INTRODUCTION
Sweet corn (Zea mays L. var. saccharata) is belonging to family Poaceae and the genus Zea. Although sweet corn uses and accepts as a vegetable; maize, including sweet corn, is the third most important cereal crop after rice and wheat in the world. Because of its high amount of minerals phosphorus, magnesium, iron, zinc, vitamins and antioxidants, it uses widely both in human nutrition and numerous industrial products (Welbaum, 2015; Keerthi et al., 2017). In addition, corn is divided and investigated in two groups: corn that is harvested as dried grain and corn that is harvested fresh as a vegetable. Vegetable corn includes not only sweet corn but also baby corn and roasting cobs (Rubatzky and Yamaguchi, 1997). The leader producer country of sweet corn is USA, other important producer countries are Nigeria, Mexico, Indonesia, Peru etc. (FAO, 2020).

Sweet corn is warm-season, frost sensitive and annual monocrop corn. The optimum mean temperature range for high quality and yield is 21-30°C and the minimum threshold temperature for growth of corn is 10°C. Optimal temperature for corn growth is 24-28°C (Welbaum, 2015).

ABSTRACT: This study was undertaken to determine the performance of some sweet corn (Zea mays L. var. saccharata) cultivars at different sowing dates under high altitude conditions. In this research, the seeds of 4 sweet corn cultivars (Zea mays L. var. saccharata cvs. ‘Martha F1, Vega F1, Merit F1 and Sunshine F1’) were used as plant material. It was determined that sowing date has a significant effect on the plant height, cob diameter and length, the number of kernels/cob, husked and de-husked cob weight, and total husked and de-husked cob yield. Due to the delay in sowing date, all examined parameters were reduced. Martha F1 compared to the other cultivars showed the best performance in terms of total husked and de-husked cob yield. The highest total husked (17260 kg ha

ÖZ: Bu çalışma, yüksek rakım koşullarında farklı ekim zamanları arasında bazı tatlı mısır (Zea mays L. var. saccharata) çeşitlerinin performansını belirlemek amacıyla yürütülmüştür. Araştırmada, 4 adet tatlı mısır çeşidi (Zea mays L. var. saccharata cvs. ‘Martha F1, Vega F1, Merit F1 ve Sunshine F1’) kullanılmıştır. Ekim zamanının bozulması, bitki boyu, koçan ağırlığı ve toplam verim üzerinde önemli bir etki olduğu belirlenmiştir. Ekim zamanındaki geçikmeye bağlı olarak incelenen tüm parametrelerde azalma tespit edilmiştir. Martha F1, diğer çeşitlere kıyasla hem kavuvsuz hem de kavuvsuz toplam koçan verimi açısından her iki deneme yılında daha iyi performans göstermiştir. Nitekim, en yüksek toplam kavuvsuz (17260 kg ha-1) ve kavuvsuz (11818 kg ha-1) koçan verimi, her iki deneme yılında da ilk ekim tarihinde Martha F1 çeşidinde tespit edilmiştir. Erzurum gibi yüksek rakım üretim alanlarında, işsizde yüksek verim ve kalite için ekim münkin olduğunca erken yapılmalıdır. Araştırma sonuçlarına göre tatlı mısır Erzurum'da 23 Mayıs'ta yapılacaktır ekim ile başarılı bir şekilde üretilabilir. Ayrıca, bu çalışma, tartılı mısır üreticisine yüksek verim ve kalite için önlemler vermek amacıyla yürütülmüştür.
growth and development is around 10°C. Also, cold night temperatures affect negatively plant growth and extend the time required maturity (Swiade et al., 1992). Sweet corn is harvested or sold based on brix values or moisture content but it can be generally harvested within 80-90 days (Welbaum, 2015; Dekhane and Dumbre 2017). On the other hand, sowing at the appropriate time is crucial for optimizing yields because the delay in sowing can lead to a reduction in yield, as heat accumulation over time directly affects growth and yield (Anapalli et al., 2005). It is a known fact that high yield depends on optimum sowing date and appropriate cultivar. Proper sowing date is important because of efficient sunlight for photosynthesis besides the efficient use of plant nutrients and soil moisture (Dekhane and Dumbre 2017). For this reason, sweet corn or corn growers are in a fine line between when the sowing date is too late and too early. Early or late sowing can result in lower yields; as adverse climatic conditions are likely to occur after sowing or during the growing season (Nielson et al., 2002; Rah Khosravani et al., 2017).

Fekonja et al. (2011) and Genc et al. (2013) reported that sweet corn is a new potential crop for moderate climates where additional agricultural improvements are provided due to climate changes. With the appropriate sowing date, sweet corn can be grown not only in moderate climates but also in high altitude growing areas because climatic changes such as increased average temperatures and extended vegetation period make it possible to sow corn earlier than recommended in many places (Rosa, 2014). Finally, according to the Rosa (2014) report, it can be clearly argued that the appropriate sowing date of sweet corn is one of the factors which affect both the yield and its quality. Therefore, this study was undertaken to determine the performance of some sweet corn (Zea mays L. var. saccharata) cultivars at different sowing dates under high altitude conditions.

**MATERIAL AND METHOD**

The field experiments were carried out in the experimental fields of Plant Production, Application and Research Centre, Atatürk University, Erzurum (40° 57’ and 39° 10’N; 40° 15’ and 42° 35’E; 1850 m above sea level), during 2011 and 2012. Detailed information on the air temperature of the experimental area during the growth period was given in Figure 1. The soil of the experimental area in 2011-2012 had a loamy texture having 32.40% sand, 41.77% silt and 24.73% clay. Some of the soil chemical characteristics were as follows: soil pH 7.72 and 7.56; organic matter 2.3 and 2.6%; available P2O5 119.1 and 138.5 kg ha-1; exchangeable K 1090.7 and 1540.6 kg ha-1 and lime 0.65% and 0.22% in 2011 and 2012, respectively. The soil temperature varied between 15.9 and 19.7°C at sowing dates at a depth of 5 cm in the experiment years.

![Figure 1](image-url)  
**Figure 1.** The maximum, minimum and average air temperature (°C) of the experimental area during the May-September period.
In this research, the seeds of 4 sweet corn cultivars (Zea mays L. var. saccharata cvs. Martha F₁, Vega F₁, Merit F₁ and Sunshine F₁) were used and supplied by the Turkish seed company, MayAgro Seed Corporation.

Seeds were sown three times in 10 days intervals (23 May, 02 June and 12 June), to investigate the effect of temperature in high altitude conditions. Seeds were sown on plots of 9 m² at the depth of 4-5 cm, in rows 300 cm long, at a distance between rows of 70 cm and between plants of 20 cm. In addition, thinning was made by hand when seedlings were at the 3-4 leaf stage, one plant with the best condition was kept and the others were eliminated (Kharazmshahi et al., 2015). The plants were irrigated twice a week with furrow irrigation and the plant care practices were irrespectively applied to the plants in each plot.

Before sowing, the soil was fertilized by 250 kg ha⁻¹ N and 100 kg ha⁻¹ P₂O₅ as urea and triple super phosphate, respectively. All of the P₂O₅ and 100 kg ha⁻¹ N fertilizer were applied with sowing and the remaining part of N (150 kg ha⁻¹) was given when the plants reached 30-40 cm plant height (Turgut and Balcı 2002).

In the experiment, the cobs were harvested by hand while the tassels dried, about 75-80 days after sowing. Plant height (cm), cob diameter (mm) and length (cm), the number of kernels/cob, husked and de-husked cob weight (g), and total husked and de-husked cob yield (kg ha⁻¹) were determined. Observations were made and recorded on 12 plants selected randomly from plants in each plot.

A completely randomized block design with 3 replications was used as the experimental design. ANOVA was applied to the data determined in the experiment and Duncan’s multiple range test was used to compared the differences between means.

**RESULTS AND DISCUSSION**

The plant height of sweet corn cultivars varied significantly ($P < 0.01$) according to the sowing dates (Table 1). It was determined that early sowing has a significant effect on the plant height. Thus, it was found that the highest plant height (173.3 cm, 170.1 cm, and 171.7 cm) was recorded in cv. Merit F₁ in 2011, 2012 and the mean of 2011-2012, respectively from the first sowing date (23 May). The shortest plant height was determined in the last sowing date (12 June) for both experiment years, and the shortest plant height was determined in cv. Vega F₁ (34.9 cm) in 2011. In other words, delaying in sowing date decreased plant height. Dekhane et al. (2017) indicated that the early sowing significantly affected the plant height and higher plant height was obtained from early sowings. Abdel-Rahman et al. (2001) and Sarvari et al. (2007) reported similar results. The mentioned studies above also confirmed the results of this study.

**Table 1. The effect of sowing dates on plant height of sweet corn cultivars (cm)**

| Cultivars   | Sowing Date | 2011   | 2012   | Mean (Years) | Mean |
|------------|-------------|--------|--------|--------------|------|
| Martha F₁  | 23 May      | 126.1 a**| 122.1 a**| 124.1 a**     | 91.3 B** |
|            | 2 June      | 105.3 b | 107.1 b | 106.2 b       |      |
|            | 12 June     | 44.2 c  | 42.7 c  | 43.5 c        |      |
| Vega F₁    | 23 May      | 112.6 a**| 117.2 a**| 114.9 a**     | 85.0 B |
|            | 2 June      | 104.8 a | 105.2 b | 105.0 b       |      |
|            | 12 June     | 34.9 b  | 35.4 c  | 35.2 c        |      |
| Merit F₁   | 23 May      | 173.3 a**| 170.1 a**| 171.7 a**     | 121.0 A |
|            | 2 June      | 146.5 b | 148.4a  | 147.4 b       |      |
|            | 12 June     | 43.7 c  | 44.1 b  | 43.9 c        |      |
| Sunshine F₁| 23 May      | 116.3 a**| 118.4 a**| 117.4 a**     | 89.9 B |
|            | 2 June      | 113.2 a | 110.9 a | 112.0 a       |      |
|            | 12 June     | 40.9 b  | 39.9 b  | 40.4 b        |      |
| Mean       | 23 May      | 132.1   | 132.0   | 132.0 A**     |      |
| (Sowing dates)| 2 June  | 117.4   | 117.9   | 117.7 B       |      |
|            | 12 June     | 40.9    | 40.6    | 40.7 C        |      |

**Significant at $P < 0.01$**

The cob length and cob diameter of different sowing dates for all cultivars used in this study are shown in Table 2. The highest cob length (21.1 cm) was recorded from 23 May sowing in cv. Vega F₁ for both experiment years and in cv. Sunshine F₁ in 2012 from 2 June sowing whereas the lowest from 12 June (18.5 cm) sowing. The cob diameter was changed between 40.5 mm and 51.6 mm in 2011, from 12 June and 23 May sowings, respectively. In addition, sowing dates did not significantly affect the cob length, except for cvs. Martha F₁ and Merit F₁ in 2011. On the other hand, due to the delay in sowing
date, the diameter of the cobs decreased. According to the report of Dekhane and Dumbre (2017), cob length changed according to the cultivars and sowing dates. Their report indicated that the cob length ranged between 19.1 and 20.4, and 17.7 and 21.8 in cultivars and sowing dates, respectively. Shaheenuzzamn et al. (2015) reported that sowing date significantly affected the cob length and diameter. Also reported that cob diameter changed between 4.09 cm and 4.44 cm. Similarly, Rosa (2014) declared that the effect of the sowing date on cob length and diameter varied according to cultivars, sowing dates and also the experiment years, and the highest cob length and diameter were 20.7 cm and 4.9 cm, respectively. The results of this work are similar and confirmative with the mentioned studies.

As it is shown in Table 3, the number of kernels/cob of sweet corn cultivars were varied according to the cultivars, and differences between sowing dates were statistically significant (P < 0.01) in 2011 and 2012. Delaying sowing date decreased the number of kernels/cob of all sweet corn cultivars in both experiment years. While the effect of sowing date on the number of kernels/cob varied with cultivars, the highest number of kernels/cob (751.2) was determined in cv. Martha F in 2011 in the first sowing date. The lowest number of kernel/cob (432.0) was found in Merit F in 2012 in the last sowing date. Similar results were also reported by Khan et al. (2009) and reported that delaying sowing date would lead to a low row number and kernel numbers. Dekhane and Dumbre (2017) also reported that the number of kernels in the cob decreased due

| Table 2. The effect of sowing dates on cob length (cm) and diameter (mm) of sweet corn cultivars |
|---------------------------------|------------------|-----------------|-----------------|-----------------|----------------|
| Cultivars | Sowing Date | 2011 | 2012 | Mean (Years) | Mean (Sowing dates) |
|-----------|-------------|------|------|--------------|---------------------|
|           | Cob length (cm) |       |       |              |                     |
| Martha F1 | 23 May   | 19.6 a** | 20.4 NS | 20.0 a* | 19.8 B* |
|           | 2 June    | 19.7 a | 20.6 | 20.1 a |                     |
|           | 12 June   | 18.5 b | 20.1 | 19.3 b |                     |
| Vega F1   | 23 May   | 21.1 NS | 21.1 NS | 21.1 NS |                     |
|           | 2 June    | 21.0 | 20.9 | 20.9 | 20.7 A |
|           | 12 June   | 19.9 | 20.1 | 20.0 |                     |
| Merit F1  | 23 May   | 19.7 a* | 20.5 NS | 20.1 NS |                     |
|           | 2 June    | 18.9 b | 20.6 | 19.8 | 19.8 B |
|           | 12 June   | 19.0 ab | 20.3 | 19.6 |                     |
| Sunshine F1 | 23 May | 20.2 NS | 20.5 NS | 20.3 NS |                     |
|           | 2 June    | 20.5 | 21.1 | 20.8 | 20.3 A |
|           | 12 June   | 19.8 | 20.0 | 19.9 |                     |
| Mean (Sowing dates) | 23 May | 20.2 | 20.6 | 20.4 A* |                     |
|           | 2 June    | 20.0 | 20.8 | 20.4 A |                     |
|           | 12 June   | 19.3 | 20.1 | 19.7 B |                     |
| Cob diameter (mm) |       |       |       |              |                     |
| Martha F1 | 23 May   | 51.6 a** | 49.4 NS | 50.5 a** | 47.8 NS |
|           | 2 June    | 49.4 a | 50.2 | 49.8 a |                     |
|           | 12 June   | 40.5 b | 45.8 | 43.2 b |                     |
| Vega F1   | 23 May   | 49.3 a** | 49.3 a** | 49.3 a** | 46.9 |
|           | 2 June    | 48.6 a | 48.9 a | 48.8 a |                     |
|           | 12 June   | 40.6 b | 44.8 b | 42.7 b |                     |
| Merit F1  | 23 May   | 48.7 a** | 51.2 a* | 49.9 a** | 47.1 |
|           | 2 June    | 47.6 a | 46.9 b | 47.3 b |                     |
|           | 12 June   | 42.6 b | 45.4 b | 44.0 c |                     |
| Sunshine F1 | 23 May | 47.5 a* | 49.3 NS | 48.4 NS | 47.0 |
|           | 2 June    | 47.1 a | 48.0 | 47.6 |                     |
|           | 12 June   | 41.0 b | 49.0 | 45.0 |                     |
| Mean (Sowing dates) | 23 May | 49.3 | 49.8 | 49.6 A** |                     |
|           | 2 June    | 48.2 | 48.5 | 48.4 B |                     |
|           | 12 June   | 41.2 | 46.3 | 43.7 C |                     |

**Significant at P < 0.01, *Significant at P < 0.05, NS: Non significant at P < 0.05.**
to the delay in sowing date. According to Tuncay et al. (2005) report the number of kernels in cobs also varies according to the size of the cobs. The results of this work are verified by the mentioned works above.

Table 3. The effect of sowing dates on the total number of kernels/cob of sweet corn cultivars

| Cultivars   | Sowing Date | 2011      | 2012      | Mean (Years) | Mean |
|-------------|-------------|-----------|-----------|--------------|------|
| Martha F₁  | 23 May      | 751.2 a** | 720.5 a** | 735.8 a**    | 666.5 A** |
|             | 2 June      | 735.3 a   | 715.2 a   | 725.3 a      |      |
|             | 12 June     | 536.3 b   | 540.3 b   | 538.3 b      |      |
| Vega F₁    | 23 May      | 653.3 a** | 727.1 a** | 690.2 a**    |      |
|             | 2 June      | 693.3 a   | 706.4 a   | 699.9 a      | 627.2 B |
|             | 12 June     | 528.5 b   | 454.9 b   | 491.7 b      |      |
| Merit F₁   | 23 May      | 623.9 b** | 661.0 a** | 642.4 b**    |      |
|             | 2 June      | 689.9 a   | 708.9 a   | 699.4 a      | 607.0 B |
|             | 12 June     | 526.7 c   | 432.0 b   | 479.3 c      |      |
| Sunshine F₁| 23 May      | 642.8 b** | 668.4 b** | 655.6 b**    |      |
|             | 2 June      | 727.1 a   | 729.2 a   | 728.1 a      | 631.0 B |
|             | 12 June     | 536.0 c   | 482.6 c   | 509.3 c      |      |
| Mean (Sowing dates) | 23 May | 667.8 | 694.2 | 681.0 B** |
|             | 2 June      | 711.4 | 714.9 | 713.2 A |
|             | 12 June     | 531.9 | 477.4 | 504.6 C |

**Significant at $P < 0.01$

The effect of the sowing date on husked cob weight and de-husked cob weight of sweet corn cultivars was shown in Table 4. There were statistically significant differences between the cob weight of sweet corn cultivars ($P < 0.01$) and sowing dates ($P < 0.01$). The highest husked cob weight was obtained from cv. Martha F₁ (372.8 g) in the first sowing date in 2011. While in the case of pooled cv. Martha F₁ gave significantly higher husked cob weight (263.8 g) over the other three cultivars. Husked cob weight was also found significant with different sowing dates. The first sowing date (23 May) had significantly high husked cob weight in 2011, 2012, and in pooled data. The de-husked cob weight was varied according to the cultivars and differences between sowing dates were statistically significant ($P < 0.05$ and $P < 0.01$), except for Martha F₁, Merit F₁ and Sunshine F₁ in 2012. It was obtained that sowing dates have a significant effect on the de-husked cob weight. Thus, it was found that significantly higher de-husked cob weight was recorded in cvs. Vega F₁ and Merit F₁ in 2011. The de-husked cob weight was changed between 104.1 g (Martha F₁) and 232.7 g (Vega F₁) in 2011 and 2012.

The effect of the sowing date on sweet corn cob weight varied according to the experiment years and cultivars. Also, the findings of Maryam et al. (2011) indicated that an appropriate sowing date will give the highest cob weight than late sowing. Similarly, Dekhane and Dumbre (2017) reported that early sowings gave higher cob weight than late sowings. On the other hand, Turgut and Balci (2002) and Eşiyok and Bozokalfa (2005) reported that cob weight changed according to the sowing dates and delaying sowing date increased cob weight of all sweet corn cultivars in Bursa and Izmir conditions, respectively. However, according to the results of this study, the weight of cobs decreased due to delayed sowing date. Considering that the cities of Bursa and Izmir are at sea level, this may be due to the fact that Erzurum is at an altitude of 1850 meters above sea level. In other words, low night temperatures, short vegetation period, and low average temperatures of the experimental area at high altitudes may have caused a reduction in cob weight. As a matter of fact, while the minimum temperatures ranged between 2.2°C and 13.9°C, the mean temperatures varied from 11°C to 21°C in the experimental area in both experiment years (Fig. 1).
Table 4. The effect of sowing dates on husked cob weight and de-husked cob weight of sweet corn cultivars (g)

| Cultivars | Sowing Date | 2011 | 2012 | Mean (Years) | Mean | Husked cob weight (g) | De-husked cob weight (g) |
|-----------|-------------|------|------|--------------|------|-----------------------|--------------------------|
| Martha F1 | 23 May      | 372.8| 307.8| 263.8        |      | 242.8**               | 216.2**                  |
|           | 2 June      | 369.7| 308.4|              |      | 247.0                 | 215.0                    |
|           | 12 June     | 160.5| 175.3|              |      | 190.0                 | 171.5                    |
| Vega F1   | 23 May      | 339.9| 283.8|              |      | 227.8 a*              | 211.3 a**                |
|           | 2 June      | 364.8| 285.0|              |      | 205.3 a               | 192.9 a                  |
|           | 12 June     | 326.5| 261.1|              |      | 102.8 b               | 91.7 b                   |
| Merit F1  | 23 May      | 284.7| 249.5|              |      | 214.2**               | 206.8**                  |
|           | 2 June      | 278.4| 230.7|              |      | 183.0                 | 174.0                    |
|           | 12 June     | 234.4| 228.5|              |      | 176.1                 | 168.8                    |
| Sunshine F1 | 23 May   | 346.3| 275.6|              |      | 204.9**               | 202.8**                  |
|           | 2 June      | 336.3| 276.9|              |      | 217.4                 | 203.9                    |
|           | 12 June     | 188.9| 243.3|              |      | 165.8                 | 151.0                    |
| Mean (Sowing dates) | 23 May | 335.9|    |              |      | 222.4                 | 218.1                    |
|           | 2 June      | 337.3| 279.2|              |      | 213.2                 | 204.9                    |
|           | 12 June     | 227.6| 193.1|              |      | 158.7                 | 154.8                    |

**Significant at P < 0.01, *Significant at P < 0.05, NS: Non significant at P < 0.05.

Total husked and de-husked cob yield of sweet corn cultivars was affected by sowing date, and statistically significant (P < 0.01) differences between sweet corn cultivars and sowing dates were determined in both experiment years (Table 5). The highest total husked and de-husked cob yield was determined on 23 May and 02 June sowings, while the lowest total yield was obtained from the last sowing date (12 June) in both experiment years. The results indicated that both total husked and de-husked cob yield of sweet corn cultivars, especially Merit F1, decreased due to delayed sowing dates in 2011 and 2012. Martha F1 compared to the other cultivars showed a better performance in terms of total husked and de-husked cob yield. The highest total husked (17260 kg ha⁻¹) and de-husked (11818 kg ha⁻¹) cob yield were determined in cv. Martha F1 in the first sowing date in both experiment years. In addition, when general means of sowing dates were taken into consideration, it was clearly said that delaying in the sowing dates decreased both total husked and de-husked cob yield (Table 5).

Dekhane et al. (2017) reported that the yield of sweet corn changed according to the cultivars and sowing dates. Therefore, selecting of high-quality cultivars and sowing at the appropriate time is very critical and important for the optimization of sweet corn yield. Similarly, Annapalli et al. (2005) and Khan et al. (2009) declared that the yield can be increased by using high yielding cultivars and sowing at the appropriate time. On the other hand, it has been previously mentioned that low night temperatures, short vegetation period and low average temperatures adversely affect the weight of the sweet corn cobs at high altitude conditions. A similar situation can be said for the total yield of sweet corn cultivars used in this work. Depending on the delay in sowing date, the reduction in the weight of the sweet corn cobs reduced the yield. Also, it was stated that the effects of climatic factors such as photoperiod and
temperature in different sowing dates on the growth and development of corn may vary. It was also reported that the highest yield was obtained from the early sowings (Dekhane and Dumbre, 2017). Similarly, Dekhane et al. (2017) argue that when sowing date was delayed, sweet corn yield decreased. In addition, early sowings were suggested for successful sweet corn production in the hilly areas (Shaheenuzzamn et al., 2015). Therefore, in order to make the best use of soil moisture, plant nutrients, and solar radiation and to obtain a high-quality yield, optimum sowing date should be determined (Keerthi et al., 2017). Withal, Shaheenuzzamn et al. (2015) reported that the highest yield (8.60 t ha\(^{-1}\)) was obtained from the first sowing in the hilly region. Sugar-75 sweet corn cultivar was reported to have the highest yield (2616 kg ha\(^{-1}\)) when sowing early (Dekhane and Dumbre, 2017). In previous studies, it is clearly seen by different researchers that the yield of sweet corn varies according to cultivars and sowing dates, and the highest yield is obtained from early sowings. Similarly, while the yield varied according to cultivars and sowing dates, the highest yield was obtained from early sowings in this study. The results obtained from this research are consistent with and supported by the findings of previous researchers.

Table 5. The effect of sowing dates on total husked and de-husked cob yield of sweet corn cultivars (kg ha\(^{-1}\))

| Cultivars | Sowing Date | 2011        | 2012        | Mean (Years) | Mean     |
|-----------|-------------|-------------|-------------|--------------|----------|
|           |             | 2011        | 2012        | Mean (Years) | Mean     |
|           |             | Husked      | de-husked   |              |          |
|           |             | cob yield   | cob yield   |              |          |
|           |             | (kg ha\(^{-1}\)) | (kg ha\(^{-1}\)) |              |          |
| Martha F\(_1\) | 23 May | 14763 b** | 12620 a** | 16102 a** | 12535\(^{NS}\) |
|           | 2 June | 17462 a | 15548 a | 16505 a |           |
|           | 12 June | 2143 a | 8033 b | 5088 b |           |
| Vega F\(_1\) | 23 May | 13982 a** | 13711 a** | 13847 a** | 10227 |
|           | 2 June | 13654 a | 12937 a | 13296 a |           |
|           | 12 June | 4243 b | 2835 b | 3539 b |           |
| Merit F\(_1\) | 23 May | 11533 a** | 15620\(^{NS}\) | 13577 a** | 11095 |
|           | 2 June | 13797 a | 13199 | 13498 a |           |
|           | 12 June | 1802 b | 10559 | 6181 b |           |
| Sunshine F\(_1\) | 23 May | 13418 a** | 12973 ab* | 13196 a** | 11586 |
|           | 2 June | 16718 a | 16614 a | 16666 a |           |
|           | 12 June | 2548 b | 7242 b | 4895 b |           |
| Mean (Sowing dates) | 23 May | 13424 | 14891 | 14158 A** |          |
|           | 2 June | 15408 | 14575 | 14992 A |           |
|           | 12 June | 2684 | 7167 | 4926 B |           |

**Significant at \(P < 0.01\), *Significant at \(P < 0.05\), NS: Non significant at \(P < 0.05\).

CONCLUSION

Consequently, the results of this study suggest that sweet corn had increased the growth characteristics such as yield with early sowings in high altitude conditions. On the other hand, parameters such as plant height, cob weight, cob size, husked and de-husked cob yield examined in the study decreased due to delay in the sowing date. The
highest total husked (17260 kg ha⁻¹) and de-husked (11818 kg ha⁻¹) cob yield were obtained from cv. Martha F₁, in the first sowing (23 May). In addition, when the sowing dates compared to each other, the higher yields were obtained from the first sowing date not only in cv. Martha F₁ but also in all other cultivars. Depending on the delay in the sowing date, the reduction in the weight of the sweet corn cobs reduced also the yield of sweet corn cultivars. In high altitude production areas such as Erzurum, sowing should be done as early as possible for high yield and quality in sweet corn. According to the results of the research, sweet corn can be produced successfully with sowing on 23 May in Erzurum. Also, all of the cultivars used in this research, especially cv. Martha F₁ can be recommended to the sweet corn producer.

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Statement of Conflict of Interest

Authors have declared no conflict of interest.

Authors’ Contributions

The contributions of authors are equal.

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