SOME CHARACTERISTICS OF ALFALFA (*Medicago sativa* L.) POPULATIONS IN LAKE REGIONS OF TURKEY

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Abstract

Clones were collected from 22 counties and 60 different points at Isparta, Burdur, Afyonkarahisar and Konya provinces. Alfalfa genotypes were characterized using phonologic and morphologic features. Collected clones were reproduced in greenhouse in 2011 and at the same year 2400 alfalfa plants were sown in the field, 80x80 cm row spacing and each population contained 40 plants. For all populations, characterizations were based on 10 different observations. Eğirdir-2, Yalvaç-3, Bolvadin-1, Senirkent-2, Yeşilova-3, Beyşehir-2, Çay-1, Sultandağı-2, Şarkikaraağaç-3 and Yenişarbademli-1 populations were selected for using synthetic variety breeding method. Selected genotypes had high covering area of plant at spring, summer, autumn and winter, high natural plant height, large crown diameter, high bud number at crown, high depth crown, high cut area of plant and dry matter yield of first cut features.

Key words: alfalfa, Medicago sativa L., collecting materials, characterization, forage yield and qualities.

INTRODUCTION

Alfalfa (*Medicago sativa* L.) is one of the most important forage legumes. It is adaptable to a wide range of environments and provides a high forage yield of good quality (El-Din and Assaeed, 1995; Berg et al., 2007; Grewal, 2010; Moreira and Fagaria, 2010). Increasing variability of selection material could be achieved by introducing distinct alfalfa varieties (Monirifar, 2011). Selection of promising genotypes in a breeding program is based on various criteria, most importantly final crop yield and its quality. Relationships between yield and yield contributing traits also play an important role (Diz et al., 1994; Guler et al., 2001; Rabiei et al., 2004). Selection may also be based on other plant and/or crop features, such as, early maturity (Ahmad et al., 1991), industrial crop yield (e.g. oil yield, Baye and Becker, 2005), crop resistance (e.g. Bridge, 2000; Singh et al., 2004) and yield quality features (e.g. Gravois, 1998). The aim of the study, some plantal features were observed of alfalfa.

MATERIALS AND METHODS

Alfalfa (*Medicago sativa* L) clones were collected from 22 counties and 60 different points at Isparta, Burdur, Afyonkarahisar and Konya provinces. Alfalfa genotypes were characterized using phonologic, morphologic, yield and quality features.

Alfalfa clones was started to collect at the 12 May 2011. For this purpose, it was accepted that each 5-15 km distance at the each district as one station. Each station was evaluated as 1 population so, 60 alfalfa populations was composed. Coordinate and altitude was recorded by GPS at the areas where alfalfa plants (Table 1).

Hundreds of alfalfa plants be founded together when went to the one station. First seen alfalfa plant direct not taken. Environment was carefully observed. Selected alfalfa plants had wide and great foliar, much branching, erect growth, habit with good height, high density of lateral roots at crown. All alfalfa populations was removed by roots (2-3 number/station) and put in pots of 25x30 cm in diameter and

depth and was brought greenhouse in the Süleyman Demirel University. After alfalfa branches which had 4-5 cm were waited in the 500 ppm indol butyric acid at the 10 sec time, alfalfa clones were planted in to the 1:1 ratio peat and pearlite mixture in the greenhouse. Alfalfa clones were reached root length about 20-25 days. After they were waited for a time out of greenhouse, total 2400 clones were planted field at 100 x100 row spacing and intrarow at the 28 september 2011.

In the alfalfa clones, observations and measurements were made at plants in 2012 and 2013 years. Data were evaluated using "National plant Germplasm System" of the plant expression of USDA (Anonymous, 2013) and Prosperi et al. (2006).

In present research, covering area of plant at spring, summer, autumn and winter, plant height, crown diameter, bud number at crown, depth crown, cut area dry matter yield of first cut features were observed.

RESULTS AND DISCUSSIONS

Averaged over two years (2012 and 2013) 10 observations of 60 collected alfalfa populations were analyzed and the Duncan results were given in Table 1. For the mean of two years, the highest cover area in spring was determined at Beyşehir1 and Beyşehir2 populations. Beyşehir2 populations had the highest, cover area in summer, autumn and winter.

The highest plant height were measured from Yalvaç3 (80 cm) and Ş.Karaağça3 (77 cm) populations. Stem crown diameter varied form 2-4.5 points at alfalfa populations.

The greatest bus number in stem crown was determined in Sultandağı2 (44.5 number/plant) population. The depth of stem crown varied from 3 to 5 at all alfalfa populations. The highest harvest area of plant eas determined at Beyşehir2 population. Beyşehir-2 population had the highest dry matter yield of first cut (68.57 g/plant).

CONCLUSIONS

End of the research, Eğirdir-2, Yalvaç-3, Bolvadin-1, Senirkent-2, Yeşilova-3, Beyşehir-2, Çay-1, Sultandağı-2, Şarkikaraağaç-3 and *Yenişarbademli*-1 populations were selected for

using synthetic variety breeding method. Selected genotypes had high covering area of plant at spring, summer, autumn and winter, high natural plant height, large crown diameter, high bud number at crown, high depth crown, high cut area of plant and dry matter yield of first cut features.

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Table 1. The mean of some observations from alfalfa populations

No	Populations	1	2	3	4	5	6	7	8	9	10
1	Yeşiova1	3	4.5	5.5	4.5	47	3	34	4.5	11.53	52.07
2	Yeşiova2	5.5	5	5	3	45.5	2.5	19.5	4	10.09	23.53
3	Yeşiova3	7.5	5.5	6	4.5	72.5	4	38	5	14.02	52.59
4	Karamanlı1	7.5	4.5	2.5	2.5	42.5	4	24	5	13.46	21.60
5	Karamanlı2	7.5	4	2	2	37	4	34	5	13.11	22.82
6	Karamanlı3	7	4	2.5	3	61	4.5	34	3.5	16.1	25.94
7	Tefenni1	7	3.5	2.5	2.5	27	4.5	26	5	16.63	22.69
8	Tefenni2	2	2.5	2.5	2.	23.5	3.5	26.5	5	13.06	19.71
9	Tefenni3	5.5	3.5	2	2.5	51	3.5	25.5	5	13.21	20.48
10	Ağlasun1	5	4	2.5	2	49.5	4.5	30.5	4	16.09	20.30
11	Ağlasun2	1.5	4.5	3.5	3	69	2	39	5	14.85	47.41
12	Ağlasun3	7.5	6.5	4.5	3.5	34	4.5	37.5	5	12.68	25.28
13	Bucak1	2.5	2.5	2.5	2.5	43.5	2.5	19.5	5	10.38	24.80
14	Bucak2	8	6.5	4.5	3.5	57	4.5	40.5	5	17.93	49.64
15	Bucak3	6	4.5	3.5	2.5	45.5	3.5	24.5	4.5	10.90	27.14
16	Eğirdir1	8.5	4	2.5	2.5	53.5	4	33	3	16.08	22.66
17	Eğirdir2	9	6	4.5	4	74	4	39.5	5	15.66	55.32
18	Eğirdir3	8	5.5	4.5	3.5	74.5	4.5	35.5	5	16.79	32.32
19	G.dost1	7	4.5	3.5	2	68	4.5	32.5	4.5	16.89	36.43
20	G.dost2	7.5	5	3.5	3	46	4.5	34.5	5	16.29	20.55
21	G.dost3	7.5	5.5	2.5	3.5	50	4.5	40	4	16.00	21.59
22	Ş.Karaağaç1	7	5.5	5	3.5	47.5	4.5	27.5	5	13.57	36.87
23	Ş.Karaağaç2	7.5	5.5	3.5	3.5	56.5	3.5	37	5	15.68	48.39
24	Ş.Karaağaç3	8.5	6.5	5	4.5	77	3	40.5	5	17.36	55.89
25	Hüyük1	4.5	3.5	2.5	2.5	37	2.5	19.5	2.5	10.08	20.80
26	Hüyük2	3.5	4	2.5	2.5	55.5	2.5	22.5	2.5	10.53	22.66
27	Yalvaç1	6	5	3	2.5	47.5	3.5	25.5	5	14.28	24.91
28	Yalvaç2	8	5.5	4.5	2.5	62	3.5	31.5	5	12.29	36.85
29	Yalvaç3	9	6	4.5	3.5	80	4	40	5	14.70	63.59
30	Akşehir1	2.5	4	4	3.5	36	2	18.5	4.5	7.54	30.52
31	Akşehir2	5.5	4	2	2	58.5	2	35	4.5	8.42	26.96
32	Akşehir3	4.5	4.5	3.5	3	46	2	40	5	13.89	52.68
33	Keçiborlu1	6.5	4.5	2.5	3	59.5	4.5	39	4	16.30	23.91
34	Keçiborlu2	3	4	4.5	2.5	62	4.5	27.5	4.5	13.06	24.71
35	Keçiborlu3	6.5	4	5	4.5	66	2	32.5	4.5	15.15	41.43
36	Uluborlu1	6	6	4.5	4.5	36.5	2.5	37	4.5	15.33	40
37	Uluborlu2	7	7	4.5	5	49.5	2.5	40	5	16.50	46.23
38	Senirkent1	2.5	2.5	2.5	2.5	24	2.5	21.5	4	7.09	22.41
39	Senirkent2	8	6.5	5.5	4.5	73	3.5	38.5	5	11.9	54.02
40	Sandıklı1	2	2.5	5	3.5	47.5	2	25	4	13.88	48.39
41	Sandıklı2	2	2.5	2.5	2.5	26	2	26.5	5	8.19	20.43
42	Sandıklı3	4.5	4.5	3.5	2.5	59	2	35.5	5	12.83	43.55
43	Dinar1	7	4.5	3.5	3.5	62.5	4.5	18	3	13.68	22.39
44	Dinar2	7	4.5	4.5	3	69.5	4.5	34	4.5	13.91	42.05
45	Dinar3	3	2.5	2	2.5	29.5	4	23	3.5	12.92	22.48
46	Şuhut1	7.5	5	4	3.5	73.5	4	28	4	12.17	26.59
47	Şuhut2	6.5	4.5	3	2.5	55.5	4	23.5	4.5	15.20	23.85
48	Şuhut3	7	4.5	4.5	2.5	66	4	22.5	4	14.31	30.27
49	Çay1	7.5	6	4.5	4	76	3.5	38	5	12.67	64.03
50	Çay2	8	7	4.5	3.5	74	4.5	37.5	5	15.45	46.75
51	Çay3	8.5	6.5	3	4.5	64.5	5	32.5	4.5	16.82	36.18
52	Sultandağı1	7.5	6.5	5.5	4.5	65.5	3.5	42	4.5	10.35	49.89
53	Sultandağı2	8.5	7.5	5.5	4.5	74	4	44.5	5	13.73	62.68
54	Bolvadin1	8.5	6	4.5	4.5	74	3.5	36.5	4	12.70	64.66
55	Bolvadin2	6.5	6.5	4.5	4.5	49	2.5	32	5	9.165	33.80
56	Bolvadin3	8.5	7.5	5	4.5	70	4.5	39	5	16.32	51.48
57	Yenişar1	8	6.5	5	4.5	72	3	40.5	5	13.99	59.39
58	Yenişar2	6.5	5.5	5	4.5	50.5	3.5	38.5	5	14.25	53.82
59	Beyşehir1	9	7.5	4.5	4.5	69.5	4	40	5	15.82	52.5
60	Beyşehir2	9	8	6	5	72.5	4.5	44	5	17.54	68.57
LSD		0.81	0.90	0.87	0.86	6.47	0.96	3.95	0.65	1.70	5.27

1. cover area in spring, 2. cover area in summer, 3. cover area in autumn, 4. cover area in winter, 5. plant height, 6. : stem crown diameter, 7. bud number in stem crown, 8. depth of stem crown, 9. harvest area of plant, 10. dry matter yield of first cut