**TASKS AND QUESTIONS OF SEMINARS**

**FOR THE DISCIPLINE OF PHYSIOLOGY OF ANIMALS AND PLANTS**

Oral survey.

Training weeks 1-8, total 7 seminar topics

WORKSHOP 1 Plant cell structure

Purpose: To study the history of the development of plant physiology. The study of the structure of a plant cell

 Questions:

1. The subject of plant physiology. Stages of development of plant physiology.

2. Goals and objectives of plant physiology.

3. Basic approaches of plant physiology to the study of vital processes. 4. Structural features of a plant cell.

5. Membranes, their structure and functions.

6. Cell wall. Chemical composition and structure (median lamina, primary,

secondary, tertiary wall). Formation of the cell wall.

7. Plastids. Structure and functions.

8. Mitochondria. Structure and functions.

9. Compartmentation of cell metabolism.

10. Structure and functions of biological membranes. Relationship between function and structure.

11. Types of transfer of substances through cell membranes.

12. Types of active transfer.

13. Types of passive transfer.

WORKSHOP 2 Water exchange

oral questioning

Purpose: To study the physiology of water metabolism in plants

Questions:

1. The root system as an organ for absorbing water

2. Osmotic absorption of water. The laws of osmosis.

4. Plant cell as an osmotic system

5. Transpiration and upper terminal motor.

6. Indicators of transpiration.

7. Regulation of stomatal transpiration.

8. Make a task to calculate the intensity of transpiration, transpiration coefficient, transpiration productivity, relative transpiration - transpiration economy

**WORKSHOP 3 O**oral questioning

*Purpose: Study of the physiology of photosynthesis, its meaning. Light phase of photosynthesis*

1. About the photosynthesis of bacteria. Present the conclusion on the message in the form of a diagram or table.

2. Structure and functions of photosynthetic pigments. Present in the form of a table or diagram.

3. Make a table or diagram of photosystems 1 and 2.

4. Draw up a scheme of photophosphorylation. Mitchell's theory.

Questions:

Photosynthesis and its importance

2. Leaf as an organ of photosynthesis

3.. Chlorophylls: structure, spectral properties and functions

5. Phycobilins: structure, spectral properties and functions

6. Carotenoids: structure, spectral properties, functions

7. Absorption of light by chlorophyll, energy states of the chlorophyll molecule

8. Photosynthetic unit and reaction center

9. Photosystems 1 and 11 (by Emerson)

10. Non-cyclic electron transport

11. Cyclic electron transport

12. Photophosphorylation. Mitchell's theory

SEMINAR 4 Photosynthesis. Dark phase of photosynthesis.

Purpose: Study of the dark phase of photosynthesis.

Form of carrying out: Oral and written survey.

Tasks:

1. Prepare a report on the importance of photosynthesis in plant life.

2. Prepare a description of the Calvin cycle in the form of a diagram or table.

3. Prepare in the form of a diagram or table a description of C4 - the path of photosynthesis.

4. Prepare in the form of a diagram or table a description of the CAM - the path of photosynthesis.

Questions:

1. C3-way of photosynthesis

2. C4 pathway of photosynthesis

3. Crassula type photosynthesis

4. Photorespiration

5. Dependence of photosynthesis on environmental factors.

WORKSHOP 5

Photosynthesis. Parameters for measuring the phases of photosynthesis.

Purpose: Parameters for measuring the phases of photosynthesis.

Form of carrying out: Oral and written survey.

Tasks:

1. Prepare a report on the importance of photosynthesis in plant life.

2. Prepare a description of the Calvin cycle in the form of a diagram or table.

3. Prepare in the form of a diagram or table a description of C4 - the path of photosynthesis.

4. Prepare in the form of a diagram or table a description of the CAM - the path of photosynthesis.

Questions:

1. Methods for determining the light phase of photosynthesis

2. Methods for determining the dark phase of photosynthesis

3. Methods for determining the efficiency of the photosynthesis phaseМетоды выделения и определения фотосинтетических пигментова

1. Methods for studying the dependence of photosynthesis on environmental factors. What factors to specify

WORKSHOP 6

Subject: Breath.

Purpose: To study the physiology of respiration in plants.

Questions:

1. Krebs cycle. Reaction sequence. energy output.

2. Glyoxylate cycle.

3. Pentose phosphate pathway of glucose oxidation.

4. Electrotransport chain of mitochondria.

5. Oxidative phosphorylation. Mitchell's chemiosmotic theory.

6. Dependence of respiration on environmental factors (oxygen concentration,

carbon dioxide, temperature, water regime, minerals, light)

WORKSHOP 7

Topic: Mineral nutrition of plants. Macronutrients.

Purpose: To study the physiology of mineral nutrition of plants. The value of macronutrients.

Form of carrying out: Oral and written survey.

Tasks:

1. Prepare in the form of a diagram or table a description of the history of the development of the theory of mineral nutrition of plants.

2. Prepare a description of macro, micro and ultramicroelements in the form of a diagram or table.

3. Prepare in the form of a diagram or table a description of the nitrogen and phosphorus cycle in nature.

4. Prepare in the form of a diagram "The physiological significance of microelements in a plant."

Questions:

1. The content of mineral elements in the plant. Key Nutrients

necessary for plant life.

2. Nitrogen. Nitrogen cycle in the biosphere. Forms of nitrogen available to plants.

3. Nitrate reduction.

4. Ways of ammonia assimilation. Amino acids and amides in the plant.

5. Phosphorus. Forms of phosphorus compounds available to plants. The participation of phosphorus in

metabolism.

6. Potassium, calcium, magnesium, physiological significance.

7. Trace elements and their physiological significance.

Topic: Growth and development of plants. cell ontogeny. Stages of ontogenesis of higher plants.

Purpose: To study the ontogeny of the cell and the stages of the ontogeny of higher races.

Form of carrying out: Oral and written survey.

Tasks:

1. "Stages of ontogeny of higher plants". Prepare in the form of a diagram or table.

3. The structure of the ovule. Double fertilization. Present in the form of a diagram or table.

4. Stages of development of the embryo.

5. "Influence of external factors on the growth and development of plants." Prepare as a message.

Questions:

1. Cell Growth

2. Mitosis.

3. Stages of ontogenesis of higher plants.

4. Stages of development of the embryo

5. Theory of aging.

 "Tropisms". Prepare in the form of a diagram or table.

2. "Nastia". Prepare in the form of a diagram or table.

3. Nutations. Prepare in the form of a diagram or table.

WORKSHOP 7

Topic 3: Plant resistance to adverse environmental conditions. Salinity and drought.

Purpose: To study the mechanisms of resistance of plants to drought and salinity

Form of carrying out: Oral and written survey.

Tasks:

1. “Physiology of stress. Strategies for coping with stress. Prepare as a diagram or table

2. "Mechanisms of plant resistance to drought" Prepare in the form of a diagram or table.

3. "Mechanisms of plant resistance to salinity" Mechanisms of plant resistance to drought and salinity "

Questions:

 1. What is stress and stressors?

2. Strategies for adapting plants to stress.

3. Mechanisms of plant resistance to drought.

4. Mechanisms of plant resistance to salinity.