych wyników.

Niniejszy raport tworzony jest w formie elektronicznej z wykorzystaniem oryginalnych danych i jest ważny bez podpisu.

REPORT AUTHOR: Artur Strzeliński

DATE: 02.12.2024

SIGNATURE:



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