«Protonema» Experiment

GROWTH AND MORPHOGENESIS OF MOSS PROTONEMA IN MICROGRAVITY

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The objectives of the experiment are to study the role of gravity in realization of growth and form-developmental processes in mosses. We plan to:

— study the role of gravity in plant movements;

— study the interaction of different stimuli, i. e., endogenous (structural and genetic determination) and exogenous (light and gravity) in realization of these processes;

— select and test new systems (different moss species and mutants).

Three well-known moss species, *Ceratodon purpureus (Hedw.) Brid., Pottia intermedia (Turn.) Fürnr.* and *Pohlia nutans* (Hedw.) Lindb. will be used in experiments with protonemata. The specific moss capsules *Bryum argenteum* Hedw. and *Funaria hygrometrica* Hedw. will be also used to study the role of gravity in formation of species. We intend to use microscopic analysis, measurement of gravity bending of protonemata, cytochemical analysis of α-amylase and glucose-6-phosphatedehydrogenase activity; cytofluorometrical analysis of free and membrane-bound Ca^{2+} and intracellular pH, immunofluorescent analysis of microtubule distribution, electrophoresis of multiple molecular forms of enzymes.

New data will be obtained, concerning the nature of sensing the gravi-stimulus and its transduction into growth and form-developmental processes, as well as the influence of gravity and light on complex transformation of an apical protonema cell into three-dimensional gametophore bud.

«Greenhouse» Experiment

GREENHOUSE OF MODULAR DESIGN FOR SHORT-TERM AND LONG-TERM GROWING OF HIGHER AND LOWER PLANTS

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It is planned to manufacture the modular greenhouse of a variable configuration and sizes depending on requirements to experiments.

The modular greenhouse with the variable geometry will consist of three devices — «lower», «middle» and «upper». These devices will be functioning both as one unit and as separate units. The «lower» device will consist of the panel with joints. The trays will be connected at right angles to the panel. The replaceable modules for cultivation (hardware for growing the plants) will be placed on the trays. The units of fastening of these modules will be joined to the power and telemetry systems connectors. The number and configuration of the trays will depend on the number of experimental modules placed on them. The «middle» device will be equipped with two joined cantilevers for connection to the consoles. The power supply and telemetry lead, which come to the joints, will be placed inside the cantilevers. Each of the consoles will be equipped with two fastening units for joining the greenhouse blocks. All the power systems for the greenhouse blocks will be fastened on the lateral sides of the consoles. The greenhouse blocks will incorporate the ware for the raising. The «middle» device will be used to fulfil (monitor) various technological tasks