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INFLUENCE ABIOTIC FACTORS ON THE GROWTH AND DEVELOPMENT OF PLANTS PARSNIP

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One of the consequences of global climate change has been the constant decline in the availability and productivity of arable land. The main factors that have a great influence on plant growth, as well as on increasing the yield and its quality characteristics, are biotic and abiotic factors that affect or even determine the result.

Abiotic factors, such as extreme temperatures, drought, floods, salinization and heavy metals, are among the main factors limiting crop productivity and quality. Combinations of abiotic stresses are known to affect the emergence and spread of biotic stresses, such as insect pests, pathogens, weeds, and so on. Decreased plant growth due to drought or heat is a widespread phenomenon throughout the world. When both stresses are combined, their effect on crop yields is more serious than the effect of individual stress.

The purpose of the research – is to study the influence of abiotic factors (temperature and precipitation) on yield, duration of phenological phases of plant growth and development, the dynamics of growth of leaves and roots in the Right Bank Forest-Steppe of Ukraine.

Material and Methods. Experimental studies were conducted during 2015-2017 in a field experiment of the Department of Vegetable and Closed Soil in NL "Fruit and Vegetable Garden" NULES of Ukraine in the Right-Bank Forest-Steppe of Ukraine. The soil of the experimental site is sod-medium-podzolic, coarse-grained, light loam.

The experiments were carried out by the "Methodology of research in vegetable and melon growing" (2001). The following sowing dates were investigated: 1st decade of April, 2nd decade of April (control), 3rd decade of April, 1st decade of May, 2nd decade of May, 3rd decade of May, 1st decade of June. The size of the accounting experimental plot was 11.3 m^2, the repetition was fourfold. Variants in the experiment were placed systematically. The predecessor for parsnip was cucumber. The Stimulus variety was used in the research. Sowing was carried out according to the scheme 45x10 cm to a depth of 1.5-2 cm.

Research results and discussion. The shortest period of sowing-seedlings lasted 16 days in the options for sowing in the 3rd decade of May and the 1st decade of June. Significant delay for 21 days of this period was observed for sowing from the 1st to the 3rd decade of April. The duration of the period from the beginning of root formation to beam ripeness was the smallest for sowing in the 1st decade of April – 28 days, and the largest for sowing in the 1st decade of June – 51 days. The vegetation period ranged from 110 to 165 days and passed for the sum of temperatures (>10 °C) 1102.4–1439.0 °C and the sum of precipitation 128.1–225.2 mm. During sowing in April, an intensive increase in root crops from 2.9 to 3.5 g/day was observed in the second half of August. During sowing in May, the largest increase in root crops from 2.1 to 2.7 g/day was observed in the first half of September. Thus, for sowing in the 1st decade of June, this figure was highest in the second half of September (1.9 g/day). The highest value of net productivity of photosynthesis (7.50 g/m^2 per day) in plants was observed for sowing from the 1st decade of April, and for sowing in subsequent periods, this figure decreased. The option for sowing in the 1st decade of April provided a high yield of root crops of 50.3 t/ha, which is 5.3 t/ha or 11.8% significantly more than the control. When sowing in the following periods, a significant decrease in yield was observed compared to the control, namely: for the 3rd decade of April – by 3.5 t/ha, or 7.7%, for

the 1st decade of May – by 8.8 t/ha, or 19.6%, for the 2nd decade of May – by 17.4 t/ha, or 38.6%, for the 3rd decade of May – by 23.0 t/ha, or 51.1%, for the 1st decade of June – by 31.7 t/ha, 70.6% compared to the control.

Conclusions. An effective and cost-effective lever to stabilize yields in vegetable growing is the use of varieties with the high genetic potential of the crop, resistant to diseases and pests and adapted to growing conditions. The creation of a variety is testing and cultivation that take place under the influence of abiotic factors, and the interaction between these factors and the genetic system of the variety determines its value.

The vegetation period in parsnip lasted 110–165 days and passed for the sum of temperatures (>10 °C) 1102.4–1439.0 °C and the amount of precipitation 128.1–225.2 mm. The yield for different sowing dates was in a wide range from 13.2 to 50.3 t/ha.