Table 1. Effect of compost rates and topping treatments on plant growth characters of Jerusalem artichoke after 120 days from planting during 2014 and 2015 seasons

Treatments	Plant height (cm)		Number of shoots /plant		shoot Fresh weight /plant (g)		shoot Dry weight /plant (g)	
	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season
Ton /fed.	***Effect of compost rates***							
3	150.33	133.44	16.11	22.98	731.1	780.00	203.20	218.04
6	171.22	139.64	19.88	25.77	913.9	843.33	254.05	234.22
9	202.22	148.97	28.33	31.44	1025.1	923.33	284.98	256.22
LSD at 5 % level	**6.54**	**5.93**	**1.45**	**0.87**	**33.15**	**23.08**	**11.63**	**7.27**
	Effect of topping number							
Without topping	206.00	186.42	15.10	20.87	977.75	960.00	271.78	268.00
Topping once	171.22	134.20	20.66	26.22	920.22	835.00	255.81	231.82
Topping twice	146.55	101.43	28.55	33.10	772.11	751.67	214.65	208.67
LSD at 5 % level	**5.13**	**4.65**	**1.14**	**0.68**	**14.82**	**24.68**	**9.12**	**5.70**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 2. Effect of interaction between compost rates and topping treatments on plant growth characters of Jerusalem artichoke after 120 days from planting during 2014 and 2015 seasons

Treatments		Plant height (cm)		Number of shoots /plant		shoot Fresh weight /plant (g)		shoot Dry weight/plant (g)	
Compost rates	Topping no	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**
3	**0**	180.66	176.66	10.00	18.30	816.6	870.0	226.89	246.00
	Once	155.33	130.00	15.00	23.00	726.7	780.0	202.01	216.80
	twice	115.00	93.66	23.33	27.66	650.0	690.0	180.70	191.33
6	**0**	215.33	184.00	14.66	20.00	1008.3	960.0	280.32	266.67
	Once	173.33	133.60	18.66	25.66	950.3	805.0	264.17	223.33
	twice	125.00	101.33	26.33	31.66	783.0	765.0	217.67	212.67
9	**0**	222.00	198.60	20.66	24.33	1108.3	1050.0	308.12	291.33
	Once	185.00	139.00	28.33	30.00	1083.7	920.0	301.26	255.33
	twice	199.66	109.30	36.00	40.00	883.3	800.0	245.57	222.00
LSD at 5 % level		8.89	**8.06**	**1.97**	**1.18**	**25.68**	**42.68**	**15.81**	**9.88**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

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Table 3. Effect of compost rates and topping treatments on shoot chemical composition of Jerusalem artichoke after 120 days from planting during 2014 and 2015 seasons

Treatments	Contents (%)							
	N		P		K		Total protein	
	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season
Ton /fed.	**Effect of compost rates**							
3	2.26	2.32	0.320	0.349	1.31	1.34	14.14	14.50
6	2.85	2.98	0.359	0.377	1.83	1.84	17.83	18.66
9	3.46	3.53	0.380	0.398	2.40	2.42	21.64	22.08
LSD at 5 % level	0.11	0.16	0.014	0.021	0.13	0.15	0.70	1.01
	Effect of topping number							
Without topping	2.91	3.01	0.371	0.392	1.87	1.91	18.19	18.81
Topping once	2.85	2.93	0.352	0.380	1.85	1.87	17.83	18.35
Topping twice	2.81	2.89	0.337	0.352	1.82	1.82	17.60	18.08
LSD at 5 % level	**0.08**	**NS**	**0.011**	**0.017**	**NS**	**NS**	**0.55**	**NS**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 4. Effect of compost rates and topping treatments on N,P and K uptake by shoot of Jerusalem artichoke after 120 days from planting during 2014 and 2015 seasons

Treatments	Uptake (mg/ shoot)					
	N		P		K	
	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season
Ton /fed.	***Effect of compost rates***					
3	4606.2	5066.7	655.7	767.0	2679.3	2928.2
6	7256.3	7007.0	916.0	887.0	4675.0	4332.0
9	9881.3	9068.3	1088.0	1022.7	6843.7	6224.7
LSD at 5 % level	498.0	564.9	72.4	80.27	438.0	483.6
	Effect of topping number					
Without topping	8072.0	8160.0	1019.3	1054.3	5246.4	5213.6
Topping once	7497.2	6882.7	909.3	883.7	4927.9	4412.7
Topping twice	6174.7	6099.3	731.0	738.7	4023.7	3858.7
LSD at 5 % level	**197.2**	**270.8**	**56.8**	**36.4**	**192.0**	**273.1**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 5. Effect of interaction between compost rates and topping treatments on shoot chemical composition of Jerusalem artichoke after 120 days from planting during 2014 and 2015 seasons

Treatments		Chemical constituents (%)							
		N		P		K		Total protein	
Compost rates	Topping no	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season
3	0	2.31	2.37	0.334	0.375	1.34	1.36	14.44	14.81
	Once	2.26	2.31	0.326	0.366	1.32	1.34	14.12	14.44
	twice	2.22	2.28	0.301	0.306	1.29	1.32	13.88	14.25
6	0	2.90	3.05	0.381	0.391	1.87	1.92	18.13	19.06
	Once	2.84	2.99	0.351	0.377	1.85	1.86	17.75	18.69
	twice	2.82	2.92	0.346	0.365	1.79	1.75	17.63	18.25
9	0	3.52	3.61	0.398	0.411	2.42	2.46	22.00	22.56
	Once	3.46	3.51	0.379	0.398	2.40	2.42	21.63	21.94
	twice	3.41	3.48	0.365	0.385	2.38	2.40	21.31	21.75
LSD at 5 % level		**0.15**	**0.21**	**0.020**	**0.029**	**0.18**	**0.21**	**0.96**	**1.37**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 6. Effect of interaction between compost rates and topping treatments on N, P and K uptake by shoot of Jerusalem artichoke after 120 days from planting during 2014 and 2015 seasons

Treatments		Nutrients Uptake (mg/ shoot)					
		N		P		K	
Compost rates	**Topping no**	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**
3	**0**	5241	5830	764.0	923.0	3040.3	3353.7
	Once	4566	5008	659.0	793.0	2666.7	2905.0
	twice	4012	4362	544.0	585.0	2331.0	2526.0
6	**0**	8129	8133	1068.0	1043.0	5242.0	5120.0
	Once	7502	6678	927.0	842.0	4887.0	4154.0
	twice	6138	6210	753.0	776.0	3896.0	3722.0
9	**0**	10846	10517	1226.0	1197.0	7457.0	7167.0
	Once	10424	8962	1142.0	1016.0	7230.0	6179.0
	twice	8374	7726	896.0	855.0	5844.0	5328.0
LSD at 5 % level		**341.6**	**469.0**	**98.4**	**63.2**	**332.6**	**473.1**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 7. Effect of compost rates and topping treatments on yield and its components of Jerusalem artichoke during 2014 and 2015 seasons

Treatments	Number of tubers/ plant		Average tuber weight (g)		Yield /plant (g)		Total yield (ton/fed)	
	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season
Ton /fed.	***Effect of compost rates***							
3	50.19	47.44	23.97	24.44	1206.3	1143.7	17.232	16.346
6	50.22	45.77	29.06	28.91	1447.4	1319.0	20.678	18.847
9	49.99	47.77	34.23	32.60	1698.3	1585.3	24.268	22.649
LSD at 0.05 level	**NS**	**1.01**	**0.90**	**0.97**	**152.2**	**75.6**	**1.058**	**0.470**
	Effect of topping number							
Without topping	47.31	44.66	35.87	34.73	1697.4	1565.0	24.250	22.364
Topping once	50.55	46.10	28.02	28.73	1425.8	1373.0	20.371	19.618
Topping twice	52.55	50.21	23.37	22.48	1228.7	1110.0	17.556	15.859
LSD at 5 % level	**1.48**	**0.79**	**0.70**	**0.76**	**61.6**	**77.6**	**0.434**	**0.519**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 8. Effect of interaction between compost rates and topping treatments on yield and its components of Jerusalem artichoke during 2014 and 2015 seasons

Treatments		Number of tubers/ plant		Average tuber weight (g)		tuber Yield /plant (g)		Total tuber yield (ton/fed)	
Compost rates	**Topping no**	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**
3	**0**	47.60	44.33	30.72	30.20	1464.1	1342.0	20.915	19.181
	Once	47.00	46.33	22.00	25.90	1150.0	1199.0	16.427	17.141
	twice	47.33	51.66	19.20	17.23	1004.7	890.0	14.353	12.715
6	**0**	49.66	44.00	36.30	34.00	1706.1	1507.0	24.379	21.540
	Once	50.66	44.66	27.07	29.11	1389.5	1300.0	19.849	18.571
	twice	51.33	48.66	23.82	23.62	1246.5	1150.0	17.806	16.429
9	**0**	52.33	45.66	40.61	40.00	1922.0	1846.0	27.457	26.370
	Once	52.33	47.33	35.01	31.20	1738.0	1620.0	24.836	23.142
	twice	53.00	50.33	27.09	26.60	1435.0	1290.0	20.510	18.434
LSD at 5 % level		**2.56**	**1.38**	**1.22**	**1.32**	**106.7**	**134.5**	**0.752**	**0.900**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 10. Effect of compost rates and topping treatments on tuber quality at harvesting time of Jerusalem artichoke during 2014 and 2015 seasons

Treatments	Dry matter (%)		Total carbohydrates (%)		Total sugars (%)		Inulin content (%)	
	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season	2014 season	2015 season
Ton /fed.	***Effect of compost rates***							
3	23.09	22.12	16.56	16.49	12.87	12.87	11.64	11.57
6	23.44	22.69	16.85	16.81	13.48	13.40	12.03	11.91
9	23.96	22.62	17.58	17.52	13.91	13.73	12.42	12.22
LSD at 0.05 level	**0.18**	**0.29**	**0.51**	**0.48**	**0.47**	**0.53**	**0.51**	**0.24**
	Effect of topping number							
Without topping	24.19	23.47	17.29	17.23	13.93	13.80	12.46	12.25
Topping once	23.45	22.68	17.06	17.01	13.30	13.23	12.02	11.87
Topping twice	22.85	21.28	16.63	16.58	13.03	12.96	11.61	11.58
LSD at 5 % level	**0.14**	**0.22**	**0.40**	**0.38**	**0.37**	**0.41**	**0.40**	**0.18**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 11. Effect of interaction between compost rates and topping treatments on tuber quality at harvesting time of Jerusalem artichoke during 2014 and 2015 seasons

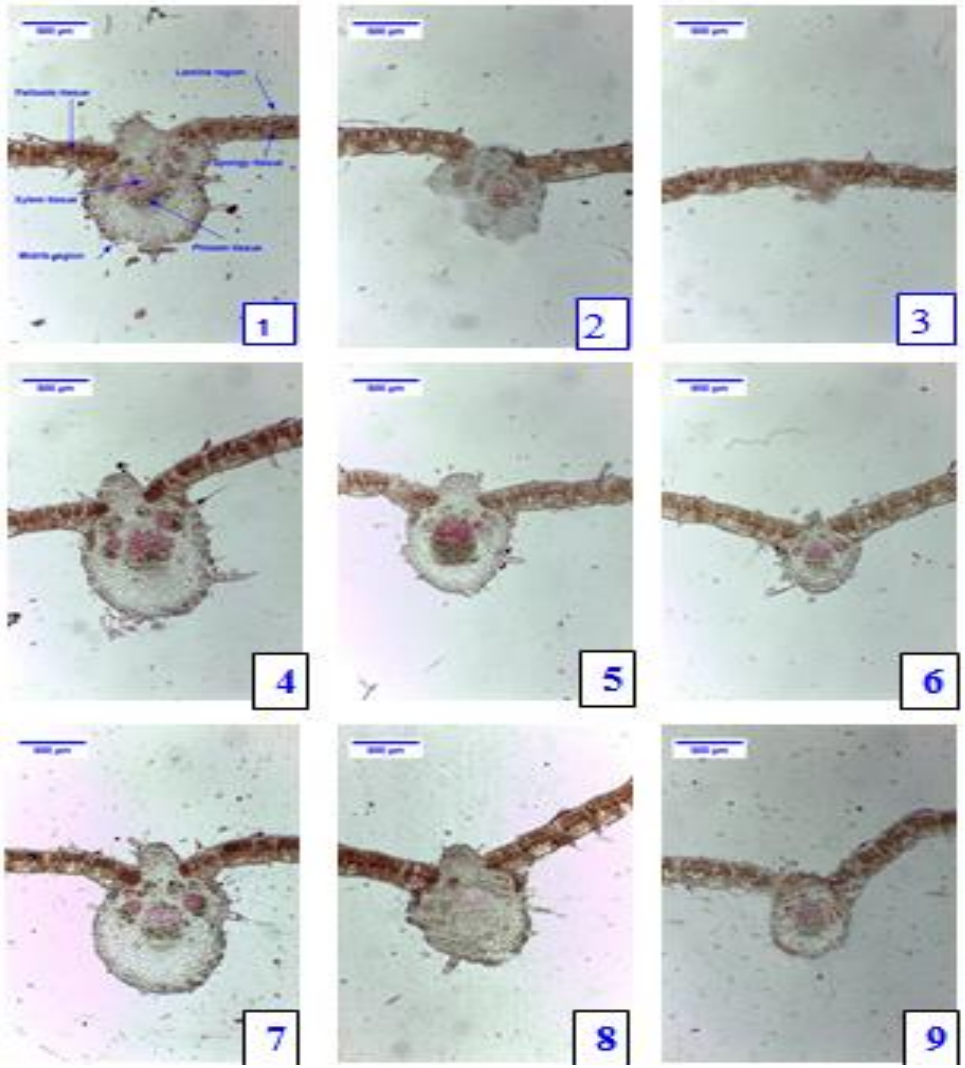
Treatments		Dry matter (%)		Total carbohydrates (%)		Total sugars (%)		Inulin content (%)	
Compost rates	**Topping no**	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**	**2014 season**	**2015 season**
3	**0**	23.72	22.96	16.90	16.83	13.37	13.22	12.10	11.97
	Once	23.02	22.20	16.60	16.52	12.71	12.80	11.65	11.55
	twice	22.53	21.22	16.18	16.12	12.55	12.60	11.17	11.20
6	**0**	24.17	23.50	17.03	17.00	14.05	14.00	12.45	12.22
	Once	23.54	22.98	16.98	16.92	13.29	13.20	11.93	11.85
	twice	22.61	21.60	16.55	16.51	13.10	13.00	11.71	11.67
9	**0**	24.68	23.97	17.94	17.87	14.37	14.20	12.83	12.56
	Once	23.79	22.88	17.62	17.59	13.91	13.70	12.49	12.21
	twice	23.42	22.96	17.18	17.11	13.46	13.30	11.95	11.89
LSD at 5 % level		**0.25**	**0.40**	**0.69**	**0.66**	**0.65**	**0.72**	**0.69**	**0.32**

Values having the same alphabetical letter (s) in each column did not significantly different according to LSD at 0.05 level of probability.

Table 13: Effect of compost, topping and their interaction on measurements of certain anatomical features in transverse sections through the leaf blade of the fourth upper on *Helianthus tuberosus* plant during the second growing season 2015 (Means of three sections from three specimens)

Treatments		Leaf parameter									
		Dimensions of the midrib		Dimensions of the midrib					Dimensions of the lamina		
		Thick. (µ)	Width (µ)	Length (µ)	Width (µ)	Phloem tissue thick. (µ)	Xylem tissue thick. (µ)	Average diameter of xylem vessel (µ)	Lamina thick. (µ)	Palisade tissue thick. (µ)	Spongy tissue thick. (µ)
Effect of compost rates											
3 ton/fed		777.76	583.99	290.04	218.17	158.17	131.87	22.85	228.06	113.20	64.00
6 ton/fed		1015.94	773.69	329.51	279.91	195.67	134.51	26.58	241.73	120.75	71.43
9 ton/fed		1039.96	832.63	354.89	300.51	202.69	152.20	27.73	244.25	123.01	72.74
Effect of No. topping											
Non		1269.84	956.88	405.16	343.04	237.03	168.80	30.47	248.54	126.03	74.40
Once		964.12	785.96	341.90	291.06	194.89	147.01	28.48	240.60	119.34	71.52
Twice		599.70	447.46	227.38	164.49	124.62	102.77	18.21	224.91	111.58	62.26
Compost rates × No. topping							***Effect of interaction***				
3 ton/fed	**0**	1170.25	927.11	385.68	321.49	231.58	154.1	28.77	246.49	123.56	71.06
	Once	813.73	668.78	284.85	230.98	140.78	144.07	26.19	232.24	116.18	66.36
	Twice	349.30	156.07	199.58	102.04	102.15	97.43	13.59	205.45	99.85	54.58
6 ton/fed	**0**	1317.67	959.88	391.77	342.66	238.60	155.17	30.74	247.59	125.60	75.46
	Once	1016.76	790.27	361.46	306.72	215.53	145.93	28.77	244.13	120.72	73.93
	Twice	713.39	570.91	235.31	190.36	132.89	102.42	20.22	233.48	115.94	64.90
9 ton/fed	**0**	1321.61	983.66	438.02	364.97	240.90	197.12	31.89	251.53	128.94	76.67
	Once	1061.86	898.83	379.38	335.49	228.35	151.03	30.47	245.42	121.12	74.27
	Twice	736.40	615.40	247.26	201.06	138.81	108.45	20.82	235.80	118.96	67.29

Figure 1: Changes in transverse sections through the fifth upper leaf blade of *Helianthus tuberosus* plants grown under their interaction between compost and topping during the second growing season of 2015.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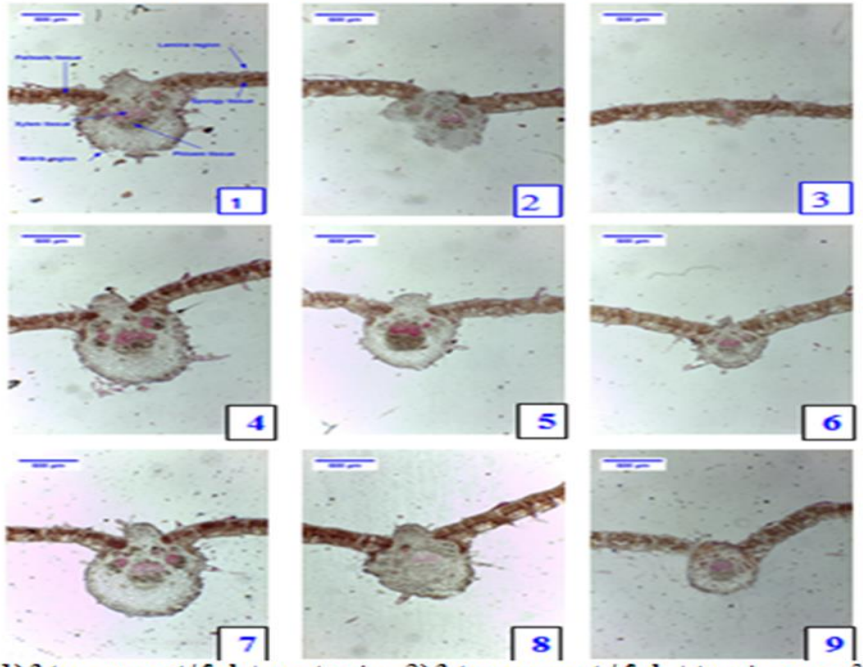
1) 3 ton compost / fed. + non-topping 2) **3 ton compost / fed.** + topping once 3) **3) ton compost / fed.** + topping twice
4) 6 ton compost / fed. + non-topping 5) **6 ton compost / fed.** + topping once 6) **6) ton compost / fed.** + topping twice
7) 9 ton compost / fed. + non-topping 8) **9 ton compost / fed.** + topping once 9) **9) ton compost / fed.** + topping twice

Figure 1: Changes in transverse sections through the fifth upper leaf blade of *Helianthus tuberosus* plants grown under their interaction between compost and topping during the second growing season of 2015.



1) 3 ton compost / fed. + non-topping 2) **3 ton compost / fed.** + topping once 3) **3) ton compost / fed.** + topping twice
4) 6 ton compost / fed. + non-topping 5) **6 ton compost / fed.** + topping once 6) **6) ton compost / fed.** + topping twice
7) 9 ton compost / fed. + non-topping 8) **9 ton compost / fed.** + topping once 9) **9) ton compost / fed.** + topping twice