DEPARTMENT OF ECOPHYSIOLOGY

The *F. Górski* Institute of Plant Physiology, Polish Academy of Sciences

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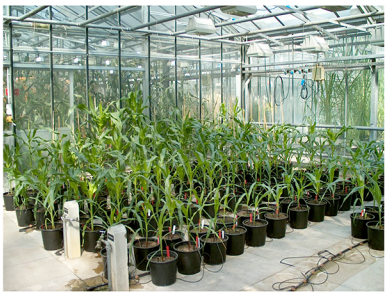
RESEARCH AREAS

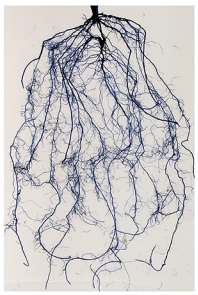
Integrated physiology of key crops at the level of the whole organism, organs and processes as well as their interaction with environmental conditions:

- leaf gas exchange, water relations, chlorophyll *a* fluorescence, and membrane injury in plants subjected to various abiotic stresses
- root system structure and the impact of drought, flooding, and soil compaction stresses on root architecture
- root-to-shoot communication and hormonal balance under drought, flooding, and low temperature (chilling, freezing) stresses
- role of phytohormone abscisic acid (ABA) in plant reactions to abiotic and biotic stresses
- phenolics as photoprotectants, antioxidants, and hydrophobic stabilizers of cell wall under drought stress



Maize plants growing in a glasshouse under different water regimes (Photo by F. Janowiak)

Doubled haploid (DH) lines of winter triticale exposed to soil drought in a glasshouse (Photo by T. Hura)



Root system architecture of maize (Photo by M. Grzesiak)

Fruiting tomato plants subjected to alternating deficit watering in a glasshouse (Photo by F. Janowiak)

NOTABLE ACHIEVEMENTS

- determination of the impact of soil compaction on morphological root structure, water relations, and leaf gas exchange in maize and triticale
- discovery of the relationship between chilling tolerance level in maize seedlings and their capacity for quick ABA accumulation under chilling conditions
- determination of the main signals in root-to-shoot communication in plants under stress conditions
- discovery of the significant role of phenolics in drought acclimatization mechanisms

COOPERATION OFFER

We offer the following expertise in basic and applied research as well as in implementation projects:

- evaluation of the tolerance level of crop genotypes/cultivars to abiotic stresses under field and glasshouse conditions
- assessment of the morphological traits of individual components of the root system
- measurement of abscisic acid (ABA) content in plant material by Enzyme-Linked ImmunoSorbent Assay (ELISA)
- determination of total antioxidant activity in tissues or in any other biological material by DPPH method adapted to microtitration plates
- measurement of free and cell wall bound phenolics level as well as hydrogen peroxide content
- assessment of changes in general chemical composition of biological material in response to abiotic and biotic stresses

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