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Sunflower Bioecophysiology

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Annotation: Sunflower (Helianthus annuus) — is a common agricultural plant that can produce high yields and has high nutritional value. Its bioecophysiological properties help to understand the importance of climate, soil and water resources in the process of growth and development. Sunflower places high demands on sunlight, heat and fertile soils, as well as the plant's photosynthesis process and heliotropism (movement towards the sun) increase its efficiency.

The plant adapts to special ecological conditions during its growth stages, that is, during the growing season, flowering and spawning periods. Its soil and water requirements play an important role in growth and crop management. Sunflower seeds and oil have a high nutritional value and contain fats and antioxidants that are beneficial for human health.

This annotation summarizes the bioecophysiological characteristics and agronomic significance of the sunflower plant, which helps to determine the conditions necessary for its effective cultivation and high quality of the crop. It is possible to grow the plant under optimal conditions, increase its nutritional value and

ensure its ecological benefits.

Keywords: Sunflower, Bioecophysiology, Photosynthesis, Heliotropism, Stages of Growth, Climatic Requirements, Soil Requirements, Water Resources, Nutritional Value, Seeds, Agrotechnics, Ecological Adaptation, Efficient Soil, Harvest, Health Benefits.

Introduction

The bioecophysiology of the sunflower (Helianthus annuus) plant has its own characteristics, and environmental factors play a major role in its development, growth and yield. In order to successfully grow sunflower, it is necessary to understand its bioecophysiological requirements. Below is an overview of the bioecophysiology of sunflower:

1. Photosynthesis and Energy Exchange:

The sunflower plant produces nutrients (glucose) from carbon dioxide and water using sunlight during photosynthesis. Sunflower is highly effective in photosynthesis because its wide, large leaves absorb the sun well. Such large leaves make the plant resistant to heat and water stress.

- Heliotropism: Sunflower flowers and leaves of some species move towards the sun (heliotropism). This feature helps the flowers to get maximum sunlight, which increases the efficiency of photosynthesis. Heliotropism is mainly observed at the beginning of flowering, then the flowers remain in place.

2. Climate and Temperature Requirements:

Sunflower likes a warm climate and can be successfully grown in many places. The best growth and development temperature for the plant is between 20-30 °C. Sunflower is resistant to cold times, so if the temperature is below 10 °C, the growth of the plant slows down and it can die.

- Compared to other plants: Sunflower grows well in dry and warm climates, but high humidity and cold should be avoided. Too high a temperature (35°C and above) can damage the plant.

3. Soil Requirements:

Sunflower grows well in fertile, well-drained, neutral or slightly acidic soils. Soil pH should be between 6.0-7.5. If the amount of organic matter in the soil is high, the growth rate and yield efficiency of plants will increase.

- Water supply: Sunflower has a specific water requirement. The plant does not require a lot of water, but regular watering is necessary for a stable harvest. Too wet soils can cause root rot.

4. Growth Stages:

Sunflower growth is divided into several stages:

- ✓ Pre-timing stage: The root system and initial leaves develop within 2-4 weeks after planting.
- ✓ Vegetation stage: The plant grows quickly and leaves and stems develop. At this stage, plants spend more energy on photosynthesis.

- ✓ Flowering and spawning stage: The plant begins to bloom. At this stage, it is very important to receive the maximum amount of sunlight.
- ✓ Harvesting: The seeds ripen, and the stem of the plant begins to dry out. It's time for the seeds to collect.

5. Plant Climate Adaptation:

Because sunflower plants receive good sunlight, the plant itself is known as "love for the sun". In the process of heliotropism and growth, the leaves and flowers focused on the sun indicate its adaptation to the climate.

- ➢ **Moisture stress**: Sunflower does not require too much moisture, but excess or insufficient moisture can slow down the development of the plant or reduce the yield.
- ➢ **Heat stress:** At very high temperatures (above 35°C), the photosynthesis process of sunflower slows down and the overall development of the plant deteriorates.

6. Resources and Nutritional Elements:

Sunflower plants are nutrient demanding. During its growth, it requires large amounts of nitrogen (N), phosphorus (P) and potassium (K). Nitrogen is necessary for vegetative growth, phosphorus for the development of the root system, and potassium for flowering and fertilization.

- ✓ Nitrogen: Nitrogen plays an important role in ensuring high plant productivity. Its deficiency can slow down the growth of the plant.
- ✓ Phosphorus and potassium: These elements support sunflower flowering and seed production.

7. Environmental Requirements:

Sunflower plants have a strong root system and effectively cultivate the soil, so soil erosion can be prevented by planting it. Sunflowers also develop symbiotic relationships with various microorganisms, which increases soil fertility.

The bioecophysiology of sunflower plants helps to understand its agronomic significance. For their optimal growth, it is necessary to adapt them to the right agrotechnical measures, soil and climatic conditions.

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