Završna konferencija HRZZ projekta

Prof. dr. sc. Irena Jug

"Procjena konzervacijske obrade tla kao napredne metode uzgoja usjeva i prevencije degradacije tla"
- ACTIVE soil –
http://www.activesoil.eu/

04. prosinca 2024. godine
Osijek, FAZOS

Trogodišnji plodoredni ciklus

Kukuruz (2024)

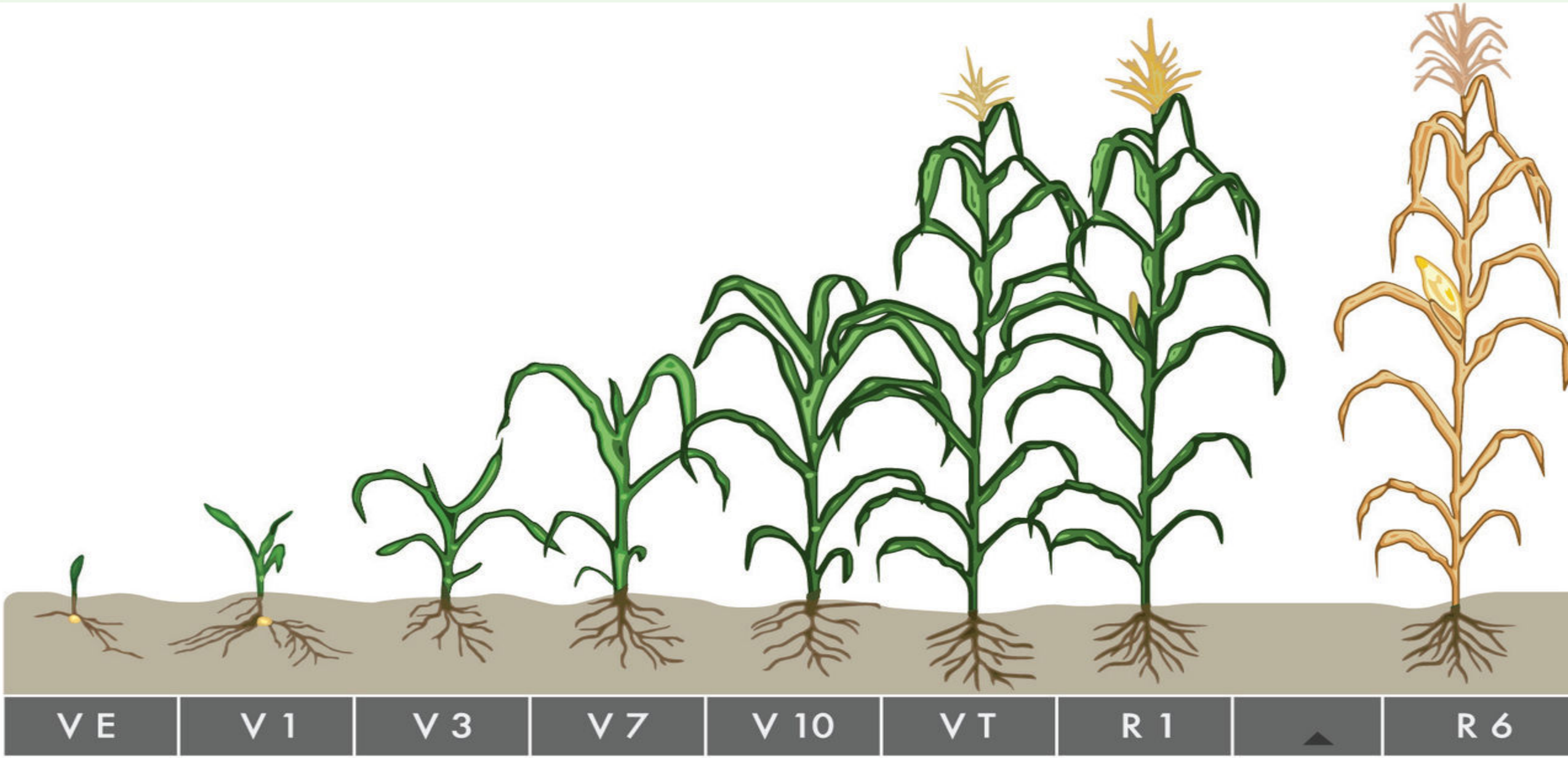
Kukuruz (2021)

Sekundarni usjev-(2023)

Sekundarni usjev (smjesa-2021/2022)

Ozima pšenica (2022/2023)

Soja (2022)


V E
V 1
V 3
V 7
V 10
V T
R 1
R 6


VE


V3


V4


V6
CTD
III-C3-GFR


V8

HRZZ projekt:
"Procjena konzervacijske obrade tla kao napredne metode uzgoja usjeva i prevencije degradacije tla"
ACTIVEsoil: IP-2020-02-2647

Voditelj Projekta: prof. dr. sc. Danijel Jug

Fenološke faze VT - R1- R6

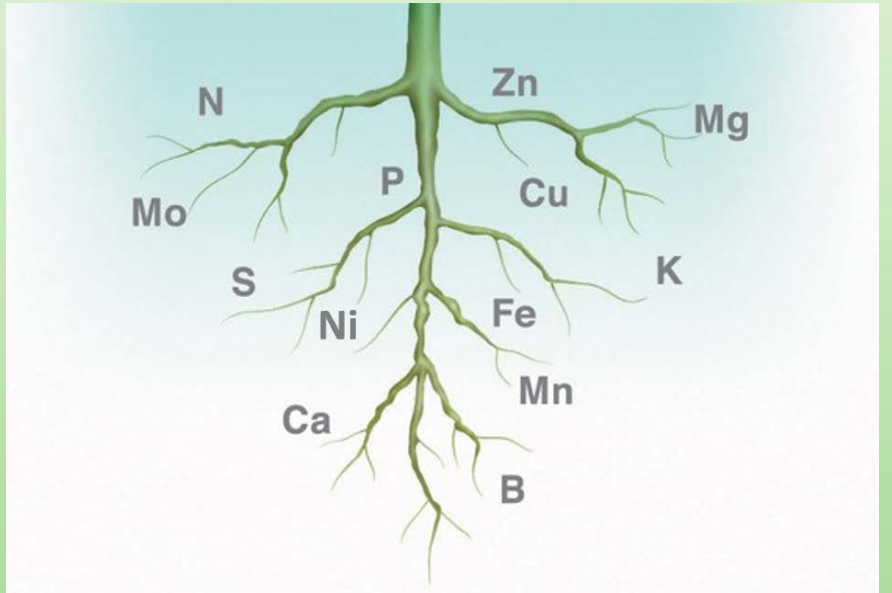
Fenofaza V4					Fenofaza R1 - svilanje								
R.b.	LAI	SPAD	Visina biljke (cm)	Masa biljke (g)	R.b.	LAI	LP biljke (m^2)	masa listova (kg)	SLA (m^2/kg)	SPAD	% N	Visina biljke (cm)	Masa biljke (g)
1	0.109	41.6	24.0	0.584	1	4.158	0.554	0.035	16.070	54.500	2.25	227	164.90
2	0.058	41.4	26.5	0.536	2	3.482	0.464	0.033	14.003	63.033	2.48	185	176.65
3	0.082	44.1	30.5	0.788	3	2.789	0.372	0.040	9.366	61.167	2.49	254	161.04
4	0.089	44.1	30.5	0.716	4	4.233	0.564	0.032	17.605	56.767	2.05	234	124.94
5	0.107	43.2	33.0	1.112	5	4.104	0.547	0.034	15.906	61.167	2.42	250	135.47
6	0.094	42.3	33.5	0.886	6	3.838	0.512	0.032	16.030	60.633	2.38	212	110.83
7	0.100	46.4	34.0	1.004	7	3.884	0.518	0.035	14.957	59.500	2.48	234	179.32
8	0.081	41.1	32.0	0.726	8	4.067	0.542	0.030	18.168	54.933	2.25	212	112.85
9	0.104	47.4	36.0	0.994	9	3.887	0.518	0.033	15.879	63.033	2.41	201	144.33
10	0.069	38.3	27.0	0.586	10	3.917	0.522	0.037	13.932	54.233	1.92	185	160.24
11	0.065	40.6	27.0	0.624	11	3.901	0.520	0.028	18.602	57.267	2.41	188	118.81
12	0.067	39.5	28.0	0.624	12	4.006	0.534	0.033	16.286	57.500	2.24	194	136.02
13	0.083	40.0	29.0	0.846	13	3.476	0.463	0.023	19.762	61.167	2.54	183	89.37
14	0.066	44.0	27.0	0.762	14	3.625	0.483	0.032	14.877	58.267	2.09	203	136.07
15	0.078	48.2	28.0	0.802	15	4.123	0.550	0.035	15.705	57.567	2.24	208	149.33
16	0.116	41.8	36.0	1.212	16	3.969	0.529	0.034	15.392	60.467	2.34	222	187.38
17	0.089	44.8	32.0	0.898	17	4.003	0.534	0.036	14.656	58.133	2.13	231	157.60
18	0.093	41.0	34.5	0.922	18	4.298	0.573	0.039	14.547	53.633	1.99	227	170.53
19	0.067	41.7	29.5	0.634	19	4.282	0.571	0.039	14.456	56.300	2.19	224	186.01
20	0.100	47.2	36.5	1.042	20	4.396	0.586	0.047	12.600	60.200	2.25	235	178.43
21	0.067	47.0	30.0	0.683	21	4.279	0.570	0.038	14.903	57.867	2.4	236	176.14
22	0.101	42.9	31.0	0.922	22	4.547	0.606	0.037	16.480	64.133	2.9	255	193.08
23	0.049	35.2	21.0	0.456	23	4.160	0.555	0.038	14.613	61.833	2.47	219	198.91
24	0.087	40.4	31.5	0.760	24	4.139	0.552	0.035	15.769	55.867	1.79	210	181.49

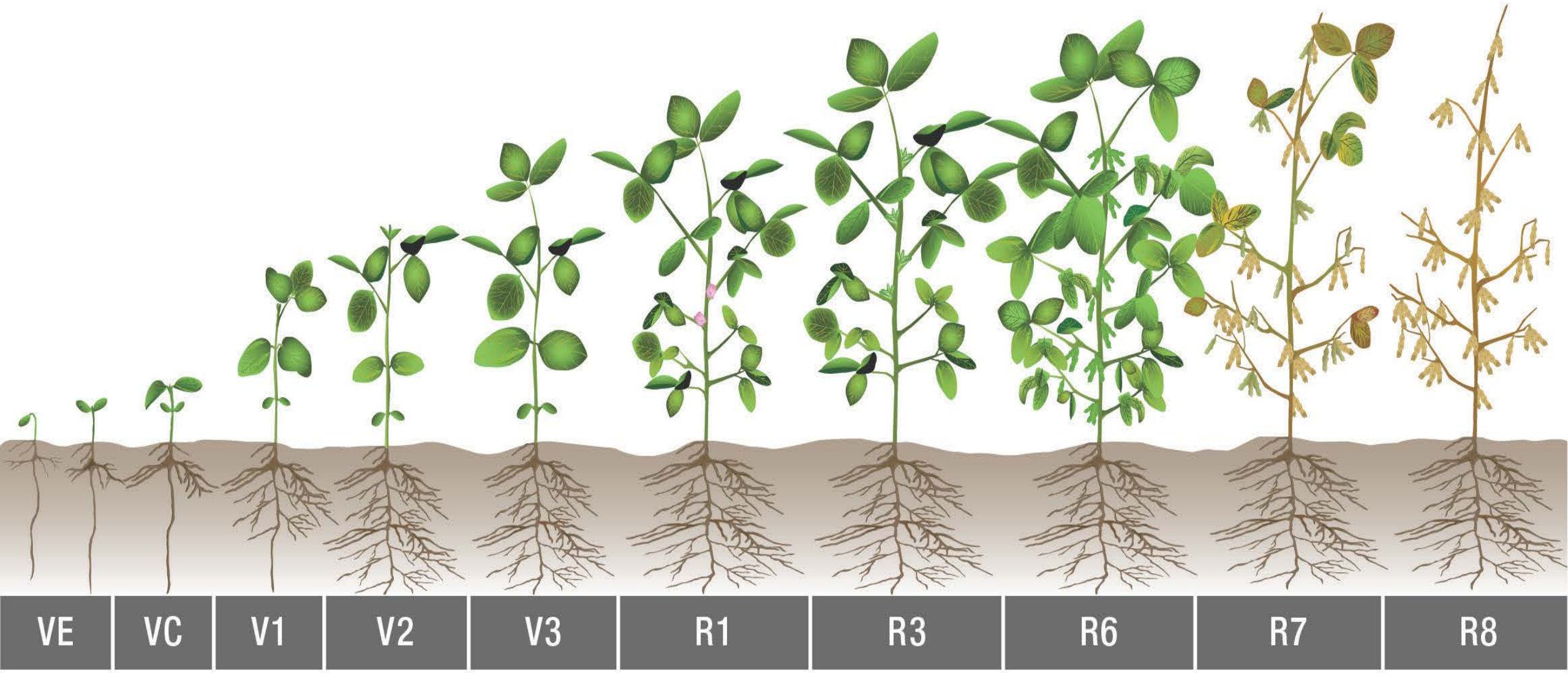
Komponente prinosa kukuruza												
Uzorak br.	Visina biljke (cm)	Masa klipa (g)	Promjer klipa (cm)	Dužina klipa (cm)	Broj redova u klipu	Broj zrna po klipu	Masa zrna po klipu (g)	Masa oklaska (g)	Masa 1000 zrna (g)	Hektolitarska masa (kg)	Vlaga zrna (%)	Masa stabljike (g)
1	234	177.4	46.1	17.8	19.5	617.3	159.0	18.4	228.6	68.0	13.5	115.5
2	225	119.5	44.1	13.8	18.0	484.0	105.3	14.3	222.8	67.2	13.2	81.6
3	246	221.7	48.0	18.8	19.1	698.9	196.1	25.6	266.8	71.1	13.5	124.8
4	252	175.5	46.1	17.4	20.0	640.2	156.5	19.0	214.4	70.3	12.6	111.4
5	275	219.9	47.6	19.1	20.0	709.0	194.6	25.3	261.1	71.1	13.8	103.3
6	244	187.4	46.2	18.3	19.0	645.5	166.4	21.0	243.1	70.6	14.1	135.4
7	254	226.0	47.7	19.1	18.6	670.6	200.0	26.0	269.5	70.2	13.4	177.8
8	232	181.1	45.9	17.3	19.5	649.0	160.4	20.8	248.0	69.4	13.9	86.8
9	230	163.6	46.2	16.7	19.0	631.4	146.6	17.0	229.2	69.0	12.8	120.2
10	210	159.7	47.8	15.7	20.0	653.4	141.9	17.9	223.3	68.2	12.5	89.1
11	226	139.8	43.6	15.8	18.3	528.8	123.3	16.5	222.5	70.2	12.2	83.7
12	209	184.9	47.2	17.5	18.3	578.0	162.6	22.3	247.5	69.5	14.8	87.0
13	219	143.7	45.0	15.4	18.0	518.4	127.3	16.4	224.4	69.3	12.9	52.2
14	208	182.9	47.7	17.0	19.0	560.3	160.9	22.0	258.7	69.0	14.7	61.2
15	226	130.4	44.1	14.8	18.0	492.8	116.3	14.1	234.0	70.0	12.4	81.7
16	245	169.6	46.2	17.8	19.6	598.0	151.1	18.4	212.9	70.4	12.7	106.0
17	241	191.6	47.6	17.2	19.1	611.8	169.0	22.6	251.5	69.2	13.6	76.4
18	241	167.0	45.8	17.3	18.0	554.4	148.7	18.3	245.2	70.1	13.7	82.9
19	245	167.1	46.1	16.0	19.8	633.6	148.9	18.2	238.7	69.0	13.1	80.5
20	243	196.8	46.4	18.2	18.8	630.5	174.1	22.6	254.9	69.7	12.5	106.8
21	230	168.4	45.4	17.2	18.8	611.2	150.2	18.2	234.1	69.8	11.5	97.2
22	245	170.9	46.8	17.5	19.6	633.8	152.9	18.0	191.0	68.1	12.1	135.7
23	214	147.4	46.6	15.0	19.3	534.0	131.1	16.3	240.7	68.8	13.2	108.8
24	240	175.5	46.7	16.9	17.6	573.8	155.5	20.0	199.7	68.7	12.9	91.0

Biološki i poljoprivredni prinos kukuruza								
Uzorak br.	Prinos zrna (kg/ha)	Prinos zrna (t/ha)	Prinos biljne mase (kg/ha)	Prinos biljne mase (t/ha)	Biološki prinos (kg/ha)	Biološki prinos (t/ha)	Žetveni indeks (%)	Žetveni indeks
1	12366.67	12.4	10043.63	10.0	22410.29	22.4	55.18	0.55
2	8372.16	8.4	7190.25	7.2	15562.41	15.6	53.80	0.54
3	15253.09	15.3	11272.92	11.3	26526.00	26.5	57.50	0.58
4	13041.67	13.0	9782.25	9.8	22823.92	22.8	57.14	0.57
5	14808.42	14.8	9642.00	9.6	24450.42	24.5	60.57	0.61
6	12389.63	12.4	11729.25	11.7	24118.88	24.1	51.37	0.51
7	15671.64	15.7	15286.50	15.3	30958.14	31.0	50.62	0.51
8	12114.66	12.1	8064.00	8.1	20178.66	20.2	60.04	0.60
9	12025.78	12.0	10289.25	10.3	22315.03	22.3	53.89	0.54
10	11916.00	11.9	8021.04	8.0	19937.04	19.9	59.77	0.60
11	10607.58	10.6	7512.00	7.5	18119.58	18.1	58.54	0.59
12	11537.58	11.5	8193.00	8.2	19730.58	19.7	58.48	0.58
13	10361.63	10.4	5144.25	5.1	15505.88	15.5	66.82	0.67
14	11491.07	11.5	6243.00	6.2	17734.07	17.7	64.80	0.65
15	9847.98	9.8	7182.00	7.2	17029.98	17.0	57.83	0.58
16	12493.44	12.5	9336.33	9.3	21829.77	21.8	57.23	0.57
17	13047.79	13.0	7423.17	7.4	20470.96	20.5	63.74	0.64
18	11396.72	11.4	7590.00	7.6	18986.72	19.0	60.02	0.60
19	11934.73	11.9	7404.00	7.4	19338.73	19.3	61.71	0.62
20	14626.50	14.6	9706.88	9.7	24333.38	24.3	60.11	0.60
21	13713.91	13.7	8655.75	8.7	22369.66	22.4	61.31	0.61
22	13267.22	13.3	11530.50	11.5	24797.72	24.8	53.50	0.54
23	10430.40	10.4	9376.50	9.4	19806.90	19.8	52.66	0.53
24	12656.98	12.7	8323.50	8.3	20980.48	21.0	60.33	0.60

Redni broj	TC (%)	N (%)	Ca (%)	Mg (%)	K (%)	P (%)
1	43.00	3.14	0.43	0.25	3.77	0.33
2	43.06	3.61	0.50	0.22	3.80	0.25
3	44.07	3.75	0.59	0.37	2.66	0.28
4	41.81	2.78	0.45	0.27	3.11	0.33
5	42.76	3.01	0.61	0.29	3.17	0.33
6	42.39	2.53	0.51	0.24	3.37	0.33
7	43.68	3.64	0.52	0.27	3.08	0.39
8	42.69	3.34	0.53	0.28	3.14	0.34
9	42.99	3.50	0.49	0.22	3.31	0.31
10	43.95	3.72	0.55	0.27	3.04	0.28
11	43.92	3.76	0.53	0.28	2.90	0.27
12	43.97	3.34	0.48	0.31	2.37	0.34
13	43.78	3.10	0.54	0.32	2.06	0.36
14	42.37	3.58	0.57	0.43	2.01	0.31
15	42.80	3.16	0.69	0.39	2.29	0.35
16	43.21	3.67	0.61	0.41	2.05	0.33
17	43.59	3.45	0.58	0.38	2.35	0.29
18	43.85	4.19	0.67	0.47	1.94	0.35
19	42.94	3.25	0.62	0.35	2.64	0.26
20	42.71	2.84	0.52	0.27	3.24	0.26
21	42.35	2.88	0.69	0.40	3.22	0.37
22	42.38	3.18	0.47	0.30	3.62	0.32
23	43.55	3.32	0.68	0.44	2.26	0.31
24	43.08	4.29	0.64	0.49	2.54	0.32

Redni broj	Cu (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	B (mg/kg)
1	14.00	497.82	53.16	38.08	7.43
2	12.38	279.60	56.67	51.66	8.17
3	14.40	266.89	50.90	52.47	7.38
4	12.46	223.04	37.09	43.88	6.87
5	11.29	378.65	39.99	39.97	7.23
6	9.68	295.73	36.60	30.72	7.58
7	13.02	267.03	49.36	48.08	6.74
8	11.37	212.36	50.34	44.31	7.77
9	11.20	341.81	45.87	46.37	8.36
10	10.85	336.40	47.99	45.41	8.87
11	12.27	299.42	53.98	45.15	8.55
12	12.91	187.84	48.37	37.62	7.57
13	11.89	231.88	42.47	42.83	7.71
14	11.95	173.95	39.78	48.77	5.51
15	12.59	233.48	41.50	41.93	6.85
16	11.78	202.69	30.27	37.60	5.99
17	10.03	182.00	32.78	38.40	7.06
18	12.36	203.91	33.34	36.17	5.62
19	11.30	489.46	36.25	31.26	6.77
20	10.39	564.73	43.39	32.73	7.13
21	11.36	353.24	37.05	30.17	7.36
22	11.02	263.32	36.02	37.89	6.73
23	14.19	367.26	47.41	41.94	7.91
24	13.59	417.28	44.72	46.54	6.75





Source: University of Illinois, 1999


VE

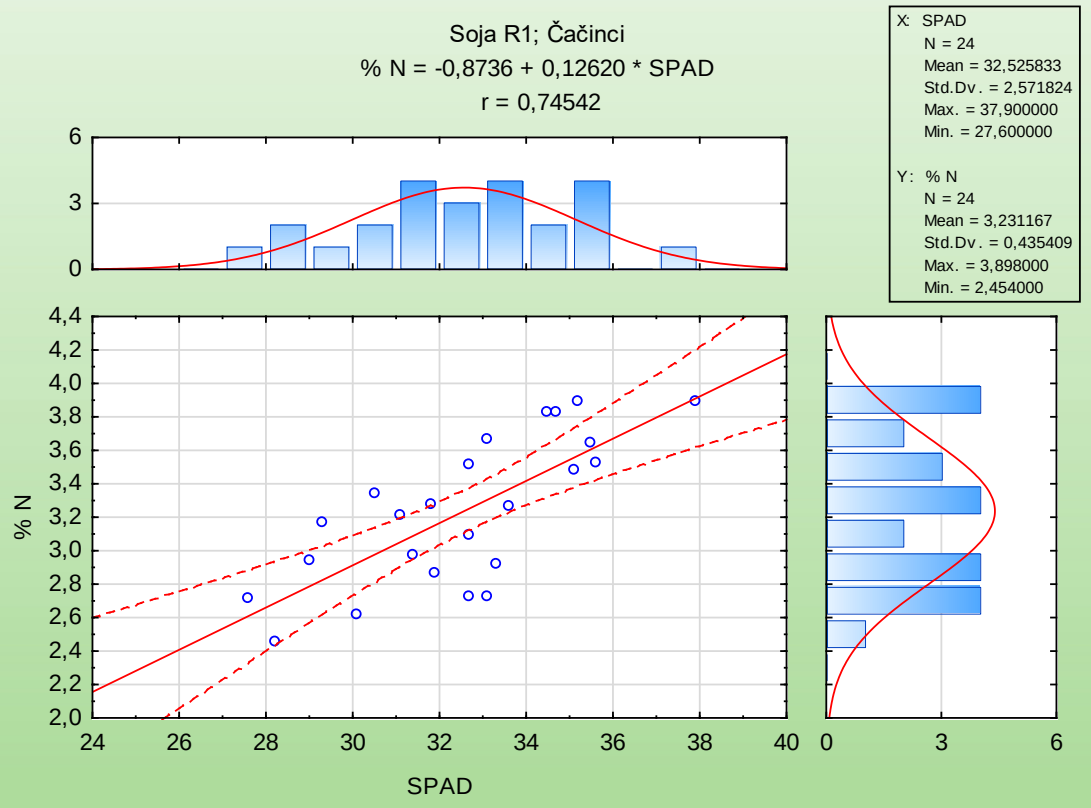

V1 – V2

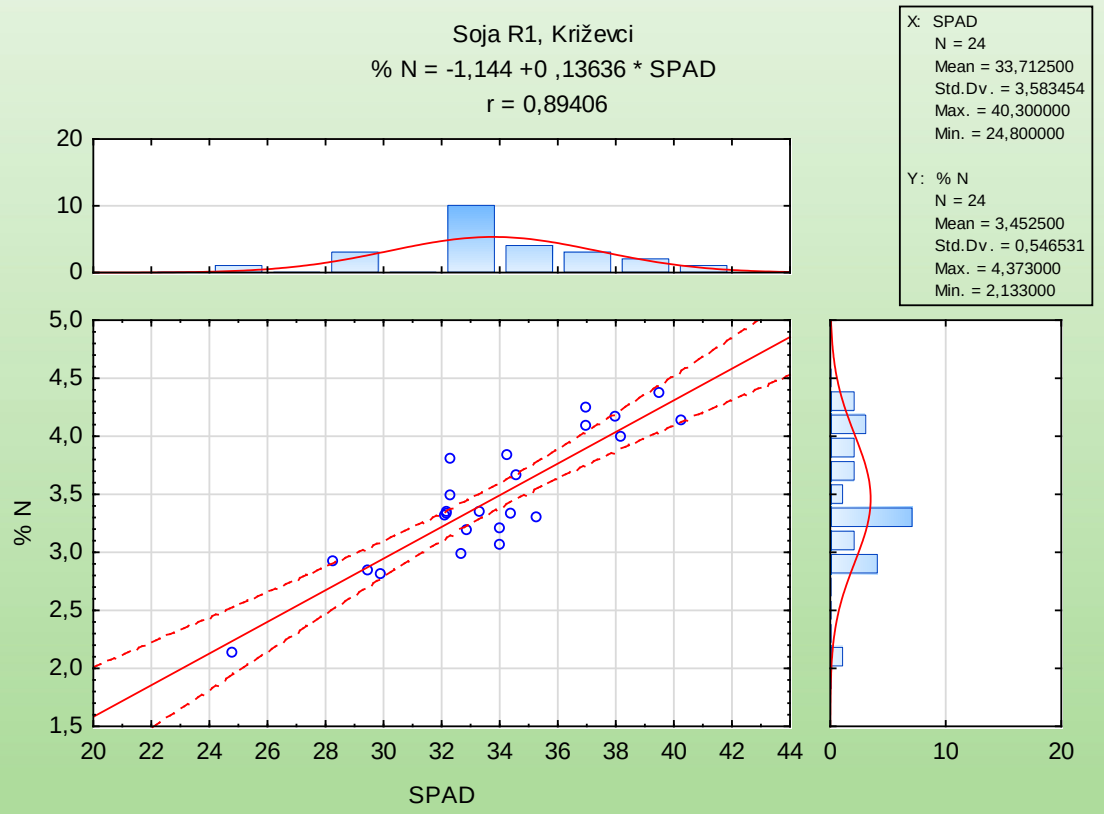

R1


R4

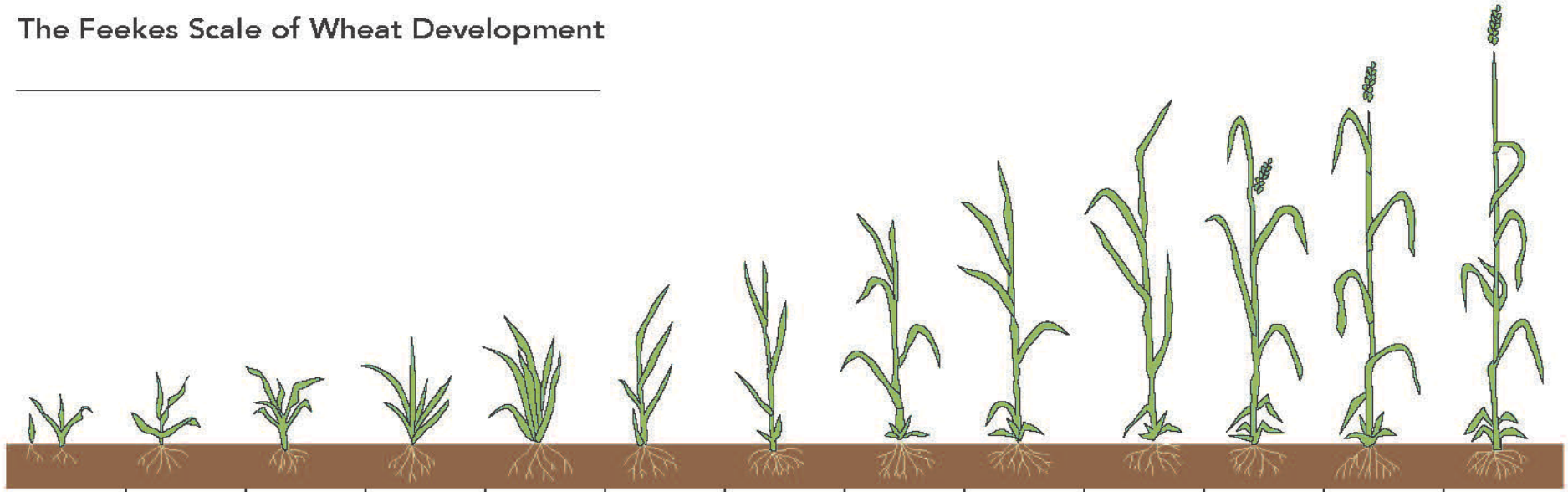

R

Visina biljke (cm)	Broj grana	Broj etaža	Broj mahuna (F)	Broj mahuna (S)	Masa zrna po biljci (g)	Masa ljuske po biljci (g)	Masa stabljike (g)	Broj zrna po mahuni	Broj zrna po biljci	Masa 1000 zrna (g)	Hektolitarska masa (kg)	Žetveni index (%)	Biološki prinos (t/ha)	Poljoprivredni prinos (t/ha)
105.2	0.0	10.0	27.6	0.2	8.11	3.36	8.50	2.4	67.0	97.5	59.5	52.04	12.52	6.51
106.0	0.6	11.0	32.4	0.6	8.41	3.86	8.51	2.5	82.0	100.5	69.8	51.84	9.15	4.74
113.6	0.4	11.4	31.4	1.0	8.63	3.94	10.19	2.5	78.8	107.3	70.6	50.31	7.26	3.65
83.6	1.0	11.4	35.4	0.2	10.46	4.21	9.61	2.6	93.2	111.2	71.3	53.10	10.20	5.42
103.8	1.4	12.6	53.6	0.6	15.98	6.37	13.73	2.6	138.8	115.8	70.6	50.96	14.79	7.54
102.6	2.6	13.4	48.4	1.0	14.08	5.77	13.03	2.5	123.4	113.2	70.7	50.84	8.19	4.16
117.4	1.8	13.4	53.8	1.0	16.29	6.86	15.66	2.7	145.0	109.1	90.9	49.80	7.25	3.61
105.4	1.0	11.0	34.4	0.6	9.16	4.24	9.21	2.4	83.2	91.4	61.8	45.11	6.95	3.13
115.4	2.6	13.6	75.2	1.4	21.30	10.04	20.23	2.4	184.2	106.0	64.6	46.47	11.21	5.21
115.6	0.8	12.2	36.6	0.2	10.36	4.91	10.86	2.5	92.0	111.4	92.8	46.30	7.81	3.62
92.2	3.8	11.6	33.6	0.6	8.57	4.26	10.38	2.3	78.0	110.0	70.5	49.83	9.42	4.69
111.8	3.4	13.4	62.2	3.0	17.67	8.40	18.14	2.4	147.2	114.0	69.5	47.94	9.41	4.51
106.8	2.4	12.0	51.4	2.6	13.06	6.54	15.41	2.4	122.0	104.7	70.7	52.40	9.25	4.85
121.4	2.4	12.0	51.4	1.4	12.81	6.07	15.28	1.6	82.2	108.6	69.6	56.83	12.25	6.96
113.2	3.0	12.8	47.6	1.2	12.83	6.33	15.86	2.5	117.2	107.2	70.5	47.74	10.44	4.98
113.2	1.8	12.2	45.6	0.0	13.36	4.56	13.14	2.7	122.4	113.0	70.7	51.32	11.77	6.04
108.0	2.8	12.8	56.0	0.8	16.88	6.75	16.43	2.6	147.2	115.1	72.0	52.91	7.30	3.86
113.0	0.6	11.6	42.8	0.2	12.12	5.42	12.25	2.6	109.4	114.1	69.6	51.68	11.48	5.93
115.2	1.4	13.2	51.0	0.4	16.68	6.96	16.20	2.7	139.0	119.4	71.1	51.79	9.94	5.15
111.6	1.0	12.2	40.0	0.6	11.84	5.04	12.89	2.8	110.0	112.8	68.8	48.90	11.59	5.67
110.4	1.4	11.2	42.2	0.0	11.88	5.00	12.48	2.5	106.0	112.4	72.0	51.44	11.28	5.80
120.6	0.8	11.6	36.6	0.6	11.90	4.13	13.03	2.4	88.6	131.9	70.1	50.18	11.34	5.69
108.8	2.4	10.0	38.2	0.4	10.55	4.82	11.13	2.6	98.0	112.0	70.0	51.47	10.68	5.50
114.6	1.8	13.4	54.4	0.4	16.25	6.47	14.76	2.5	135.4	124.4	72.3	50.14	10.05	5.04


Soja R1; Čačinci
% N = -0,8736 + 0,12620 * SPAD
r = 0,74542
X: SPAD
N = 24
Mean = 32,525833
Std.Dv. = 2,571824
Max. = 37,900000
Min. = 27,600000
Y: % N
N = 24
Mean = 3,231167
Std.Dv. = 0,435409
Max. = 3,898000
Min. = 2,454000
% N
SPAD


Soja R1, Križevci
% N = -1,144 +0 ,13636 * SPAD
r = 0,89406
X: SPAD
N = 24
Mean = 33,712500
Std.Dv. = 3,583454
Max. = 40,300000
Min. = 24,800000
Y: % N
N = 24
Mean = 3,452500
Std.Dv. = 0,546531
Max. = 4,373000
Min. = 2,133000
% N
SPAD

The Feekes Scale of Wheat Development



1	2	3	4	5	6	7	8	9	10	10.1	10.5	11
One Shoot	Tillering Begins	Tillers Formed	Leaf Sheaths Lengthen	Leaf Sheaths Strongly Erected	First Node of Stem Visible	Second Node Visible	Last Leaf Just Visible	Ligule of Last Leaf Just Visible	In "Boot"	Head Visible	Flowering (Wheat)	Ripening
Tillering					Stem Extension					Heading		



Sklop (broj biljaka/m2)	Dužina stabljike (cm)	Dužina klasa (cm)	Masa stabljike	Masa klasa	Broj klasića (F)	Broj klasića (S)	Masa zrna po klasu	Broj zrna po klasu	Masa 1000 zrna (g)	Hektolitarska masa (kg)	Žetveni index (%)	Biološki prinos (t/ha)	Poljoprivredni prinos (t/ha)	Prinos biljne mase (t/ha)
356	64.3	8.5	1.25	2.05	17.9	2.5	1.54	54.0	37.9	72.1	46.7	19.80	9.24	10.56
352	56.8	7.9	1.30	1.95	18.3	2.5	1.51	47.5	34.3	70.6	46.4	19.50	9.05	10.45
368	62.9	9.0	1.50	1.90	20.1	2.1	1.68	53.6	36.1	71.7	49.3	20.40	10.05	10.35
276	53.8	7.2	1.10	1.50	17.2	3.0	1.43	49.0	35.5	72.3	55.1	15.60	8.60	7.00
404	60.2	7.8	1.35	2.05	17.7	2.3	1.41	43.6	35.8	75.0	41.5	20.40	8.48	11.93
424	57.8	7.2	1.60	2.00	17.7	2.2	1.40	42.6	37.7	72.4	38.9	21.60	8.40	13.20
368	58.6	8.9	1.45	2.20	19.5	2.1	1.66	53.3	40.3	73.0	45.6	21.90	9.99	11.91
420	55.0	7.0	1.05	1.60	16.6	3.2	1.23	40.2	35.2	72.7	46.2	15.90	7.35	8.55
588	66.1	7.7	1.25	1.85	17.5	2.6	1.42	48.2	36.0	73.5	45.7	18.60	8.51	10.10
356	61.7	8.3	1.45	2.15	18.9	2.6	1.68	51.9	39.9	73.6	46.6	21.60	10.07	11.53
480	69.9	8.5	1.30	1.90	19.4	2.1	1.47	45.2	39.1	75.7	45.9	19.20	8.81	10.40
348	61.4	8.2	1.30	1.95	18.3	2.5	1.48	45.1	37.3	76.4	45.6	19.50	8.89	10.61
444	62.5	7.8	1.45	1.95	17.4	2.3	1.48	43.1	41.1	76.8	43.7	20.40	8.91	11.49
580	68.4	8.2	1.55	1.70	18.3	2.1	1.25	36.7	38.0	74.1	38.5	19.50	7.50	12.00
448	63.7	8.1	1.40	2.00	18.6	2.2	1.53	45.2	42.0	77.2	45.1	20.40	9.20	11.20
440	64.1	7.7	1.55	1.65	17.5	2.9	1.26	40.2	38.8	74.8	39.5	19.20	7.58	11.62
368	57.4	7.3	1.40	2.00	17.1	2.8	1.32	41.1	38.9	74.0	38.8	20.40	7.92	12.48
420	62.4	9.4	1.60	2.40	20.2	2.0	1.79	64.2	34.6	74.8	44.6	24.00	10.71	13.29
260	53.7	7.9	1.25	1.95	18.5	2.3	1.22	39.7	40.9	72.5	38.2	19.20	7.33	11.87
504	63.9	9.2	1.10	1.95	19.0	1.5	1.44	49.2	34.6	72.4	47.1	18.30	8.61	9.69
380	56.4	9.2	1.25	2.50	19.8	1.6	1.76	59.7	35.7	73.6	46.8	22.50	10.54	11.96
500	66.1	8.7	1.65	2.30	18.5	1.6	1.50	48.9	36.9	73.6	38.0	23.70	9.02	14.69
408	60.1	9.1	1.45	2.30	19.6	2.2	1.56	54.3	36.1	71.1	41.5	22.50	9.33	13.17
360	60.5	9.1	1.50	2.15	19.8	2.0	1.67	50.3	39.4	72.8	45.7	21.90	10.00	11.90

LAI	LP biljke (m^2)	masa listova (kg)	SLA (m^2/kg)	SPAD	Visina biljke (cm)	Masa biljke (g)
0.438	0.00073	0.051	0.01433	42.0	35.5	110.03
0.417	0.00070	0.052	0.01330	39.4	33.5	108.45
0.460	0.00077	0.070	0.01094	48.6	35.5	143.84
0.401	0.00067	0.053	0.01268	39.8	37.5	123.91
0.461	0.00077	0.068	0.01130	42.8	37.0	151.06
0.483	0.00081	0.061	0.01319	43.7	36.7	138.55
0.429	0.00072	0.058	0.01239	41.4	34.5	127.62
0.403	0.00067	0.047	0.01422	40.8	31.0	97.10
0.383	0.00064	0.057	0.01129	39.5	29.7	118.96
0.936	0.00156	0.049	0.03181	39.8	29.5	104.24
0.820	0.00137	0.065	0.02106	41.6	35.0	148.07
0.485	0.00081	0.058	0.01390	42.4	35.0	126.94
0.495	0.00082	0.053	0.01551	43.3	36.0	116.78
0.447	0.00075	0.063	0.01183	46.3	30.0	140.85
0.426	0.00071	0.054	0.01325	44.0	33.0	121.70
0.451	0.00075	0.059	0.01267	46.4	38.5	124.96
0.478	0.00080	0.050	0.01589	42.0	34.5	114.37
0.492	0.00082	0.061	0.01350	47.5	38.0	139.46
0.471	0.00079	0.052	0.01500	45.5	36.0	120.46
0.443	0.00074	0.061	0.01208	44.6	34.5	133.48
0.456	0.00076	0.046	0.01638	39.6	32.0	107.87
0.557	0.00093	0.060	0.01547	47.3	37.5	138.05
0.412	0.00069	0.057	0.01203	41.5	35.0	124.74
0.433	0.00072	0.052	0.01393	44.4	34.0	124.14

R.b.	LAI	LP biljke (m^2)	masa listova (kg)	SLA (m^2/kg)	SPAD	Visina biljke (cm)	Masa biljke (g)
1	0.509	0.00085	0.167	0.00508	36.2	82.0	363.18
2	0.491	0.00082	0.155	0.00529	37.0	80.5	322.84
3	0.636	0.00106	0.176	0.00603	38.0	93.0	363.18
4	0.453	0.00076	0.153	0.00493	31.4	81.5	362.62
5	0.677	0.00113	0.149	0.00757	37.0	86.0	333.56
6	0.611	0.00102	0.142	0.00719	37.4	82.0	323.52
7	0.718	0.00120	0.150	0.00798	34.8	82.5	333.68
8	0.641	0.00107	0.200	0.00534	40.2	83.0	413.34
9	0.779	0.00130	0.162	0.00799	38.2	86.5	343.82
10	0.568	0.00095	0.170	0.00558	37.3	75.0	363.38
11	0.698	0.00116	0.167	0.00696	33.8	85.0	383.78
12	0.573	0.00096	0.174	0.00548	37.9	79.0	382.98
13	0.539	0.00090	0.146	0.00615	35.4	82.5	323.04
14	0.483	0.00080	0.126	0.00640	33.1	79.5	283.12
15	0.518	0.00086	0.150	0.00575	33.2	81.0	343.00
16	0.864	0.00144	0.153	0.00942	36.4	90.0	324.04
17	0.672	0.00112	0.176	0.00637	35.3	81.0	403.50
18	0.697	0.00116	0.170	0.00682	44.2	90.0	393.56
19	0.476	0.00079	0.157	0.00507	31.4	80.0	362.86
20	0.734	0.00122	0.165	0.00740	37.5	81.0	363.64
21	0.449	0.00075	0.121	0.00618	27.9	78.0	283.26
22	0.664	0.00111	0.157	0.00705	43.1	89.1	363.68
23	0.507	0.00085	0.129	0.00656	26.6	78.2	283.66
24	0.937	0.00156	0.159	0.00980	36.0	88.0	384.40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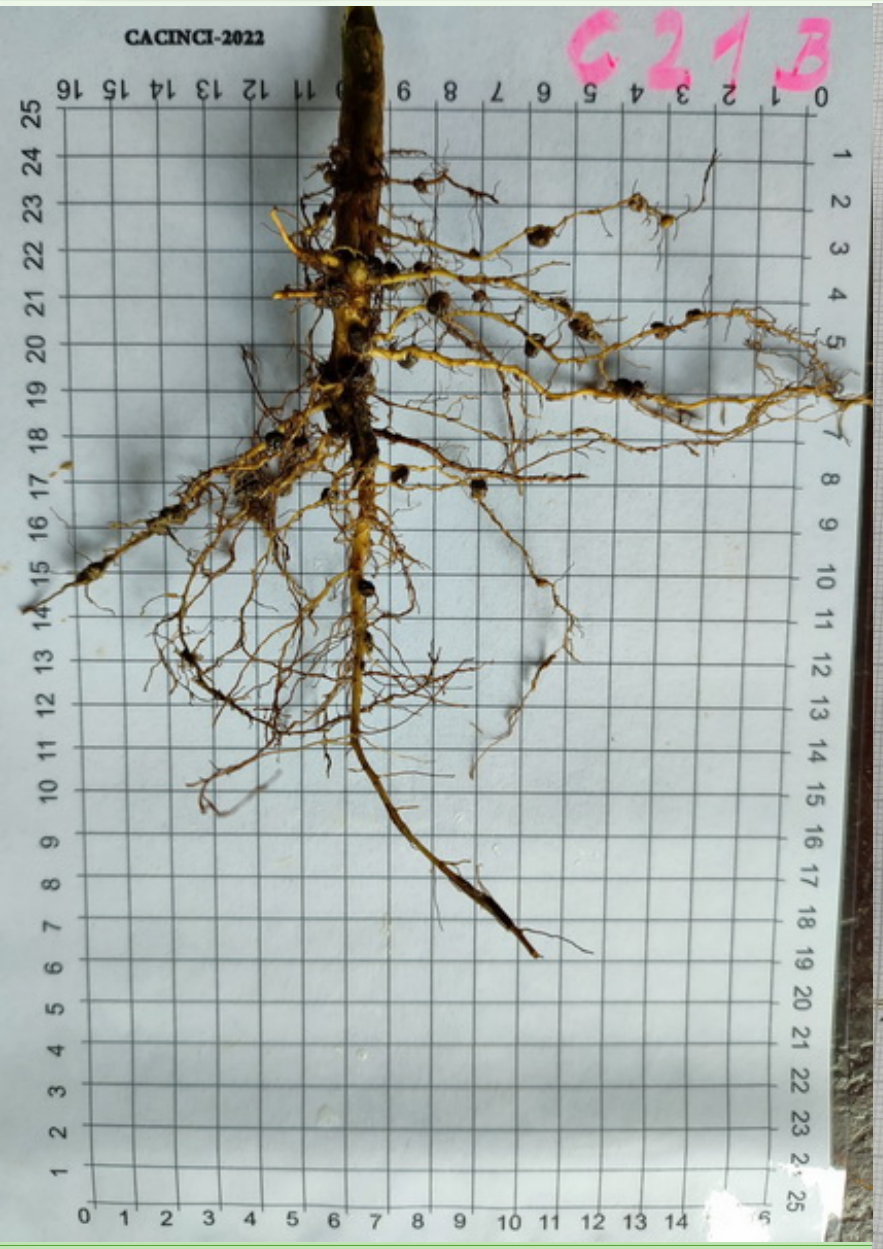
POVRŠINA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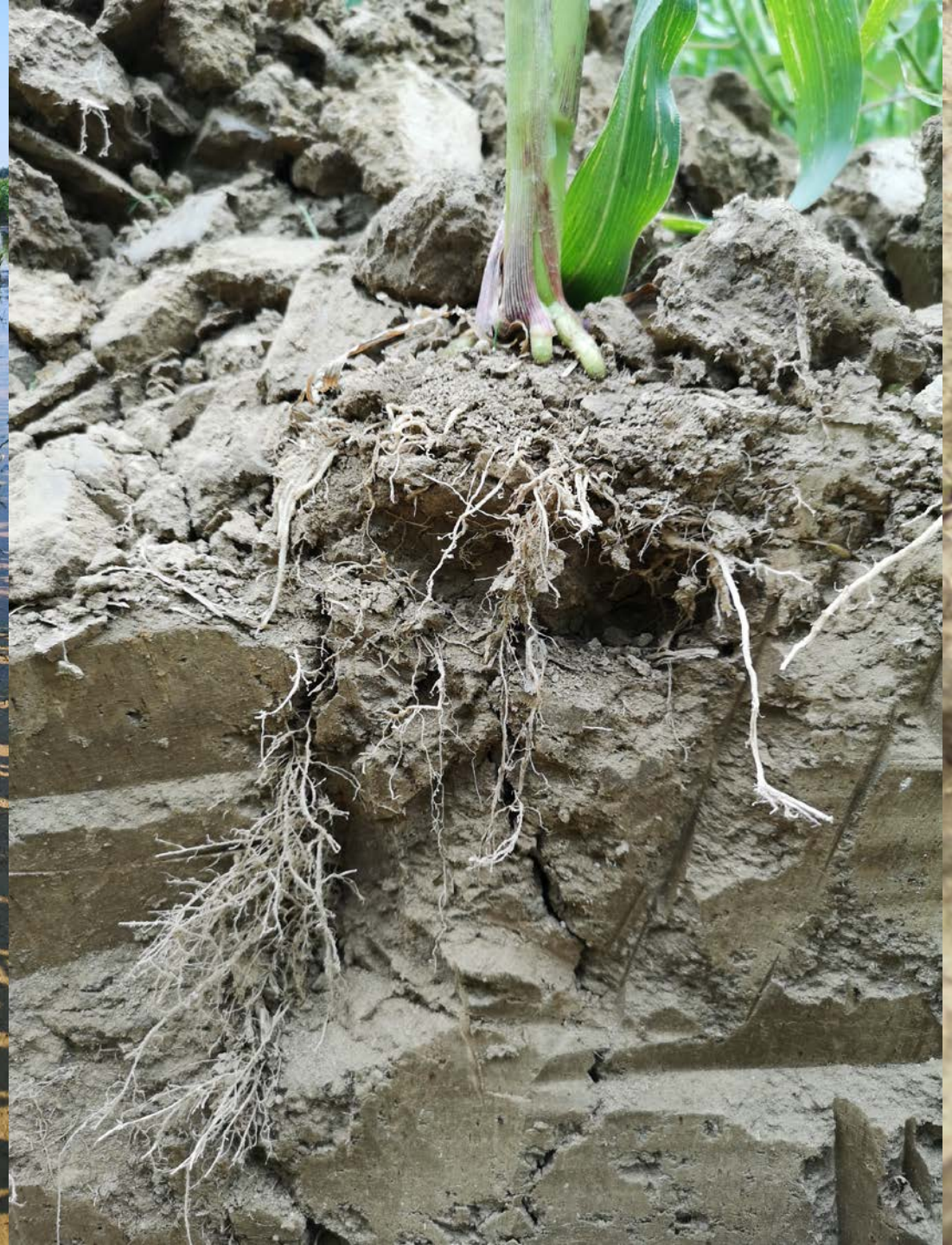




HRZZ projekt:
"Procjena konzervacijske obrade tla kao napredne metode uzgoja usjeva i prevencije degradacije tla"
ACTIVEsoil: IP-2020-02-2647

Effects of conservation tillage on maize yield

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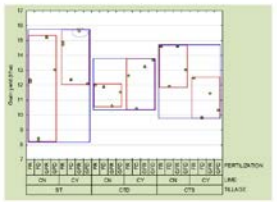
Conservation tillage is prescribed to prevent and protect soil from degradation processes. Conservation tillage ensures more moisture storage, reduces erosion, benefits the crop in arid and semiarid areas by reducing drought risk and increasing grain yield.

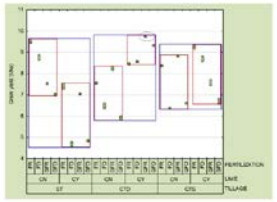
The aim of the research was to determine the changes in the grain and straw yield as a harvest index with regard to the tillage systems (ST, CTD, CTS), liming (CY, CN) and fertilization treatment (FR, FD, GFR, GFD).

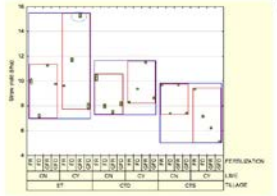
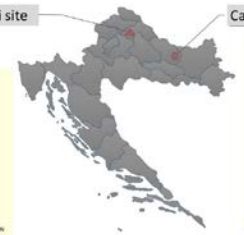
ST	Standard tillage deep mouldboard ploughing
CTD	Conservation tillage deep (chiseling with minimum 30% of surface covered with plant residues)
CTS	Conservation tillage shallow tillage up to 10 cm and minimum 50% of surface covered with plant or plant residues

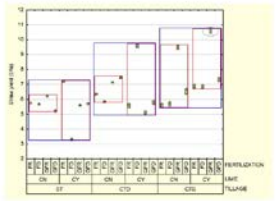
FR	according recommendation (NPK)
FD	fertilization decreased by 50% compared to recommendation
GFR	fertilization according recommendation + 300 kg/ha Geo2
GFD	fertilization decreased by 50% + 300 kg/ha Geo2

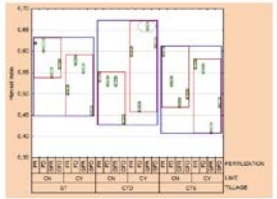
CY	treatment with liming
CN	treatment without liming









The obtained results indicate the importance liming (on acid soils), applying optimal doses of fertilizer with the use of biophysiological soil activators and the possibility of implementation conservation tillage for maize production in different agroecological conditions.

HRZZ Croatian Science Foundation

2nd Central European ISTRO Conference
Brno, Czech Republic, 6 – 8 September 2022

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58th Croatian & 18th International Symposium on Agriculture (SA 2023)

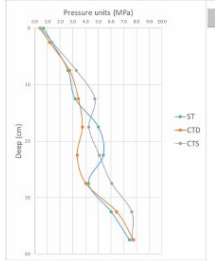
Conservation tillage effects on soil health in maize production

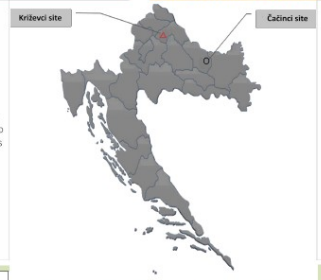
Irena Jug, Boris Đurđević, Bojana Brozović, Vesna Vukadinović, Ante Bubalo, Domagoj Veseli, Danijel Jug

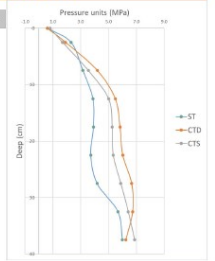
Faculty of Agrobiotechnical Sciences Osijek, University of Josip Juraj Strossmayer in Osijek, Vladimira Preloga 1, Osijek, Croatia (ijug@fazos.hr)

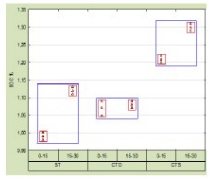
ST	Standard tillage deep mouldboard ploughing
CTD	Conservation tillage deep (chiseling with minimum 30% of surface covered with plant residues)
CTS	Conservation tillage shallow tillage up to 10 cm and minimum 50% of surface covered with plant residues

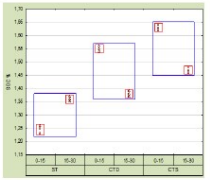
CT is prescribed to prevent and protect soil from degradation processes. Conservation tillage methods improve soil health and productivity, reduce runoff, increase soil carbon sequestration and limit the extent of erosion and also promote certain economic and environmental benefits as decrease in carbon dioxide and greenhouse gas emissions, less reliance on farm machinery and equipment, and an overall reduction in fuel and labor costs.

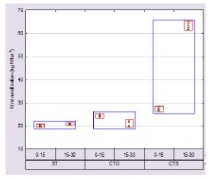












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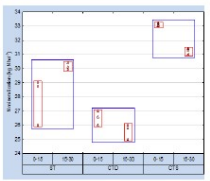
After the first year of research, a large heterogeneity of the researched parameters between the tillage treatments was recorded



Compared to conventional agriculture, conservational tillage shows many advantages, of which the most important are the prevention of further soil degradation and restoring soil properties. Obtained results shows that the conservational tillage system is much more beneficial than the conventional one.

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Centralna agrobiotehnička analitička jedinica

ISTRO 2024, 22nd Conference, Virginia Beach, VA, USA, Sep 23 – 27 2024

Effects of conservation tillage on soil properties and soybean yields on Stagnosol, Eastern Croatia

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*Faculty of Agrobiotechnical Sciences Osijek, University of Josip Juraj Strossmayer in Osijek, Vladimira Preloga 1, Osijek, Croatia (ijug@fazos.hr)

ST	Standard tillage, deep mouldboard ploughing up to 30 cm
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FR	Fertilization according recommendation (NPK)
FD	Fertilization decreased by 50% compared to recommendation
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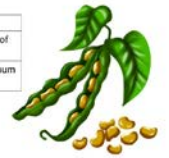
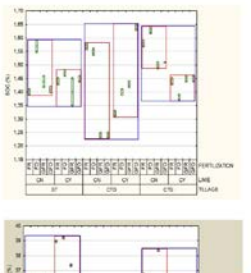
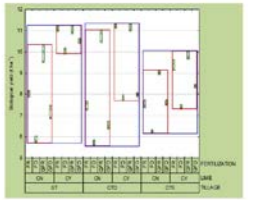
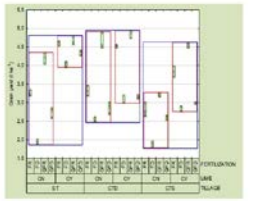
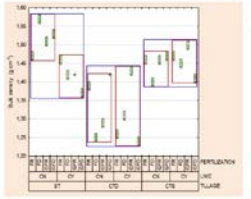
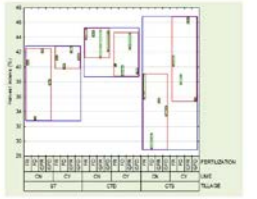
CY	Treatment with liming
CN	Treatment without liming



Physical properties		Chemical properties	
Soil texture: Silty clay loam		pH (H_2O)	5.12
Silt = 60.84		pH (KCl)	3.92
Clay = 29.35			
Sand = 9.81			
Field capacity - FC (vol.%)		Hy (cmol$^{(+)}$ kg^{-1})	
43.04			7.48
Particle density – ρ_s (g cm^{-3})		P_2O_5 mg kg^{-1} soil	
2.65			75
Packing density – PD (g cm^{-3})		K_2O mg kg^{-1} soil	
1.76			111
Total porosity – ε (%)		SOM (%)	
43.50			2.83





Properly selected sustainable land management practices are essential for maintaining long-term soil productivity and reducing soil degradation caused by agricultural activities, especially on soils with poorer productive capabilities.

Effective management practices, like conservation soil tillage, liming and optimal doses of fertilizers with the use of biophysiological soil activators are essential to mitigate the challenges posed by Stagnosols and improve their productivity.

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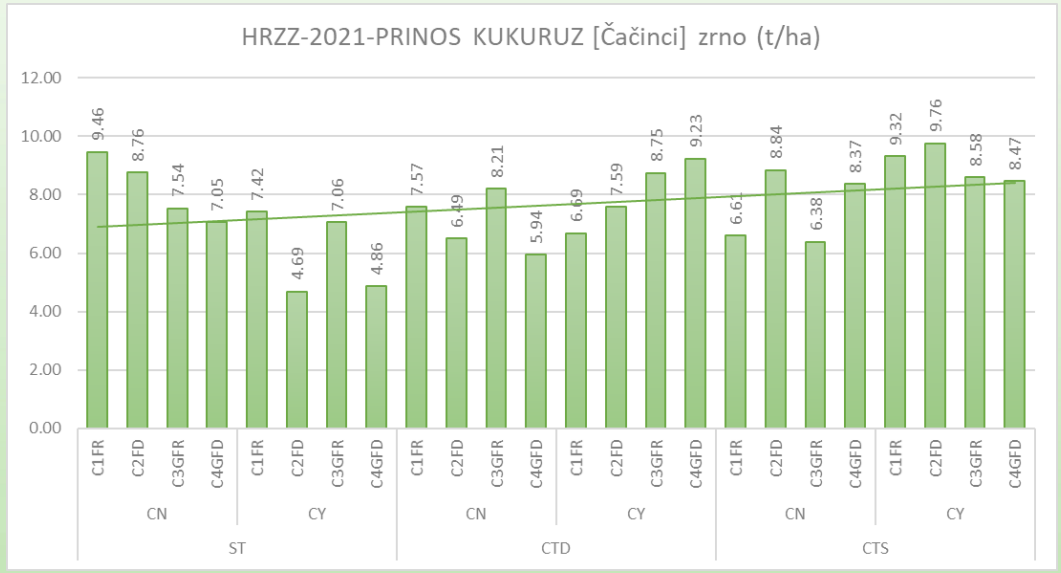
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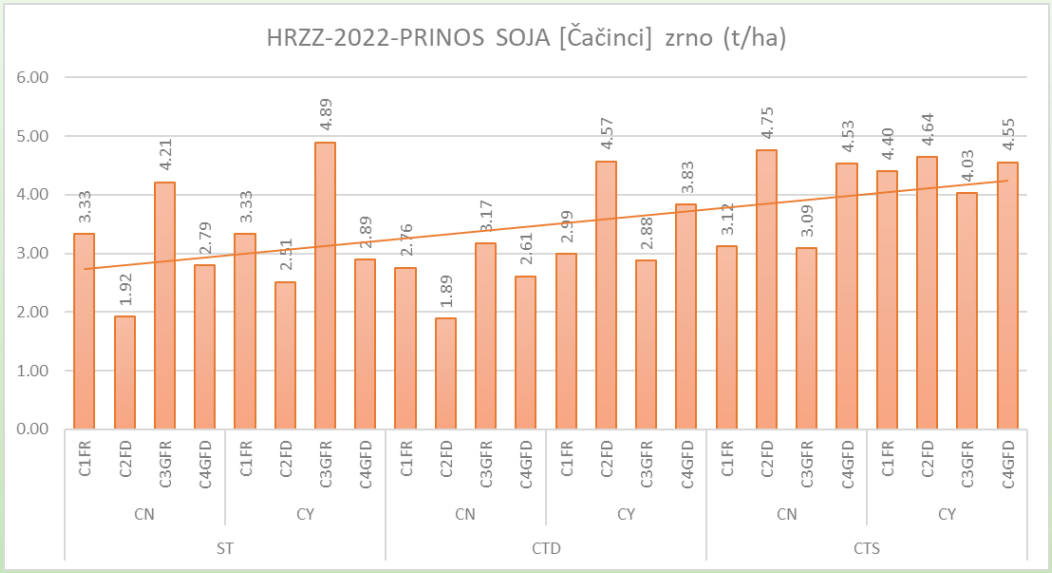
9.46 8.76 7.54 7.05 7.42 4.69 7.06 4.86 7.57 6.49 8.21 5.94 6.69 7.59 8.75 9.23 6.61 8.84 6.38 8.37 9.32 9.76 8.58 8.47
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS


HRZZ-2022-PRINOS SOJA [Čačinci] zrno (t/ha)
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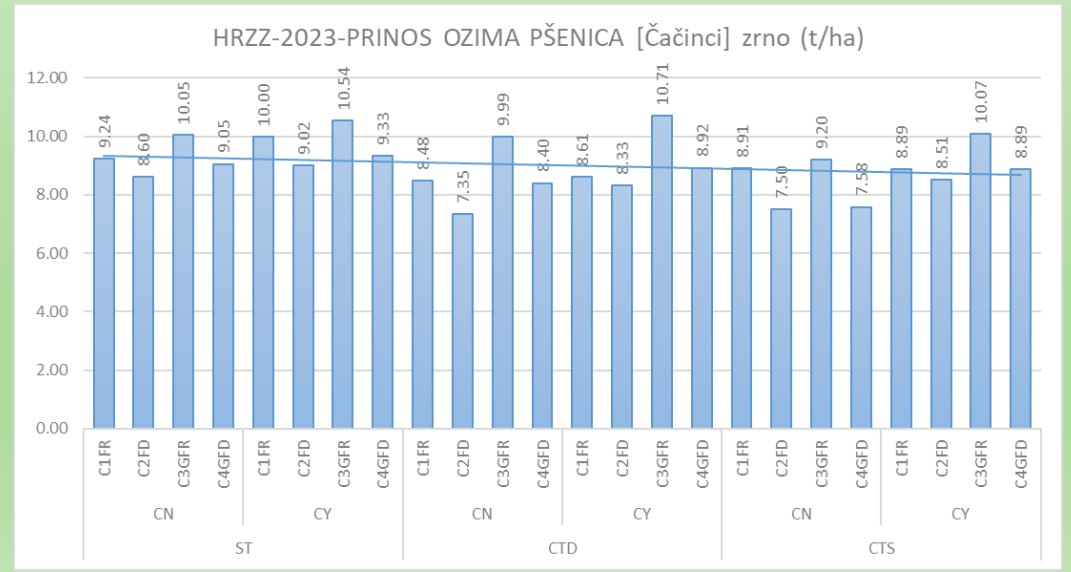
5.00
4.00
3.00
2.00
1.00
0.00
3.33 1.92 4.21 2.79 3.33 2.51 4.89 2.89 2.76 1.89 3.17 2.61 2.99 4.57 2.88 3.83 3.12 4.75 3.09 4.53 4.40 4.64 4.03 4.55
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS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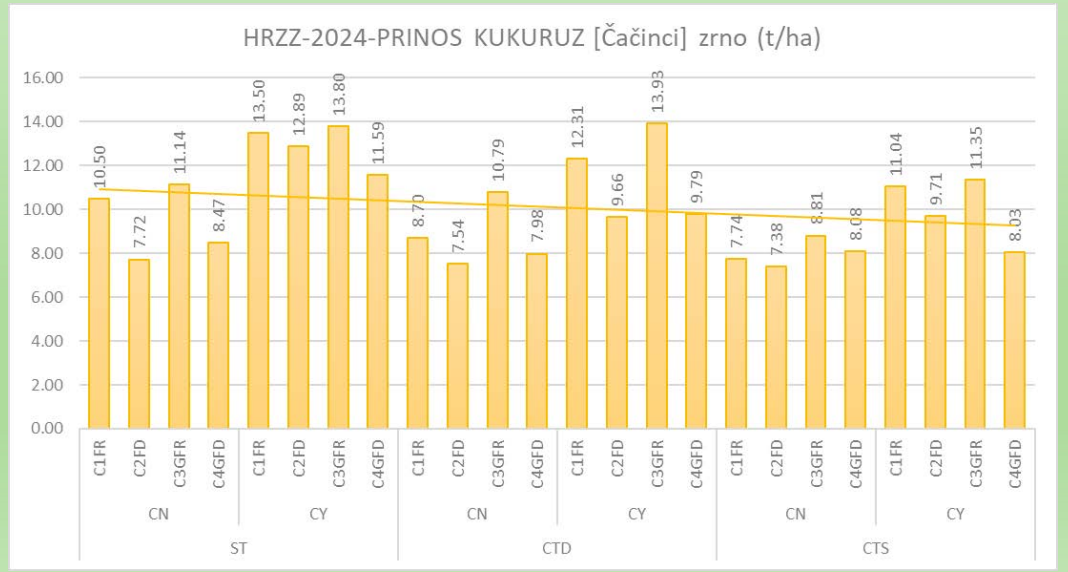
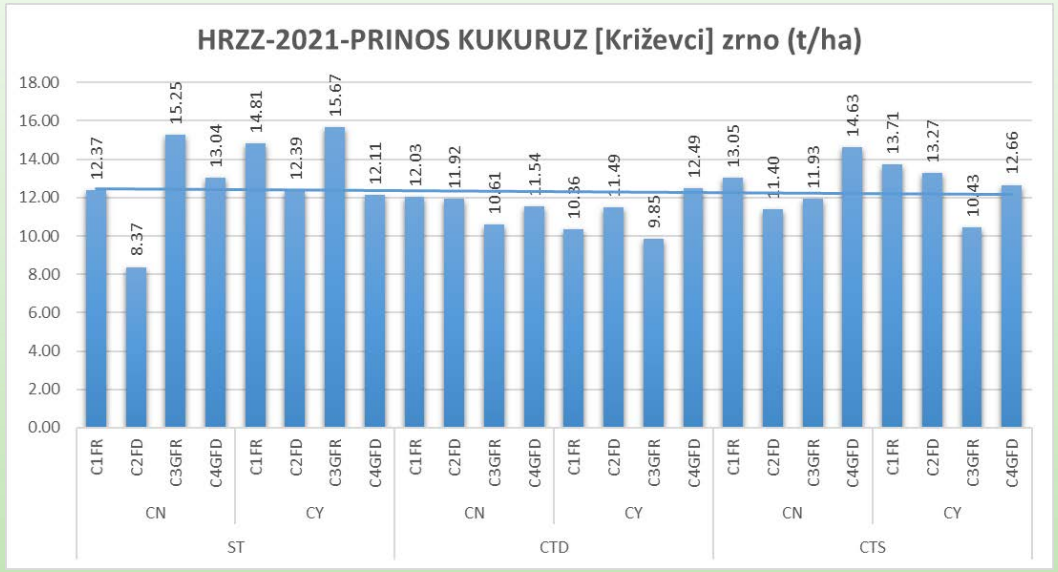
12.00
10.00
8.00
6.00
4.00
2.00
0.00
9.24 8.60 10.05 9.05 10.00 9.02 10.54 9.33 8.48 7.35 9.99 8.40 8.61 8.33 10.71 8.92 8.91 7.50 9.20 7.58 8.89 8.51 10.07 8.89
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS


HRZZ-2024-PRINOS KUKURUZ [Čačinci] zrno (t/ha)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
10.50 7.72 11.14 8.47 13.50 12.89 13.80 11.59 8.70 7.54 10.79 7.98 12.31 9.66 13.93 9.79 7.74 7.38 8.81 8.08 11.04 9.71 11.35 8.03
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS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8.00
6.00
4.00
2.00
0.00
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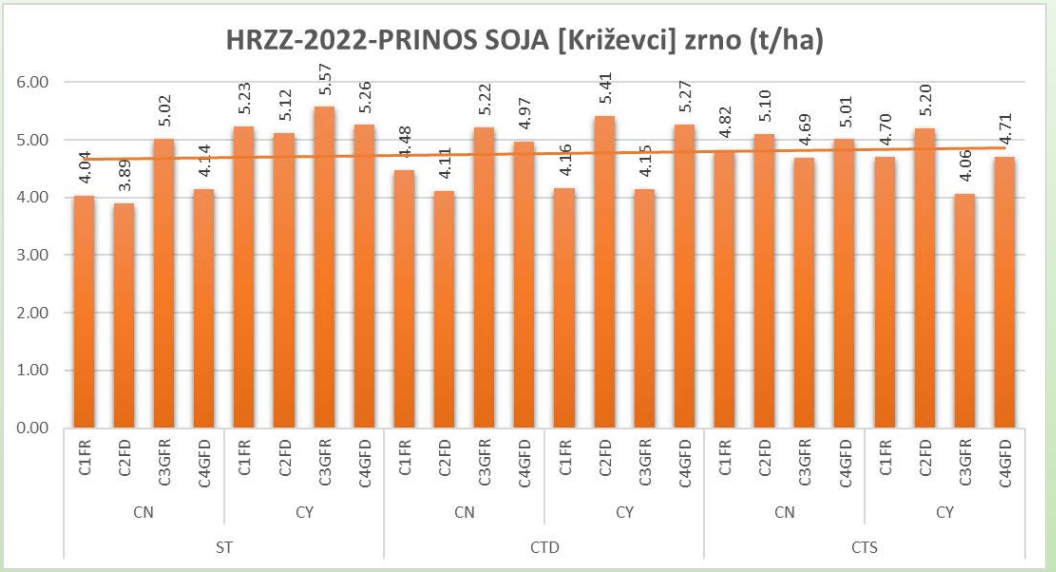
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS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4.00
3.00
2.00
1.00
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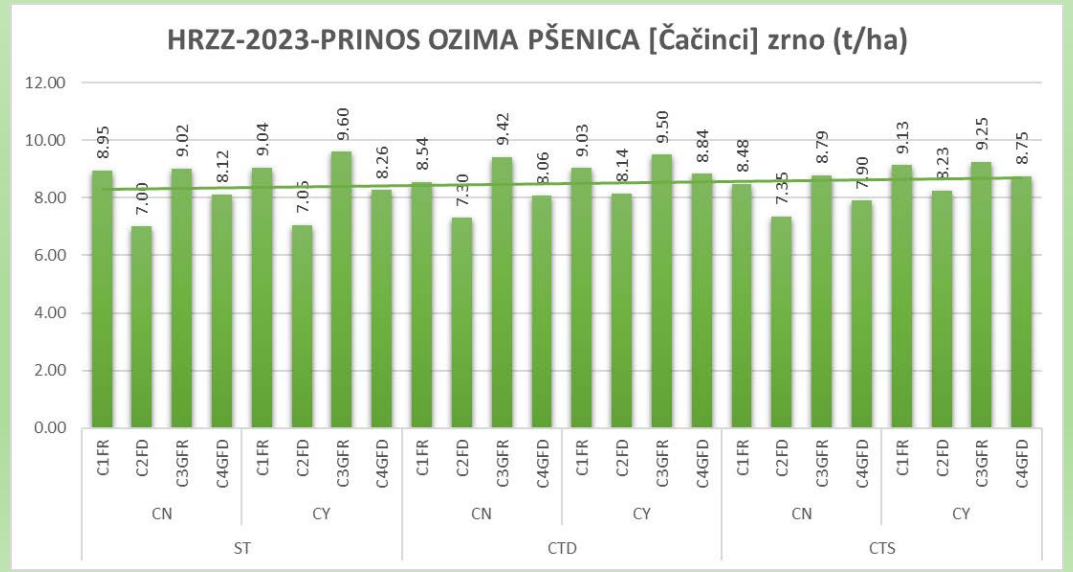
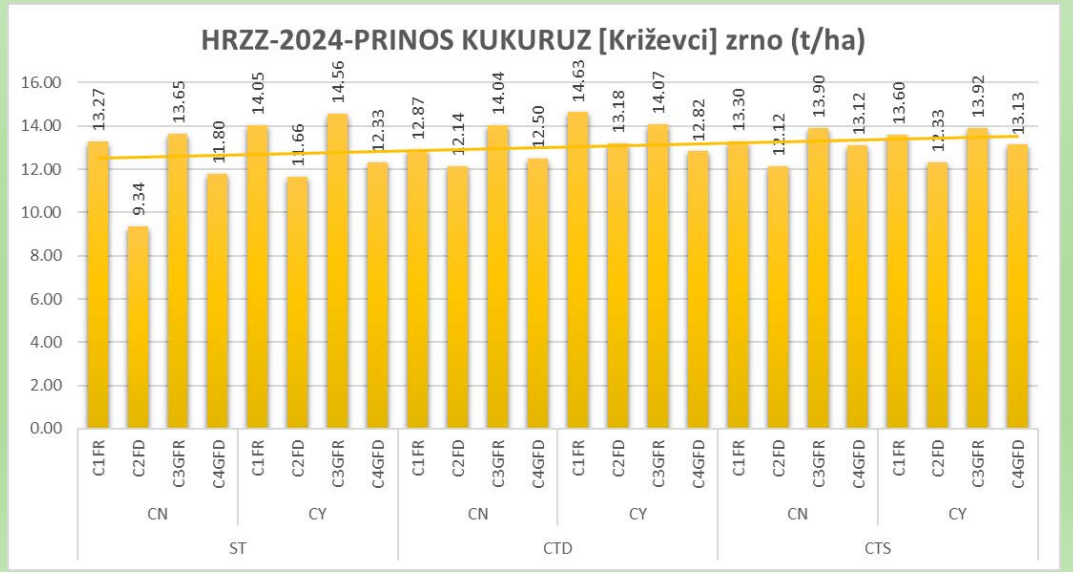
4.04 3.89 5.02 4.14 5.23 5.12 5.57 5.26 4.48 4.11 5.22 4.97 4.16 5.41 4.15 5.27 4.82 5.10 4.69 5.01 4.70 5.20 4.06 4.71
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS


HRZZ-2023-PRINOS OZIMA PŠENICA [Čačinci] zrno (t/ha)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
8.95 7.00 9.02 8.12 9.04 7.05 9.60 8.26 8.54 7.30 9.42 8.06 9.03 8.14 9.50 8.84 8.48 7.35 8.79 7.90 9.13 8.23 9.25 8.75
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS


HRZZ-2024-PRINOS KUKURUZ [Križevci] zrno (t/ha)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
13.27 9.34 13.65 11.80 14.05 11.66 14.56 12.33 12.87 12.14 14.04 12.50 14.63 13.18 14.07 12.82 13.30 12.12 13.90 13.12 13.60 12.33 13.92 13.13
C1FR C2FD C3GFR C4GFD
CN CY
ST CTD CTS

Završno izvješće projekta – ekonomska analiza korištenih tehnoloških rješenja

Zoran Grgić, Branka Šakić Bobić

Sveučilište u Zagrebu
Agronomski fakultet

Soja – najbolji rezultati

	Čačinci	
Prinos	Ekonomičnost	CK
8	18	18
15	1	1
1	20	20
13	4	4
18	2	2

Najbolji prinosi i ekonomski rezultati:

1. **Kod plitkog rahljenja i korištenja normalne gnojidbe,**
2. **Reducirane gnojidbe s primjenom poboljšivača tla i**
3. **Reducirane gnojidbe**

	Križevci	
Prinos	Ekonomičnost	CK
9	9	9
12	12	12
17	6	6
19	17	17
6	8	8

Najbolji prinosi i ekonomski rezultati:

1. **Kod plitkog rahljenja i korištenja normalne gnojidbe,**
2. **Reducirane gnojidbe s primjenom poboljšivača tla i**
3. **Reducirane gnojidbe**

Pšenica– najbolji rezultati

Čačinci

Prinos	Ekonomičnost	Cijena koštanja
7	2	2
1	1	1
8	18	19
21	17	17

Najbolji prinosi i ekonomski rezultati:
1. Normalna tehnologija s plićim rahljenjem
2. Reducirana gnojidba

Križevci

Prinos	Ekonomičnost	Cijena koštanja
11	9	9
3	11	11
9	10	3
13	3	10

Najbolji prinosi i ekonomski rezultati:
1. Normalna tehnologija s plićim rahljenjem
2. Normalna tehnologija s poboljšivačem tla i rahljenjem
3. Reducirana gnojidba s poboljšivačem tla i plićim rahljenjem

Kukuruz – Najbolji rezultati

Broj polja	Lokacija: Čačinci	
Prinos	Ekonomičnost	Cijena Koštanja
15	1	15
7	2	7
5	9	23
6	10	5

Broj polja	**Lokacija: Križevci**	**najbolje ankete**
Prinos	Ekonomičnost	CK
13	22	1
7	10	17
15	14	3
5	6	15
11	13	20

Najveći prinosi:
1. Normalna gnojidbe i obrade tla (klasično i pliće rahljenje) s korištenjem poboljšivača tla,
2. Reducirana gnojidbe i pliće rahljenje.

Najekonomičniji su (odnos prihoda i troškova):
1. Normalna gnojidba i ostala agrotehnika,
2. Reducirana gnojidba.

Najbolji po cijeni koštanja (najniži troškovi po kg prinosa):
1. Normalna gnojidba i obrada tla (klasično i pliće rahljenje) s korištenjem poboljšivača tla

Najveći prinosi:
1. Klasična tehnologija (gnojidba, obrada),
2. Normalna gnojidba i obrade tla (klasično i pliće rahljenje) s korištenjem poboljšivača tla.

Najekonomičniji su:
1. Reducirana gnojidba s oba tipa rahljenja, te normalna gnojidba s plićim rahljenjem.

Najbolji po cijeni koštanja:
1. Normalna gnojidba i obrada tla s oba tipa rahljenja,
2. Reducirana gnojidba s korištenjem poboljšivača te
3. Reducirana gnojidba s korištenjem poboljšivača i plićim rahljenjem.

Hvala na pozornosti