SUPPLEMENTARY MATERIAL

A study on *Cannabis sativa* L. cultivated on loamy and sandy soils in north-eastern Poland

Krystyna Żuk-Gołaszewska[1)], Barbara Kalisz*[2)], Marian Lewicki[3)], Hazem M. Kalaji[4)], Robert Duliński[5)], Janusz Gołaszewski[6)]

[1)] University of Warmia and Mazury, Faculty of Agriculture and Forestry, Department of Agrotechnology and Agribusiness, Pl. Łódzki 3, 10-727 Olsztyn, Poland
[2)] University of Warmia and Mazury in, Faculty of Agriculture and Forestry, Department of Soil Science and Microbiology, Pl. Łódzki 3, 10-727 Olsztyn, Poland
[3)] Linowiec 23, 13-324 Grodziczno, Poland
[4)] Warsaw University of Life Sciences SGGW, Department of Plant Physiology, Institute of Biology, Nowoursynowska St, 159, bldg 37, 02-776 Warsaw, Poland
[5)] University of Agriculture in Krakow, Faculty of Food Technology, Department of Biotechnology and General Food Technology, Mickiewicza Al, 21, 31-120 Kraków, Poland
[6)] University of Lomza, Faculty of Health Sciences, Akademicka St, 14, 18-400 Łomża, Poland

* Corresponding author

Table S1. Mean daily temperature and total precipitation in each month of the study, and growing degree days and accumulated precipitation during the growing season in 2020

Month	Mean daily temperature in 2020 (in 1991–2020) (°C)	Precipitation in 2020 (in 1991–2020) (mm)	Farming operations/ growth stage measurement	Date	Days after sowing (DAS)	Growing degree days (GDD)		Accumulated precipitation (AP) (mm)
						per growth stage	accumulated	
						°Cd		
January	2.3 (–2.2)	28.6 (34.2)	–	–	–	–	–	–
February	3.1 (–1.2)	44.9 (26.4)	–	–	–	–	–	–
March	3.3 (2.1)	25.4 (30.9)	–	–	–	–	–	–
April	6.9 (8.1)	1.1 (29.0)	–	–	–	–	–	–
May	10.1 (13.1)	64.0 (62.4)	sowing	29.05.2020	1	11.0	11.0	0.0
June	17.9 (16.4)	99.3 (72.5)	2nd leaf pair	17.06.2020	20	314.3	325.3	24.1
July	17.7 (18.5)	39.7 (91.9)	6th leaf pair	02.07.2020	35	299.3	624.6	81.7
			8th leaf pair	09.07.2020	42	121.1	745.7	14.1
			9th leaf pair	16.07.2020	49	115.4	861.1	7.5
			flower formation	24.07.2020	57	145.5	1006.6	6.0
			beginning of flowering	31.07.2020	64	129.9	1136.5	6.2
August	19.2 (18.3)	107.2 (66.1)	full flowering	07.08.2020	71	129.3	1265.8	18.4
			harvest	24.08.2020	88	17.4	1283.2	0.1
September	14.7 (13.4)	32.1 (58.0)	–	–	–	–	–	–
October	10.1 (8.1)	81.2 (56.2)	–	–	–	–	–	–
November	5.6 (3.4)	10.9 (43.4)	–	–	–	–	–	–
December	1.5 (–0.4)	25.1 (43.6)	–	–	–	–	–	–
Total year	9.4	559.5	total growing season		88	1283.2		158.1

Source: Meteorological Station of the University of Wamia and Mazury in Bałcyny (53°35′46.4″ N, 19°51′19.5″ E).

Table S2. The main effects and the interaction effects between soil type (S), silicon application (Si), sowing density (D), and nitrogen application (N) on plant height at harvest, inflorescence length, and inflorescence dried mass of *Cannabis sativa*

Treatments			Plant height, cm			Inflorescence length, cm			Inflorescence dried-mass, g		
			S1	S2	Si×Di×N	S1	S2	Si×Di×N	S1	S2	Si×Di×N
			S×Si×D×N*			S×Si×D×N			S×Si×D×N*		
Si1	D1	N1	384.1	72.2	259.3	89.9	5.3	56.1	5.73	0.33	3.57
		N2	359.9	90.5	303.2	64.3	7.5	52.3	4.69	0.27	3.76
	D2	N1	302.4	104.8	199.3	47.5	16.5	31.3	3.85	1.37	2.55
		N2	331.7	92.0	258.7	50.1	13.6	39.0	3.33	1.08	2.65
Si2	D1	N1	353.3	214.1	302.1	50.7	39.0	46.4	3.23	4.05	3.53
		N2	394.9	134.3	302.9	51.9	19.0	40.3	3.64	0.95	2.69
	D2	N1	364.9	203.2	252.4	78.6	37.2	49.8	5.88	3.25	4.05
		N2	361.1	94.8	238.2	59.3	10.3	36.7	2.30	2.48	2.39
			S×Si×D*		Si×D	S×Si×D*		Si×D	S×Si×D*		Si×D
Si1	D1		369.0	79.5	283.8	73.9	6.2	54.0	5.08	0.31	3.67
	D2		319.7	100.1	229.0	49.1	15.4	35.2	3.54	1.26	2.60
Si2	D1		373.2	177.3	302.5	51.3	29.8	43.5	3.43	2.62	3.13
	D2		363.0	173.6	247.3	68.9	29.9	45.1	4.09	3.04	3.45
			S×Si×N*		Si×N*	S×Si×N		Si×N	S×Si×N		Si×N
Si1		N1	339.2	93.9	223.0	66.6	12.8	41.1	4.69	1.02	2.95
		N2	345.3	91.5	278.8	57.0	11.4	45.0	3.99	0.79	3.15
Si2		N1	357.6	206.5	274.9	60.9	37.7	48.2	4.21	3.49	3.82
		N2	381.8	114.6	274.9	54.8	14.7	38.7	3.12	1.72	2.56
			S×D×N		D×N	S×D×N		D×N	S×D×N*		D×N
	D1	N1	366.5	148.6	283.2	67.5	23.5	50.6	4.30	2.33	3.55
		N2	374.7	116.8	303.1	59.0	14.4	46.6	4.24	0.68	3.25

continue Tab. S2

Treatments			Plant height, cm			Inflorescence length, cm			Inflorescence dried-mass, g		
			S1	S2	Si×Di×N	S1	S2	Si×Di×N	S1	S2	Si×Di×N
			S×Si×D×N*			S×Si×D×N			S×Si×D×N*		
	D2	N1	326.7	161.0	225.8	59.6	28.3	40.6	4.64	2.44	3.30
		N2	340.7	93.3	251.3	52.9	12.1	38.2	3.02	1.73	2.55
			S×Si*		Si*	S×Si		Si	S×Si*		Si
Si1			342.9	93.0	252.3	60.7	12.2	43.2	4.26	0.93	3.06
Si2			369.4	175.0	274.9	57.9	29.8	44.3	3.68	2.88	3.29
			S×D		D*	S×D		D	S×D		D
	D1		371.0	134.8	293.4	62.8	19.5	48.6	4.27	1.61	3.40
	D2		334.5	139.6	237.0	55.9	23.2	39.5	3.73	2.22	2.97
			S×N*		N*	S×N*		N	S×N		N*
		N1	348.1	157.1	250.2	63.8	26.8	44.9	4.46	2.41	3.41
		N2	358.7	103.5	277.2	56.2	13.1	42.4	3.67	1.27	2.90
			S*			S*			S*		
			354.0	137.8		59.6	21.9		4.02	2.00	

Explanations: * = significant at $p < 0.05$, e.g. S×Si×D×N* denotes a significant soil type × silicon application × sowing density × nitrogen fertilization interaction; soil type, S: S1 = loamy soil, S2 = sandy soil; silicon application, Si: Si1 = no silicon application, Si2 = silicon application; sowing density, D: D1 = 6 kg·ha^{-1}, D2 = 10 kg·ha^{-1}; nitrogen application, N: N1 = no fertilization, N2 = 60 kg N·ha^{-1}.

Source: own study.