Proposals of topics of dissertation theses for academic year 2018/2019

Study Programme: Tropical Agrobiology and Bioresource Management

Department:	**Department of Sustainable Technologies**

1. ***doc. Ing. Jan Banout, Ph.D.***
Impact of traditional processing and natural antioxidants on the quality and shelf-life of game meat

2. ***doc. Ing. Jan Banout, Ph.D.***
Toxicological assessment of selected pollutants accumulated in aquatic vegetables grown in peri-urban wetlands

3. doc. Ing. Jan Banout, Ph.D. **|** Ing. Klára Urbanová, Ph.D.
Influence of drying method on capsaicinoids content from different Capsicum species

4. ***doc. Ing. Jan Banout, Ph.D.*** **|** Ing. Helga Hernandez, Ph.D.
Influence of drying pre-treatments on final organoleptic and physical properties of dehydrated products

5. ***doc. Ing. Jan Banout, Ph.D.***
The influence of intensive agriculture practices on coral reef resilience in Sumatra

Department:	**Department of Crop Sciences and Agroforestry**

1. doc. Ing. Bohdan Lojka, Ph.D. **|** Mgr. Martina Janoušková, Ph.D.
Ecology of arbuscular mycorrhizal fungi in the domestication of edible plants in the tropical Andes

2. d*oc. Ing. Bohdan Lojka, Ph.D.* | Prof. Robert L. Bradley, Ph.D.
Would planting trees in the agricultural landscape improve soil health trough Arbuscural Mycorrhizal Fungi (AMF)?

3*. doc. Ing. Bohdan Lojka, Ph.D.* | doc. Mgr. Bohumil Mandák, Ph.D. (ČZU v Praze a AV ČR – Botanický Ústav)
Morphological and genetic diversity of tropical agroforestry trees

4. d*oc. Ing. Bohdan Lojka, Ph.D.* | doc. RNDr. Josef Raichard, Ph.D. (JČU), Thomas J. Greevy Ph.D. (University of Rhode Island)
Value of agroforestry for biodiversity conservation

5*. doc. Ing. Bohdan Lojka, Ph.D.* | Prof. Dr. Ir. Patrick Van Damme
Agroforestry tree domestication among farmers in selected region (country)

6. ***doc. Dr. Ing. Eloy Fernández Cusimamani*** **|** Ing. Miroslav Klíma, Ph.D.
Microspore culture, embryogenesis and doubled haploid induction in *Brassica carinata*, *B. juncea* and *Eruca sativa*

7. *doc. Dr. Ing. Eloy Fernández Cusimamani* | doc. Ing. Pavel Klouček, Ph.D.
Induced polyploidization *in vitro* of selected medicinal plants

8. *doc. Dr. Ing. Eloy Fernández Cusimamani* | Ing. Jana Šedivá, Ph.D.
Induced polyploidization *in vitro* of selected ornamental plants

9*. prof. Ing. Ladislav Kokoška, Ph.D.*
Antimicrobial activity and chemical composition of essential oil-bearing tropical plants against microorganisms causing spoilage of agricultural products

10*. prof. Ing. Ladislav Kokoška, Ph.D.*
Antimicrobial effect of essential oils from Southeast Asian plants against bacterial pathogens causing respiratory diseases

11. prof. Ing. Ladislav Kokoška, Ph.D.
Antimicrobial activity of Cambodian medicinal plants

12. prof. Ing. Ladislav Kokoška, Ph.D.
Antimicrobial effect of medicinal plants used in Philippines for treatment of food-borne diseases

13. *doc. Ing. Zbyněk Polesný, Ph.D.* | Shamsul Khamis, Ph.D.
Ethnobotany among indigenous people Orang Asli in peninsular Malaysia

14. *doc. Ing. Zbyněk Polesný, Ph.D.* | Dr. Tran Thi Hoa
The wild, indigenous, underutilized fruit tree species *(Xerospermum noronhianum*, Sapindaceae): Domestication, utilization and conservation

***15. doc. Ing. Zbyněk Polesný, Ph.D.* |** Dr. Luisa Custódio
Diversity, nutritive value and local preference of some tropical underutilized plant species

16. *doc. Ing. Zbyněk Polesný, Ph.D.* | Gisella Cruz García, Ph.D. **|** María Elena Chuspe Zans
Diversity, properties and management of underutilized root and tuber crops in the Peruvian Amazon

17. *doc. Ing. Zbyněk Polesný, Ph.D.* | Prof. Dr. Ir. Patrick Van Damme
Ethnobotany and conservation of Sacha mango (*Grias peruviana*, Lecythidaceae) in the Amazon

18. *doc. Ing. Zbyněk Polesný, Ph.D.* | prof. Andrea Pieroni
Ethnobotany of migrant communities in the Czech Republic

19. *doc. Ing. Zbyněk Polesný, Ph.D.* | Dr. Jiří Woitsch
Historical ethnobotany of the Czech Republic: an archival research

20. *doc. Ing. Zbyněk Polesný, Ph.D.* | prof. Patrick Van Damme
Informal seed system effect on cultivated diversity in the Czech Republic: conservation and dissemination of negleted/underutilized crops snd local landraces

21. *doc. Ing. Zbyněk Polesný, Ph.D.* | Dr. Tran Thi Hoa
Survey of *Dalbergia* spp. (Leguminosae) in Vietnam for identifying *Dalbergia oliveri* from a species complex for conservation

22. *doc. Ing. Zbyněk Polesný, Ph.D.* | Dr. Tran Thi Hoa
Origin evolution and diversity of Cà Te *Afzelia* spp. (Leguminosae): implication for Vietnam forest conservation and sustainable management

23. *doc. Ing. Zbyněk Polesný, Ph.D.*
Tradional agroforestry systems in Kyrgyzstan: implications for biodiversity conservation in the Central Asia

Department:	Department of Animal Science and Food Processing

1. Doc. Ing. Karolína Brandlová, Ph.D.
Ecology of African ungulates

2. Prof. MVDr. Daniela Lukešová, CSc.
The Geographical Distribution of Parasitic Zoonoses in Europe and Asia: the Role of Wildlife in the Transmission

3. ***Doc. Francisco Ceacero Herrador, Ph.D.***
Characterization and improvement of the meat, goat and wool production of the local breed Meriz goat in Kurdistan

4. ***Doc. Francisco Ceacero Herrador, Ph.D.*** **|** Mgr. Barbora Černá Bolfíková, Ph.D.
Development of analytical methods for detection of history of populations

5. ***Doc. Francisco Ceacero Herrador, Ph.D.*** **|** Mgr. Martina Komárková, Ph.D. **|** Mgr. Jaroslav Šimek, Ph.D.
Nutritional landscape and competence among wild and domestic ungulates in the strictly protected area Gobi B, Mongolia

6. ***Doc. Francisco Ceacero Herrador, Ph.D.*** **|** Ing. Radim Kotrba, Ph.D.
Influence of selected amino acids in the performance and ecology of Cervids

7. ***Doc. Francisco Ceacero Herrador, Ph.D.*** **|** Ing. Radim Kotrba, Ph.D. **|** Dr. Bronson Strickland
Performance of the introduced population of white-tailed deer in the Czech Republic: comparison with other local Cervids and native populations in USA

8. ***Prof. RNDr. Pavla Hejcmanová, Ph.D.***
Habitat Use, Prey Preference, and Social Interactions in free roaming large carnivores on Sir Bani Yas Island, UAE

9. ***Prof. RNDr. Pavla Hejcmanová, Ph.D.***
Evaluation of feeding and welfare activities of wild animals on Sir Bani Yas Island, UAE

10. ***Prof. RNDr. Pavla Hejcmanová, Ph.D.***
Trace elements bioavailability in the nutrition of wildlife

11. Prof. MVDr. Daniela Lukešová, CSc. | Doc. MVDr. Pavel Novák, CSc.
The Improvement of the Meat Production and Veterinary Care for Local Breeds of Small Ruminants in Selected Locations in Pakistan

12. Prof. MVDr. Daniela Lukešová, CSc. | Doc. MVDr. Pavel Novák, CSc.
Development of a Novel HACCP System Implementation to Improve the Management System of Dairy Herd

Department:	**Department of Sustainable Technologies**

1. Topic:	**Impact of traditional processing and natural antioxidants on the quality and shelf-life of game meat**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Jan Banout, Ph.D.
Supervisor-consultant:	
Prospective funding:	Internal grant agency,
Annotation: (150-200 words recommended)	The increasing demand for alternative meat sources leads to the invention of new meat products or to the effort to replace conventional meat (beef or pork) in traditional meat products. Moreover, the consumers' demand and their pressure to eliminate artificial substances in meat products open new opportunities to utilise natural substances as perspective antioxidants and antimicrobial agents. Since the visual appraisal of meat and meat products is critical for the consumers' purchasing decisions, as they relate colour to freshness, a suitable method to lower the amount of used chemical additives, added to meat products, seems to be the use of natural substances (e.g. spices and plant extracts). These substances are known to have a positive affect not only on the colour, but also on the shelf life of conventional meat products. Besides, they are a natural part of meat products and can also pleasantly affect the organoleptic characteristics of these products. The thesis will focus on the application and evaluation of natural substances and traditional processing (drying) and their impact on the sensory and technological properties of antelope meat.

2. Topic:	**Toxicological assessment of selected pollutants accumulated in aquatic vegetables grown in peri-urban wetlands**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Jan Banout, Ph.D.
Supervisor-consultant:	
Prospective funding:	Internal grant agency, Czech development cooperation project
Annotation: (150-200 words recommended)	Aquatic vegetables such as Water spinach (Ipomoea aquatica), Water Mimosa (Neptunia oleracea), Cambodian mint (*Polygonum odoratum)* and others are intensively cultivated especially in South-East Asia. In this region they are important part of human diet. The same situation is in Cambodia. The numerous plots located around wetlands in peri-urban Phnom Penh, are important sources of edible aquatic vegetables for the city and other areas of Cambodia. Farmers in several wetlands near Phnom Penh make a good living by growing vegetables and selling them in local markets for human consumption. These vegetables, however, pose serious health hazards to consumers, since they are grown using wastewater, much of it polluted with heavy metals from industries as well as additional fertilizers and pesticides are also heavily applied. A cross-sectional study of pesticide handling practices and self-perceived symptoms of acute pesticide poisoning was conducted using questionnaire-based interviews with 89 pesticide sprayers in Boeung Cheung Ek (BCE) Lake, Phnom Penh, Cambodia. The study showed that 50% of the pesticides used belonged to WHO class I + II and personal protection among the farmers were inadequate (Jensen et al., 2011). Up to 80 % of Phnom Penh's domestic wastewater is pumped into the lakes of Phnom Penh, together with industrial and chemical

	effluents from a growing industrial sector. Thus the main objective of this research is to monitor the consumer behavior and growing practices of selected aquatic vegetables in peri-urban areas of Phnom Penh in Cambodia. Further a representative sample collection and analyses with respect to contamination by potentially toxic elements (PTEs) such as Cd, Cu, Ni, Pb, Sb, Zn and other pollutants such as pesticides will be done. Finally a human health risk assessment will be publish based on key indicators such as the Target Hazard Quotients (THQ).

3. Topic:	**Influence of drying method on capsaicinoids content from different Capsicum species**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Jan Banout, Ph.D.
Supervisor-consultant:	Ing. Klára Urbanová Ph.D.
Prospective funding:	Internal grant agency,
Annotation: (150-200 words recommended)	Chili peppers from different *Capsicum* species are used worldwide in foods for their pungent flavor, aroma, and to prolong food spoilage. With different capsaicin contents a different varieties offer a wide range of options for people all over the world. The food industry often relies on food additives to suppress microbial growth. Foods are commonly preserved by compounds such as nitrite, sodium benzoate, and sodium metabisulfite that have been tested and proven safe. However, there are occasional reports of allergic reactions. Natural preservatives such as essential oils isolated from some plant sources have been found to be effective antimicrobial agents. Similarly the research is underway to determine the potential for the application of chili pepper extracts in the food industry in place of artificial preservatives. As many other products the chilli papers are usually processed by drying for its preservation. A limited number of studies were focused on the influence of drying method on capsaicinoids content in chilli peppers. Furthermore up to now a limited number of *Capsicum* species and chilli varieties were subjected to the investigation of drying process and its influence on final capsaicinoids content. Thus the main objective of this research is to investigate the influence of different drying methods (cabinet drying, solar drying and freeze drying) on the final content of capsaicinoids in *Capsicum* species. More than 70 varieties of different *Capsicum* species will be subjected to the investigation in this study. The antibacterial effect of natural extracts from fresh and dried varieties of chilli peppers will be tested as well.

4. Topic:	**Influence of drying pre-treatments on final organoleptic and physical properties of dehydrated products**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Jan Banout, Ph.D.
Supervisor-consultant:	Ing. Helga Hernandez Ph.D.
Prospective funding:	Internal grant agency,
Annotation: (150-200 words recommended)	Pretreatments, such as blanching, dipping and sulfating are common in most drying processes to improve product quality or process efficiency. The main objective of using blanching is to inactivate enzymes in products such as polyphenoloxidases (PPO) and peroxidase (POD) enzymes, which cause deterioration reactions, off-flavor and undesirable changes in color. Other purposes of blanching include the destruction of microorganisms,acceleration of drying rate by expelling intercellular air from the tissues, softening the texture or by

	dissociating the wax on the products skin, and forming of fine cracks on skin of products. In recent years, exhaustive efforts have been made for an improvement in the quality retention of dried products by altering processing strategy and/or pretreatment. Thus the main purpose of this topic is to use modified dips and blanching pretreatments and investigate their influence on product quality and drying kinetics.

5. Topic:	**The influence of intensive agriculture practices on coral reef resilience in Sumatra**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Ing. Jan Banout, PhD
Supervisor-consultant:	
Prospective funding:	Internal grant agency (FTA, CULS)
Annotation: (150-200 words recommended)	In coral reef damage it is usually difficult to discern the different synergically acting stressors resulting i.a. from climate change, pollution, overfishing but the long-term effects of euthropication on inner shelf coral reefs has been reported in Florida or Great Barrier Reef. Poor ocean water quality caused by anthropogenic activity plays an important role in lowering the thermal tolerance (i.e. bleaching resistance) of symbiotic reef corals and there is a reported biophysical linkage between terrestrially-sourced dissolved inorganic nitrogen amount and the upper thermal bleaching thresholds of inshore reefs. On inner shelf coral reefs new inputs of nitrogen and phosporus come primarily from terrestrial runoff which is associated with massive use of fertilizer on cropping land that tend to be located in the close proximity of the coast. The aim of the topic is to identify reef locations that exhibit lower resistance to thermal bleaching and explain the change in thermal-tolerance threshold by poor water quality caused by intensive agriculture. The study will be based on measuring the concentrations of terrestrially-sourced nutrients together with underwater observation of coral reef condition. These measures and observations will be conducted in intensive agricultural areas (river deltas) and in no agriculture areas and these areas will be compared subsequently.

Department:	**Department of Crop Sciences and Agroforestry**

1. Topic:	**Ecology of arbuscular mycorrhizal fungi in the domestication of edible plants in the tropical Andes**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Ing. Bohdan Lojka, Ph.D.
Supervisor-consultant:	Mgr. Martina Janoušková, Ph.D., Inst. of Botany, Czech Academy of Sciences
Prospective funding:	IGA FTZ, CIGA, student scholarship
Annotation: (150-200 words recommended)	The tropical Andes are an important source of biodiversity including numerous plant species nowadays utilized as food. However, plant domestication has been one of the causes for decreasing biodiversity in these ecosystems. At present, conventional agricultural practice includes the use of chemical fertilizers and pesticides with negative impact on soil quality. Organic farming systems are less deleterious, but still lead to considerable losses in biodiversity and ecosystem services. Soil-dwelling arbuscular mycorrhizal fungi (AMF) form association with the majority of plant species and, by facilitating plant phosphorus uptake as the main benefit, constitute a functionally important group of microorganisms especially in

	tropical soils. AMF communities are sensitive to vegetation structure and physico-chemical soil characteristics. Changes in AMF diversity and community composition may impact on the functionality of the symbiosis. However, studies addressing these two important characteristics of mycorrhizal symbiosis simultaneously are scarce, especially in tropical soils. The objective of the proposed thesis is to determine the effect of plant domestication in the tropical Andes on mycorrhizal symbiosis: the taxonomic diversity of root colonizing AMF communities and their functionality in terms of mycorrhizal effects on plant nutrient uptake and growth. At least two native plant species will be studied in secondary forests, organic and conventional agricultural systems. The methodology will include 1) analysis of prevalence and diversity of AMF in field-sampled root and soil samples by microscopy and NGS; 2) determination of the infectivity and efficiency of the AMF communities in greenhouse and in-situ experiment. The results will render essential background information for potential management of AMF communities in the agricultural systems, which is considered a promising strategy to increase crop phosphorus acquisition efficiency.

2. Topic:	**Would planting trees in the agricultural landscape improve soil health trough Arbuscural Mycorrhizal Fungi (AMF)?**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Bohdan Lojka, Ph.D.
Supervisor-consultant:	Prof. Robert L. Bradley, Ph.D., University of Sherbrook, Canada
Prospective funding:	University of Sharebrook, Canada
Annotation: **(150-200 words recommended)**	Brassica rapa is a major oilseed crop in both the whole Northern Europe, but also Northern U.S and Canada. Distinguishing features of B. rapa are its non-mycorrhizal roots and tissues that contain glucosinolates. Both of these features, combined with continuous monocropping, are expected to decrease the abundance of arbuscular mycorrhizal fungi (AMF) in soil because: (1) AMF are obligate symbionts and, therefore, cannot grow and multiply in the absence of a host plant, and (2) glucosinolates that are released in soil may be catabolized to produce fungitoxic derivatives. While a decrease in AMF abundance should not pose a problem for B. rapa, it is expected to induce stress in other mycotrophic crops grown in rotation with B. rapa (e.g. barley or wheat). In fact, most agronomic crops rely on the AMF symbiosis to enhance nutrient uptake, drought resistance and protection against root pathogens. Several fast-growing trees, such as poplars (Populus spp.), also form symbiotic associations with AMF. We hypothesize, that if intercropped with B. rapa, poplars roots could maintain a long-term presence of active AMF biomass. Hence, poplar roots could provide a “nursery” of AMF inocula in soils for mycotrophic crops grown in rotation with B. rapa. The research will attempt to demonstrate these phenomena through a series of field, microcosm and laboratory studies. The results are expected to provide strong science-based arguments for the implementation of tree-based intercropping systems in temperate climates.

3. Topic:	**Morphological and genetic diversity of tropical agroforestry trees**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Bohdan Lojka, Ph.D.

Supervisor-consultant:	doc. Mgr. Bohumil Mandák, Ph.D. (ČZU v Praze a AV ČR – Botanický Ústav)
Prospective funding:	IGA FTZ, CIGA, student scholarship
Annotation: (150-200 words recommended)	Tropical regions contain high tree species diversity, but most of these tree species were never intensively studied. On the other hand, high number of native tropical trees are used by local population for their useful products and services, such as fruit, timber, fuelwood, medicine, fodder etc. The sources of germplasm of those semi-domesticated multipurpose trees are usually unknown and their further domestication could help the farmers to increase their production. Moreover the genetic pool of the species can be narrow by selection by farmers and thus there is an urgent need to find useful strategies for conservation of their genetic diversity. In the last decade, there has been an enormous increase worldwide in the use of molecular marker methods to assess genetic variation in trees. These approaches can provide significant insights into the defining features of different taxa and this information may be used do define appropriate management strategies for species. The results from molecular marker research are very limited to date for tropical trees and especially for the tropical agroforestry species. The objective of this thesis is to evaluate morphological and genetic diversity of selected agroforestry tree species. The specific objective is to investigate relationships and to characterize the level and structure of genetic variation of selected tree populations (e.g. differences among wild and domesticated populations of the species). The study will include on-site collection of morphological data, tissue samples of selected species and then laboratory analysis at the CULS molecular genetic labs. The marker techniques will be based on the polymerase chain reaction (PCR). The results could help us to identify appropriate strategies for selected species germplasm conservation and future domestication.

4. Topic:	**Value of agroforestry for biodiversity conservation**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Bohdan Lojka, Ph.D.
Supervisor-consultant:	doc. RNDr. Josef Raichard, Ph.D. (JČU), Thomas J. Greevy Ph.D. (University of Rhode Island)
Prospective funding:	IGA FTZ, CIGA, student scholarship
Annotation: (150-200 words recommended)	Tropical forests contain some of the highest biodiversity of flora and fauna in the world. However, biodiversity at all scales is increasingly threatened by a variety of human-induced structural impacts. Replacement of native forest through clearing for agriculture continues to be a major issue worldwide. The agroforestry, renowned for their high tree-species richness and complex vegetation structure, stands out as promising biodiversity conservation tools. A number of studies confirm that agroforestry systems are able to conserve biological diversity. The objective of the proposed research is to assess the potential impact of agroforestry on biodiversity conservation in selected tropical region. We focus on relating habitat and animal diversity (various taxa) in selected agroforestry systems as compared with primary and secondary forests and agriculture. To assess the vegetation structure and diversity, we will choose number of representative sites in agroforestry and other habitats. On each site one defined plot will be located and vegetation structure (tree, low and high shrub and herbaceous layer) will be sampled

	and analyzed according the standard methods. The sampling of selected taxa of (in)vertebrate species richness and diversity will be conducted on the same sampling plots in all land-use systems, according to appropriate methodology that is used for catching and observing the different animals (e.g. insects, birds, mammals, amphibians, fish etc.). Animals will be trapped, identified, morphometric and reproductive measurements taken, and a tissue or mouth swab sample taken for later DNA analysis. The data collected on vegetation and animals will be analyzed with statistical models and traditional biodiversity analysis tools. The outputs of the proposed research will be: 1. Assessment of animal diversity in selected taxons; 2. Evaluation of the capacity of agroforestry to support natural biodiversity; 3. Determination of which habitat parameters are important to animal diversity; 4. Determination of phylogenetic and taxonomic relationships; and/or 5. Value of that biodiversity of integrated pest and crop management. This research will increase our knowledge about biodiversity conservation in tropical agroecosystems and help determine the value of ecosystem services of these systems.

5. Topic:	**Agroforestry tree domestication among farmers in selected region (country)**
Study Programme:	Tropical Agrobiology and Bioresources Management
Supervisor:	doc. Ing. Bohdan Lojka, Ph.D.
Supervisor-consultant:	Prof. Dr. Ir. Patrick Van Damme (Ghent University)
Prospective funding:	IGA FTZ, CIGA, student scholarship
Annotation: (150-200 words recommended)	The trees are indispensable part of agricultural systems, especially in tropical countries. The multi-purpose trees (MPT) provide farmers with wide variety of products and services and these so called agroforestry systems (AFS) are traditionally practiced almost exclusively by small-scale farmers. The aim of this study is to better understand the diversity of woody species, their uses, importance, state of domestication and preferences among farmers in selected region or country. Knowing the preferences, any domestication efforts should be able to better address the needs of these people and their land use systems. Possibly resulting increased land cover dedicated to AFS due to wider adoption of these could help in the fight against global land degradation. The first objective of this study is prioritization of MPT species preferred by farmers in selected region(s) of and the comparison of the results with previous studies to check if and how preferences of farmers have changed. Among the secondary objectives of the work is the evaluation of how these preferences differ between regions, characterization and description of highly valued native tree species and their products, their presence on farmers' fields, silvicultural management, germplasm availability, pest and disease-related problems, traits desired by farmers and their incorporation within AFS. The methodology of the data collection will be based on a number of classical ethnobotanical approaches and manuals published by ICRAF (World Agroforestry Centre).

6. Topic:	**Microspore culture, embryogenesis and doubled haploid induction in *Brassica carinata*, *B. juncea* and *Eruca sativa***
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Dr. Ing. Eloy Fernández Cusimamani
Supervisor-consultant:	Ing. Miroslav Klíma, Ph.D.

Prospective funding:	Project NAZV QJ1510172 and RO0417 (Crop Research Institute in Prague)
Annotation: (150-200 words recommended)	The family Brassicaceae is very diverse and includes many crops worldwide. Some of them are grown also in tropical and subtropical climate as important oilseeds, vegetables or spices. Such crops include, for example, Abyssinian mustard (*Brassica carinata* A. Braun), Indian mustard (*B. juncea* L.) or Rocket (*Eruca sativa* L. (Mill.)). New cultivar development through traditional breeding usually takes 7-9 years. Progressive biotechnological approaches, such as regeneration of completely homozygous plants from microspore embryos under *in vitro* conditions, can contribute to significant shortening of the whole process. By using the doubled haploid method, it is also possible to create such genetic combinations that are difficult to obtain by conventional techniques. The main aim of the Thesis will be to introduce, optimize and apply microspore culture technique in selected important members of the family Brassicaceae and the subsequent regeneration of genotypes with the required parameters.

7. Topic:	**Induced polyploidization *in vitro* of selected medicinal plants**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Dr. Ing. Eloy Fernández Cusimamani
Supervisor-consultant:	doc. Ing. Pavel Klouček, PhD.
Prospective funding:	
Annotation: (150-200 words recommended)	Mitotic polyploidization in vitro is widely used method which allows getting various breeding goals (e.g. higher yields, change of chemical composition, equalizing of ploidy level etc.).The main objective of this PHD thesis is to get plants with new physiological, morphological, anatomical and biochemical characteristics. Induced polyploidization will be realized by oryzalin (antimitotic toxin) application on nodal (germinating plants) cultivated in in vitro conditions. The direct method (chromosome counting) and indirect method (flow cytometric assessment of nuclear DNA content) will be used as control of polyploids. Via mentioned mitotic polyploidization in vitro we can get a new breeding material.

8. Topic:	**Induced polyploidization *in vitro* of selected ornamental plants**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Dr. Ing. Eloy Fernández Cusimamani
Supervisor-consultant:	Ing. Jana Šedivá, Ph.D. (Výzkumný ústav pro krajinu a okrasné zahradnictví)
Prospective funding:	
Annotation: (150-200 words recommended)	Mitotic polyploidization in vitro is widely used method which allows getting various breeding goals (e.g. higher yields, change of chemical composition, equalizing of ploidy level etc.).The main objective of this PHD thesis is to get plants with new physiological, morphological, anatomical and biochemical characteristics. Induced polyploidization will be realized by oryzalin (antimitotic toxin) application on nodal (germinating plants) cultivated in in vitro conditions. The direct method (chromosome counting) and indirect method (flow cytometric assessment of nuclear DNA content) will be used as control of polyploids. Via mentioned mitotic polyploidization in vitro we can get a new breeding material.

9. Topic:	**Antimicrobial activity and chemical composition of essential oil-bearing tropical plants against microorganisms causing spoilage of agricultural products**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	prof. Ing. Ladislav Kokoška, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	Tropical plant taxa are important industrial sources of essential oils (EOs). For example, plants belonging to the Eucalyptus genus are known to contain more than 200 various types of EOs, which are commonly used in various agricultural applications. Despite the great economical potential of essential oil-bearing tropical plants, a number species endemic in tropical regions have not systematically been investigated for their chemical composition and biological effects. In frame of this thesis, the antimicrobial activity of EOs and their constituents from tropical plants selected based on chemotaxonomical and ethnobotanical data will be tested in liquid and vapour phase using broth microdilution volatilisation method against broad spectrum of bacterial (e.g. representatives of genera *Corynebacterium*, *Erwinia*, *Pseudomonas*, and *Xanthomonas*) and fungal (e.g. *Aspergillus* spp., *Fusarium* spp., and *Penicillium* spp.) pathogens of agricultural crops and plant foods. The chemical composition of the most effective EOs will be characterized using gas chromatography/mass spectrometry. The supposed results of the thesis can be used for development of new bio-agents for control pathogenic microorganisms causing spoilage of agricultural products. In addition, the result will deepen the knowledge on chemical composition and biological effects of essential oil-bearing tropical plants.
10. Topic:	**Antimicrobial effect of essential oils from Southeast Asian plants against bacterial pathogens causing respiratory diseases.**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	prof. Ing. Ladislav Kokoška, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	Respiratory tract infections belong to major health care problems worldwide due to their high morbidity and mortality rates, whereas plant-derived products are an option for treatment and alleviation of their symptoms. Despite the fact that Southeast Asia is rich genetic centre essential oil-bearing families such as Myrtaceae, Myristicaceae, Piperaceae and Zingiberaceae, many endemic species belonging to these families remain phytochemicaly and pharmacologically unexplored. In frame of this thesis, the antimicrobial activity of EOs and their constituents from Southeast Asian plants selected based on chemotaxonomical and ethnobotanical data will be tested in liquid and vapour phase using broth microdilution volatilisation method against broad spectrum of bacterial pathogens causing respiratory infections such as *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. The chemical composition of the most effective EOs will be characterized using gas chromatography/mass spectrometry. The supposed results of the thesis can be used for development of new herbal-based pharmaceutical preparations and may

	contribute to low-cost and sustainable control of food-borne diseases in Southeast Asia. In addition, the result will deepen the knowledge on chemical composition and biological effects of essential oil-bearing plants.

11. Topic:	**Antimicrobial activity of Cambodian medicinal plants.**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	prof. Ing. Ladislav Kokoška, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	It is estimated that there are about 350 generic infectious diseases in the world today, whereas more than half of them are potentially endemic to Cambodia. Thus, alleviating the burden of major infectious diseases is one of the main concerns of the health sector in the region. In Cambodian folk medicine, the use of anti-infective herbal preparations has great tradition in many regions of the country. Despite this rich tradition, the anti-infective potential of herbal preparations used in Cambodian traditional medicine has poorly been studied by modern laboratory methods. In frame of this thesis, the antimicrobial activity of crude extracts and their constituents from medicinal plants used in folk medicine for treatment of infectious diseases will be tested using broth microdilution methods against broad spectrum of microorganisms. The chemical composition of the most prospective extracts will be characterized using high-performance liquid chromatography and mass spectrometry and nuclear magnetic resonance spectroscopy. The supposed results of the thesis can be used by food, pharmaceutical and cosmetic industries for development of new herbal-based food, pharmaceutical and cosmetic preparations. In addition, the result may contribute to low-cost and sustainable control of communicable diseases in Cambodia.

12. Topic:	**Antimicrobial effect of medicinal plants used in Philippines for treatment of food-borne diseases.**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	prof. Ing. Ladislav Kokoška, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	The Philippines continues to witness outbreaks of food-borne infections like cholera, salmonellosis and shigellosis. In many regions of the country, there is great tradition of anti-infective herbal preparations use in folk medicine. Despite this rich tradition, the possibilities of development of new modern anti-infective products based on herbal preparations used in Philippian traditional medicine have poorly been studied. In frame of this thesis, the antimicrobial activity of crude extracts and their constituents from medicinal plants used in folk medicine for treatment of infectious diseases will be tested using broth microdilution methods against broad spectrum of microorganisms. The chemical composition of the most prospective extracts will be characterized using high-performance liquid chromatography and mass spectrometry and nuclear magnetic resonance spectroscopy. The supposed results of the thesis can be used by food, pharmaceutical and cosmetic industries for development of new herbal-based food, pharmaceutical and cosmetic preparations. In addition, the

	result may contribute to low-cost and sustainable control of food-borne diseases in Philippines.

13. Topic:	**Ehnobotany among indigenous people Orang Asli in peninsular Malaysia**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Shamsul Khamis, Ph.D. (UKM, Malaysia)
Prospective funding:	Erasmus credit mobility programme, Ekhagastiftelsen Foundation
Annotation: (150-200 words recommended)	Previous ethnobotanical studies from Malaysia demonstrates a remarkable significance of wild food plants as an intangible cultural heritage in the area where local flora has contributed to local people's dietary diversity. Seventy species of wild edible herbs and over 500 wild fruit species were documented in the area so far. However, none of the previous studies used quantitative analysis of ethnobotanical data neither the analysis of food medicine/medicinal food aspect. This study should contribute to the preservation of the traditional knowledge in the country, which continuously experience losses of folk knowledge due to increasing deforestation, integration into mainstream society and urbanization. It can be assumed, that people in this region still gather wild food plant species, predominantly wild fruits and vegetables. Although living in biodiverse-rich environment, people tend to use common wild plant species for food. The aim of this study is to conduct an in-depth ethnobotanical survey, aimed at documenting uses of wild food and medicinal plants among Orang Asli people living in different plant ecosystems in peninsular Malaysia, using modern ethnobotanical methods. The Royal Bellum Natural Reserve in the north of the peninsula has been proposed as a main study site. It is expected to retain important reservoirs of ethnobotanical knowledge, bearing in mind its unique biological as well as cultural richness in the context of a relatively small, developed tropical country. Thesis aims (1) To record the traditional knowledge on wild food plants among Orang Asli in different plant ecosystems, (2) to determine the most culturally important plant species, botanical families and food categories, (3) To identify promising underutilized food species and medicinal foods, (4) To analyze collection patterns in the context of plant species conservation, (5) To compare the diversity of wild food plants and their uses between different biomes and ethnic groups.

14. Topic:	**The wild, indigenous, underutilized fruit tree species (Xerospermum noronhianum (Blume) Blume: Sapindaceae): Domestication, utilization and conservation**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Dr. Tran Thi Hoa
Prospective funding:	Institute of Agricultural Genetics, Center for Biodiversity and Biosafety and local government in HLNR provide financial support on field trips an meals during the field trips in Vietnam.
Annotation: (150-200 words recommended)	Buffer zone of Huu Lien Nature Reserve (BZHL) is among the poorest in the province (Lang Son) and food security problems are severe. Fruit trees are essential in the diets of rural people in these areas, providing: i) nutrients and vitamins to diets otherwise dominated by upland rice and maize; ii) food at times where stocks of annual crops are low; iii) sources of income

	through commercialisation. Despite the generally accepted importance of trees, most food security programmes focus on cereals. The potential of fruit trees is under-utilised. Xerospermum noronhianum, locally known as ké (leech's longan) is a multipurpose fruit tree species of high economic importance, native to the limestone forests of Vietnam. This species along with lychee (Litchi chinensis Sonn) belong to the Sapindaceae family. The fruits of X. noronhianum are edible, with a sweet and pleasant taste, resembling those of Nephellium lappaceum, another Sapindaceae species that yields the commercially important rambutan tropical fruit. The fruit of X. noronhianum is too small to be of any commercial value, but the species is a source of medicines against diarrhea, stomach pains and Alzheimer disease. This project aims to: i) increase food security and livelihoods for people in BZHL through facilitating access to knowledge about and germplasm of fruit tree species with focus on X. noronhianum; ii) fully training marketing agricultural production including domestication of ethno-botanic productions adapted to environmental change, their product geographical indicator (PGI; iii) Conservation guidelines for conservation and sustainable use. We require a representative group of plants with well established in traditional cultivation and uses, rich in species occupying a wide range of terrestrial habitats. If this can be done for a genus that is part of an extensive continental flora, then inferences relevant to conservation and land management will be well grounded. The student will: i) collect data on the species, uses (medical and other uses), ethnobotanical data including traditional knowledge in cultivation in Nung, Dao and Kinh communities; ii) collect data on cultivation conditions (eco-agricultural data) for domestication; iii) collect data on conservation status of the species to promote conservation guidelines. We concentrate our investigation on two local landscapes within BZHL: 1) Huu Lien lime stone in Huu Lung commune; and 2) Yen Thinh buffer zone. These provide complementary case studies in distinct floristic regions differing in postglacial vegetation history, soils, climate and disturbance regime.

15. Topic:	**Diversity, nutritive value and local preference of some tropical underutilized plant species**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Dr. Luisa Custódio (Centro de Ciências do Mar, MarBiotech group, Faro, Portugal)
Prospective funding:	IGA FTZ, Christensen Fund, Erasmus plus programme
Annotation: (150-200 words recommended)	It is generally argued that neglected and underutilized crops can significantly contribute to secure qualitative as well as quantitative nutrition of millions of people. Tropical areas are great reservoir of plant resources, which are now under threat due to deforestation and subsequent degradation of the cleared land. Among these species several plants with significant nutritive value and intraspecific variability occur being utilized by natives in times of food scarcity or they are simply underutilized due to several reasons thus their diversity and nutritive potential remains unknown. The scientific neglecting of these species could lead to continual decrease of their genetic variability, which can limit their use potential for human nutrition as well as human medicine as a source of

	bioactive compounds. The study will include several cultivated as well as wild species, e.g. *Musa* spp. The plant material will be characterized from the point view of morphological and genetic diversity, nutritive value, and sensoric characteristics.

16. Topic:	**Diversity, properties and management of underutilized root and tuber crops in the Peruvian Amazon**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Gisella Cruz García, Ph.D. (CIAT, Cali, Colombia) María Elena Chuspe Zans (UNIA, Pucallpa, Peru)
Prospective funding:	IGA FTZ, FINCyT (Peru), EULALINKS Erasmus programme
Annotation: (150-200 words recommended)	It is generally argued that neglected and underutilized crops, often conserved through use in local rural or even marginal agroecosystems, can significantly contribute to secure qualitative as well as quantitative nutrition of millions of people. The Amazon basin is a great reservoir of plant resources, which are now under threat due to deforestation and subsequent degradation of the cleared land. Among these species several plants with edible roots and tubers occur being utilized by natives in times of food scarcity or they are simply underutilized due to cultivation of popular "boom" crops such as Inca peanut or *Myrciaria dubia*. The scientific neglecting of these edible roots and tubers could lead to continual decrease of their genetic variability, which can limit their use potential for human nutrition as well as human medicine as a source of bioactive compounds. The study will include several species, e.g. *Dioscorea trifida, Dioscorea bulbifera, Calathea allouia, Xanthosoma sagittifolium, Colocasia esculenta, Canna edulis, Pachyrrhizus ahipa*, etc. The species will be characterized from the point view of morphological and genetic diversity, nutritive value, and traditional use and management.

17. Topic:	**Ethnobotany and conservation of Sacha mango (*Grias peruviana*, Lecythidaceae) in the Amazon**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Prof. Dr. Ir. Patrick Van Damme
Prospective funding:	IGA, CIGA, Eulalinks
Annotation: (150-200 words recommended)	It is generally argued that neglected and underutilized species can significantly contribute to secure qualitative as well as quantitative nutrition of millions of people. The Amazon basin is a great reservoir of plant resources, which are now under threat due to deforestation and subsequent degradation of the cleared land. Among these species Grias peruviana is fruit species from the family Lecythidaceae – one the very abundant family in the Amazonian rainforest. This is the semi-domesticated species which is listed in the IUCN red book of endangered plant species. According to our best knowledge this species has not been subjected to any previous comprehensive study of its ecology, ethnobotany and domestication in the context of conservation issues. This study could significantly contribute to the conservation of the species in the wild and to its domestication possibly leading to its conservation through use approach.

18. Topic:	**Ethnobotany of migrant communities in the Czech Republic**

Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	prof. Andrea Pieroni (University of Gastronomic Sciences, Polenzo Bra, Italy)
Prospective funding:	IGA FTZ
Annotation: (150-200 words recommended)	It is often assumed that the demand for traditional plant resources will decrease with increasing welfare, because they will be replaced in time by modern cultivated and synthetic products. Moreover, the reliance on medicinal plants may decline in the long term as modern health care facilities become available. Recent studies on urban ethnobotany, however, contradict these assumptions. Research on the use of medicinal plants by ethnic minorities in EU and in the USA has shown that immigrants generally adhere to their culture and continue their traditional medical practices after emigration. Instead of being replaced by conventional medicine as part of the process of cultural adaptation, the demand for medicinal plants remains, even when modern health care facilities are available. Most immigrants in the Czech Republic have a health insurance so they are able to take full advantage of Czech health care facilities. However, they have probably retained their traditional concepts of health and illness, where also daily diet plays an important role. Consequently, the thesis should answer the following questions: Do these immigrants continue to use herbal medicine and traditional foods from their homeland? If so, for which ailments do they use these plants?

19. Topic:	**Historical ethnobotany of the Czech Republic: an archival research**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Dr. Jiří Woitsch (Etnologický ústav AV ČR)
Prospective funding:	IGA FTZ
Annotation: (150-200 words recommended)	A valuable source of information for the study of ethnobotany is one of the archival collections deposited in the department of documentation and archival collections of the Centre of Scientific Information of the Institute of Ethnology of the Academy of Sciences of the Czech Republic. This neglected collection includes systematically structured information concerning in particular the importance of different plant species in folk culture. It is not only their therapeutic effects, but also their role in social anthropology, the family and the ceremonies or in folk magic. The collection includes local plant names in the dialects as well as links to related botanical collections. This archival study could tell us important information on historical use of plant resources especially in terms of their medical and veterinary applications

20. Topic:	**Informal seed system effect on cultivated diversity in the Czech Republic: conservation and dissemination of neglected/underutilized crops and local landraces**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	prof. Patrick Van Damme
Prospective funding:	IGA FTZ
Annotation: (150-200 words recommended)	International organizations dealing with agriculture and new sources (FAO, Bioversity International, etc.) constantly stress the importance of preserving indigenous local crops and their old and landraces and related wild species. Especially local varieties excel in high genetic variability and bear especially valuable

	genes of resistance to biotic and abiotic stresses. They have so much importance in breeding, genetics and overall food security. In addition, in relation to current climate change, where agriculture is a significant contributor to the growing these crops one of the recommended sustainable agricultural measures to curb climate change. These crops and varieties are in fact a long adapted to local conditions, and in particular showing stable revenues without dependence on agricultural inputs such as mineral fertilizers, pesticides and artificial irrigation. In addition to these benefits represent a significant cultural heritage of the past, which unfortunately nowadays conventional agriculture is declining rapidly into oblivion. Last but not least, local crops are practically commercially non-bred on uniformity, appearance or yield, and therefore contain a substantial amount of original vitamins, trace elements and other biologically active substances that contribute to nutrition and health. This study captures the quantity and diversity of cultivated species distributed by non-profit organization Gengel. Data analysis reveals the most popular species and varieties among growers in the network, including factors affecting the interest of the growers in cultivation of orphan and neglected crops. The study will provide the analysis of plant material flows and return of regional varieties to their original growing areas. The study will focus on the aspects and issues of motivation principle of public seed banks - the return of distributed seeds from growers. The results will reveal the rate of return and the total current interest in this valuable form of cultural heritage among Czech growers. In addition, determining what type of growers are most interested in those resources. This study focused on the expansion of agricultural biodiversity contributes to emphasize the importance of public and community seed banks in the global challenge of saving the gene pool of crops. A more thorough analysis of the spread of local crops, although so far little noticed, is important to the overall understanding of the protection of these resources. Documentation of the functioning of community seed bank network, based on voluntary and non-profit activities of several interested small growers can serve as an example of low-cost sustainable conservation and dissemination of agricultural biodiversity in the developing world, which face a rapid and often irreversible loss of diversity of crops.

21. Topic:	**Survey of *Dalbergia* spp. (Leguminosae) in Vietnam for identifying *Dalbergia oliveri* from a species complex for conservation)**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Dr. Tran Thi Hoa
Prospective funding:	Institute of Agricultural Genetics, Center for Biodiversity and Biosafety and local government in HLNR provide financial support on field trips an meals during the field trips in Vietnam.
Annotation: (150-200 words recommended)	Most tropical ecosystems are characterized by a huge biodiversity that is presently endangered in many countries, hence the need for rapid, accurate and effective ways to document the biodiversity of tropical environments. Identification of Dalbergia sps. for monitoring timber trade (IDMTT) and conservation of species diversity in Vietnam forests has been highly debated. The IDMTT is moreover still not well characterized, particularly the spatial variation of community composition (beta diversity). Four specific aims had been defined: (i) Carrying out

	morphology-based as well as DNA-based studies and evaluate its statistical performance when the diversity is estimated by community samples; (ii) Quantify morphological analyses and sequences of ITS region and matK gene to describe a newly revised taxon (commonly known as the Cẩm Lai) and redefine D. oliveri; (iii) A description of a new-revised species will be presented. Vietnamese Dalbergia oliveri or Cẩm Lai Bông (vernacular name) is native to Vietnam and found in dense tropical evergreen or semi-deciduous forest. It is hard and heavy with a color that ranges from reddish -orange to a deep red, oftentimes with dark stripes. The species is a quite valuable timber in SE Asia and in the Indochina region. It is currently is listed in the IUCN Red List (A1cd) and meets the criteria for CITES category II Bi since it is at risk of extinction due to illegal logging and deforestation. However, the identification of this species remains problematic until now, hindering its conservation. The aim of this study is therefore to apply morphologyand DNA-based taxonomic identification methods to try to overcome this problem and to complete a taxonomic revision of the D. oliveri species complex. The student will: i) collect plants and making specimen vouchers; ii) morphological identification; iii) applying DNA-based taxonomic identification methods such as using sequences of ITS region and matK gene to describe a newly revised taxon. Study Localities: We concentrate our investigation on three national parks namely Chumomray, Cat Tien and Chuyansin National Parks.

22. Topic:	**Origin evolution and diversity of Cà Te *Afzelia* spp. (Leguminosae): implication for Vietnam forest conservation and sustainable management**
Study Programme:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Dr. Tran Thi Hoa
Prospective funding:	Institute of Agricultural Genetics, Center for Biodiversity and Biosafety and local government in HLNR provide financial support on field trips an meals during the field trips in Vietnam.
Annotation: (150-200 words recommended)	Tropical Rain Forest Forests (TRFF) represent the most diverse terrestrial ecosystems on the planet. Despite the important services they provide, SE Asia TRFF regress in a context of global change. Understanding how TRFF woody species responded to past climate changes and currently meet the increasing human pressure, participate in the prediction of future evolutionary pathway/trajectory and the formulation of appropriate mitigation strategies. This project addresses the genus Afzelia and particularly a complex of species listed under the denomination "pod mahogany". The idea is to model test various hypotheses concerning the impacts of past climate changes (speciation in forest refuges) and current anthropogenic impacts (reduction of genetic diversity). Indeed, the distribution of "pod mahogany " on the continent suggests various adjustments according to ecological gradients, and the quality of their wood makes them priority species for the forest industry. By studying the genetic and ecology of the genus Afzelia, this project aims at: (1) understanding more accurately the ecological factors involved in the mechanisms of speciation, (2) testing the correlation between patterns of genetic diversity

	and supposed Pleistocene forest refuges, (3) assessing the impacts of selective exploitation of timber on intraspecific genetic diversity. Strategies for conservation and sustainable management can be deduced from the results of this study. The investigation will be conducted in three national parks namely Chumomray, Cat Tien and Chuyansin.

23. Topic:	**Traditional agroforestry systems in Kyrgyzstan: implications for biodiversity conservation in the Central Asia**
Field of study:	Tropical Agrobiology and Bioresource Management
Supervisor:	doc. Ing. Zbyněk Polesný, Ph.D.
Supervisor-consultant:	Dr. Georgy Lazkov (botanist, Academy of Sciences of the Kyrgyz Republic) Dr. Niels Thevs (landscape ecologist, World Agroforestry Centre, Senior scientist Coordinator central Asia programme)
Prospective funding:	IGA FTZ, Christensen Fund, Erasmus plus programme
Annotation: (150-200 words recommended)	While central Asia is traditionally taken to include Kyrgyzstan, Kazakhstan, Tajikistan, Uzbekistan, and Turkmenistan, the greater central Asia region also extends into parts of Afghanistan, northern Pakistan, western Mongolia, and the Autonomous Region of Xinjiang in China. It is characterized by a transitional economy, which in most countries is evolving from a centrally planned to a market economy. They are undergoing a set of structural transformations intended to develop market-based institutions and increase local and global trade, which includes implementing land reform and changing resource tenure arrangements. For the first time in their history, the region's farmers have to make their own decisions, including those to incorporate trees into landscapes and livelihoods. But the environment in which these decisions must be taken is anything but static. Climate warming, socioeconomic transformation and other factors are projected to lead to dramatic changes in water resources, land use, land cover, soil moisture and soil fertility, and to the frequency and amplitude of extreme events. Woody vegetation is already invading alpine rangelands, and extreme events are becoming more frequent, while development pressures on water, land and energy are increasing relentlessly. These changes present smallholder farmers with opportunities as well as threats. But many, particularly the disadvantaged, face a growing vulnerability that is made worse by the sluggishness with which regional governments have included local people in decision-making about their water, food and energy futures. It is in that context that the case for agroforestry must be evaluated and, if found promising, made. The services trees provide are widely recognized: they include erosion control, extreme weather buffering, soil fertility, biodiversity protection and income diversification. Each of these is potentially useful in the set of circumstances facing central Asia. For that reason, it is important to assess good examples these services in the central Asian context, to identify the most suitable agroforestry systems and to help development partners zero in on the most promising areas for intervention.

Department:	**Department of Animal Science and Food Processing**

1. Topic:	**Ecology of African ungulates**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Ing. Karolína Brandlová, Ph.D.
Supervisor-consultant:	
Prospective funding:	CIGA
Annotation: (150-200 words recommended)	Large variety of ungulates inhabits all suitable habitats in Africa, antelopes being the most numerous among them. The aim of the proposed dissertation is to explore viability of selected species in savannah ecosystem, especially in the context of spatio-temporal overlap with livestock and agricultural activities which are becoming one of the major threats for the savannah antelopes. The results of traditional (line and point transects, ground census, direct observations) and modern (camera traps, satellite collars, drones) methods will be compared and optimized for a routine use for antelope monitoring and conservation in African savannah.

2. Topic:	**The Geographical Distribution of Parasitic Zoonoses in Europe and Asia: the Role of Wildlife in the Transmission**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Prof. MVDr. Daniela Lukešová, CSc.
Supervisor-consultant:	
Prospective funding:	IGA, CIGA
Annotation: (150-200 words recommended)	The changes in rural landscapes due to urbanization have a huge impact on the transmission of zoonotic parasites. Since many wildlife species are unable to adapt to these alterations in their environment (decline of biodiversity in areas of urban development), in contrast, some wild animals are attracted to peri-urban and urban habitats (e.g. availability of an abundant food supply). In many areas composition of wildlife communities differs between rural and urban areas. Some of these highly adaptable species are also hosts for a number of parasites of public health and veterinary importance (e.g. toxoplasmosis, toxocarosis, alveococcosis, trichinellosis, taeniosis/cysticercosis etc.) More than 80% of human diseases are of zoonotic origin. It will be important to understand the dynamics between wildlife and domestic animal species and human population. The main objective of this thesis is focused on the risk factors for various helminths with zoonotic potential from contrasting types of urbanized areas. Ecological changes significantly contributed to these trends: the high wild animal population and the high density of freely roaming predators (Canidae, Felidae) maintain a permanent infection pressure of these and other parasites. The direct method (necropsy of animals) and indirect method (serological investigation) will be used due to close cooperation with the State veterinary institutes in the Czech Republic, where we have got a strong support to solve this problems (e.g. study of interactions of vectors, reservoir hosts, the transmission of pathogens to humans and/or domestic animals, prevalence of diseases, biosecurity plans, etc). The supposed results can be used by: veterinary authorities (planning and implementing of effective prevention strategies and a close collaboration between veterinary and public health professionals in a 'One Health' concept); veterinary and pharmaceutical industries (monitoring the effectiveness of

	suitable therapeutic animal products); public health professionals (knowledge of prevalence of antibodies in animal population and health risks for humans) in different regions of the Czech Republic and EU countries.

3. Topic:	**Characterization and improvement of the meat, goat and wool production of the local breed Meriz goat in Kurdistan**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Francisco Ceacero Herrador, Ph.D.
Supervisor-consultant:	
Prospective funding:	Application to CIGA.
Annotation: (150-200 words recommended)	Meriz goats are an important agricultural resource in Kurdistan, since it is well adapted to the harsh conditions of the area. Their outercoat fibres are used in the manufacture of the Kurdish national costume, and additionally it is a source of meat and milk. The breed has not been adequately genetically characterized yet, information about their performance is scarce, and no attempt has been done to enhance its productivity following a scientific approach. The first goal of this thesis will be to characterize the current traditional husbandry techniques, main feedstuffs used, meat, milk and wool production, and an analysis of the market prices of these products. Several farms will be involved in observational studies where growth curves (average daily gains, maximum efficiency to slaughter weight, conversion rates, etc.), lactation curves, and wool production curves will be calculated. This information will be collected during the first two years. Thereafter, and according to the weaknesses in the production systems detected before, a set of experiments will be conducted in order to improve the observed production curves. These experiments will be mainly focused on the supplementation of the diet with certain key by-products available in the area at low cost.

4. Topic:	**Development of analytical methods for detection of history of populations**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Francisco Ceacero Herrador, Ph.D.
Supervisor-consultant:	Mgr. Barbora Černá Bolfíková, Ph.D.
Prospective funding:	Project is partially funded by TACR gama and CIGA
Annotation: (150-200 words recommended)	For sustainable management of bioresources, it is necessary to have detail knowledge about history of managed population, population structure and relatedness of individuals which are under the management. Such knowledge is essential under all possible climatic conditions including tropical ecosystems. Detection of population structure without any a priori knowledge of assignment of individuals may be solved by various methods like Bayesian clustering analyses or others. Results of these analyses may be tested and interpreted according to the biology of the tested species/populations. The most crucial part of this process is a marker selection. Aim of this project is to propose suitable combination of genetic markers to be able to recognize population structure of closely related groups and also recognize hybrid categories in recent past. Microsatellites and SNPs will be tested for dog breeds of known and unknown origin and for ungulates in captive breeding systems. These methods are applicable for breeders and also for nature protection in recognition of hybrid categories between wild and domestic

	animals, including tropics. Dog model is used because of ongoing project TACR gama and samples from this project may be used for more advanced analyses such as genomics. Free ranging dos which are threatening integrity of wild canids are worldwide problem for example hybridization of Ethiopian wolf with feral dogs. Ungulates are selected because of available specimens in our lab under project of CIGA. Antelopes inhabits various habitats mainly African savannahs but also tropical forests such as Bongo, which is also included in our analyses. We will use Illumina sequencer to detect single nucleotide polymorphisms. Illumina may handle various individuals and species in one run, so the combination of seemingly miscellaneous samples is possible. Project is partially funded by TACR gama and CIGA and is in concordance with targets of the lab of molecular biology of FTA which is research of hybridization events and genome interactions.

5. Topic:	**Nutritional landscape and competence among wild and domestic ungulates in the strictly protected area Gobi B, Mongolia**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Francisco Ceacero Herrador, Ph.D.
Supervisor-consultant:	Mgr. Martina Komárková, Ph.D. Mgr. Jaroslav Šimek, Ph.D. (Prague Zoo)
Prospective funding:	Applications to GAČR and CIGA grants.
Annotation: (150-200 words recommended)	The Great Gobi B Strictly Protected Area is a nature reserve in Gobi desert, south-western Mongolia, established in 1975 and International Biosphere Reserve since 1991. The area comprises a variety of habitats including desert steppe, arid mountains, deserts and semi deserts. Mainly lowlands are used by a variety of wild (Przewalski´s horses, khulans and goitered gazelles) and domestic ungulates (cattle, goat, sheep, horses and camels). Siberian ibex and argalis can be found in the mountains, and maral deer in the surroundings. Such variety of herbivores in a nutritionally poor environment implies important human-wildlife conflicts which may increase in the future because (the strict protection of the wild species is leading to an increase in their numbers). In order to understand competition processes, anticipate conflicts, and ensure wildlife conservation and maximum profitability for local herdsmen it is necessary a deep knowledge of the ecosystem, but this information is missing. Main plant communities have been identified and mapped, but we don´t have a clear idea about carrying capacity of the area or competition among the species. This project includes multiple approaches to achieve these goals. Intensive study of the grasslands will be based on line transects, in order to study plant availability across the area. For each plant detected, 4 specimens will be collected: two for herbarium, one for genetic determination, and one for the preparation of a microhistological library. Faecal samples of the ungulates´ species will be collected during the same fieldwork. Stable isotopes in faeces will be used to study diet overlap. Diet composition will be studied by microhistology and by molecular techniques. Diet selection will be determined by comparison of plant availability and diet selection. Nutritional composition of the most important plants (used and selected) will be determined. Nutritional efficiency of each species will be determined from faecal nutrients. Exclusion parcels will help to understand the

	impact of ungulates on the ecosystem and to determine carrying capacity.

6. Topic:	**Influence of selected amino acids in the performance and ecology of Cervids**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Francisco Ceacero Herrador, Ph.D.
Supervisor-consultant:	Ing. Radim Kotrba, Ph.D.
Prospective funding:	Application to CIGA, ZEMĚ and Vysehrad funds. VVS s.r.o. will be involved as supplier of the necessary feed additives.
Annotation: (150-200 words recommended)	Supplementation of amino acids is a novel research area of great interest for ruminants. It has been traditionally assumed that supplementation is not necessary for them, but that´s far from true. Recent research has shown that Methionine and Lysine are also limiting amino acids for cattle. Lysine seems especially interesting for Cervids because of its important role in the formation of collagen, precursor of bone tissue and therefore of antler. However, in fact we still don't know which are the limiting amino acids for Cervids, which is one of the first goals of this topic. Our preliminary data (we are already working in this topic for the last three years) show interesting results on the effects on body growth, meat quality, antler size and quality, and metabolism of proteins. However, these results are interesting especially from an ecological point of view: deer are not domestic animals subjected to centuries of selection for more productive breeds, but wild species recently farmed; thus, our preliminary results are totally different to those found in other domestic animals, with different patterns of deposition of fat or muscle tissue in different seasons. This thesis will study the role of amino acids in deer nutrition in depth. Different supplementation regimes will be supplied to pregnant fallow deer females, and its effect will be measured both in the hind and the calf at delivery. The experiment will continue during lactation, after weaning and up to the growth of the second antler in some males, and up to the first reproduction in certain females. Body weight, body condition and blood samples will be collected regularly along the experiment. Milk samples will be collected during lactation. Digestive efficiency will be compared among diet-treatments along the different stages of life. Meat quality and carcass traits will be measured at market culling age (around 15 months) after the long term supplementation experiment (in collaboration with the Institute of Animal Science). Sperm quality will be assessed in adult males. Similar experimental setting will be repeated for three years, using different supplementation treatments. The experiment will be replicated in several farms in Czech Republic, Poland and Slovakia, and at least in one population in some tropical country (probably Thailand) in order to detect differences between seasonal and tropical environments. The topic is also relevant for several tropical areas where deer farming is rapidly increasing as alternative food source.

7. Topic:	**Performance of the introduced population of white-tailed deer in the Czech Republic: comparison with other local Cervids and native populations in USA**

Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Doc. Francisco Ceacero Herrador, Ph.D.
Supervisor-consultant:	Ing. Radim Kotrba, Ph.D. Dr. Bronson Strickland (Mississippi State University)
Prospective funding:	Applications to CIGA, ZEMĚ and INTER-ACTION (USA) programs.
Annotation: (150-200 words recommended)	According to the constant population growth and the high antler quality of the white-tailed deer (*Odocoileus virginianus virginianus*) ranging in the Dobříš area (Czech Republic), it seems that this introduced species is doing well. That is surprising, considering the very different conditions in the native area of this subspecies (from Mississippi to Virginia, USA; humid subtropical climate). On the other hand, it is well known the great adaptability of the species to very different habitats (40 subspecies ranging from Alaska to Peru), and great nutritional adaptability (from fully browser to fully grazer, depending of the area). The main goal of this thesis is to clarify the reasons for such good performance in a double way: 1) understand differences with the local cervids, and 2) understand differences with the source animals (*i.e.*, adaptations to the conditions in the new ranging area). For the first goal, an exhaustive sampling will be done on hunted and road killed animals in the study area, including red, fallow, roe and white-tailed deer. For the second goal, similar samples will be collected on hunted white-tailed deer in Mississippi. Samples from captive individuals will be also available from both populations. The collection of samples in Czech Republic was already agreed with local hunters and land owners. The collection of samples from the original populations was already agreed with researchers from the Mississippi State University working with this species for long term. Some of the samples to be collected include: Biometrics (body weight, measurements, condition), antlers (measurements, tomography, mineralization), digestive tract content (parasitic load, nutritional efficiency), ruminal content and fluids (nutritional efficiency, diet by microhistology, pH, microbes spectrum), blood samples (plasma biochemistry), fur (moulting patterns, diet overlap by isotopes, stress hormones), reproductive status (number of foetuses), liver samples (accumulation of heavy metals), external parasites, and a set of samples for the detection of some common diseases in wild cervids.

8. Topic:	**Habitat Use, Prey Preference, and Social Interactions in free roaming large carnivores on Sir Bani Yas Island, UAE**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Prof. RNDr. Pavla Hejcmanová, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	Carnivores cherish their top rank in the food chain and are important indicators of healthy and functional ecosystems. At present, 73 percent of the larger members of this category are endangered globally, therefore increased dedicated efforts for in-situ and ex-situ conservation of these majestic animals are conducted. There are complex challenges towards the management of their feeding habits and natural predatory skills. The failure to adequately address these interventions may result in a severe impact on physiology and behaviour of the animals.

	It is a lot more complicated to maintain the predators in wildlife parks and safaris, where they are allowed to hunt on their own and where there is a mixture of high valued or rare species along with others. In such cases, it is vital to assess which species are preferred for predation compared to the species of particular interest. Sir Bani Yas Island is home to free roaming Northern Cheetah (*Acinonyx jubatus soemmeringii*) and Arabian striped hyaena (*Hyaena hyaena sultana*). These carnivores roam freely and predate at their own will. The proposed study is designed to develop a sound scientific baseline on their prey preference and use of different habitat types in the 4100 ha Arabian Wildlife Park on Sir Bani Yas Island, UAE. The animals will be continuously monitored for their movement, social interaction and predatory habits using direct observations, indirect signs, leftover, carcases and camera traps.

9. Topic:	**Evaluation of feeding and welfare activities of wild animals on Sir Bani Yas Island, UAE**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Prof. RNDr. Pavla Hejcmanová, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	Small or marginal nutritional deficiencies or excesses may lead to reduced fertility, suppression of the immune system and ultimately the death of captive wild animals. Feeding wild animals successfully in captivity requires knowledge of basic nutritional requirements, an understanding of different animal types and digestive physiologies, an appreciation for natural feeding behaviours, a familiarity with appropriate food sources, inter and intra specific conflicts and an awareness of potential diet related ailments. A general perception is that feeding wild animals does not conflict with conservation goals and contribute toward conservation; however, little research has focused on assessing these beliefs. The proposed study is designed to develop a comprehensive scientific baseline on the feeding practices and welfare of ungulate and ratite species on Sir BaniYas Island; including endangered and extinct in wild categories. The study will also provide data on the management of feeding activities and the importance of well-being in semi captive conditions. The study will focus on comparisons of selected species feeding on natural browse and those depending on supplemented feed; ways to reduce competition in mixed exhibits, and effect of enrichment on feeding behaviour and competition. This data will help to provide recommendations for animal husbandry in diverse exhibits and ex-situ conservation projects.

10. Topic:	**Trace elements bioavailability in the nutrition of wildlife**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Prof. RNDr. Pavla Hejcmanová, Ph.D.
Supervisor-consultant:	
Prospective funding:	
Annotation: (150-200 words recommended)	Minerals act in the animal nutrition, reproduction, health and behaviour and perform in animals structural, physiological, catalytic and regulatory functions. Many functions can be performed simultaneously by the same element in the same animal and many take place in both the plants on which herbivores depend and the microbes or parasites that infect

	them. Trace elements such as zinc, copper, selenium, iron and manganese are highly sought-after by animals either in special dietary items or by geophagy of free ranging animals or are supplemented as supplementary mineral licks or feed additives to animals in the human care. The aim of the thesis is to investigate the role and bioavailability of trace minerals in the nutrition of wildlife species of large herbivores in human care. Specific aims will include testing effects of mineral feed supplements containing different concentrations of trace elements the tissue and fur mineral status in diverse species of deer (red deer, roe deer, fallow deer) and bovids (including antelopes) in the human care. The investigation will be conducted in cooperation with deer farms or wildlife reserves.

11. Topic:	**The Improvement of the Meat Production and Veterinary Care for Local Breeds of Small Ruminants in Selected Locations in Pakistan**
Study Programmes:	Tropical Agrobiology and Bioresource Management
Supervisor:	Prof. MVDr. Daniela Lukešová, CSc.
Supervisor-consultant:	Doc. MVDr. Pavel Novák, CSc.
Prospective funding:	IGA FTA CULS Prague
Annotation: (150-200 words recommended)	The Asian continent contributes 61% of the total mutton and goat meat produced in the world (FAOSTAT, 2016). China produces 54% and Pakistan ranks third in Asia for mutton and goat meat production, after India. Sheep and goat production is one of the major economic activities under the arid and semi-arid condition of Pakistan (census: 53.8 million goats and 26.5 million sheep). The main purpose of raising these small ruminants in the country is meat production for local consumption, as well for export. Aim of this project is to describe the traditional approaches to ensuring sustainable rearing of small ruminants (sheep and goats) on selected local Pakistani farms. As the research hypotheses will be defined: Firstly-the reproduction indicators of ewe crossbred will be higher than pure breeds and growth ability of crossbred lambs will be higher than pure lamb breeds. Secondly-the feed conversion and carcass value of crossbred animals will be higher than pure ones. In methodology drinking water and feed sources will be defined; in animals will be regularly recorded: live body weight, feed consumption, average daily gain, nutrient conversion, average slaughter weight, quality of carcasses intended for human consumption and analyzed up to date market meat prices. Based on the results achieved, work will be carried out to improve and enrich the feed ration with supplements from local sources to increase meat yield. Feed production will take place on a farms, seasonal feed will be grown, and palatability will be analyzed based on the choice of animals. Last but not least, the health status of local breeds will be monitored throughout the research, proposals for preventive measures to ensure biosecurity in local breeds of sheep and goats will be recorded. Recommended practices will be transfer to ensure food quality and safety in the food chain. The topic will be solved in cooperation with the Pakistani National Agriculture Research Centre and Institute of Animal Science in Prague, Czech Republic.

12. Topic:	**Development of a Novel HACCP System Implementation to Improve the Management System of Dairy Herd**
Study Programmes:	Tropical Agrobiology and Bioresource Management

Supervisor:	Prof. MVDr. Daniela Lukešová, CSc.
Supervisor-consultant:	Doc. MVDr. Pavel Novák, CSc.
Prospective funding:	IGA FTA CULS Prague
Annotation: (150-200 words recommended)	In the last few decades, dairy farming system has changed dramatically. Despite an increase in the global demand for dairy products, increasing production costs have led to declining profit margins. Furthermore, food diseases occurred mostly from animal originated products, in developed countries have made the consumers lose confidence in food industry; and revealed the inadequacies of traditional methods on food production, processing and marketing and a system necessity for food safety. Production diseases and declining fertility associated with intensification has a negative impact on both profitability and welfare. Bangladesh is a low-lying agro-based country with huge pressure of population of which more than 80 percent of the people live in the rural areas and about 70 percent are directly or indirectly engaged in agricultural operation. Dairy farming play a pivotal role in national economy and fulfillment of nutritional requirement by providing food (milk and meat) for human consumption, draft power and manure for crop production, foreign exchange through export of hides and skin. It also generates employment and income; serve as a saving to poor households. In Bangladesh, bacterial and somatic cell number, fat and protein content in milk are used as important factors in the grading of milk. Therefore, by applying this novel HACCP system in dairy farms farmers strive to minimize bacterial and somatic cell number with higher milk quality to obtain higher raw milk prices from milk processing companies. Moreover, achieved results from this study and suggested approaches from different dairy cattle breeds will be easier to apply due to the identification of CCP in different climatic conditions of dairy cattle with different management systems. Aims of this research: 1.Develop, implement and evaluate HACCP principles in dairy herd health and production management to clarify if this approach may yield better results than conventional methods in Czech and Bangladeshi conditions. 2. To determine the CCPs associated with animals and different environments and distribution of the end products which can affect the quality for human consumption and 3. To suggest the control limits for the different CCPs based on the recommended international standards. Materials and methods in this research will be carried out through compare the quality of raw milk on Holstein cattle farms with a different management and identify critical control points (CCPs) at the risk of infectious pathogens. Data will be collected from state and private dairy farms of different regions of the Czech Republic, before and after the implementation of the HACCP system. Possible changes in the quality of raw milk at different seasons of the year and the impact of different management conditions will also be analyzed. The health status of the herd and compliance with the principles of biosecurity will be evaluated on a regular basis. From each farm, the following data and raw milk samples will be collected monthly basis for this study: milk production quantity (kg/head/day), breeding interval (day/head), weaning period (day/head), somatic cell count in raw milk (cells/mL), number of bacteria in raw milk (cells/mL), milk fat and milk protein content, and monthly expenses for antibiotics. Each milk sample will be analyzed by an automatic milk analyzer for somatic cell count, number of bacteria, and fat and protein content to monitor the effect of microbiological quality on its technological parameters

	that could increase the thermostability or taste properties of treated milk. The topic will be solved in cooperation with the Bangladesh Livestock Research Institute (BLRI) and Veterinary and Pharmaceutical Faculty in the Czech Republic.