

## Supplementary Materials

### **Fatty acid profile, silymarin content and production properties of milk thistle (*Silybum marianum*) germplasm under different water environments**

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## Supplementary Tables

**Table S1. Mean squares of combined analysis of variance for measured traits in milk thistle over moisture environments and years (2013 and 2014)**

Source of variation	df	DF	CD	PH	NCP	NFC	FW	OC	Si	FY
Year (Y)	1	7626.47**	211.76**	88643.01**	1261.02**	17905.41**	549.59**	271.80**	25.69 <sup>ns</sup>	108.29**
Moisture environment (E)	1	154.63**	0.07 <sup>ns</sup>	39.87 <sup>ns</sup>	0.98 <sup>ns</sup>	232.85 <sup>ns</sup>	43.70 <sup>ns</sup>	25.53 <sup>ns</sup>	235.47**	1.31 <sup>ns</sup>
Y × E	1	49.28*	3.46*	2.00 <sup>ns</sup>	127.33*	1764.57 <sup>ns</sup>	0.55 <sup>ns</sup>	13.76 <sup>ns</sup>	180.51*	0.49 <sup>ns</sup>
Replication/E× Y	4	3.94	0.24	318.22	16.10	587.42	11.78	14.50	4.31	3.22
Genotype (G)	25	52.04**	0.58**	440.72**	88.53**	108.70**	8.74**	123.33*	3.39**	8.35**
G × Y	25	11.62*	0.45 <sup>ns</sup>	286.55**	27.20 <sup>ns</sup>	469.11 <sup>ns</sup>	5.02 <sup>ns</sup>	9.60 <sup>ns</sup>	1.04 <sup>ns</sup>	3.50 <sup>ns</sup>
G × E	25	8.23 <sup>ns</sup>	0.26 <sup>ns</sup>	144.33 <sup>ns</sup>	45.17**	276.77 <sup>ns</sup>	3.87 <sup>ns</sup>	16.53 <sup>ns</sup>	1.07 <sup>ns</sup>	4.45 <sup>ns</sup>
G × E× Y	25	14.27**	0.20 <sup>ns</sup>	52.24 <sup>ns</sup>	46.29**	220.94 <sup>ns</sup>	2.71 <sup>ns</sup>	17.02 <sup>ns</sup>	1.50 <sup>ns</sup>	3.70 <sup>ns</sup>
Error	100	6.86	0.28	166.30	17.81	565.05	3.54	12.97	0.91	2.39
CV (%)	-	2.7	11.5	17.5	35	34.7	9.4	20.8	9.4	38.8

\* and\*\* are significant at 5% and 1% levels of probabilities, respectively. ns: not significant.

DE= days to emergence, DF=days to flowering, CD=capitulum diameter, PH= plant height, NCP= number of capitula per plant, NFC=number of fruits per capitulum, FW= 1000-fruit weight, OC= oil content, Si=Silymarin content per dry matter, FY=fruit yield per plant.

**Table S2. Means of agro-morphological traits in Iranian ecotypes of milk thistle under non-stress and water stress conditions**

Plant characters															
No.	PI No.	DF		CD		PH		NCP		NFC		FW		FY	
		Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress
1	SMMASH1	110	107.00	6.42	6.16	92.41	93.88	17.00	10.00	65.50	46.50	20.38	22.50	29.53	10.92
2	SMMASH2	110	104.00	5.87	5.72	112.69	103.19	19.00	10.50	93.50	98.50	20.61	20.46	31.88	22.02
3	SMMASH3	110	98.00	6.56	6.44	106.75	103.00	11.00	9.00	64.00	69.50	22.10	23.55	20.64	14.61
4	SMSARI	107	104.00	6.16	6.00	120.88	96.88	15.00	10.50	87.00	78.00	20.86	21.66	29.56	18.00
5	SMMAJA	104	101.00	6.22	6.59	119.88	98.75	14.00	10.00	78.50	77.00	22.69	20.23	31.53	17.62
6	SMESFA	107	110.00	6.09	5.96	120.81	98.58	12.00	10.00	109.50	86.00	20.51	22.89	27.20	19.09
7	SMNAJA	110	107.00	6.25	6.25	106.25	95.38	7.00	6.00	93.50	99.50	19.77	21.53	19.74	11.87
8	SMMANG	110	107.00	6.25	7.00	88.50	105.25	12.00	10.00	110.00	71.00	19.84	20.88	20.43	15.95
9	SMROST	110	110.00	5.50	5.50	70.00	57.75	14.00	9.00	83.00	50.00	17.93	14.94	24.21	8.52
10	SMDEHL	104	104.00	5.50	6.50	84.00	80.00	11.00	15.00	61.00	48.00	19.00	20.50	21.90	17.15
11	SMSHAH	101	98.00	5.56	5.50	88.90	91.75	12.50	11.50	92.50	69.00	24.08	22.80	18.27	18.30
12	SMHAFT	110	98.00	5.50	6.25	89.75	97.50	29.00	20.00	70.50	61.00	22.68	22.58	39.86	18.04
13	SMSHUS	104	98.00	5.79	6.67	104.84	81.83	20.00	13.00	73.50	55.00	23.08	20.26	33.30	13.13
14	SMSHUT	107	101.00	4.50	6.13	90.16	92.50	20.00	17.00	55.50	49.50	21.50	18.82	22.50	24.95
15	SMANDI	104	98.00	4.48	5.85	82.63	83.21	13.50	11.50	64.00	74.00	23.07	22.17	28.04	31.51
16	SMBEHB	98	98.00	5.64	5.44	80.71	93.63	14.50	13.00	78.00	58.00	22.47	20.10	26.41	14.89
17	SMRAMH1	110	98.00	4.00	4.75	58.00	58.50	16.00	10.00	53.00	48.00	25.44	22.94	21.77	8.80
18	SMRAMH2	98	98.00	5.34	6.80	101.13	113.21	11.00	13.00	89.50	75.00	23.62	21.77	24.01	17.01
19	SMJARA	98	98.00	4.78	5.82	99.00	106.84	16.50	12.00	58.50	56.00	20.62	22.20	22.77	13.00
20	SMBEAS	98	98.00	5.15	5.28	104.25	116.06	17.00	16.00	68.00	62.00	24.15	20.35	25.70	23.29
21	SMCHAM	104	98.00	5.06	5.41	87.31	107.81	20.00	16.00	82.00	67.00	21.89	20.63	36.57	21.95
22	SMHEND	101	98.00	5.34	5.00	91.31	96.81	10.00	11.00	80.00	70.50	25.05	23.01	20.19	12.58
23	SMOMID	98	98.00	5.78	6.11	107.69	117.22	24.00	14.50	73.50	83.50	22.25	20.34	33.35	24.11
24	SMSHAD	107	101.00	4.72	5.80	99.45	94.75	10.00	14.00	97.50	90.00	21.48	21.57	19.40	18.80
25	SMRAMS	98	101.00	5.25	5.75	105.94	102.67	16.00	19.00	86.00	67.00	21.23	17.90	23.63	16.98
26	SMCHAR	98	104.00	6.07	5.36	104.29	99.39	13.00	13.00	84.50	74.50	23.15	20.87	31.77	20.72
LSD (5%)		6.5	4.61	1.21	1.21	35.39	22.25	3.59	3.13	23.02	19.12	3.45	4.26	10.07	4.7

DF=days to flowering, CD=capitulum diameter, PH= plant height, NCP= number of capitula per plant, NFC=number of fruits per capitulum, FW= 1000- fruit weight, FY= fruit yield per plant.

**Table S3. Means of seed quality parameters in Iranian ecotypes of milk thistle under non-stress and water stress conditions**

		Plant characters							
		OC (%)		OY (g/plant)		Si (%)		SiY (g/plant)	
No.	PI No.	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress
1	SMMASH1	16.60	15.50	1.25	1.69	9.10	12.75	2.69	1.39
2	SMMASH2	17.90	20.07	3.46	4.43	4.50	13.70	1.43	3.02
3	SMMASH3	17.70	26.00	2.33	4.36	5.40	10.50	1.12	1.55
4	SMSARI	18.00	18.90	2.44	3.41	6.35	14.60	1.88	2.61
5	SMMAJA	17.60	18.20	3.51	3.66	9.05	13.70	2.77	2.42
6	SMESFA	18.10	22.00	1.85	4.20	8.15	12.45	2.22	2.38
7	SMNAJA	12.80	16.33	1.45	1.94	7.90	11.50	1.56	1.37
8	SMMANG	12.20	21.60	2.00	7.00	7.60	14.20	1.55	2.26
9	SMROST	14.60	34.83	1.40	6.88	7.40	11.85	1.80	1.01
10	SMDEHL	18.80	14.40	1.81	3.68	8.00	12.40	1.75	2.13
11	SMSHAH	14.30	24.00	2.40	4.39	8.75	13.55	1.61	2.46
12	SMHAFT	19.20	17.20	3.09	5.16	9.00	13.20	3.59	2.38
13	SMSHUS	19.90	21.60	3.05	2.43	8.70	14.15	2.90	1.86
14	SMSHUT	18.20	17.40	4.90	4.34	7.95	13.20	1.79	3.32
15	SMANDI	16.20	18.80	1.83	5.92	8.30	13.00	2.33	4.09
16	SMBEHB	17.30	18.05	2.56	3.90	9.50	14.25	2.50	2.11
17	SMRAMH1	11.40	21.75	1.80	4.09	8.60	13.00	1.87	1.14
18	SMRAMH2	15.60	18.70	2.69	3.18	8.75	14.55	2.14	2.48
19	SMJARA	15.80	15.10	2.39	3.91	8.60	12.70	1.96	1.66
20	SMBEAS	16.00	13.80	3.84	3.23	8.90	12.60	2.27	2.90
21	SMCHAM	18.60	25.00	2.53	5.49	6.30	13.00	2.30	2.84
22	SMHEND	17.40	21.60	2.55	3.56	9.20	11.75	1.87	1.45
23	SMOMID	17.00	20.80	3.64	5.02	8.85	13.75	2.95	3.31
24	SMSHAD	15.40	21.90	2.67	4.36	7.90	13.80	1.53	2.59
25	SMRAMS	15.30	17.70	3.69	3.01	8.40	11.90	1.99	2.02
26	SMCHAR	13.90	26.50	3.00	5.65	8.05	12.85	2.54	2.66
	LSD (5%)	4.23	2.49	1.15	1.14	1.4	1.62	0.88	0.68

OC= oil content, OY= oil yield, Si=silymarin content per dry matter, SiY=silymarin yield.

**Table S4. Mean squares of combined analysis of variance for fatty acid composition in ecotypes of milk thistle over water stress and non-stress environments**

Source of variation	df	Palmitic acid (C16:0)	Stearic acid (C18:0)	Oleic acid (C18:1)	Linoleic acid (C18:2)	Linolenic + Arachidic acid (C18:3 + C20:0)	Gadoleic acid (C20:1)	Behenic acid (C22:0)	Lignoceric acid (C24:0)
Moisture environment (E)	1	1.077*	0.47*	6.46 <sup>ns</sup>	0.94 <sup>ns</sup>	0.28 <sup>ns</sup>	0.007*	0.23*	0.038*
Replication/E	2	0.016	0.009	3.39	4.35	0.028	0.0002	0.0056	0.001
Genotype (G)	20	9.53**	0.99**	15.76**	14.99**	0.23**	0.028**	0.11**	0.023 <sup>ns</sup>
G × E	20	3.42*	0.24**	0.75 <sup>ns</sup>	1.20 <sup>ns</sup>	0.021 <sup>ns</sup>	0.014**	0.031**	0.019 <sup>ns</sup>
Error	84	0.07	0.09	1.09	1.49	0.015	0.0018	0.004	0.016
CV (%)	-	3.07	4.59	2.88	3.08	3.18	5.19	3.16	16.69

\*: Significant at the 0.05 probability level, \*\*: Significant at the 0.01 probability level, ns: non-significant.

**Table S5. Means of fatty acid composition in Iranian ecotypes of milk thistle under non-stress and water stress conditions**

No.	PI No.	Palmitic acid (C16:0)		Stearic acid (C18:0)		Oleic acid (C18:1)		Linoleic acid (C18:2)		Linolenic acid + Arachidic acid (C18:3 + C20:0)		Gadoleic acid (C20:1)		Behenic acid (C22:0)		Lignoceric (C24:0)	
		Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress
1	SMMASH1	9.20	9.33	6.05	7.07	33.73	34.67	41.94	40.81	3.96	3.95	0.79	0.83	1.98	2.05	1.01	0.75
3	SMMASH3	9.74	9.57	6.13	6.03	38.79	40.37	37.44	35.72	3.66	3.69	0.88	1.00	2.03	2.19	0.67	0.76
4	SMSARI	8.98	9.49	6.94	7.25	34.94	35.18	40.82	39.57	3.98	4.08	0.81	0.87	2.11	2.18	0.89	0.84
5	SMMAJA	8.92	9.10	7.38	7.39	35.55	34.89	39.73	40.39	4.17	4.08	0.78	0.83	2.18	2.10	0.79	0.71
6	SMESFA	8.97	9.37	6.85	7.12	36.85	35.42	39.31	39.84	3.87	3.97	0.81	0.87	1.99	2.12	0.80	0.75
7	SMNAJA	9.37	9.34	7.25	6.94	33.05	33.15	41.53	42.08	4.18	4.11	0.91	0.91	2.23	2.19	0.60	0.73
8	SMMANG	9.31	9.65	7.17	7.11	36.79	37.21	35.89	38.17	4.38	3.93	1.01	0.74	2.32	1.80	0.89	0.77
9	SMROST	8.71	10.11	6.24	7.09	33.42	33.91	42.28	41.80	4.13	3.83	1.03	0.83	2.47	2.05	0.79	0.79
10	SMDEHL	8.66	8.98	5.91	7.13	36.34	37.68	39.66	38.67	4.00	3.78	1.18	0.81	2.34	1.96	0.84	0.94
11	SMSHAH	9.58	9.62	6.63	6.80	33.29	34.34	41.26	40.53	4.26	4.20	0.80	0.84	2.49	2.26	0.79	0.84
12	SMHAFT	8.52	9.79	6.41	7.48	37.06	37.15	39.87	38.75	3.76	3.73	0.81	0.79	2.01	1.96	0.66	0.82
13	SMSHUS	8.60	8.83	6.50	6.13	38.49	37.77	38.50	39.87	3.74	3.50	0.75	0.81	1.89	1.84	0.61	0.69
15	SMANDI	9.06	9.19	6.28	6.10	35.53	35.04	41.11	42.88	3.60	3.42	0.83	0.91	1.93	1.90	0.71	0.79
16	SMBEHB	8.54	8.33	6.02	5.60	36.97	38.34	40.06	40.12	3.64	3.34	0.96	0.95	2.09	1.94	0.83	0.85
18	SMRAMH2	9.47	9.44	6.46	6.50	37.23	38.05	38.34	38.20	3.89	3.69	0.90	0.81	2.16	1.92	0.70	0.80
19	SMJARA	9.33	9.31	6.92	6.61	36.70	38.01	38.55	38.36	3.97	3.68	0.83	0.78	1.98	1.83	0.77	0.80
22	SMHEND	9.40	9.17	6.38	6.35	36.69	38.34	39.84	38.82	3.53	3.53	0.73	0.79	1.70	1.71	0.89	0.72
23	SMOMID	9.06	8.93	7.58	7.51	38.75	39.95	36.42	35.70	4.11	4.10	0.68	0.73	1.93	1.89	0.58	0.68
24	SMSHAD	8.47	8.66	7.65	7.74	34.99	36.55	40.61	38.87	4.03	3.98	0.71	0.74	1.93	1.92	0.75	1.05
25	SMRAMS	8.56	8.74	6.63	6.69	39.35	39.38	37.64	37.76	3.73	3.68	0.68	0.69	1.87	1.76	0.68	0.74
26	SMCHAR	8.66	8.94	6.19	6.07	33.37	34.15	44.04	43.50	3.53	3.40	0.77	0.76	1.84	1.69	0.62	0.95

**Table S6. Mean squares of analysis of variance for triacylglycerols in 26 ecotypes of milk thistle over water stress and non-stress environments**

S.O.V	df	POO	POL	PLL	EOO	OOO	EOL	OOL	ELL	OLL+ OOL	LLL+OLLn
Moisture environment (E)	1	0.08 <sup>ns</sup>	0.09 <sup>ns</sup>	0.05 <sup>ns</sup>	0.00005 <sup>ns</sup>	0.04 <sup>ns</sup>	0.036 <sup>ns</sup>	0.05 <sup>ns</sup>	0.12 <sup>ns</sup>	0.024 <sup>ns</sup>	0.062 <sup>ns</sup>
Replication/E	2	0.16	0.01	0.24	0.16	0.64	0.07	0.22	0.21	1.49	0.06
Genotype (G)	20	0.97**	0.3**	1.35**	1.13**	4.35**	0.98**	3.49**	1.06**	3.94**	1.45**
G × E	20	0.05 <sup>ns</sup>	0.025 <sup>ns</sup>	0.12 <sup>ns</sup>	0.13*	0.19 <sup>ns</sup>	0.044 <sup>ns</sup>	0.16 <sup>ns</sup>	0.07 <sup>ns</sup>	0.29 <sup>ns</sup>	0.10 <sup>ns</sup>
Error	84	0.07	0.02	0.12	0.06	0.32	0.05	0.15	0.07	0.37	0.19
CV (%)	-	5.24	1.57	5.41	5.70	6.94	3.29	2.83	5.03	4.53	5.62

\*: Significant at the 0.05 probability level, \*\*: Significant at the 0.01 probability level, ns: non-significant  
tP= Palmitic acid, O= oleic acid. L= linoleic acid, Ln= linolenic acid, E= stearic acid.

**Table S7. Means of triacylglycerols in Iranian ecotypes of milk thistle under non-stress and water stress conditions**

No.	PI No.	POO		POL		PLL		EOO		OOO		EOL		OOL		ELL		OLL+OOLn		LLL+OLLn	
		Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress	Non-stress	Water stress
1	SMMASH1	4.91	5.12	8.91	8.83	7.31	6.66	3.90	4.84	7.15	7.32	6.91	7.15	12.98	12.59	5.51	5.5	13.64	12.48	8.46	8.47
3	SMMASH3	6.10	6.47	9.45	9.42	6.17	5.6	4.58	4.74	9.46	10.3	6.91	6.74	14.45	14.71	4.54	4.34	12.59	11.89	7.13	6.94
4	SMSARI	4.91	4.93	8.81	8.71	6.74	6.47	4.46	4.66	7.31	7.34	7.42	7.52	13.04	12.63	5.91	5.94	13.70	12.98	8.04	7.79
5	SMAJAJA	4.97	4.70	8.73	8.54	6.27	6.45	4.85	4.65	7.27	7.02	7.89	7.76	12.80	12.47	5.97	6.27	12.90	13.27	7.82	8.16
6	SMESFA	5.32	4.97	8.83	8.69	6.31	6.47	4.62	4.57	8.30	7.46	7.44	7.42	13.61	12.80	5.58	5.83	13.15	12.99	7.48	8.12
7	SMNAJA	4.79	4.55	9.03	8.75	7.31	7.34	4.23	4.09	6.69	6.50	7.16	7.17	12.39	12.06	6.00	6.37	13.72	13.96	8.47	8.55
8	SMMANG	5.93	5.60	8.90	8.97	5.88	6.13	5.49	5.05	8.90	8.38	7.53	7.54	13.38	13.20	5.22	5.50	12.28	12.59	7.12	7.45
9	SMROST	4.75	4.77	8.74	9.03	7.35	7.40	3.80	3.71	7.22	6.55	6.63	6.66	13.01	12.64	5.76	5.92	14.47	14.27	8.72	8.67
10	SMDEHL	5.48	5.33	8.85	8.63	6.80	6.09	4.88	4.92	8.76	8.95	6.85	7.24	13.79	13.90	4.72	5.41	13.35	13.53	8.44	7.83
11	SMSHAH	4.94	4.83	9.19	8.92	7.20	6.97	4.03	4.18	6.81	7.04	6.98	7.00	12.40	12.38	5.79	5.96	13.45	13.41	8.33	8.28
12	SMHAFT	5.27	5.14	9.02	8.79	6.49	6.11	4.39	4.81	8.77	8.52	6.94	7.22	14.73	14.17	5.29	5.59	14.41	13.82	7.47	7.53
13	SMSHUS	5.75	5.26	8.93	8.95	5.82	6.30	5.01	4.32	9.53	8.74	7.28	6.81	14.68	14.83	4.83	4.94	13.23	14.52	7.52	7.81
15	SMANDI	5.37	4.97	9.13	8.99	6.84	7.48	4.28	3.58	8.21	7.73	6.98	6.62	14.16	13.81	5.21	5.61	14.32	14.89	7.81	8.25
16	SMBEHB	5.24	5.01	8.96	8.68	6.20	6.06	4.30	4.03	8.95	9.23	6.86	6.44	15.31	15.99	4.84	4.69	14.64	15.10	7.64	7.99
18	SMRAMH2	5.99	6.14	9.52	9.73	6.26	6.44	4.68	4.88	8.75	9.01	7.26	7.25	13.81	14.25	5.09	4.84	12.63	12.65	7.09	6.64
19	SMJARA	5.85	6.00	9.28	9.46	6.23	6.41	4.91	4.82	8.72	8.91	7.45	7.24	13.40	14.09	5.48	5.13	12.63	13.09	7.18	7.02
22	SMHEND	5.58	5.75	9.64	9.54	6.46	6.36	4.49	4.71	8.33	8.80	7.31	7.27	14.60	14.89	4.93	4.68	13.64	13.45	7.39	7.26
23	SMOMID	5.99	6.06	9.09	8.99	5.42	5.46	5.94	6.07	9.44	9.65	8.34	8.25	13.86	13.93	5.08	4.81	11.28	11.31	6.63	6.84
24	SMSHAD	4.94	5.13	8.88	8.90	6.45	6.14	5.05	5.24	7.51	7.83	8.48	8.50	13.27	13.38	6.07	6.19	13.15	12.66	7.59	7.29
25	SMRAMS	5.77	5.76	8.90	8.90	5.70	5.90	5.12	5.12	10.23	9.90	7.28	7.29	15.29	14.87	4.79	4.90	13.32	12.86	6.93	7.38
26	SMCHAR	4.69	4.71	8.99	8.99	7.80	7.71	3.77	3.80	7.09	7.26	6.63	6.54	13.36	13.68	5.83	5.60	15.81	15.88	8.68	8.82

LSD (5%)

P= Palmitic acid, O= oleic acid, L= linoleic acid, Ln= linolenic acid, E= stearic acid.



**Table S8. Correlation coefficients among seed quality parameters and agro-morphological traits under non-stress (above diameter) and water stress (bottom diameter) conditions**

Trait	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.DF	1	0.19 <sup>ns</sup>	-0.15 <sup>ns</sup>	-0.0001 <sup>ns</sup>	0.08 <sup>ns</sup>	-0.40*	-0.01 <sup>ns</sup>	-0.05 <sup>ns</sup>	-0.47**	-0.38*	-0.26 <sup>ns</sup>	0.07 <sup>ns</sup>	0.04 <sup>ns</sup>	-0.29 <sup>ns</sup>	0.12 <sup>ns</sup>	0.32 <sup>ns</sup>	-0.33 <sup>ns</sup>	-0.31 <sup>ns</sup>	-0.11 <sup>ns</sup>	-0.32 <sup>ns</sup>	0.03 <sup>ns</sup>	0.31 <sup>ns</sup>
2.CD	0.19 <sup>ns</sup>	1	0.56**	-0.16 <sup>ns</sup>	0.43*	-0.35 <sup>ns</sup>	0.17 <sup>ns</sup>	0.15 <sup>ns</sup>	-0.22 <sup>ns</sup>	-0.18 <sup>ns</sup>	0.04 <sup>ns</sup>	0.25 <sup>ns</sup>	-0.01 <sup>ns</sup>	-0.10 <sup>ns</sup>	-0.03 <sup>ns</sup>	0.22 <sup>ns</sup>	-0.21 <sup>ns</sup>	-0.17 <sup>ns</sup>	-0.15 <sup>ns</sup>	-0.26 <sup>ns</sup>	-0.08 <sup>ns</sup>	0.18 <sup>ns</sup>
3.PH	-0.23 <sup>ns</sup>	0.26 <sup>ns</sup>	1	-0.04 <sup>ns</sup>	0.39*	-0.1 <sup>ns</sup>	0.23 <sup>ns</sup>	0.35 <sup>ns</sup>	-0.22 <sup>ns</sup>	0.35 <sup>ns</sup>	0.06 <sup>ns</sup>	0.11 <sup>ns</sup>	0.52*	0.22 <sup>ns</sup>	-0.21 <sup>ns</sup>	0.02 <sup>ns</sup>	-0.08 <sup>ns</sup>	0.01 <sup>ns</sup>	0.48*	-0.15 <sup>ns</sup>	-0.35 <sup>ns</sup>	-0.28 <sup>ns</sup>
4.NCP	-0.44*	-0.04 <sup>ns</sup>	0.27 <sup>ns</sup>	1	-0.36*	0.11 <sup>ns</sup>	0.74**	0.44*	0.05 <sup>ns</sup>	0.49**	0.65**	-0.37 <sup>ns</sup>	0.02 <sup>ns</sup>	0.37 <sup>ns</sup>	-0.21 <sup>ns</sup>	-0.10 <sup>ns</sup>	-0.16 <sup>ns</sup>	0.37 <sup>ns</sup>	0.08 <sup>ns</sup>	0.35 <sup>ns</sup>	-0.06 <sup>ns</sup>	-0.30 <sup>ns</sup>
5.NFC	-0.16 <sup>ns</sup>	0.11 <sup>ns</sup>	0.45**	-0.29 <sup>ns</sup>	1	0.25 <sup>ns</sup>	-0.08 <sup>ns</sup>	-0.21 <sup>ns</sup>	-0.2 <sup>ns</sup>	-0.14 <sup>ns</sup>	-0.21 <sup>ns</sup>	0.02 <sup>ns</sup>	0.47*	-0.19 <sup>ns</sup>	-0.04 <sup>ns</sup>	0.38 <sup>ns</sup>	-0.23 <sup>ns</sup>	-0.24 <sup>ns</sup>	0.28 <sup>ns</sup>	-0.30 <sup>ns</sup>	-0.60 <sup>ns</sup>	-0.03 <sup>ns</sup>
6.FW	-0.30 <sup>ns</sup>	0.009 <sup>ns</sup>	0.23 <sup>ns</sup>	-0.21 <sup>ns</sup>	0.2 <sup>ns</sup>	1	0.06 <sup>ns</sup>	-0.05 <sup>ns</sup>	0.38*	0.31 <sup>ns</sup>	0.26 <sup>ns</sup>	0.18 <sup>ns</sup>	-0.06 <sup>ns</sup>	0.22 <sup>ns</sup>	-0.02 <sup>ns</sup>	-0.49**	0.60**	0.012 <sup>ns</sup>	0.08 <sup>ns</sup>	0.33 <sup>ns</sup>	0.62 <sup>ns</sup>	-0.31 <sup>ns</sup>
7.FY	-0.25 <sup>ns</sup>	0.03 <sup>ns</sup>	0.42*	0.42*	0.32 <sup>ns</sup>	0.01 <sup>ns</sup>	1	0.54**	-0.05 <sup>ns</sup>	0.26 <sup>ns</sup>	0.78**	-0.47*	-0.06 <sup>ns</sup>	0.17 <sup>ns</sup>	0.08 <sup>ns</sup>	-0.27 <sup>ns</sup>	-0.31 <sup>ns</sup>	0.12 <sup>ns</sup>	-0.01 <sup>ns</sup>	0.24 <sup>ns</sup>	0.21 <sup>ns</sup>	-0.05 <sup>ns</sup>
8.OC	0.21 <sup>ns</sup>	-0.23 <sup>ns</sup>	-0.37*	-0.28 <sup>ns</sup>	0.03 <sup>ns</sup>	-0.28 <sup>ns</sup>	-0.19 <sup>ns</sup>	1	-0.12 <sup>ns</sup>	0.34 <sup>ns</sup>	0.37*	-0.30 <sup>ns</sup>	-0.26 <sup>ns</sup>	0.48*	-0.16 <sup>ns</sup>	-0.42 <sup>ns</sup>	-0.01 <sup>ns</sup>	0.38 <sup>ns</sup>	0.03 <sup>ns</sup>	0.48*	-0.7 <sup>ns</sup>	-0.20 <sup>ns</sup>
9.SiC	-0.16 <sup>ns</sup>	0.23 <sup>ns</sup>	0.15 <sup>ns</sup>	0.16 <sup>ns</sup>	0.09 <sup>ns</sup>	-0.01 <sup>ns</sup>	0.25 <sup>ns</sup>	-0.17 <sup>ns</sup>	1	0.02 <sup>ns</sup>	0.56**	-0.24 <sup>ns</sup>	-0.05 <sup>ns</sup>	0.02 <sup>ns</sup>	0.06 <sup>ns</sup>	-0.07 <sup>ns</sup>	0.04 <sup>ns</sup>	0.03 <sup>ns</sup>	0.10 <sup>ns</sup>	0.18 <sup>ns</sup>	0.1 <sup>ns</sup>	-0.07 <sup>ns</sup>
10.OY	-0.09 <sup>ns</sup>	-0.09 <sup>ns</sup>	-0.13 <sup>ns</sup>	0.06 <sup>ns</sup>	0.006 <sup>ns</sup>	-0.25 <sup>ns</sup>	0.3 <sup>ns</sup>	0.60**	0.06 <sup>ns</sup>	1	0.21 <sup>ns</sup>	-0.30 <sup>ns</sup>	0.32 <sup>ns</sup>	0.55**	-0.37 <sup>ns</sup>	-0.22 <sup>ns</sup>	0.07 <sup>ns</sup>	0.45*	0.44*	0.42 <sup>ns</sup>	-0.21 <sup>ns</sup>	-0.56**
11.SiY	-0.25 <sup>ns</sup>	0.64 <sup>ns</sup>	0.42*	0.41*	0.33 <sup>ns</sup>	0.001 <sup>ns</sup>	0.97**	-0.20 <sup>ns</sup>	0.44*	0.30 <sup>ns</sup>	1	-0.46*	-0.06 <sup>ns</sup>	0.17 <sup>ns</sup>	0.06 <sup>ns</sup>	-0.25 <sup>ns</sup>	-0.21 <sup>ns</sup>	0.14 <sup>ns</sup>	0.02 <sup>ns</sup>	0.29 <sup>ns</sup>	0.18 <sup>ns</sup>	-0.1 <sup>ns</sup>
12.P	0.34 <sup>ns</sup>	0.17 <sup>ns</sup>	-0.20 <sup>ns</sup>	-0.33 <sup>ns</sup>	-0.10 <sup>ns</sup>	0.03 <sup>ns</sup>	-0.24 <sup>ns</sup>	0.38 <sup>ns</sup>	-0.23 <sup>ns</sup>	0.36 <sup>ns</sup>	-0.26 <sup>ns</sup>	1	0.05 <sup>ns</sup>	-0.06 <sup>ns</sup>	-0.22 <sup>ns</sup>	0.22 <sup>ns</sup>	0.22 <sup>ns</sup>	0.67**	-0.12 <sup>ns</sup>	-0.34 <sup>ns</sup>	-0.43 <sup>ns</sup>	-0.15 <sup>ns</sup>
13.E	0.37 <sup>ns</sup>	0.26 <sup>ns</sup>	0.06 <sup>ns</sup>	0.11 <sup>ns</sup>	0.25 <sup>ns</sup>	-0.10 <sup>ns</sup>	0.01 <sup>ns</sup>	-0.10 <sup>ns</sup>	0.15 <sup>ns</sup>	0.07 <sup>ns</sup>	0.06 <sup>ns</sup>	0.29 <sup>ns</sup>	1	0.02 <sup>ns</sup>	-0.32 <sup>ns</sup>	0.58**	-0.20 <sup>ns</sup>	-0.13 <sup>ns</sup>	0.88**	-0.40 <sup>ns</sup>	-0.56**	-0.35 <sup>ns</sup>
14.O	-0.58**	0.17 <sup>ns</sup>	0.47*	0.48*	-0.17 <sup>ns</sup>	0.08 <sup>ns</sup>	0.03 <sup>ns</sup>	-0.18 <sup>ns</sup>	-0.03 <sup>ns</sup>	-0.05 <sup>ns</sup>	0.01 <sup>ns</sup>	-0.33 <sup>ns</sup>	-0.21 <sup>ns</sup>	1	-0.85**	-0.32 <sup>ns</sup>	0.26 <sup>ns</sup>	0.96**	0.28 <sup>ns</sup>	0.78**	-0.53*	-0.87**
15.L	0.38 <sup>ns</sup>	-0.34 <sup>ns</sup>	-0.55**	-0.33 <sup>ns</sup>	0.01 <sup>ns</sup>	-0.16 <sup>ns</sup>	0.06 <sup>ns</sup>	0.16 <sup>ns</sup>	0.02 <sup>ns</sup>	0.07 <sup>ns</sup>	0.06 <sup>ns</sup>	0.05 <sup>ns</sup>	-0.20 <sup>ns</sup>	-0.87**	1	-0.17 <sup>ns</sup>	-0.23 <sup>ns</sup>	-0.80**	-0.47*	-0.41 <sup>ns</sup>	0.83**	0.88**
16.Ln+A	0.37 <sup>ns</sup>	0.26 <sup>ns</sup>	0.15 <sup>ns</sup>	-0.29 <sup>ns</sup>	0.40 <sup>ns</sup>	0.06 <sup>ns</sup>	-0.08 <sup>ns</sup>	-0.04 <sup>ns</sup>	0.10 <sup>ns</sup>	-0.11 <sup>ns</sup>	-0.04 <sup>ns</sup>	0.37 <sup>ns</sup>	0.79**	-0.32 <sup>ns</sup>	-0.17 <sup>ns</sup>	1	-0.38 <sup>ns</sup>	-0.34 <sup>ns</sup>	0.37 <sup>ns</sup>	-0.72**	-0.48**	0.12 <sup>ns</sup>
17.POL	-0.41 <sup>ns</sup>	-0.7 <sup>ns</sup>	0.30 <sup>ns</sup>	-0.06 <sup>ns</sup>	-0.05 <sup>ns</sup>	0.22 <sup>ns</sup>	-0.14 <sup>ns</sup>	0.20 <sup>ns</sup>	-0.18 <sup>ns</sup>	0.07 <sup>ns</sup>	-0.17 <sup>ns</sup>	0.22 <sup>ns</sup>	-0.38 <sup>ns</sup>	0.43 <sup>ns</sup>	-0.34 <sup>ns</sup>	-0.34 <sup>ns</sup>	1	0.24 <sup>ns</sup>	-0.08 <sup>ns</sup>	0.25 <sup>ns</sup>	-0.20 <sup>ns</sup>	-0.39 <sup>ns</sup>
18.OOO	-0.60**	0.17 <sup>ns</sup>	0.46*	0.51*	-0.22 <sup>ns</sup>	0.11 <sup>ns</sup>	0.07 <sup>ns</sup>	-0.23 <sup>ns</sup>	-0.08 <sup>ns</sup>	-0.07 <sup>ns</sup>	0.04 <sup>ns</sup>	-0.36 <sup>ns</sup>	-0.32 <sup>ns</sup>	0.98**	-0.80**	-0.41 <sup>ns</sup>	0.42 <sup>ns</sup>	1	0.12 <sup>ns</sup>	0.83**	-0.42 <sup>ns</sup>	-0.79**
19.EOL	0.02 <sup>ns</sup>	0.24 <sup>ns</sup>	0.45*	0.15 <sup>ns</sup>	0.48*	0.11 <sup>ns</sup>	0.16 <sup>ns</sup>	-0.24 <sup>ns</sup>	0.28 <sup>ns</sup>	-0.08 <sup>ns</sup>	0.23 <sup>ns</sup>	-0.13 <sup>ns</sup>	0.79**	0.16 <sup>ns</sup>	-0.48*	0.64**	-0.12 <sup>ns</sup>	0.04 <sup>ns</sup>	1	-0.13 <sup>ns</sup>	-0.68**	-0.55*
20.OOL	-0.64**	-0.14 <sup>ns</sup>	0.18 <sup>ns</sup>	0.52*	-0.32 <sup>ns</sup>	-0.01 <sup>ns</sup>	0.04 <sup>ns</sup>	-0.12 <sup>ns</sup>	0.02 <sup>ns</sup>	-0.04 <sup>ns</sup>	0.02 <sup>ns</sup>	-0.52*	-0.62**	0.79**	-0.41 <sup>ns</sup>	-0.78**	0.37 <sup>ns</sup>	0.83**	-0.28 <sup>ns</sup>	1	0.06 <sup>ns</sup>	-0.56**
21.OLL+OOLn	0.30 <sup>ns</sup>	-0.39 <sup>ns</sup>	-0.53*	0.01 <sup>ns</sup>	-0.19 <sup>ns</sup>	-0.23 <sup>ns</sup>	0.06 <sup>ns</sup>	0.16 <sup>ns</sup>	0.04 <sup>ns</sup>	0.16 <sup>ns</sup>	0.05 <sup>ns</sup>	-0.18 <sup>ns</sup>	-0.52*	-0.46*	0.80**	-0.60**	-0.22 <sup>ns</sup>	-0.37 <sup>ns</sup>	-0.69**	0.14 <sup>ns</sup>	1	0.68**
22.LLL+OLLn	0.57**	-0.29 <sup>ns</sup>	-0.63**	-0.36 <sup>ns</sup>	-0.10 <sup>ns</sup>	-0.25 <sup>ns</sup>	-0.07 <sup>ns</sup>	0.23 <sup>ns</sup>	-0.13 <sup>ns</sup>	0.06 <sup>ns</sup>	-0.10 <sup>ns</sup>	0.01 <sup>ns</sup>	-0.06 <sup>ns</sup>	-0.85**	0.89**	0.04 <sup>ns</sup>	-0.60**	-0.79**	-0.45*	-0.51*	0.66**	1

DF=days to flowering, CD=capitulum diameter, PH= plant height, NCP= number of capitula per plant, NFC=number of fruits per capitulum, FW= 1000- fruit weight, FY= fruit yield per plant. OC= oil content, Si=silymarin content per dry matter, OY= oil yield, SiY=silymarin yield, P= Palmitic acid, O= oleic acid. L= linoleic acid, Ln= linolenic acid, E= stearic acid.  
 ns: non-significant, \*: Significant at 5 % level of probability and \*\*: Significant at 1 % level of probability