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Evaluation of Silage Corn Hybrids as Second Cropping

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ABSRACT

In this study, ten varieties and varieties-to-be of hybrid maize (BT-M-12 x BT. M-B, BT-M-30 x BT. M-B, BT-M-46 x BT. M-B, BT-M-71 x BT. M-B, BT-M-124 x BT. M-B, BT-M-149 x BT. M-B, BT-M-159 x BT. M-B, OSSK-644, Arifiye and MAT-97) were grown as second crop in the 2005 growing season in the ecological conditions of Antalya. The experiment was designed with "Randomized Complete Blocks Designed" with four replications. In the research, plant height, leaves per plant, stem diameter, leaf / stem ratio, leaf ratio, flowering period, vegetation period, forage yield, dry matter ratio, dry matter yield, protein ratio and crude protein yield were determined. According to the results, green forage yields of hybrid maize varieties were 77.7 t/ha (BT-M-71 x BT.M-B) – 133.0 t/ha (BT-M-159 x BT.M-B), dry matter ratio were 18.99 % (BT-M-12 x BT.M-B) - 20.93 % (OSSK 644), dry matter yield were 15.0 t/ha (BT-M-71 x BT.MB) – 26.9 t/ha (BT-M-159 x BT.M-B), crude protein rates were 2.36 % (MAT-97) - 2.76 % (BT-M-71 x BT.M-B), and crude protein yields were 2.1 t/ha (BT-M-71 x BT.M-B) – 3.2 t/ha (BT-M-159 x BT.M-B) respectively. This research suggests that "BT-M-159 x BT.M-B" can be grown as second crop under the ecological conditions in Antalya.

1. Introduction

Rapid population increases necessitate production of high yield and quality for animal and plant based food products. Corn is used as food directly or indirectly both in Turkey and the World. Corn is used as animal feed (silage or feed) and human food (bread, fresh, processed, flour and oil) (Sade 2002).

Corn as animal feed has an important share in Turkey. However, silage corn production is still in its infancy for maximum silage yield per unit area and for digestible feed stuff (Geren 2000).

Development of animal husbandry in Turkey depends on both raising better bred animals and use of high quality green feed. It is crucial to feed animals with silage made of green vegetation that are grown from spring to fall in order to improve milk and meat yield of animals in winter months. Nowadays, use of silage as animal feed has increased in western European countries and in United States, indicating importance of corn as silage-animal feed. Corn is one of the leading crop species for silage making. It is relatively easy to store corn having high fermentable carbohydrate. Corn is thought to be an excellent crop plant for silage due mainly to its high dry matter and sugar contents as well as its ease of fermentation when harvested at the right stage. Silage corn has added advantages like being a quality rough feed, being part of crop rotation and second cropping as well as creating new jobs.

It is important to determine and to advise high yielding corn cultivars with high feed value suitable to Antalya conditions. In general, silage is made from main corn crop in Turkey. However, there are number of reports showing that second crop silage corn is grown in areas with favorable climates (Akdağ et al. 1997).

Although there are number of new corn cultivars registered in turkey in the last decade, very small portion of it registered for silage purpose. Ecological conditions of Turkey allow production of many crop plants. Corn and sorghum species are leading crop plants in silage production even though silage can be made from many

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plant species. The objective of this study was to determine the adaptation and agronomic characteristics under Mediterranean region. It is thought that use of second crop corn for making silage would ease erosion pressure, aid animal production.

2. Material and Methods

This study was carried out in Bircan Tarim research area, Altinova, Antalya in 2005. Plant material included hybrid corn cultivars BT-M-12 x BT. M-B, BT-M-30 x BT. M-B, BT-M-46 x BT. M-B, BT-M-71 x BT. M-B, BT-M-124 x BT. M-B, BT-M-149 x BT. M-B and BT-M-159 x BT. M-B developed by Bircan Tarim. Hybrid corn cultivars OSSK-644, Arifiye and MAT-97 were used as control.

The meteorological data of Antalya that belongs to 2005 (year of the study) and 60-year-mean is presented in Table 1.

The soil was sampled from 0 to 60 cm top layer and was tested (Laben, Antalya). The result is summarized in Table 2. The soil is silty-loam, low in organic matter, calcium, potassium and phosphorus; high in iron, and sufficient in zinc.

Table 1
The meteorological data of Antalya that belongs to 2005 (year of the study) and 60-year-mean *

Mouths	Precipitation (mm)		Temperature (^{0}C)		Relative Humidity (%)	
	1944-2004	2005	1944-2004	2005	1944-2004	2005
July	2.9	34.1	28.2	28.4	58	63.6
August	2.9	----	27.8	28.8	59	60.2
September	12.9	25.5	24.3	25.3	58	54.7
October	77.4	17.2	19.4	19	62	54.9
November	179.4	142.2	14.0	13.7	66	56
Total	275.5	219	----	----	----	----
Mean	----	----	22.7	23	60.6	57.9

* Data obtained from Antalya Meteorological station

Table 2
Chemical and Physical Characteristics of the soil at the experimental area*

Soil depth (cm)	Ph	Organic matter (%)	$CaCO_3$ (%)	P_2O_5 (kg da^{-1})	K_2O (kg da^{-1})	Structure	Fe (ppm)	Zn (ppm)
0 – 60	7 .2	2	1.3	6.64	184.8	silty - loam	5.93	0.46

*soil was tested by Laben. Antalya

The preceding crop at the experimental area was wheat. The area was prepared for seeding corn after wheat harvest. The experiment was set up as randomized complete bloc design for four replications. Plots were 5.0 m x 2.8 m = 14.0 m^2, 70 cm between rows, 15 cm within rows, consisting of four rows. Seeds were planted on 15th July 2005. Six kg/da NPK was applied with seeding, and 9 kg da^{-1} N was added after second weeding. Plots were irrigated as needed. Plots were harvested between 3-7 November, 2005 at dough making stage. A 4 x 1.4 = 5.6 m^2 plot area was harvested, excluding two rows at the edges and a 50 cm planting at the beginning and end of each row. The plant height (Sade 1987), number of leaf (Gökçora 1956), stem diameter (Sade 1987), leaf blade ratio, leaf ratio, tasseling date, vegetation period, vegetative yield (Keskin 2001), dry matter ratio (Keskin 2001), dry matter yield (Keskin 2001), crude protein ratio (Kacar 1972) and crude protein yield were collected in this study (Sade 1987).

The data were analyzed with MSTAT-C program, Least Significant Difference (LSD) of each mean calculated independently (Yurtsever 1984).

3. Results and Discussion

Ten hybrid corn were evaluated as second crop for silage yield and yield components at Antalya in 2005.

3.1. Plant Height

Plant height was significantly different among cultivars ($p \leq 0.01$) (Table 3). The tallest cultivar was "Arifiye" with 257.7 cm, and the shortest was "BT-M-71 x BT.M-B" with 173.4 cm. Overall plant height of the cultivars was 227.7 cm (Table 4). Mean plant height was reported as 274.8 cm by Keskin (2001), as 203.4 cm by Mülayim et al. (2002), as 270.0 – 310.1 cm for silage corn by Güneş (2004). Our results are in agreement with previous reports.

Plant height is affected by environmental condition. The main aim in silage corn production is to get maximum silage yield per unit area, which makes plant height an important component. "Arifiye", "OSSK 644" "BT-M-159 x BT.M-B" and "MAT-97" cultivars were taller than the rest.

3.2. Leaf Number

The cultivars were significantly different from each other ($p \leq 0.01$) for leaf number (Table 3). The "BT-M-12 x BT.M-B" and "BT-M-124 x BT.M-B" had the highest leaf number with 15.1 leaf/plant, followed by "BT-M-159 x BT.M-B" with 14.8 leaf/plant, "BT-M-46 x BT.M-B" with 14.6 leaf/plant, "BT-M-149 x BT.M-B" with 14.5 leaf/plant, "Arifiye" with 14.5 leaf/plant, "BT-M-30 x BT.M-B"with 13.7 leaf/plant, "MAT-97" with 13.7 leaf/plant, and "OSSK 644" with 13.7 leaf/plant. And the lowest leaf number was obtained from "BT-M-71 x BT.M-B" with 12.4 leaf/plant. Overall mean leaf number of the cultivars was 14.1 leaf/plant (Table 4).

Mean leaf number per plant was reported to be 14.2 – 17.1 by Ayrancı (1999), 11.5 by Mülayim et al. (2002), 14.7 by Güneş (2004) which are in good agreement with our findings.

Leaf number is an important parameter for silage corn quality; increased leaf number enhances the quality. Therefore, the hybrids "BT-M-12 x BT.M-B", "BT-M-124 x BT.M-B" and "BT-M-159 x BT.M-B" with high leaf number may be good candidates for silage.

3.3. Stem Diameter

The hybrids were significantly different from each other ($p \leq 0.01$) for stem diameter (Table 3). The thickest and thinnest stem diameter belonged to "BT-M-159 x BT.M-B" and "OSSK 644" with 2.76 cm and 2.42 cm, respectively. Overall stem diameter of cultivars was 2.55 cm (Table 4). Leaf diameters were reported to be 1.71-2.21 cm by Keskin (2001), 1.84-4.01cm in Bursa by Mülayim et al. (2002), 2.37 – 2.48 cm by Güneş (2004). The differences in stem diameter between different studies may be due to location, genotype, and growing conditions or combination of these factors.

Leaf / Stem ratio the hybrids were significantly different from each other ($p \leq 0.01$) for leaf / stem ratio (Table 3).The highest and lowest leaf / stem ratio belonged to BT-M-149 x BT.M-B" and "BT-M-71 x BT.M-B" with 27.21% and 20.5%, respectively. Overall leaf/stem ratio of the hybrids was 24.17% (Table 4). In silage corn, the higher the leaf/stem ratio is better the silage quality. Budak et al. (2005) reported variation for leaf/stem ratio among cultivars which are consistent with our findings.

3.4. Leaf Ratio

The hybrids were significantly different from each other ($p \leq 0.01$) for leaf ratio (Table 3). The hybrid "BT-M-149 x BT.M-B" had the highest leaf ratio with 21.35%, followed by "Arifiye" with 20.92%, "MAT-97" with 20.20, "BT-M-46 x BT.M-B" with 19.95%, "BT-M-124 x BT.M-B" with 19.27%, "BT-M-159 x BT.M-B" with 19.11, "BT-M-12 x BT.M-B" with 18.90%, "OSSK 644" with 18.43% and "BT-M-30 x BT.M-B" with 18.39 %.The lowest leaf ratio was found for the hybrid "BT-M-71 x BT.M-B" with 16.99% where overall leaf ratio of the cultivars was 19.35% (Table 4).

Table 3

Mean squares of data collected in the study

Source	Plant height	Number of leaf	Stem diameter	Leaf blade ratio
Reps	189.132	0.137	0.002	5.28
Cultivars	2714.509**	3.753**	0.072**	16.274**
Error	56.319	0.211	0.007	3.467
source	Leaf ratio	Taseling date	Vegetation period	Vegetation yield
Reps	2.446	0.067	0.067	998664.658
Cultivars	6.730**	6.044**	5.378**	7601585.699**
Error	1.454	0.067	0.067	349479.44
source	Dry matter ratio	Dry matter yield	Protein ratio	Crude protein yield
Reps	1.497	36811.917	0.007	599.446
Cultivars	1.568*	371233.378**	0.074**	3804.849**
Error	0.645	20639.957	0.009	288.494

** means significantly different at p= % 1.

Leaf ratio of corn were reported to be 23.29- 26.67% by Turan and Yılmaz (2000), 25.86-28.20% by Güneş (2004).The differences among results may be due to genotype, environment or growing conditions as well as harvest dates.

Leaf ratio is affected by leaf number, leaf weight, and stem + husk weight. Digestibility of leaf is better than stem but lower than husk (Orak and İptaş 1999). Leaf ratio is an important quality parameter in silage corn where the higher the leaf ratio the better the silage quality. Therefore, the hybrid "BT-M-149 x BT.M-B" with the highest leaf ratio may be recommended for silage.

3.5. Tasseling date

The hybrids were significantly different from each other ($p \leq 0.01$) for tasseling date (Table 3). The earliest tasseling was observed for "MAT-97" at 50 days after

planting and the latest for "BT-M-71 x BT.M-B", "BT-M-159 x BT.M-B" and "OSSK 644" at 54 days after planting. Mean tasseling date of the hybrids was 51 days (Table 4). Hough (1972) reported that temperature and relative humidity are closely related with tasseling and hot and sunny days promote tasseling.

3.6. Vegetation period

The hybrids were significantly different from each other ($p \leq 0.01$) for vegetation period (Table 3) The latest harvest was done for "MAT-97" at 82 days after planting and the earliest harvest for "BT-M-159 x BT.M-B" and "OSSK 644" at 78 days after planting. Overall mean of vegetation period was 79 days for the hybrids (Table 4).

Harvest date is important for silage corn. The hybrids with shorter vegetation period are preferred. Because all the hybrids were ready for harvest at about 80 days after planting, they are suitable for second crop silage production under Antalya conditions.

Table 4

Mean separation of corn cultivars for different agronomic characteristics

Cultivars	Plant height	Number of leaf	Stem diameter	Leaf blade ratio
BT-M-12 x BT.M-B	206.6 c	15.1 a	2.60 abc	23.36 bcd
BT-M-30 x BT.M-B	212.6 bc	13.7 bc	2.50 cd	22.55 cd
BT-M-46 x BT.M-B	226.3 b	14.6 ab	2.51 bcd	24.93 abc
BT-M-71 x BT.M-B	173.4 d	12.4 d	2.37 d	20.50 d
BT-M-124 x BT.M-B	227.2 b	15.1 a	2.73 a	24.94 abc
BT-M-149 x BT.M-B	223.4 b	14.5 ab	2.67 ab	27.21 a
BT-M-159 x BT.M-B	252.0 a	14.8 a	2.76 a	23.63 abcd
MAT-97	243.6 a	13.1 cd	2.43 d	25.31 abc
Arifiye	257.7 a	14.5 ab	2.52 bcd	26.49 ab
OSSK 644	254.5 a	13.0 cd	2.42 d	22.59 cd
Mean	227.7	14.1	2.55	24.17
Cultivars	Leaf ratio	Taseling date	Vegetation period	Vegetation yield
BT-M-12 x BT.M-B	18.90 bcd	51 c	79 c	11250.00 b
BT-M-30 x BT.M-B	18.39 cd	51 c	79 c	11666.67 b
BT-M-46 x BT.M-B	19.95 abc	52 b	80 b	11142.86 b
BT-M-71 x BT.M-B	16.99 d	50 d	79 c	7773.81 c
BT-M-124 x BT.M-B	19.27 abcd	52 b	80 b	11183.24 b
BT-M-149 x BT.M-B	21.35 a	51 c	79 c	10842.99 b
BT-M-159 x BT.M-B	19.11 abcd	50 d	78 d	13297.62 a
MAT-97	20.20 abc	54 a	82 a	11280.95 b
Arifiye	20.92 ab	51 c	79 c	11988.10 b
OSSK 644	18.43 cd	50 d	78 d	11119.05 b
mean	19.35	51	79	11154.53
Cultivars	Dry matter ratio	Dry matter yield	Protein ratio	Crude protein yield
BT-M-12 x BT.M-B	18.99 c	2134.99 c	2.46 cd	276.47 bc
BT-M-30 x BT.M-B	20.06 abc	2341.10 bc	2.70 ab	315.34 a
BT-M-46 x BT.M-B	20.06 abc	2236.27 bc	2.67 ab	297.33 abc
BT-M-71 x BT.M-B	19.28 bc	1496.97 d	2.76 a	214.32 d
BT-M-124 x BT.M-B	19.34 bc	2159.38 c	2.43 d	271.17 bc
BT-M-149 x BT.M-B	20.64 a	2235.84 bc	2.52 bcd	272.72 bc
BT-M-159 x BT.M-B	20.25 ab	2689.92 a	2.42 d	321.82 a
MAT-97	20.15 abc	2275.97 bc	2.36 d	266.02 c
Arifiye	20.45 ab	2450.95 ab	2.53 bcd	303.15 ab
OSSK 644	20.93 a	2326.39 bc	2.64 abc	293.14 abc
Mean	20.01	2234.78	2.55	283.15

* Means with the same letter in a column are statistically similar.

3.7. Green forage yield

The hybrids were significantly different from each other ($p \leq 0.01$) for green forage yield (Table 3)The highest green forage yield was obtained from "BT-M-159 x BT.M-B" with 13297.62 kg da^{-1}, followed by Arifiye" (11988.10 kg da^{-1}), "BT-M-30 x BT.M-B" (11666.67 kg da^{-1}), "MAT-97" (11280.95 kg da^{-1}), "BT-M-12 x BT.M-B" (11250.00 kg da^{-1}), "BT-M-124 x BT.M-B" (11183.24 kg da^{-1}), "BT-M-46 x BT.M-B" (11142.86 kg da^{-1}), "OSSK 644" (11119.05 kg da^{-1}), "BT-M-149 x BT.M-B" (10842.99 kg da^{-1}) and -M-71 x BT.M-B" (7773.81 kg da^{-1} a). Overall green forage yield of the hybrids was 11154.53 kg da^{-1} (Tablo 4).

In studies conducted elsewhere, green forage yields were reported to be 6944.0 – 7529.0 kg da^{-1} by Aydın and Albayrak (1995), 4000.0 - 6305.0 kg da^{-1} by Yılmaz et al (1999), 6416.0 – 8666.0 kg da^{-1} by Turan and

Yılmaz (2000), 3986.0 – 8658.0 kg da^{-1} a by Budak and Soya (2003), 6892.8 - 8488.0 kg da^{-1} by Güneş (2004). Green forage yield varies by genotype and environment in silage corn (Yılmaz et al. 1999; Avcıoğlu et al. 2001). Our findings differed from the reported green forage yields. The reasons for differences could be due to environment, genotype, growing conditions or harvest date. Sencar et al (1993) reported that cultivars varied for green forage yields. Antalya has an added advantage due to the fact that temperatures are favorable until November for maturing the seeds up to dough stage. Therefore, second crop silage corn is preferred over other silage crop in Antalya because of high silage quality and yield. The hybrid "BT-M-159 x BT.M-B" may be recommended for second crop silage production in Antalya due to high green forage yield.

3.8. Dry matter ratio

The hybrids were significantly different from each other ($p \leq 0.05$) for dry matter ratio (Table 3). The highest dry matter ratio was obtained for "OSSK 644" with 20.93%, followed by "BT-M-149 x BT.M-B" (20.64%), "Arifiye" (20.45%), "BT-M-159 x BT.M-B" (20.25%), "MAT-97)" (20.15%), "BT-M-30 x BT.M-B" (20.06%), "BT-M-46 x BT.M-B" (20.06%), "BT-M-124 x BT.M-B" (19.34%), "BT-M-71 x BT.M-B" (19.28%) and "BT-M-12 x BT.M-B"(18.99%). Overall mean dry matter ratio of the hybrids was 20.01% (Table 4).

Dry matter ratio was reported in corn as 18.50 – 26.30 % by İptaş et al. (1997), 29.53 – 32.10% by Güneş (2004), and 16 – 43% by Tosun (1967). The differences in dry matter ratio may be due to environment, genotype, growing conditions, and harvest dates.

3.9. Dry matter yield

The hybrids were significantly different from each other ($p \leq 0.01$) for dry matter yield (Table 3). The highest dry matter yield was obtained for "BT-M-159 x BT.M-B" with 2689.92 kg/da, followed by "Arifiye" (2450.95 kg da^{-1}), "BT-M-30 x BT.M-B" (2341.10 kg da^{-1}), "MAT-97" (2275.97 kg da^{-1}), "OSSK 644" (2326.39 kg da^{-1}), "BT-M-149 x BT.M-B" (2235.84 kg da^{-1}), "BT-M-46 x BT.M-B" (2336.27 kg da^{-1}), "BT-M-124 x BT.M-B" (2159.38 kg da^{-1}), "BT-M-12 x BT.M-B" (2134.99 kg da^{-1}) and "BT-M-71 x BT.M-B" (1496.97 kg da^{-1}).Overall dry matter yield of the hybrids was 2234.78 kg da^{-1} (Table 4).

Aydın and Uzun (1995) reported dry matter yields of 621.6 – 965.4 kg da^{-1} and Aydın and Albayrak (1999) of 1661.0 – 1795.0 kg da^{-1}, Yılmaz et al. (1999) of 2634.9 – 2572.0 kg da^{-1}, Turan and Yılmaz (2000) of 1482.9 kg da^{-1}, Keskin (2001) of 1152.0 – 1437.0 kg da^{-1}, and Güneş (2004) of 2193.4 – 2657.5 kg da^{-1}. Our findings in dry matter yields varied from the reported yields probably due to environmental, genotypic, growing, and harvest date differences. Sencar et al (1993) reported significant differences in dry matter yield among cultivars.

3.10. Protein ratio

The hybrids were significantly different from each other ($p \leq 0.01$) for protein ratio (Table 3). The highest protein ratio was obtained for "BT-M-71 x BT.M-B" with 2.76%, and the lowest was recorded for "MAT-97" with2.36%. Overall mean protein ratio of the hybrids was 2.55% (Table 4).

Aydın and Albayrak (1995) reported protein ratio of 10.72 – 11.25% for second crop corn, Turan and Yılmaz (2000) of 5.36 – 5.74%, Keskin (2001) of 5.18 – 6.25 %, and Güneş (2004) of 3.61-4.06. Our findings for protein ratio were lower than the reported ratios probably due to differences in environment, genotype and harvest dates.

3.11. Crude protein yield

The hybrids were significantly different from each other ($p \leq 0.01$) for crude protein yield (Table 3). The highest crude protein yield was obtained for BT-M-159 x BT.M-B" with 321.82 kg da^{-1}, followed by "BT-M-30 x BT.M-B" (315.34 kg da^{-1}), "Arifiye" (303.15 kg da^{-1}), "OSSK 644" (293.14 kg da^{-1}), "BT-M-46 x BT.M-B" (297.33 kg da^{-1}), "BT-M-12 x BT.M-B" (276.47 kg da^{-1}), "BT-M-149 x BT.M-B" (272.72 kg da^{-1}), "BT-M-124 x BT.M-B" (271.17 kg da^{-1}), "MAT-97" (266.02 kg da^{-1}) and "BT-M-71 x BT.M-B" (214.32 kg da^{-1}). Overall mean crude protein yield was 283.15 kg da^{-1} (Table 4).

Aydın and Albayrak (1995) reported crude protein yield of 155.00 – 192.40 kg da^{-1}, Turan and Yılmaz (2000) of 79.46 – 93.31 kg da^{-1}, Keskin (2001) of 64.77 – 88.01 kg da^{-1}, Güneş (2004) of 98.39 – 125.96 kg da^{-1}. Our findings indicated higher crude protein yield than the ones reported at earlier studies. The reasons for difference may be due to environment, genotype, growing conditions, and harvest dates as well as higher forage yield obtained in Antalya.

4. Conclusion

This study was carried out at Bircan Tarim experiment station to evaluate hybrid corn cultivars for suitability as silage corn for second cropping in Antalya in 2005. The study was conducted as Randomized complete block design with four replications. The cultivars were BT-M-12 x BT. M-B, BT-M-30 x BT. M-B, BT-M-46 x BT. M-B, BT-M-71 x BT. M-B, BT-M-124 x BT. M-B, BT-M-149 x BT. M-B , BT-M-159 x BT, and OSSK-644, Arifiye and MAT-97 hybrids used as control cultivars. The planting was 70 cm x 15 cm with 5 m four rows for each replication per hybrid seeded on 15th July 2005. Six kg da^{-1} of N, P, K fertilizers were applied with seeding. A 9 kg da^{-1} N was added after second weeding. Irrigation was made as needed. Plots were harvested at the dough maturation stage by hand on 3-7 November. A 50 cm length at the end and beginning of plots, and rows at the edge of the plots were left for edge-effect where remaining plants were harvested on 3-7 November 2005.

Plant height, leaf number, stem diameter, leaf/stem ratio, leaf ratio, height of first husk, husk length, tasseling date, vegetation period, green forage yield, dry matter ratio, dry matter yield, crude protein ratio, crude protein yield were measured in this study.

For plant height "Arifiye", "OSSK 644" "BT-M-159 x BT.M-B" and "MAT-97", for leaf number "BT-M-12 x BT.M-B", "BT-M-124 x BT.M-B" and "BT-M-159 x BT.M-B", for stem diameter BT-M-159 x BT.M-B" and "BT-M-124 x BT.M-B", for husk height "Arifiye" and "OSSK 644", for leaf/stem ratio "BT-M-149 x BT.M-B" and "Arifiye", for leaf ratio "BT-M-149 x BT.M-B" and "Arifiye", for husk lenght "BT-M-124 x BT.M-B" and "BT-M-12 x BT.M-B", for tasseling date "MAT-97", "BT-M-124 x BT.M-B" and "BT-M-46 x BT.M-B", for vegation period "MAT-97", "BT-M-124 x BT.M-B" and "BT-M-46 x BT.M-B", for forage yield "BT-M-159 x BT.M-B", "Arifiye" and "BT-M-30 x BT.M-B", for dry matter ratio "OSSK 644" and "BT-M-149 x BT.M-B", for dry matter yield "BT-M-159 x BT.M-B" and "Arifiye", for protein ratio "BT-M-71 x BT.M-B", "BT-M-30 x BT.M-B" and "BT-M-46 x BT.M-B", for crude protein yield "BT-M-159 x BT.M-B" and "Arifiye" hybrids were leading cultivars.

A number of corn cultivars with various vegetation periods have been registered in recent years in Turkey. However, hybrids developed for silage making are not many. Corn is the leading crop plant for silage making. The objective of this study was to assess adaptation and agronomic characteristics of hybrid corns developed for silage making under Mediterranean conditions. The idea was to make use of land after first crop by planting second crop silage corn where feed availability in the region is expected to aid animal production.

5. Acknowledgment

This paper is was summarized from MSc thesis of Duran SIMSEK.

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