
# THE EFFECT OF DIFFERENT PLANTING DATES ON THE BIOMETRIC CHARACTERISTICS OF THE UNDERGROUND ORGANS OF BROCCOLI

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**https://doi.org/10.5281/zenodo.21158680**

**ARTICLE INFO**

Received: 26th June 2026
Accepted: 28th June 2026
Online: 30th June 2026

**KEYWORDS**

*underground organs, root weight, root volume, biometric characteristics.*

**ABSTRACT**

*This article presents the average biometric characteristics of the underground organs of the broccoli hybrids Fiesta F1 and Nahos F1 grown as the main crop under different planting dates. The study evaluates root weight (31.4-33.7 g) and root volume (87.2-90.7 cm³), averaged over the years, and determines the influence of planting time on the development of these parameters.*

**Introduction.** The root system of broccoli is similar to that of cabbage and cauliflower. After seed germination, the primary taproot develops first, followed by the formation of lateral roots. Fibrous roots usually develop when the main root is damaged during transplanting. The diameter of these roots generally ranges from 0.5 to 1.0 cm. Within a relatively short period, the roots may penetrate to a depth of 1.5-2.0 m, while the majority of the root system develops within the upper 20-30 cm soil layer. When broccoli is cultivated through seedlings, the root system spreads laterally and vertically to a depth of approximately 40-45 cm, although most roots are concentrated within the upper 20-25 cm of the soil profile [1].

Therefore, investigating the biometric characteristics of the root system is of considerable importance in broccoli cultivation studies.

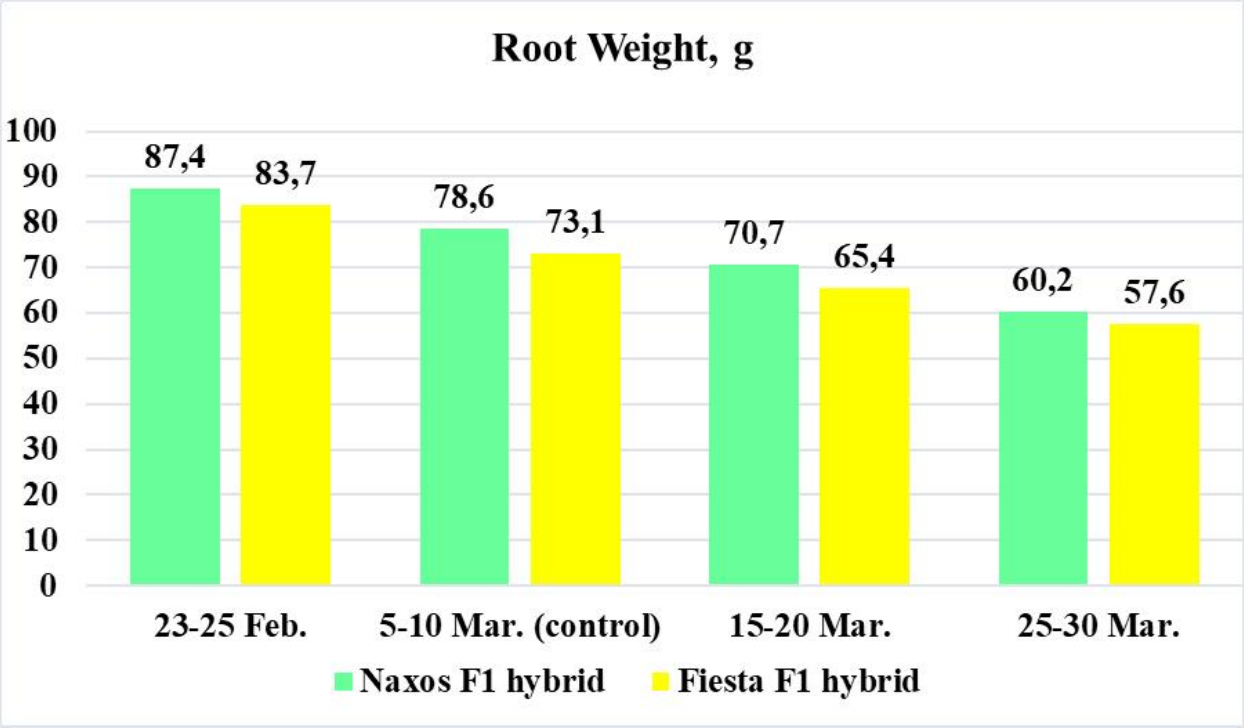
**Materials and Methods.** Field experiments were conducted according to the methodological guidelines presented in *Methodology of Field Experiments in Vegetable and Melon Crops* [2], *Methodology of Field Experiments* [3], and *Methods of Conducting Experiments in Vegetable, Melon, and Potato Crops* [4].

In the present study, seedlings of the broccoli hybrids Nahos $F_1$ and Fiesta $F_1$ were transplanted at four different planting dates (23-25 February; 5-10 March (control); 15-20 March; and 25-30 March) using a planting scheme of 70 × 30 × 1 cm. Biometric characteristics, including root weight and root volume, were evaluated separately for each hybrid.

**Results and Discussion.** The biometric characteristics of root weight were analyzed for the broccoli hybrids Fiesta $F_1$ and Nahos $F_1$ grown as the main crop under four different planting dates (23-25 February, 5-10 March (control), 15-20 March, and 25-30 March).

The highest root weight was recorded in the earliest planting period (23-25 February), reaching 83.7-87.4 g in the Fiesta $F_1$ and Nahos $F_1$ hybrids. In the subsequent planting periods, root weight gradually decreased. Specifically, root weight was 73.1-78.6 g in the control planting date (5-10 March), 65.4-70.7 g when planted on 15-20 March, and only 57.6-60.2 g in the latest planting period (25-30 March), representing the lowest values observed in the experiment.

**Figure 1.** Root weight development in broccoli plants.




In our study, the development of root volume in the broccoli hybrids **Fiesta $F_1$** and **Nahos $F_1$** grown as the main crop under different planting dates (23-25 February, 5-10 March (control), 15-20 March, and 25-30 March) was analyzed separately for each hybrid.

The highest root volume was recorded in plants transplanted on **23-25 February**, reaching **87.2-90.7 $cm^3$** in the **Fiesta $F_1$** and **Nahos $F_1$** hybrids. At the control planting date (**5-10 March**), root volume ranged from **81.8 to 82.6 $cm^3$.** It further decreased to **71.7-74.5 $cm^3$** in plants transplanted on **15-20 March** and reached the lowest values, **63.6-65.7 $cm^3$,** in the latest planting period **(25-30 March).**

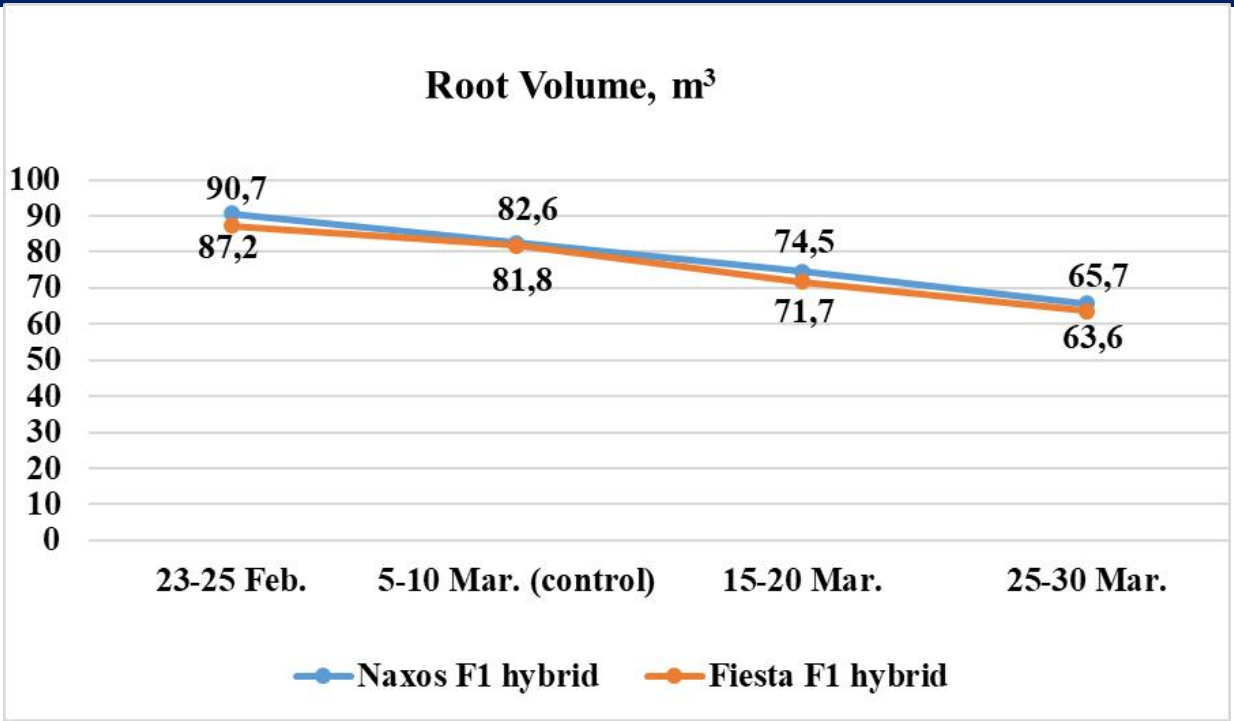



**Figure 2. Root volume development in broccoli plants.**

**Conclusions.** The results of the study demonstrated that transplanting the broccoli hybrids Fiesta $F_1$ and Nahos $F_1$ as the main crop during 23-25 February ensured the most favorable development of the root system. Under this planting date, the highest root weight (83.7-87.4 g) was obtained, exceeding the control treatment by 8.8-10.6 g or 11.2-14.5%. Likewise, the greatest root volume (87.2-90.7 $cm^3$) was recorded, which was 5.4-8.1 $cm^3$ or 6.6-9.8% higher than that of the control treatment.

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