

Table 1. Soil pH and content of available nutrients before beginning of the experiments

Year	pH (H ₂ O)	N-min / 1000 g	P ₂ O ₅ / 100 g	K ₂ O / 100 g
2013 r.	5,40	32,3	44,0	21,6
2014 r.	5,80	26,0	20,1	50,5
2015 r.	4,92	30,8	18,5	20,8

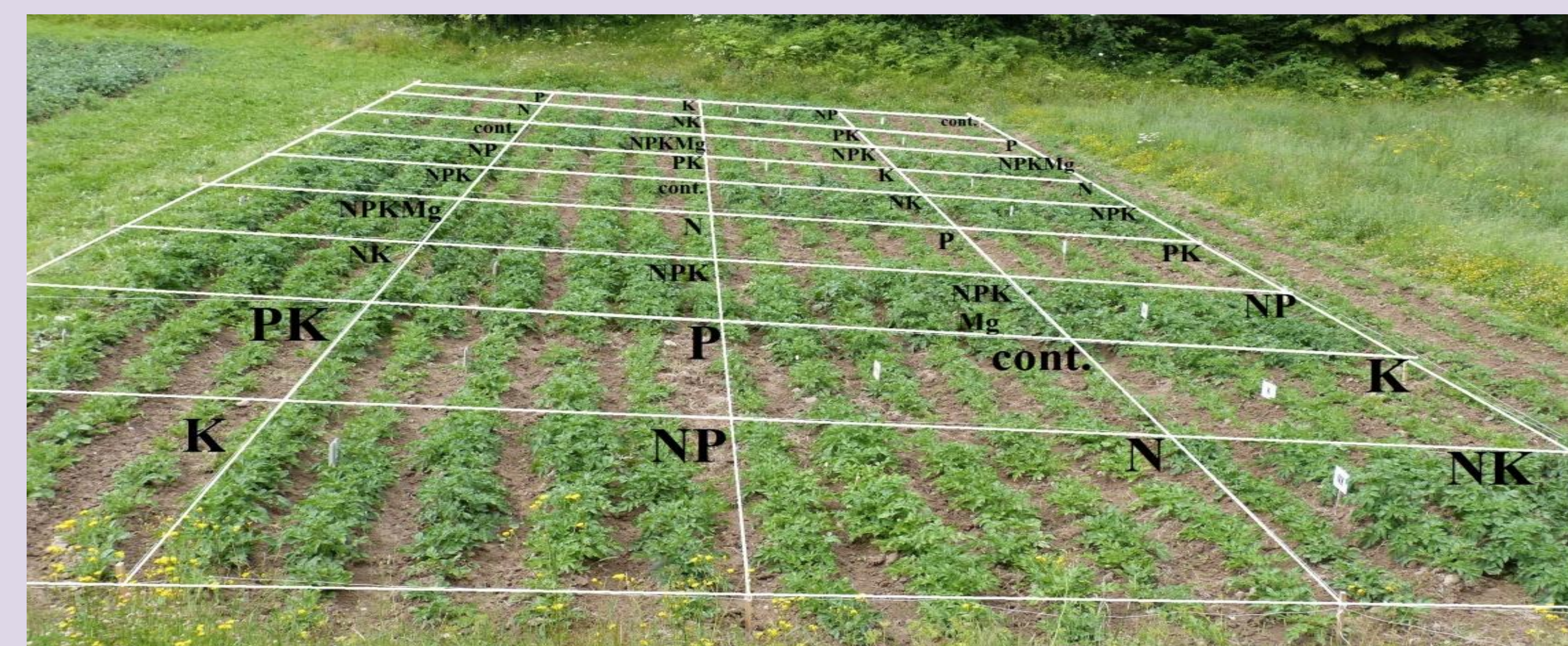
Table 2. Soil pH and content of available nutrients after the end of the experiments

Year	2013				2014				2015			
	pH	N min	P ₂ O ₅	K ₂ O	pH	N min	P ₂ O ₅	K ₂ O	pH	N min	P ₂ O ₅	K ₂ O
control	5,41	30,9	38,3	18,0	4,67	21,5	27,9	40,2	4,41	18,5	13,5	18,9
N	5,31	224,8	34,8	14,4	4,19	106,8	34,8	43,3	4,11	133,4	11,2	17,0
P	5,52	18,5	49,6	54,4	4,46	21,5	41,4	79,5	4,67	24,6	20,9	30,5
K	5,56	24,6	39,9	92,0	4,49	18,5	35,0	61,2	4,68	18,5	13,0	30,6
NP	5,43	194,0	51,9	64,6	4,43	120,2	49,5	70,4	4,46	120,1	20,7	37,6
NK	5,42	212,5	51,9	93,5	4,44	116,9	36,7	57,5	4,54	132,9	17,2	33,0
PK	5,51	58,5	63,0	95,6	4,66	33,8	41,5	69,9	4,75	33,9	24,0	30,3
NPK	5,43	252,5	64,4	97,6	4,54	126,2	42,2	89,0	4,68	141,7	23,5	39,9
NPKMg	5,65	351,1	65,2	88,0	4,74	123,0	44,3	84,5	4,74	147,8	23,1	35,0

Table 3. Nutrient use efficiencies: PFP (yield/fertilizer rate) and AE (kg increasing of the yields/kg applied nutrient). The presented data for the nutrient use efficiencies are average for the period*

Variants	AE _N	AE _P	AE _K	PFP _N	PFP _P	PFP _K
control	-	-	-	-	-	-
N	25,27	-	-	80,10	-	-
P	-	38,66	-	-	134,61	-
K	-	-	49,05	-	-	125,81
NP	74,57	130,50	-	129,40	226,45	-
NK	55,27	-	77,38	110,09	-	154,14
PK	-	56,58	45,26	-	152,52	122,02
NPK	118,12	206,71	165,37	172,95	302,66	242,13
NPKMg	102,41	179,22	143,38	157,24	275,17	220,13

The trial was conducted on shallow brown forest soil (Cambisols-coarse) during the vegetation periods of 2013 to 2015. The variants of the experiment were: control, N₁₄₀; P₈₀; K₁₀₀; N₁₄₀P₈₀; N₁₄₀K₁₀₀; P₈₀K₁₀₀; N₁₄₀P₈₀K₁₀₀; N₁₄₀P₈₀K₁₀₀Mg₃₃. The applied fertilization slightly decreased soil's pH after the harvest of potatoes compared to the soil pH before planting. The positive effect of fertilization on soil fertility after the end of the trails was more pronounced at variants NPK and NPKMg. The content of available nitrogen, phosphorus and potassium forms for these variants was the highest for each year. The highest yields were recorded at variants NPK and NPKMg - 24 and 22 t ha⁻¹, average for the period. The partial factor productivity (PFP_N, PFP_P and PFP_K) of the applied fertilizers was the highest at variant NPK. The PFP_N (80,10 kg kg⁻¹) for the yields of variant N was 57 % lower than the PFP_N at variant NPK (180,36 kg kg⁻¹). The PFP_P and PFP_K at variants P and K was approximately 57 and 47 % lower compared with variant NPK. Agronomic efficiency (AE) of applied nutrient was the highest for the combined NPK fertilization. The application only of N, P, K and PK combination without N was agronomically not effective.



Picture 1. Potato plants during the vegetation (July)



Picture 2. Potato plants during the vegetation (August)

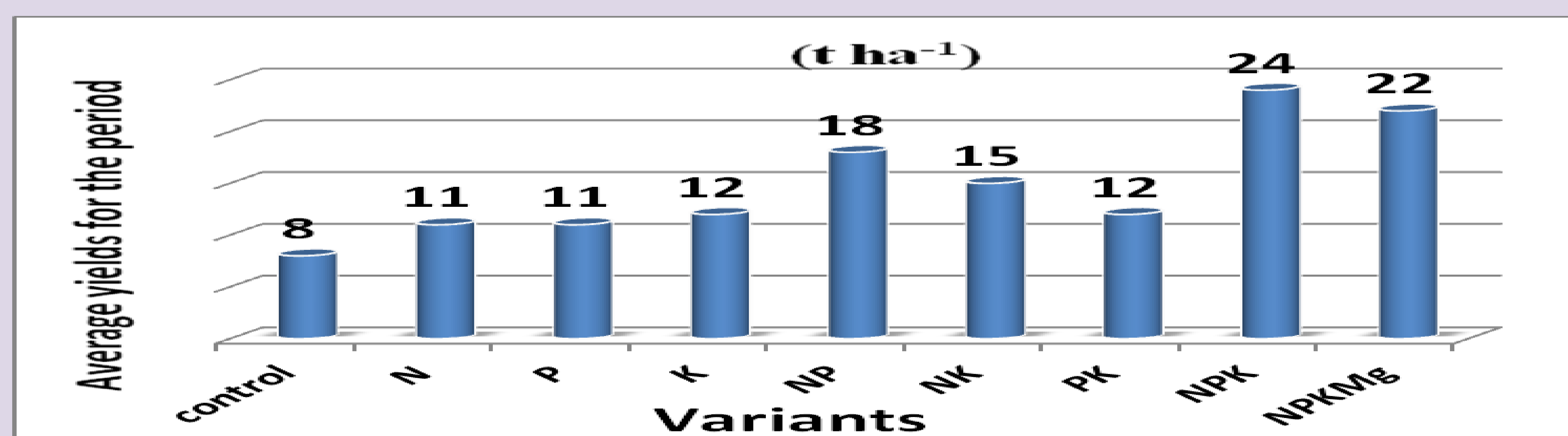


Figure 1. Average yields for the period