

Research subjects and tasks of the Institute

1. Structure and organization of plant genomes
2. application of genetic transformation in gene expression analysis and crop modification
3. Bioinformatics in structural genomics and functioning of plants
4. Genetic, physiological and molecular background of plant resistance to pathogens and environmental stress factors
5. Biotechnological and biometric methods in generation, preservation and characterization of plant variation
6. Cytogenetic and molecular analyses of genomes of grasses from genera *Festuca* and *Lolium*
7. Generation and genetic analysis of hybrids of distant cereals and oil crops

Subject 1: Structure and organization of plant genomes

Heads of subject: Prof. dr hab. Bogdan Wolko, Prof. dr hab. Wojciech Święcicki

Task 1.1. Structure of the narrow-leaved lupin (*Lupinus angustifolius* L.) genome in view of studies conducted by physical and genetic mapping

Realized by team: Prof. dr hab. Bogdan Wolko, doc. dr hab. Barbara Naganowska, mgr Michał Książkiewicz, mgr Karolina Leśniewska, mgr inż. Łucja Przysiecka, mgr inż. Karolina Wójcik, mgr inż. Weronika Jankowska

Task 1.2. Localization of new genes on the linkage map of pea (*Pisum sativum* L.) using molecular markers

Realized by team: Prof. dr hab. Wojciech Święcicki, dr Magdalena Gawłowska, mgr Magdalena Chudy, mgr Katarzyna Tokarska, inż. Czesława Nawrot

Task 1.3. Intraspecific genetic and phenotypic variation of grass peavine (*Lathyrus sativus* L.)

Realized by team: doc. dr hab. Wojciech Rybiński, mgr Katarzyna Pankiewicz

Task 1.4. Analysis of transgenic tobacco containing coding sequences of HBV preS1 and preS2 epitopes with increased immunogenicity

Realized by team: dr Tomasz Pniewski, dr Aurelia Ślusarkiewicz-Jarzina, dr Aleksandra Ponitka, mgr Hanna Pudelska, mgr Anna Kostrzak

Subject 2. Protein and DNA analyses using statistical and IT methods

Head of subject: doc. dr hab. Paweł Krajewski

Task 2.1. Methods localizing and characterizing protein binding sites in DNA sequences

Realized by team: doc. dr hab. Paweł Krajewski, prof. dr hab. Zygmunt Kaczmarek, mgr Marcin Przystalski

Task 2.2. Methods analyzing evolution of biochemical functions of protein in view of its structure

Realized by: dr Grzegorz Koczyk

Subject 3. Identification of genetic, physiological, biochemical and molecular factors of plant adaptation to environmental stress conditions

Head of subject: prof. dr hab. Tadeusz Rorat

Task 3.1. Identification and functional analysis of genes, which activity leads to plant cold acclimation and soil drought adaptation

Realized by team: dr Agnieszka Kielbowicz-Matuk, prof. dr hab. Tadeusz Rorat

Task 3.2. Analysis of gene expression for genes related with drought tolerance and cold tolerance in species from the *Lolium-Festuca* complex at the transcriptome and proteome levels and cytogenetic identification of chromosome regions carrying genes of tolerance to analyzed stresses

Realized by team: dr Arkadiusz Kosmala, prof. dr hab. Zbigniew Zwierzykowski, dr Tomasz Książczyk, dr Izabela Pawłowicz, mgr Aleksandra Bocian, mgr Magdalena Taciak, mgr Włodzimierz Zwierzykowski

Task 3.3. Isolation and functional analysis of selected genes of spring rape, constituting elements of drought signal transduction

Realized by team: prof. dr hab. Jan Sadowski, dr Małgorzata Kaczmarek, dr Danuta Skowrońska

Research task 3.4. Genetic background for cereal efficiency and their resistance to water and mineral stress

Realized by team: doc. dr hab. Andrzej Górny, mgr Dominika Ratajczak

Task 3.5. Variation in metabolome of fodder grasses during cold acclimation

Realized by team: doc. dr hab. Piotr Kachlicki, mgr Anna Karkocha

Subject 4. Genetic and molecular background of variation in quantitative traits in cereals

Head of subject: prof. dr hab. Tadeusz Adamski

Task 4.1. Efficiency of functional markers of genes determining variation in technological characteristics of grain in wheat (*Triticum aestivum* L.)

Realized by team: doc. dr hab. Bolesław Salmanowicz, prof. dr hab. T. Adamski, prof. dr hab. Z. Kaczmarek, prof. dr hab. M. Surma, dr K. Krystkowiak, dr A. Kuczyńska, mgr J. Nowak, mgr M. Dylewicz

Task 4.2. Phenotypic effects of allelic variants of locus *denso* in barley (*Hordeum vulgare* L.)

Realized by team: dr Anetta Kuczyńska, prof. T. Adamski, prof. M. Surma, doc. dr hab. P. Krajewski, dr E. Adamska, dr K. Krystkowiak, mgr M. Przystalski

Subject 5. Creation and cytological and genetic analyses of inter- and intraspecific hybrids in the family Poaceae

Head of subject: doc. dr hab. Halina Wiśniewska

Task 5.1. Introgression of genome D fragments of heat to hexaploid triticale

Realized by team: dr Magdalena Majewska, doc. dr hab. Halina Wiśniewska

Task 5.2. Gene transfer from *Agropyron* spp. to wheat and triticale

Realized by team: doc. dr hab. Halina Wiśniewska, dr Anna Kaczmarek, mgr Jolanta Belter

Task 5.3. Identification of genes and QTLs connected with resistance of cereals to biotrophs and necrotrophs

Realized by team: dr Lidia Błaszczyk, prof. dr hab. Jerzy Chełkowski, dr Łukasz Stępień, mgr inż. Jolanta Belter

Task 5.4. Genetic and phenotypic variation of plants within the species *Panicum virgatum* L.

Realized by team: doc. dr hab. Stanisław Jeżowski, dr Katarzyna Głowacka

Subject 6. Genetics of pathogenic fungi and their antagonistic species

Heads of subject: prof. dr hab. Jerzy Chełkowski, doc. dr hab. Małgorzata Jędryczka

Task 6.1. Characteristics of fungi from genus *Fusarium* infesting cereals and their antagonistic species

Realized by team: dr Łukasz Stępień, prof. dr hab. Jerzy Chełkowski, doc. dr hab. Piotr Kachlicki, dr Łukasz Stępień, dr Lidia Błaszczyk, dr Grzegorz Koczyk

Task 6.2. Genetic characteristics of populations of *Leptosphaeria maculans* and *L. biglobosa* in Poland and studies on interactions of their pathogens with rape

Realized by team: doc. dr hab. Małgorzata Jędryczka, doc. dr hab. Piotr Kachlicki, dr Danuta Babula, mgr Witold Irzykowski