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Feed Quality Parameters of Silage Corn Cultivars in Muş Ecological Conditions

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ABSTRACT

The present study was carried out to determine the feed quality of some silage corn cultivars in 2020-2021 years. Fourteen silage corn cultivars belonging to different FAO maturity groups were used. Field trials were conducted in a farmer's field in Muş province of Turkey. Average acid detergent fiber content, neutral detergent fiber content, crude protein content, digestible dry matter ratio, dry matter consumption and relative feed value quality parameters of the cultivars used in the study were examined, and significant differences were observed for these parameters. According to the two-year results of the study, the average acid detergent content of cultivars was 34.46%, the neutral detergent fiber content was 59.92%, the crude protein content was 10.16%, digestible dry matter ratio was 62.88%, dry matter consumption was 2.05 and relative feed value was 100.5%. In terms of all quality parameters examined in the study, cv. Pioneer 1570 was in the highest statistical groups and came to the forefront in Muş. According to the results of the study, in terms of the quality parameters, cv. Pioneer 1570 could play an important role in meeting the quality parameters required by a good quality forage for the region.

1. Introduction

Animal husbandry is a vital part of agricultural systems all over the world and is an increasingly developing sector. As a result of the development of this sector, although the feed need of animals in the world has increased, quality forage production remains limited due to reaching the limits of agricultural areas (Ozata et al., 2018; Li et al., 2020). In order to meet the increasing need for quality forage, it is necessary to cultivate silage forage crops in agricultural areas, which are an alternative forage source with high yields per area. The easy mechanization of silage corn cultivation, which is suitable for machine agriculture from sowing to harvesting, the high water content of silage, the low nutrient losses and the ability to increase its quality with various applications offer advantages in terms of product management. When it comes to silage, the reason why corn plants come to mind in the world and in Turkey is due to their high yield per unit area, suitability for silage production and the feeding value of the silage made (Kordikanlioglu and Gulumser, 2021).

As in Turkey, the forage plants most commonly used for silage in the province of Muş are alfalfa and corn. In Turkey, alfalfa is produced as 19.3 million tons of fresh forage in an area of approximately 673 000 ha while corn is produced as 27.3 million tons of silage in an area of 530 000 ha. In the province of Muş, on the other hand, 1.1 million tons of fresh alfalfa is produced in an area of 49 500 ha area and approximately 97 000 tons of silage is produced in an area of 2 008 ha (Anonymous, 2021). The average alfalfa and silage corn yields in Turkey are 28.95 and 52.08 ton/ha, respectively, which are somewhat higher than yield values in Muş Province (21.73 and 48.30 ton/ha, respectively) (Anonymous, 2021) The low yields in Muş province are caused by the lack of information of the producers on technical issues as well as by the fact that the cultivars

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suitable for the region have not been determined, especially for silage corn production.

There are many studies investigating different cultivars for silage corn production. In a study dealing with 24 different silage corn cultivars in Bilecik province of Turkey, the average crude protein content was 9.15%, acid detergent fiber (ADF) content was 38.20%, neutral detergent fiber (NDF) content was 57.45% and relative feed value was 97.76 (Kordikanlioglu and Gulumser, 2021). In Malaysia, the average the crude protein content between 10.1 and 11.4%, the ADF content between 34.2 and 36.5% and the NDF content between 63.0 and 64.2% (Nazli et al., 2019). In another study conducted with 14 different genotypes of silage corn under Çukurova conditions, the average dry matter rate was 98.40%, average crude protein content was 8.80%, average digestible dry matter ratio was 61.7%, average ADF content was 34.91%, and average NDF content was 59.70% (Korkmaz et al., 2019)

Yield and quality of silage corn are associated with many factors such as climate and soil factors, altitude, planting time, planting density, irrigation and harvest period as well as with genotype (Cusicanqui and Lauer, 1999) The use of suitable corn cultivars in silage production is very important in terms of quality feed production (Iptas and Acar., 2003) Especially in the province of Muş, where the winters are long and the snow cover remains quite long, it is of utmost importance to determine the cultivars of silage corn suitable for the region. Upon the completion of Alparslan II irrigation dam construction and putting it into operation, the irrigable agricultural lands of Muş province will increase. Therefore, it is important for the region to investigate genotypes to obtain more yields of high value-added crops such as alfalfa and silage corn (Yasar, 2021). In this respect, it is necessary to increase the unit area yield of corn to be used as silage within the context of a profitable and sustainable animal husbandry. This study was carried out to determine the silage corn cultivars suitable for the province of Muş in terms of quality parameters.

2. Material and Method

The study was carried out in the experimental areas of Muş Alparslan University in 2021-2022 years. Fourteen corn cultivars belonging to different FAO maturity groups were used as materials (Table 1). According to the results of the soil analysis conducted by the Directorate of the Central Research Institute of Soil, Fertilizer and Water Resources of the Ministry of Agriculture and Forestry, the experimental soils had clayed-loam texture, a soil reaction of pH=6.61, electrical conductivity of 0.61 dS/m, organic matter content of 2.21%, total phosphorus amount of 22.0 kg/ha and total potassium amount of 780 kg/ha.

The temperature averages and the total rainfall amounts during the experimental years and long term are given in Table 2. Accordingly, the total rainfall in 2020 was 121.29 mm, which was approximately 36% more than the long-term average. However, the total amount of rainfall in 2021 was 30.08 mm, which was about 34% of the long-term average. In 2020, the average temperature was 24.4 °C which was 1 °C lower than the long-term average, while in 2021 it was about 2 °C higher than the long term average (Anonymous, 2022).

Table 1. Silage corn cultivars used in the research and their FAO maturity groups

Cultivars	FAO maturity group
LG Helen	600-700
32W86	650
AS 160	500-600
AGM 1644	600
72MAY80	700
Pioneer 1570	600
Greenlife Macha	700
Everest	700
Hido	800
30B74	600
Sy Antex	400-500
Truva	500
Colonia	650
31Y43	650

The field trials were planted as main crop on 29 May 2020 and on 21 May 2021 in Central District of Muş province. The planting was carried out on 70 cm apart rows as 15-16 cm between plants using a pneumatic corn seeder. Row length was 4 m. Experimental design was randomized complete blocks with three replications. As fertilizer, 100 kg/ha nitrogen and 100 kg/ha phosphorus were applied at planting. When the plants reached 45-50 cm in height, urea was applied as a top fertilizer as 100 kg/ha of nitrogen (Korkmaz et al., 2019). During the growing period, the amount of water needed by the plant was given as needed by sprinkler irrigation until the plants reached 1 meter in length and then by wild irrigation as needed by the plants (Kir and Unsal, 2020). During the growing period, weed control was carried out as needed.

Table 2. Some climatic data of experimental area

	Precipitation (mm)			Average temperature (°C)		
Months	LT	2020	2021	LT	2020	2021
May	52.7	100.2	7.7	24.1	24.7	31.0
June	16.2	10.6	3.3	25.9	23.4	29.7
July	6.8	5.3	3.3	26.3	24.8	25.1
August	3.6	0.0	10.0	24.5	25.1	20.7
September	10.2	5.3	13.8	26.4	24.0	30.5
Total/average	89.4	121.3	30.1	25.5	24.4	27.4

LT: Long-term (1981-2021)

The harvest was performed during the dough stage when the dry matter content of the plant was 30-35% (Korkmaz *et al.*, 2019). The harvesting was made by sickles. One row at each side of the plot and a 50 cm length at the two ends of the rows were not harvested and left as edge effect, only two rows at the middle were harvested. These two rows of plants were used both for determining plot yields and for quality analysis. Ten plants were selected from the plants harvested for plot yields, and they were ground with a grinder to pass through a 1-mm diameter sieve to carry out chemical analyses. The crude protein content, ADF content and NDF content analyzes were performed in Near Infrared Reflectance Spectroscopy (NIRS,

Foss6500) using IC-0904FE software with software program coded IC-0904FE. Digestible Dry Matter Ratio was calculated as $= 88.9 - (0.779\ x\ ADF\%)$, Dry Matter Consumption= $120/(NDF\%)$. Relative Feed Value was calculated as: =(Digestible Dry Matter Ratio x Dry Matter Consumption)/ 1.29 (Sheaffer *et al*., 1995) using the digestible dry matter ratio and dry matter consumption. The results obtained in the study were subjected to variance analysis using JMP 13.0 statistical software. Tukey multiple comparison test was used to compare the differences between the means.

3. Results and Discussion

3.1. Acid Detergent Fiber

The average ADF content was 34.46%. Significant differences were observed for cultivars, years and cultivar x year interaction for the ADF contents (Table 3). The average ADF content of the cultivars varied between 30.25 and 35.79%, and the lowest ADF content was obtained from cv. Pioneer 1570, while the highest from cv. 30B74, which was in the same statistical group as the cvs. Colonia and AS160. High ADF contents of the cultivars used in the study showed that the digestion rate was low (Kir and Unsal, 2020). Indeed, the digestion rate of the cv. Pioneer 1570, which had lower ADF contents, was high (Table 3). In the first year of the study, the average ADF content was 34.56% while it was 34.37% in the second year. In terms of the cultivar x year interaction, the lowest average ADF content was obtained from the cv. Greenlife Macha (27.05%) in the second year and the highest average ADF rate was obtained from the cv. Colonia (39.44%) in the second year. The fact that cvs. Greenlife Macha and 30B74 which were among the high statistical group, in the first year of the study were in different statistical groups in the second year of the study resulted in significant cultivar x year interaction. While the results obtained from the research were in agreement with the findings of some researchers (Korkmaz et al., 2019; Nazli et al., 2019), they were higher than the findings of some others (Kir, 2020; Li et al., 2022; Zeng et al., 2022). This may have been due to differences in the cultivars used and the climatic conditions in which they were grown. As a matter of fact, Kir (2020) stated that the difference in the ADF content may be caused by the difference in the cultivar and environment used. ADF content, a parameter used to estimate the energy value of corn silage, is the component most associated with the digestibility of feed, and since it is composed of cellulose, lignin and proteins, higher levels of this fiber content indicate less digestibility of feed materials (Moreno-Resendez et al., 2017). Therefore, the ADF content must be between certain values. In a normal silage corn, these values are required to be between 20-33% (Nazli et al., 2019). Accordingly, in terms of the two-year average ADF contents, most of the cultivars seemed to have ADF values close to the desired levels (Table 3).

3.2. Neutral Detergent Fiber Content

NDF content of the cultivars ranged from 51.28 to 64.61% ($P \leq 0.01$). The highest average NDF content was obtained from the cv. Colonia (64.61%), while the lowest average NDF content was obtained from cv. Pioneer 1570 (Table 3). The average NDF content was 64.76% in the first year of the study and 55.05% in the second year. In the study, the different responses of the cultivars in the two years caused the year x cultivar interaction to be significant. As a matter of fact, in the first year of the study, the highest NDF content was obtained from cv. 30B74, while in the second year it was obtained from cv. Colonia. The differences in years may has been due to the fact that cultivars that were not exposed to drought stress in 2021 showed greater stalk development, creating more ligninized tissues with an increase in the proportion of structural matter (Kacar et al., 2006). The findings from the study are in agreement with the findings of some researchers (Ozata et al., 2012; Korkmaz et al., 2019; Kordikanlioglu and Gulumser, 2021; Li et al., 2022). NDF content in forage is negatively correlated with digestibility. Indeed, Kir, (2020) stated that high NDF content is an indicator of low level of forage consumption, and low NDF content is an indicator of high level feed consumption. To obtain forage with a high energy value, it is necessary to use corn cultivars containing less than 50.0% of such fibers (Moreno-Resendez et al., 2017). In forage feeds, low NDF contents have effects such as a decrease in chewing, lower rumen pH and decrease in milk fat synthesis, and especially as a result of the decrease in saliva secretions, lower digestion rate, and consequently the lower forage utilization rate. Therefore, a certain level of NDF is desired (Tekce and Gul, 2014).

3.3. Crude Protein Content

Crude protein content of the varieties was 10.16%. The average crude protein content was 10.79% in the first year of the study and 9.53% in the second year, and this difference was significant ($p < 0.01$) (Table 4). According to the two-year average results, the average crude protein values ranged from %8.89 to 10.89. The cultivar with the lowest crude protein content was Colonia (8.89%) while the cultivar with the highest crude protein value was Pioneer 1570 (10.89%). According to the results of the research, the cultivar x year interaction was significant (Table 4). As a matter of fact, cvs. 72MAY80 and Pioneer 1570, which were in the same group in the first year of the research, were included in different groups in the second year of the research. The average crude protein content obtained in the present study was higher than the findings of some researchers (Geren et al., 2003; Korkmaz et al., 2019; Ozata et al., 2018; Li et al., 2022) but in agreement with the findings of others (Ayaz et al., 2013; Moreno-Resendez et al., 2017; Nazli et al., 2019; Singh et al., 2020; Kordikanlioglu and Gulumser, 2021). The reason for this difference in study findings may be the cultivar used and climate difference. Indeed, Geren et al. (2003) stated that the amount of nitrogen contained in the plant organs also affects the crude protein content of the plants and that the strong and different photoperiodic and thermoperiodic effects in the vegetation time produce significant differences in the nitrogen reserve in the tissues. This explains the reason for the difference in crude protein between the years in our study. High crude protein content is desirable because it is a quality trait of nutrition. As a matter of fact, Adesogan (2006) emphasized that the crude protein content should be more than 7% in silage analyses. According to the results of the two-year

study, the average crude protein content was approximately 50% more than the recommended amount (10.16%). This means that all of the cultivars used in the study performed better than what was suggested in terms of crude protein content.

Table 3. Average acid detergent fiber and neutral detergent fiber contents of the corn cultivars examined in the study

	Acid detergent fiber (%)			Neutral detergent fiber (%)		
Cultivars	2020	2021	Mean	2020	2021	Mean
Helen	31.22 kl*	35.47 cde	*33.34 bcd*[2]	58.96 fgh*	61.83 c-f	*60.39 abc*[2]
32W86	37.74 abc	32.13 ijk	*34.94 ab*	68.56 ab	55.03 ghi	*61.79 abc*
AS 160	36.72 bcd	34.53 d-h	*35.63 a*	67.48 abc	56.48 fgh	*61.98 abc*
AGM 1644	32.24 h-k	32.57 g-k	*32.41 de*	61.04 d-g	57.21 fgh	*59.13 bcd*
72MAY80	31.93 jk	34.42 d-i	*33.18 cd*	60.78 e-h	59.43 fgh	*60.10 a-d*
Pioneer 1570	31.27 kl	29.24 lm	*30.25 f*	58.75 fgh	43.82 k	*51.28 e*
Greenlife Macha	37.95 ab	27.05 m	*32.50 de*	68.92 ab	48.79 ijk	*58.85 cd*
Everest	34.90 d-g	27.65 m	*31.28 ef*	66.44 a-e	44.76 k	*55.60 de*
Hido	35.25 def	27.27 m	*31.26 ef*	67.21 a-d	48.41 jk	*57.81 cd*
30B74	38.71 ab	32.87 f-k	*35.79 a*	69.56 a	54.79 g-j	*62.17 abc*
SY Antex	32.65 g-k	34.03 e-j	*33.34 bcd*	62.85 b-f	59.64 fgh	*61.24 abc*
Truva	35.19 def	32.03 ijk	*33.61 bcd*	66.55 a-e	54.48 hij	*60.51 abc*
Colonia	31.62 kl	39.44 a	*35.53 a*	61.03 d-g	68.19 abc	*64.61 a*
31Y43	36.38 b-e	32.54 g-k	*34.46 abc*	68.54 ab	58.32 fgh	*63.43 ab*
Mean	**34.56 A**[1]	**34.37 B**	**34.46**	**64.76 A**[1]	**55.08 B**	**59.92**

*) The cultivar x year combination averages shown with the same lowercase letters in the same column are not statistically different from each other (P ≤0.01).

[1]) The averages of the years indicated by different capital letters are statistically different from each other (P ≤0.01).

[2]) The mean of the year indicated by the same italic lowercase letters are not statistically different from each other (P ≤0.01).

3.4. Digestible Dry Matter Ratio

The average digestible dry matter ratio of the cultivars used in the study was 62.88%. The average digestible dry matter ratio was 61.97% in the first year and 63.79% in the second year (Table 4). This difference between the years was significant (p ≤ 0.01) for the average digestible dry matter ratio of corn cultivars. According to the two-year results, the average digestible dry matter ratio of corn cultivars ranged from 61.01 to 65.32% and this difference was significant (Table 4). The lowest average digestible dry matter ratio was obtained from the cv. 30B74 while the highest was obtained from the cv. Pioneer 1570. The cultivar x year interaction was significant for the average digestible dry matter ratio. Based on the interaction results, the lowest digestible dry matter ratio was obtained from cultivar Colonia (58.17%), while the highest was from cvs. Everest, Hido and Greenlife Macha (67.35, 67.65 and 67.82, respectively). When calculating the digestible dry matter ratio values, the average ADF contents are used and they are inversely proportional. The fact that the cultivars with the highest ADF content had the highest digestible dry matter ratios and the cultivars with the lowest ADF content had the highest digestible dry matter ratio proved this hypothesis. As a matter of fact, some investigators reported that digestion increases due to reduced cellulose and lignification in plants (Korkmaz et al., 2019).

Table 4. Average crude protein content and digestible dry matter ratios of the corn cultivars examined in the study

	Crude Protein Content (%)			Digestible Dry Matter Ratio (%)		
Cultivars	2020	2021	Mean	2020	2021	Mean
Helen	9.20 g-j*	9.08 hij	*9.10 de*[2]	64.57 bc*	61.26 i-k	*62.92 cde*[2]
32W86	11.29 abc	9.62 e-I	*10.46 ab*	59.49 kl	63.86 cde	*61.68 ef*
AS 160	9.56 f-i	10.25 b-h	*9.910 bcd*	60.28 jkl	61.99 f-j	*61.14 f*
AGM 1644	10.50 b-g	10.50 b-g	*10.80 ab*	63.77 c-f	63.52 c-g	*63.65 bc*
72MAY80	11.95 a	8.50 ij	*10.22 ab*	64.02 cd	62.07 e-j	*63.05 cd*
Pioneer 1570	11.84 a	9.94 d-h	*10.89 a*	64.53 bc	66.12 ab	*65.32 a*
Greenlife Macha	10.26 b-h	11.07 a-d	*10.67 ab*	59.33 l	67.82 a	*63.57 bc*
Everest	10.75 a-f	10.91 a-e	*10.83 ab*	61.70 g-j	67.35 a	*64.53 ab*
Hido	10.88 a-e	10.63 a-f	*10.76 ab*	61.43 hij	67.65 a	*64.54 ab*
30B74	10.10 c-h	8.23 j	*9.17 cde*	58.74 l	63.29 c-h	*61.01 f*
SY Antex	11.14 a-d	8.99 hij	*10.07 abc*	63.45 c-g	62.38 d-i	*62.92 cde*
Truva	11.56 ab	9.60 e-i	*10.58 ab*	61.48 hij	63.94 cde	*62.71 cde*
Colonia	11.12 a-d	6.67 k	*8.89 e*	64.26 bc	58.17 m	*61.21 f*
31Y43	10.33 b-g	9.46 f-j	*9.90 bcd*	60.55 i-l	63.54 c-g	*62.05 def*
Mean	**10.79 A**[1]	**9.53 B**	***10.16***	**61.97 A**[1]	**63.79 B**	***62.88***

*) The cultivar x year combination averages shown with the same lowercase letters in the same column are not statistically different from each other (P ≤0.01).

[1]) The averages of the years indicated by different capital letters are statistically different from each other (P ≤0.01).

[2]) The mean of the year indicated by the same italic lowercase letters are not statistically different from each other (P ≤0.01).

3.5 Dry Matter Consumption

The average dry matter consumption of the cultivars was 2.05. The average dry matter consumption was 1.86 in 2020 and 2.24 in the 2021, and this difference was significant (Table 5). According to the two-year average results, the average dry matter consumption of the cultivars ranged from 1.87 to 2.60 and this difference for average dry matter consumption was significant. The lowest average dry matter consumption was obtained from cv. Colonia, and the highest from cv. Pioneer 1570. The cultivar x year interaction was significant for average dry matter consumption. According to the interaction results, the lowest dry matter consumption was obtained from cv. 30B74 in the first year and the highest from cv. Pioneer 1570 in the second year (Table 5). When calculating dry matter consumption, average NDF contents are used. Just as there is a relationship between the rate of digestible dry matter ratio and ADF content, there is an inversely proportional relationship between dry matter consumption and NDF content. It is something expected that the cultivar with the highest average NDF content also has the lowest dry matter consumption and the cultivar with the lowest NDF content has the highest dry matter consumption. One of the most important factors in animal feeding is the amount of dry matter consumption. Indeed, Horrocks and Vallentine (1999) stated that the quality of animal nutrition is clearly important but identified the change in the intake of dry matter consumption as the most important factor determining the yield productivity level and effectiveness in ruminant animals. It was also reported that the reduction in dry matter uptake causes ketosis in cows and that control of ketogenesis may be influenced by dry matter uptake through the provision of glucogenic precursors (Lean, 2020)

3.6. Relative Feed Value

The average relative feed value of the cultivars used was 100.5. The average relative feed value was 89.67 in the first year of the study and 111.33 in the second year, and this difference was significant. According to the two-year results of the study, the lowest relative feed value was obtained from the cv. Colonia and the highest from cv. Pioneer 1570, and the difference among the cultivars was statistically significant (Table 5). According to the results of the study, the cultivar x year interaction was significant for average relative feed value. According to the results of the study, the lowest relative feed value was obtained from cv. 30B74 (78.55) and the highest from cv. Pioneer 1570 (161.91) (Table 5). Similar relative feed values were obtained by some researchers (Sen, 2017; Kordikanlioglu and Gulumser., 2021; Zhao et al., 2022) while higher values were reported by some others (Nazli et al., 2014; Li et al., 2022). This difference may be caused by the differences in the cultivars used and climate. As a matter of fact, (Canbolat, 2019)reported that the quality of forage varies considerably with the variability of the cultivars, climate productions and harvesting practices used. The relative feed value is an important indicator for the forage quality in the market, and forage producers and buyers use the relative feed value index to price forage (Canbolat, 2019) When calculating the relative feed value, the digestible dry matter ratio and dry matter consumption of the feeds are calculated. Since the ADF and NDF contents are used when calculating these values, the relative feed values are inversely proportional to ADF and NDF contents. The higher relative feed value content of the cv. Pioneer 1570, which has a low ADF and NDF contents, revealed this association.

Table 5. Average dry matter consumption and relative feed value of the corn cultivars examined in the study

	Dry matter consumption			**Relative feed value (%)**		
Cultivars	2020	2021	Mean	2020	2021	Mean
Helen	2.03 cde*	1.94 e	*1.98 bc*[2]	101.88 efg*	92.17 efg	*97.03 bc*[2]
32W86	1.75 e	2.18 b-e	*1.96 bc*	80.72 g	107.96 c-f	*94.34 c*
AS 160	1.78 e	2.12 cde	*1.95 bc*	82.33 efg	102.09 efg	*92.71 c*
AGM 1644	1.96 de	2.09 cde	*2.03 bc*	97.37 efg	103.29 d-g	*100.33 bc*
72MAY80	1.97 cde	2.01 cde	*1.99 bc*	98.06 efg	97.17 efg	*97.62 bc*
Pioneer 1570	2.04 cde	3.15 a	*2.60 a*	102.42 efg	161.91 a	*132.17 a*
Greenlife Macha	1.74 e	2.45 bcd	*2.10 bc*	80.07 g	129.34 bcd	*104.71 bc*
Everest	1.80 e	2.68 ab	*2.24 ab*	86.43 efg	139.97 ab	*113.20 b*
Hido	1.78 e	2.47 bc	*2.13 bc*	85.06 efg	130.00 bc	*107.54 bc*
30B74	1.72 e	2.19 b-e	*1.95 bc*	78.55 g	107.46 c-f	*93.00 c*
SY Antex	1.91 e	2.01 cde	*1.96 bc*	93.97 efg	97.31 efg	*95.64 bc*
Truva	1.81 e	2.20 b-e	*2.00 bc*	86.46 efg	109.19 cde	*97.83 bc*
Colonia	1.98 cde	1.75 e	*1.87 c*	99.17 efg	79.36 g	*89.27 c*
31Y43	1.75 e	2.05 cde	*1.90 bc*	82.17 fg	101.38 efg	*91.78 c*
Mean	**1.86 B**[1]	**2.24 A**	***2.05***	**89.67 B**[1]	**111.33 A**	***100.5***

*) The cultivar x year combination averages shown with the same lowercase letters in the same column are not statistically different from each other (P ≤0.01).

[1]) The averages of the years indicated by different capital letters are statistically different from each other (P ≤0.01).

[2]) The mean of the year indicated by the same italic lowercase letters are not statistically different from each other (P ≤0.01).

4. Conclusion

In the study, the quality characteristics of silage corn cultivars suitable for Muş and similar ecological conditions were examined. In addition to the forage yield, consumption rate and quality by the animals are also important in silage corn. Especially in Muş, the fact that silage corn cultivation is not common increases the importance of determining the quality of silage corn cultivars suitable for the region. In this respect, the results of this study are highly important for the region. In the

results of the two-year study, it was revealed that Pioneer 1570 were suitable for Muş and similar ecological conditions in terms of average acid detergent fiber, neutral detergent fiber, crude protein content, digestible dry matter ratio, dry matter consumption and relative feed value. In order to make more precise conclusions for the producers of the region, it could be appropriate to carry out studies in the districts of Muş, which have different climate zones, and/or in the surrounding provinces with different altitudes. In addition, future studies using cultivars belonging to short maturity groups such as FAO 300-400 as the second crop in the region could contribute to closing the forage deficit of the region.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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