

## RESEARCH TEAM PROFILES

### FACULTY

Faculty of Horticulture Lednice

### RESEARCH AREA

The research team activities are focused primarily on issues concerning fruit trees, grapevine and vegetables. One of the research areas is to breed new genotypes resistant against economically significant pathogens of these species (e.g. PPV, ESFY, fungal pathogens of grapevine etc.). Another research direction is to evaluate genetic variability within extensive genepools of fruit and vegetable species situated on the Faculty of Horticulture fields. The development and innovation of the detection tools for the diagnosis of pathogens and use of plant biotechnology in horticultural production are also the important areas of research.

### RESEARCH TEAM

Prof. Boris Krška, team leader, contact: [uov@zf.mendelu.cz](mailto:uov@zf.mendelu.cz)

Assoc. Prof. Miroslav Baránek

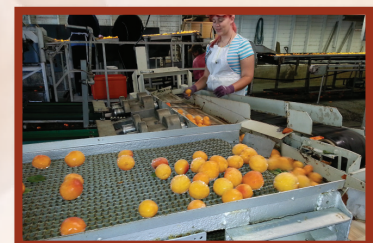
Assoc. Prof. Mojmír Baroň

Tomáš Nečas, Ph.D.

Ivo Ondrášek, Ph.D.

### EXPERT/TECHNICAL PROFILE OF THE TEAM (SPECIFIC PART OF RESEARCH)

The members of the team use modern and up to date technologies and procedures used in the scientific research. For example for their research are utilised equipments and protocols for DNA sequencing, DNA-based markers, Real time PCR, DAS ELISA, fluorescence microscopy, etc. The staffs are experienced in testing and evaluation of plant materials, artificial inoculation, the diagnosis of diseases and in the assessment of the quality parameters of the listed species. Also available are large collections of genetic resources of apricot, peach and wine. Team has acces to large collections of genetic resources of apricot, peach and wine, and the material from the breeding program of apricots, which includes more than 20,000 hybrids at different levels of evaluation (currently about 5,000 seedlings and selected hybrid elites about 500 genotypes).



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## EXPERIENCE

### Participation in national projects (programme and provider)

#### NAZV/KUS – ministry of Agriculture

- The development of complex procedures of diagnostics of economically important and quarantine phytopathogenic organisms for developing of the fruit trees certification system in the Czech Republic
- The research and innovation of diagnostic procedures for economically significant, controlled and quarantine plant pathogenic organisms for the certification program of fruit trees with emphasis on molecular methods
- Increasing of the number the assortment in pome rootstocks and varieties of pear on new, promising rootstocks and non-traditional varieties of Asian pear derived from *Pyrus pyrifolia* NAKAI. and *Pyrus ussuriensis* MAXIM
- The selection of apricot genotypes resistant to PPV with the fruit market quality
- The complex research on resistance of transgenic plum, *Prunus domestica* L., clone C5, to the PPV, and complex infections with PDV and ACLSV, identification of nontransgenic resistance sources of Prune to PPV
- The research and development of standard methodological procedures of recovering of fruit trees and grapevines by chemotherapy of in-vitro cultures for certification system of healthy status of planting material

#### Conference organization etc. (national and international)

- Applied Plant Biotechnology 2013 – the international conference to mark the 100<sup>th</sup> anniversary of the scientific work on Mendeleum institute
- Horticulture in quality and culture of life, September 24–26, 2014, Lednice

#### Involvement in cross-border/regional and bilateral cooperation

- Bilateral project between Czech Republic and China republic / The development of methods and study stress metabolism and genomics in China and in the Czech Republic
- Bilateral project between Czech Republic and China republic / Czech-Chinese scientific and research cooperation in the field of breeding and introduction of varieties of the genus *Prunus*
- Bilateral project between Czech Republic and China republic / The exchange and Czech-Chinese cooperation in the field of genetic resources of fruit species

#### Involvement in European (especially in Framework Programmes projects, EUREKA, EUROSTARS, COST etc.) and international cooperation

- SharCo – 7<sup>th</sup> framework project “Containment of Sharka virus in view of EU-expansion”
- The realization of the project – “The development of a reliable system for the detection and quantification of pathogens causing diseases of cleaner vines and mapping the occurrence of this disease in the Czech Republic” within COST FA1303 action
- The realization of the project – “The effect of in vitro manipulations and thermotherapy-induced stress on genetic and epigenetic changes in the grapevine genome” within COST FA858 action

#### Other foreign activities and contacts (active participation in conferences, publications, membership in international bodies etc.)

- Miroslav Baránek – a member of the management committee for COST action FA1303
- Boris Krška – the editorial board in journal of Horticulture Science and Acta Agronomica Serbica
- Faculty of Horticulture – a member of the ISHS (International Society for Horticultural Science)

#### The most important publication within last 5 years

- Čechová, J., Baránek, M., Krška, B., Pidra M.: Screening of differentially expressed genes during the end of endogenous dormancy of flower buds in *Prunus armeniaca* L. Plant Growth Regulation. 2012. vol. 67, pp.141–150. ISSN 0167-6903.
- Nečas, T., Mašková, V., Krška, B.: Study of symptoms variability after artificial inoculation by phytoplasma ESFY in different *Prunus* species. Acta Horticulturae 2012, no. 966, pp. 123–130. ISSN 0567-7572.
- Ondrášek, I., Dokoupil, L., Krška, B.: Evaluation of time demands of pruning selected apricot varieties and rootstocks. Horticultural Science. 2013. vol. 40, no. 4, pp. 145–148. ISSN 0862-867X.
- Krška, B., Gogolková, K., Ondrášek, I., Nečas, T.: Evaluation of precocious decline of young apricot orchards in the Czech Republic. Acta Horticulturae. 2012. č. 966, s. 175–182. ISSN 0567-7572.
- Schmitzer, V., Slatnar, A., Mikulic P. M., Veberic, R., Krška, B., Štampar, F.: Comparative study of primary and secondary metabolites in apricot (*Prunus armeniaca* L.) cultivars. Journal of the Science of Food and Agriculture. 2011. sv. 91, č. 5, s. 1–7. ISSN 0022-5142.
- Baroň, M., Sochor, J.: Estimation of Thiol Compounds Cysteine and Homocysteine in Sources of Protein by Means of Electrochemical Techniques. International Journal of Electrochemical Science. 2013, 8, 11072-11086.

#### Topics for cooperation in H2020/project proposal

- Study of stone fruit resistance to plum pox virus (PPV) and phytoplasma ESFY
- Breeding of temperate stone fruit and pear on for improving of fruit quality
- Study of pome fruit resistance to phytoplasma PD and AP
- Possibility of cross-protection applications against phytoplasma in fruit species
- Development of plant hormones for use in nursery production
- Development and optimization of the new methods (PCR Lamp Blue Lamp) for use in detecting diseases of fruit species and wine
- Utilisation of epigenetic for breeding and cultivation of horticultural crops
- Monitoring of assimilable nitrogen in wine

#### Patents

- Baroň, M., Kumšta, M., Bábíková, P., Mendel University in Brno. Composition of saturated fatty acids and its use for inhibition of alcoholic or malolactic fermentation and dose reduction of sulphur dioxide in wine making technology. Patent 303556, Industrial Property Office, Czech Republic.



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