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Field of specialisation

Genetics, molecular cytogenetics of plants

Research area

- Genome size analysis within the genus *Lupinus* (all Old World species and selected New World ones) as related to phylogeny and taxonomy of lupins.
- Cytogenetic localization of 18S-25S and 5S rDNA by FISH in 12 lupin species of the Old World in phylogenetic aspect.
- Construction of the *Lupinus angustifolius* (narrow-leafed lupin) idiogram on the basis of cytogenetic markers and chromosome measurements.
- Cytogenetic analysis of *L. angustifolius* genome by FISH with the use of BAC clones from the nuclear genome BAC library as molecular probes (BAC-FISH).
- Localization of short DNA sequences in plant chromosomes by PRINS.
- Assignment of linkage groups to chromosomes aimed at integration of cytogenetic and genetic maps of the narrow-leafed lupin.

National research projects

- Project of the Ministry of Sciences and Higher Education no. N N301 391939 „Nuclear genome of *Lupinus angustifolius* L.: structure of selected genes, their genetic and physical localization and comparative analysis of selected genome regions with other legume species”, 2010–2013; project leader.
- Project of the Ministry of Sciences and Higher Education no. PBZ-MNiSW-2/3/2006/3 "Identification of molecular markers linked with resistance gene to pathogenic fungus *Diaporthe toxica* causing brown stem spotting of the narrow-leafed lupin (*Lupinus angustifolius* L.)" (2007-2010); project contractor.
- Project of the Ministry of Sciences and Higher Education no. N301 084 32/3234 „Analysis of the *Lupinus angustifolius* genome structure containing resistance gene to anthracnose" (2007–2010); project contractor.
- Project of the State Committee for Scientific Research no 3 P06A 009 24: „Structure of the nuclear genome and phylogeny of the genus *Lupinus* in the light of molecular and cytogenetic analyses" (2003–2006); project leader.

EU project

- Centre of Excellence in Plant Agrobiolgy and Molecular Genetics PAGEN; 5th Framework Programme of the European Union (QLAM-2001-00379), 2003-2006; leader of WP9: "Promotion and dissemination of information on the PAGEN Centre".

National co-operation

- **Poznań University of Life Sciences, Department of Biochemistry and Biotechnology** (Prof. Cezary Mądrzak, Dr. Dorota Narożna). Analysis of sequence and organisation of selected genes coding enzymes of phenylpropanoid synthesis pathway, genetic and physical localization of these genes in the genome of the narrow-leafed lupin (*Lupinus angustifolius* L.).
- **Institute of Bioorganic Chemistry, Laboratory of Plant Molecular Biology** (Prof. Marek Figlerowicz, Dr. Jan Podkowiński). Analysis of sequence and organisation of selected genes involved in the nitrogen fixation and nodulation process, genetic and physical localization of these genes in the genome of the narrow-leafed lupin (*Lupinus angustifolius* L.).
- **Adam Mickiewicz University in Poznań, Institute of Molecular Biology** (Assoc. Prof. Wojciech Karłowski). Functional annotation of BAC-end sequences from the nuclear genome BAC library of *L. angustifolius*, aimed at the identification of candidate genes for important agricultural traits.

International co-operation

- **Department of Agriculture and Food Western Australia, Perth, Australia** (Dr. Hu'an Yang). International Genetic Material Transfer Agreement between State of Western Australia and IPG PAS. The use of sequences from the genetic map of the narrow-leafed lupin linked to agricultural traits for cytogenetic mapping.
- **University of Western Australia Perth, Australia** (Dr. Matthew Nelson). Genetic and cytogenetic mapping of *L. angustifolius* genome.
- **Université de Rennes, France** (Dr. Abdel-Kader Aïnouche). Studies on one of the lupin nodulation genes (*SymRK*) by cytogenetic mapping of selected BAC clones including gene sequence fragments (BAC-FISH).

Main recent publications

- LESNIEWSKA K., KSIĄŻKIEWICZ M., NELSON M.N., MAHÉ F., AÏNOUCHE A., WOLKO B., NAGANOWSKA B. (2011). Assignment of 3 Genetic Linkage Groups to 3 Chromosomes of Narrow-Leafed Lupin. *Journal of Heredity* 102 (2): 228-36. Epub 2010 Oct 14.
- STRZALKA W., KACZMAREK A., NAGANOWSKA B., ZIEMIENOWICZ A. (2010). Identification and functional analysis of *PCNA1* and *PCNA-like1* genes of *Phaseolus coccineus*. *Journal of Experimental Botany* 61(3): 873–888.
- KACZMAREK A., NAGANOWSKA B., WOLKO B. (2009). Karyotyping of the narrow-leafed lupin (*Lupinus angustifolius* L.) by using FISH, PRINS and computer measurements of chromosomes. *Journal of Applied Genetics* 50 (2): 77-82.
- NAGANOWSKA B., LEŚNIEWSKA K. (2008). Cytogenetic mapping of the *Lupinus angustifolius* genome. (Editors: Jairo A. Palta and Jens D. Berger), CSIRO Plant Industry, Wembley, Western Australia, ISBN 0-86476-153-8 pp. 291-293.
- KACZMAREK A., NAGANOWSKA B., WOLKO B. (2007). PRINS and C-PRINS: promising tools for the physical mapping of the lupin genome. *Cellular & Molecular Biology Letters* 12 (1): 16-24.
- KASPRZAK A., ŠAFÁŘ J., JANDA J., DOLEŽEL J., WOLKO B., NAGANOWSKA B. (2006). The bacterial artificial chromosome (BAC) library of the narrow-leafed lupin (*Lupinus angustifolius* L.). *Cellular & Molecular Biology Letters* 11 (3): 396–407.
- NAGANOWSKA B., WOLKO B., ŚLIWIŃSKA E., KACZMAREK Z., SCHIFINO-WITTMANN M. T. (2006). 2C DNA variation and relationships among New World species of the genus *Lupinus* (Fabaceae). *Plant Systematics and Evolution* 256: 147-157.
- NAGANOWSKA B., KACZMAREK A. (2005). Repetitive DNA sequences in cytogenetic studies of the *Lupinus* genome. In: E. van Santen and G.D. Hill (eds). *Mexico, Where Old and New World Lupins Meet*. Proceedings of the 11th International Lupin Conference, Guadalajara, Jalisco, Mexico. May 4-9, 2005. International Lupin Association, Canterbury, New Zealand, pp. 27-29.
- NAGANOWSKA B., ZIELIŃSKA A. (2004). Localisation of rDNA in the *Lupinus* genome during the cell cycle. *Journal of Applied Genetics* 45 (2): 189-193.
- NAGANOWSKA B., WOLKO B., ŚLIWIŃSKA E., KACZMAREK Z. (2003). Nuclear DNA content variation and species relationships in the genus *Lupinus* (Fabaceae). *Annals of Botany* 92: 349-355.
- NAGANOWSKA B., DOLEŽEL J., ŚWIĘCICKI W.K. (2003). Development of molecular cytogenetics and physical mapping of ribosomal RNA genes in *Lupinus*. *Biologia Plantarum* 46 (2): 211-215.
- NAGANOWSKA B., ZIELIŃSKA A. (2002). Physical mapping of 18S-25S rDNA and 5S rDNA in *Lupinus* by fluorescent *in situ* hybridization. *Cellular & Molecular Biology Letters* 7 (2B): 665-670.