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ZINGIBER OFFICINALE L – BOTANICAL DESCRIPTION OF THE PLANT

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Abstract:

In this article, the botanical description of the ZINGIBER OFFICINALE L. plant, the introduction of the ZINGIBER OFFICINALE L. plant in the soil and climate conditions, and the distribution areas and seasonal development of the plant are based on the results of experiments.

Keywords: *Zingiber officinale* L., type, world, scientific, botanical, description.

In the life process of flowering plants, the period from the seed that falls on the ground to the formation of seeds until they grow old in a natural way is called ontogenesis or the individual development of the plant[1].

According to RELevina, each species has its own genetic program for growth and development, and ontogenetic or age-related development includes metabolism, organogenesis, reproduction, senescence. and takes on youthful aspects.

Biomorphological characteristics of plants are studied according to the classification developed by TARAbotnov and completed by AAUranov into the following main growth and development periods: Latent, Virginil, Generative, Postgenerative. During the latent period, the seed is studied[3].

ANALYSIS AND RESULTS. The virginal period is divided into 4 states: 1. Tumor, 2. Juvenile (young) plant, 3. Immature plant, 4. Virginal plant.

The generative period is also studied in the following cases:

1. Young generative plant
2. A middle-aged generative plant
3. An aging generative plant
4. An aging generative plant

the postgenerative period:

1. Subsenile plant
2. Senile plant

Any plant undergoes many morphological, anatomical, physiological and biochemical changes during its ontogeny.

Research was conducted in the territory of Termiz district during 2019-2021 in an introductory state[4]. The growth and development of *Zingiber officinale L.* under different conditions of introduction was divided into the following periods: virginal, generative, postgenerative. The virginal period, in turn, is divided into 3 stages: grass, juvenile, immature.

THE VIRGINAL PERIOD. Grass stage. In the second ten days of March 2020, the rhizomes of *the Zingiber officinale L.* plant brought from the Republic of India were brought to the "Surkhondaryo scientific experimental station" located in the Termiz district of the Surkhondarya region for experimenting (1 - app)[5]. Preparing the plant for planting, it was planted in the soil at a depth of 4 cm. At the time of planting, the air temperature was 23 ^{0} C.

Zingiber officinale) was used in the research . Four options were selected for the field experiment: Option 1 was a control option without fertilizer and was used to compare the remaining options; Option 2: N75P50K50 kg of mineral fertilizer per hectare; Option 3: N125 P100 K100 kg mineral fertilizer per hectare; Option 4: fertilizers with macro- and microelements were used[6]. After the rhizomes of the plant were planted in the soil, they germinated on the soil surface in 37 days. After 3-4 days, mulberry leaves were formed. The sprouted leaves were green, and the first triple leaf after that appeared in 10-15 days. The next leaves were formed at intervals of 6-8 days, depending on the biological characteristics of the plant and the growing conditions (temperature, lighting and nutrition level, etc.) (Fig. 3.1)[7].

JUVENILE STAGE. At this stage, the number of leaves of the plant is 1-2 and their length has reached 1-1.5 cm. The upper part of the formed leaves is pointed, ribbon-like, the central part is concave along the length, and it is bordered with yellow-brown spots. The juvenile stage lasted 4-5 days[8].

During our research , under the conditions of introduction , *Zingiber officinale* L . morphological characteristics of the species were as follows: the rhizomes of the plant are considered to be an underground vegetative reproduction organ and have a long spherical appearance and a yellowish skin on the outside[9]. In the central part of the rhizomes are bundles of conductive tissue, which tend upward through the stem. The average diameter of rhizomes is 8, 10 cm and height is 10-15 cm, weight is from 40-60 gr to 100 gr (in rare cases 120 gr). At the time of

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harvesting, the weight and size of rhizomes increase significantly[11].

When the bark of the rhizomes of the plant is removed, wrinkled bumps are visible on its body. In turn, buds are placed between them, which form small cavities. The first and second upper shoots are usually larger than the others and have a flat shape[10].

From the buds located at the bottom, rhizomes are formed, and in some cases (depending on the ecological environment) they are formed. This characteristic of the plant can be effectively used to increase the coefficient of vegetative reproduction by dividing the rhizomes into several parts, in turn increasing the amount of nutrients[12].

The leaves of the plant are up to 6-12, scabbard, ribbon-like, the central part of which is bordered with flowing green color. The upper leaves are shorter than the lower leaves.

In the 2020 experiment, the formation of vegetative organs of *Zingiber officinale* L. in Termiz conditions began in the third ten days of May (air temperature 24-32 ^{o} C, relative air humidity 33%). The leaves of the plant begin to appear pale green from the soil, its complete formation took 15 days, and its length was 2-11 cm (Fig. 1)[13].

Phenological observations are one of the most convenient and effective methods for studying introduced plants. Phenological observations are important not only in determining the transition periods of different phases, but also in determining the durability and productivity of plants, as well as the rhythm of their vital processes [29; p. 199]. *Zingiber officinale,* which is the object of the dissertation in this part of our scientific research . Let's focus on the seasonal development phases of type L.

The initial parameters of the plants in option 1 were as follows: the length of the main stem is on average between 11-23 cm, the number of leaves per plant is from 4 to 8, the width of the leaf is 1.5-2.5 cm, and the leaf length was 6-12.5 cm.

The initial parameters of the plants in option 2 were as follows: the length of the main stem is on average between 11-26 cm, the number of leaves per plant is from 3 to 8, the width of the leaf is 2-2.5 cm and the leaf length was 8-13 cm[14].

The initial parameters of the plants in option 3 were as follows: the length of the main stem is on average between 19-35 cm, the number of leaves in one plant is from 6 to 8, the width of the leaf is 2-2.5 cm and the leaf length was 9-15 cm.

4 were as follows: the length of the main stem is on average between 21-35 cm, the number of leaves per plant is from 6 to 10, the width of the leaf is 2-2.5 cm and the leaf length was 12-15 cm.

The initial parameters of the plants in option 5 were as follows: the length of the main stem is on average between 24-32 cm, the number of leaves per plant is from 3 to 6, the width of the leaf is between 1-2 cm and the leaf length was 8-11 cm.

After 17-20 days (June 21-25), the height of the above-ground part of the plant reached 6-16 cm. By July 15, the length of the main stem of the plant is between 24-32 cm, the number of leaves in one plant is 5-9 pieces, the width of the leaves taken from the 2nd joint is 2-2.5 cm, the length of the leaf and it was 9-13 cm, and the weather temperature in this month was max 39 ^{0} c min 23 ^{0} c.

The appearance of rhizomes in the plant began in the first ten days of June. At this time, the average air temperature was 31-41 ^{0} C.

It is known that the role of (N_2) nitrogen, (P) phosphorus and K (potassium) is very important in the growth and development of plants. Nitrogen is part of proteins, phospholipids, coenzymes, chlorophylls, phytohormones and other compounds. It can be seen that N is absorbed more than other mineral elements. Mineral fertilizers play an important role in the cultivation of medicinal ginger. In the cultivation of ginger, mineral fertilizers are used taking into account the type of soil and climatic conditions. N36-225P20-115K48-200 per hectare has been applied for ginger production in different regions of India (Mohanty et al., 1990; Sahu and Mitra, 1992; Panda et al., 1993). Roy et al (1992) reported a significant increase in yield of ginger when micronutrients (Zn (0.3%) + Fe (0.2%) + B (0.2%)) were applied 2 times i.e. 45 and 75 days after planting[15].

Today, there is no information about the agrotechnology of growing the unique ginger (*Zingiber officinale) plant in our Republic.*

When analyzing the number of leaves and leaf width of ginger plant, the option using fertilizer in the amount of N125P100K100 kg per hectare and the options using macro- and micronutrient fertilizer (MMEO') had a positive effect was determined. It was analyzed that the variant with N125P100K100 kg of fertilizer per hectare increased the number of ginger leaves by 46% and the leaf width by 23% compared to the control. According to the results of the analysis, it was found that the MMEO' applied variant increased the number of plant leaves by 53% and the leaf width by 30% compared to the control[16].

As can be seen from the above table, the length of the main stem, leaf width and leaf length in the plants

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planted in the 2nd and 4th option are slightly faster than the plants in the other option.

Fertilization was carried out 2 times during the vegetation period. Fertilization 1 was carried out in the first ten days of June, according to the variants, it was calculated per hectare in relation to the elements N_2, F, K and the percentages were determined ($N_{125} P_{100} K_{100}$, $N_{100} P_{75} K_{75} + B_3 Zn_6 Fe_6$, $N_{75} P_{50} K_{50}$) fertilizers were given in proportions.

The 2nd fertilizing was carried out in July, and the fertilizers were N_2 (200 gr) P (150 gr) K (150 gr) for option 1, N_2 (250 gr) P (300 gr) for option 2 K (300 g), Option 3 was given N_2 (225 g) P (175 g) K (175 g) in the proportions.

At this time, rapid growth of vegetative organs was observed in plants. Changes in the plants after fertilization were recorded. The results were statistically analyzed and the main conclusions were drawn. According to the results, the growth and development process of the plants in the 2nd and 4th options was accelerated. This situation continued in September. October The leaves of the plant stopped growing. Yellowing of leaves in the conditions of Termiz district in the first ten days of October 2020 (18-27 ° C) is observed, and the end of the growing season is in the middle of October. At the end of October 2020, the above-ground part of the plant has completely dried up. At the beginning of November, plant rhizomes were dug up. According to the results, the quality was determined by weighing 10 model plants. Option 1 without fertilizer, 480 g in the control option, option 2 - 810 g in the option of mineral fertilizer N75P50K50 kg per hectare; Option 3: N125, P100, K100 kg mineral fertilizer per hectare, 680 g; 720 g was obtained in option 4 of macro- and microelement fertilizers, and 510 g of organic fertilizer was obtained in option 5. At the time of planting , 10 kg of ginger rhizomes were planted in an area of 46m x 4m. As a result of our research, 47 kg of ginger rhizomes were obtained from 1 hectare. In his homeland, this indicator is 10,000 (ten thousand) kg of yield per hectare.

In our research conducted during 2019-2020, the vegetation duration of *Zingiber officinale* L. It lasted 240-242 days.

The rate of transpiration of the unique ginger plant in the climatic conditions of Surkhandarya region was analyzed in 120 days. According to our results, it was observed that the evaporation of water from the leaves of the ginger plant, that is, transpiration, changed during the day. It was noted that the rate of transpiration in ginger leaves was high in the morning and low in the afternoon in all variants. The highest value was found to be at 9 o'clock in all variants.

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Ginger is a simple plant that grows in the subtropical zone, it needs abundant watering and high humidity. The presence of buds on the plant rhizome is a necessary condition for plant germination. To wake up "sleepless" buds, the rhizome can be placed in a plastic bag in warm water for two to three weeks or several hours. Before planting the rhizome, you need to buy a wide pot, not a tall one, because ginger grows wide, not deep. The pot should have special drainage holes to feed the rhizome with oxygen and filter water. It is necessary to pay special attention to the soil. First, drainage material (for example, gravel) is filled with mineral-rich soil about 3-4 cm into the bottom of the container. Experts also recommend using a mixture of turf, soil, peat and river sand.

CONCLUSION . *Zingiber officinale* . L passes into the generative period from the second or third vegetation year under the conditions of introduction. From 10 kg of planted rhizomes of the plant, 47 kg of harvest was obtained on 1 square meter.

Also , *Zingiber officinale* L. In order to organize large-scale plantations of the species of the family, we focused the main indicators on the resistance indicator of plants in the field.

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