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Phenological Parameters of Leeks Grown as a Main Crop at Different Planting Dates

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Annotation: The demand for leek cuttings in the food industry is growing daily, and therefore the need for a fast and high-quality supply of this product to farmers is also increasing. To meet this demand, this article describes the correct determination of planting time and phenological parameters when growing leeks as a main crop from seedlings at different planting times

Keywords: Leek, open space, closed area, growing from seeds, growing from seedlings, planting depth, fertilization, irrigation, variety, hybrids, morphological, biological, economic characteristics, cultivation technologies, planting patterns, feeding areas, development periods, meadow gray soils, onions, nursery.

Introduction

The Development Strategy of the Republic of Uzbekistan for 2022-2026 focuses on “increasing the income of farmers and peasants by at least 2 times through intensive development of agriculture on a scientific basis and increasing the annual growth rate of the sector to 5%, in particular, by 2026, increasing the volume of food products to 7.4 million tons and the level of processing of fruits and vegetables to 28%.” In this regard, important elements in the cultivation

of leek, an export-oriented vegetable crop, as well as the selection of varieties and hybrids, determining the optimal planting date, determining the optimal planting scheme and introducing them into production are among the urgent tasks. In one of the directions of solving such urgent tasks, large-scale research on improving the technologies for growing leek as a vegetable and medicinal crop and increasing its yield is of urgent importance. Scientific research is being conducted on the cultivation of leeks from seeds and seedlings in open and closed fields, planting depth, fertilization, and irrigation. However, special attention should be paid to the development of resource-saving technologies for growing leek varieties and hybrids, the impact of planting dates and planting schemes on yield, and improving the biochemical composition and quality of false stems [1].

97.0% of the world's leek production is in Asia and Europe. A total of 126.0 thousand ha are planted per year, producing 2.2 million tons of gross crop. Leeks are mainly produced in Indonesia (639.0 thousand. t), Turkey (226.0 thousand. t), Belgium (180.0 thousand. t), France (168.0 thousand. t), China (150.0 thousand. t), and South Korea (149.0 thousand. t). The highest yields (38.5-46.2 t/ha) are obtained in South Korea, Germany, China, Sweden, and Belgium, while the average yield is 16.9 t/ha. However, it is cultivated in very small areas in our country. Taking this into account, there is a need to create and introduce high-yielding, high-quality, and nutrient-rich varieties of this vegetable, which is rare in our republic, and to develop cultivation technologies [2].

Methodology

The research was conducted to determine the influence of different planting dates on the phenological development of leek hybrids Lincoln F1 and Bolgarsky F1 under the meadow gray soil conditions of the Samarkand region. The study used a field experiment in which seedlings grown without cover were transplanted to the main field at four planting dates: April 5, April 15, April 25 (control), and May 5. Seedlings were uniform in age, ranging from 45–50 days, and possessed 3–4 true leaves at the time of transplanting. All the treatments were subjected to standard agronomic treatments such as fertilization, irrigation, and weed control to enable the establishment of differences in the development of the plants being attributed to planting time only. Phenological observations were conducted at set intervals to monitor the rate of germination, false stem formation as well as developmental stages until technical and harvest maturity. Germination was counted at 10 percent and 75 percent level whereby the biometric measurements concentrated on the dates needed to attain 10 percent and 75 percent formation of the false stem. Visual observation, morphological characteristics measurement, and temporal determination of growth stages were used to gather data in 2021 2023. The weather was observed so as to understand how they affect the establishment and growth of plants. The experimental design enabled the comparison of early, mid and late planting dates in order to find out their influence on the length of growth, rate of establishment and false stem development by each hybrid. Statistical analysis involved identifying trends over the three years to ensure reliability of results. This methodological approach ensured an accurate evaluation of how planting dates affect the phenological parameters and adaptability of the studied leek hybrids.

Results and Discussion

A number of scientific and practical works are being carried out in our republic to ensure food security of the population and create a healthy nutrition portfolio by increasing the economic efficiency of vegetable growing and expanding its assortment. In this regard, we also studied the effects of planting dates and schemes on the duration of leek development periods by growing 2 hybrids of leek Lincoln F1 and Bolgarsky F1 on the meadow gray soils of the Samarkand region as the main vegetable crop [3].

In allium vegetables, especially onions and leeks, it is easy and cheap to grow seedlings without a cover. Growing allium vegetables from seedlings has its advantages as well as disadvantages. Especially when seedlings are sown from seeds in nursery soil without a cover, when

transplanting seedlings to the field, most of the roots remain in the soil and it is difficult for them to take root when planted in the main place. In addition, the age of the seedlings and the number of true leaves formed on them significantly affect the germination of seedlings. Also, severe damage to the root system when transplanting seedlings to the field negatively affects its growth and development [4].

Transplanted plants do not have a taproot, and shallow lateral roots form. Therefore, when growing leeks from seedlings, it is necessary to take into account their weight, because if part of the roots remains in the soil or a small number of small roots do not create enough opportunities for seedlings with a high volume and weight to fully take root. In addition, the amount of moisture in the air and soil, as well as temperature, are one of the main factors in the complete establishment of seedlings. Therefore, when growing leeks from seedlings, their complete establishment also depends on the planting dates. In our experiments, seedlings of the Linkolin F1 and Bolgarsky F1 hybrids of leeks were planted in 4 periods (05.04.; 15.04.; 25.04. (control); 5.05) and phenological observations and biometric measurements were carried out on them. In particular, at all planting dates, seedlings of the same age of 45-50 days with 3-4 cotyledons of the leek hybrids Linkolin F1 and Bolgarsky F1 were planted [5].

The germination of seedlings of leek hybrids varied depending on the planting dates. In the years 2021-2023, when the research was conducted, when the leek hybrid Linkolin F1 was grown from seedlings at the planting dates of 5.04. and 15.04., 10% germination of seedlings was observed in two days. Also, 75% germination of seedlings planted in the field was observed 3 days after planting. In the control variant of our experiment, 10% germination of seedlings of the Linkolin F1 hybrid planted at the planting date of 25.04. was observed in 2-3 days, and 75% germination in 4 days. 4 variants of the experiment 5.05. Germination of the seedlings planted in the period of planting was later than in other planting periods. Although 10 percent of seedlings planted in this period took 3 days to sprout immediately after being planted, it took 4-5 days to sprout 70 percent seedlings [6].

During our experiments, it was noted that the germination rate of the Bulgarian F1 seedlings of leek also varied with the change in planting dates. At the initial planting of the Bulgarian F1 leek hybrid (5.04), the germination of the seed was 10 percent in 2 days and 75 percent in 3 days in 2021-2022 and 2023 respectively [7].

In the second case, i.e., where the seedlings were planted on the planting date of 15.04, 10% germination was derived within 2-3 days, and 75% germination was derived within 3-4 days. With control option of the experiment, i.e. the seedlings were sown on planting date of 25.04, the germination of seedlings was observed to be 10 percent in 3 days and 75 percent in 4-5 days. In the 4 alternatives investigated on the planting dates of leek, i.e., when planting date of 5.05, 10% germination of seedlings was observed in 3 days, and 75 percent germination was observed in 5 days after seedling planting. The significant effect of planting dates on the germination of seedlings of the Linkolin F1 and Bolgarsky F1 hybrids of leek was clearly demonstrated in our experiments in 2021-2023. It was observed that the later the sowing date, the longer the time it took for leeks to overtake the hybrids Linkolin F1 and Bolgarsky F1 by 1-2 days. Therefore, when growing leeks from seedlings, it is advisable to sow earlier (05.04 or 15.04).

The need for leek cuttings in the food processing industry is increasing day by day, so farmers are also required to deliver this product in a timely manner and with high quality. To meet this demand, it is important to correctly determine the planting date when growing leeks from seedlings [8].

In our experiments, when the hybrids of leeks Linkolin F1 and Bolgarsky F1 were grown from seedlings at different planting dates, the time taken for the formation of a false stem differed significantly. Depending on the planting dates, the initial (10%) formation of a false stem in the plants of the studied hybrid leeks Linkolin F1 was recorded in 40-45 days in each year. The full (75%) formation of a false stem was recorded in 44-49 days in 2021, 45-50 days in 2022, and

45-51 days in 2023. When the seedlings of the hybrid leek Linkolin F1 were planted on April 5, 2021, the formation of the first false stems was observed in the plants on 40 days, when the seedlings were planted on April 15, on 41 days, when the seedlings were planted on April 25, on 43 days, and when the seedlings of this hybrid were planted on May 5, on 44 days. Also, at these planting dates, the full (75%) formation of the false stem was recorded on 44, 45, 48 and 49 days. In the years and replicates of the experiments, it was found that the earlier the planting date, the faster the formation of the first (10%) and (75%) false stems.

When the leek hybrid Bolgarsky F1 was grown from seedlings on April 5, the initial formation of the false stem was observed in the experimental years in 42-43 days, 44-45 days when planted on April 15, 46-47 days when planted on April 25, and 49-50 days when planted on May 5. Also, the complete (75%) formation of the false stem was recorded on 46-48 days in the 1st planting period, 49-50 days in the 2nd planting period, 51-52 days in the 3rd planting period, and 54-55 days in the 4th planting period. Based on the experimental results, it should be noted that when leek varieties and hybrids are grown from seedlings in the next period, the formation of the false stem is delayed by 6-7 days, depending on the planting dates.

Conclusion

Depending on the planting date, the complete (75%) emergence of leek seedlings took 3-5 days, the formation of the false stem took 44-55 days, the technical maturity of the false stem took 107-128 days, and the harvest maturity took 112-133 days. It was found that the relative shortening of the active (growth) period was observed with the delay in the planting date of leek seedlings.

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