



## INTERNATIONAL SUMMER SCHOOL – ZAGREB, CROATIA

„Organic Agriculture : From Field to Fork – OrganicF2F“

# INFORMATION PACKAGE FOR STUDENTS

**PLEASE READ THIS DOCUMENT CAREFULLY**

Dear students,

You are invited to apply for participation on the International Summer School "**Organic Agriculture - From Field to Fork**". Summer school will be held on **English language**. Each student will be awarded with **7 ECTS credits** and Certificate of completion upon finishing the programme.

**WHERE:** Zagreb, Croatia

**HOST INSTITUTION:** University of Zagreb Faculty of Agriculture, Svetosimunska 25, 10000 Zagreb, Croatia

**WHEN:** June 27 – July 15, 2016

**NUMBER OF PARTICIPANTS:** One student per each TEMPUS LIFEADA partner institution. List of partner institutions: <http://lifeada.agr.hr/partners>

**CRITERIA:** Graduate or Postgraduate level, English language minimum B2.

**APPLICATION FORM**

<https://docs.google.com/forms/d/1JulbxnJ6aoJSU6njKoCFpQlgy7YzolebaAjtrnuwPY8/viewform?c=o&w=1>

**APPLICATION DEADLINE:** **June 10, 2016**

**REGISTER HERE!**

**SUMMER SCHOOL COSTS:** **NO COSTS** for students coming from partner institutions within TEMPUS LIFEADA project

Each student will receive **scholarship up to 1.050,00 EUR** for covering the costs of stay/daily allowance (depending on the destination).

**Travel costs** will be covered by the University of Zagreb Faculty of Agriculture.

Students must send scanned pre-invoice for travel ticket (bus, plane, rail) for payment via e-mail [LifeADA@agr.hr](mailto:LifeADA@agr.hr).

**The pre-invoice must be issued on:**

University of Zagreb Faculty of Agriculture

Svetosimunska 25

HR-10000 Zagreb

TEMPUS - LifeADA project

If the pre-invoice is **not issued** as explained we will not be able to cover travel costs.

For more details please contact responsible persons at your home institution (see list below).

List of contact persons at Partner Institutions:

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**ACCOMODATION:**

You are free to find accommodation in private arrangement.


**We recommend** accommodation in **Hostel "Palmers Lodge"** located between Faculty and City Centre. Price range is from 17,00 - 21,00 EUR per person/per night depending on the room type (8, 6 or 4 beds). Private rooms with separate bathroom (max. 3 persons) are available from 55,00 EUR per room/per night. Breakfast available on request - 2,00 EUR per person. For all additional information please go to: <http://palmerslodge.com.hr/>. FB: <http://www.facebook.com/palmerslodgehostelzagreb>. **FOR BOOKING:** [bookings@palmerslodge.com.hr](mailto:bookings@palmerslodge.com.hr) OR <http://www.hostelworld.com/>

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If you need any additional information feel free to contact us on [LifeADA@agr.hr](mailto:LifeADA@agr.hr)!

INTERNATIONAL SUMMER SCHOOL „Organic Agriculture : From Field to Fork – OrganicF2F“				
PROGRAMME				
DAY	DATE	TIME	TITLE OF THE LECTURE	LECTURER
<b>PART I – Organic agriculture</b>				
DAY 1	27.6.2016.	08:30 – 09:00	Dean's welcome speech Summer school coordinator's speech	Zoran Grgić Renata Bažok
		09:00 – 11:00	Introduction to organic agriculture	Ivica Kisić
		11:00 – 13:00	Global ecology	Željka Zgorelec
		13:00 – 14:30	Break	
		14:30 – 16:30	Sampling and data processing in order to provide rational soil use in organic agriculture	Igor Bogunović
DAY 2	28.6.2016.	08:00 – 10:00	Adulteration of bee products as a threat to the ecological beekeeping	Lidija Svečnjak
		10:00 – 11:00	Ecological footprint of aquaculture	Daniel Matulić
		11:00 – 12:00	Challenges in front of recreational fishing	Tomislav Treer
		12:00 – 13:30	Break	
		13:30 – 14:30	Hybrid fishes - problems and solutions	Tea Tomljanović
	14:30 – 15:30	ARE WE LOSING OUR FISH DIVERSITY? Introductions of alien freshwater fish species in Balkans (Europe), risk assessment and the impact of exotic invasions	Marina Piria	
DAY 3	29.6.2016.	08:00 – 10:00	Organic farming and climate change	Darija Bilandzija
		10:00 – 12:00	Organic production of vegetables	Sanja Radman
		12:00 – 13:30	Break	
		13:30 – 15:30	Disease-resistant cultivars as a solution for organic viticulture	Jasminka Karoglan Kontić

DAY 4	30.6.2016.	08:00 – 10:00	The Role of Agriculture and Related Activities in Protected Areas	Aleksandra Perčin
		10:00 – 12:00	Medicinal and aromatic plants: conservation, utilization and use	Zlatko Šatović; Martina Grdiša, Kladija Carović-Stanko
		12:00 – 13:30	Break	
		13:30 – 15:30	<i>Lecture sequel:</i> Medicinal and aromatic plants: conservation, utilization and use	Zlatko Šatović; Martina Grdiša, Kladija Carović-Stanko
<b>PART II – Marketing and Management in organic agriculture</b>				
DAY 5	1.7.2016.	08:00 – 09:00	Marketing trends in agribusiness Overview of world organic food market	Marija Cerjak
		09:00 – 10:00	Market-driven marketing plan for organic agri-food products	Marija Cerjak
		10:00 – 12:00	Market segmentation Organic food consumers' motives and obstacles	Marija Cerjak
		12:00 – 13:30	Break	
		13:30 – 14:30	Product policy and product market combination	Marina Tomić
		14:30 – 15:30	Organic food labelling and certification	Marina Tomić
DAY 6	4.7.2016.	08:00 – 10:00	Students' presentation of the state-of-the-art of organic agriculture in their countries	Marija Cerjak
		10:00 – 12:00	Pricing strategy for organic agri-food products	Marina Tomić
		12:00 – 13:30	Break	
		13:30 – 15:30	Guest Lecturer	 <b>BIOVEGA</b> <a href="http://www.biovega.hr/">http://www.biovega.hr/</a>
DAY 7	5.7.2016.	08:00 – 10:00	Marketing channels for organic agri-food products	Marina Tomić
		10:00 – 12:00	Promotion strategy of organic agri-food products	Marija Cerjak
		12:00 – 13:30	Break	
		13:30 – 14:30	Business results of organic farming in the EU	Josip Juračak
		14:30 – 15:30	Organic farming versus conventional farming: the comparison of business indicators	Josip Juračak

DAY 8	6.7.2016.	08:00 – 09:00	Planning of business projects in organic farming	Branka Šakić Bobić
		09:00 – 11:00	Application of budgeting techniques in the business plan	Branka Šakić Bobić
		11:00 – 12:00	Time preference of money in the assessment of long-term projects	Josip Juračak
		12:00 – 13:30	Break	
		13:30 – 14:30	Assessing the financial viability of projects in organic farming	Branka Šakić Bobić
		14:30 – 15:30	Risk assessment and sensitivity of investments	Josip Juračak
<b>PART III – Plant protection measures in organic agriculture</b>				
<i>a) Entomology</i>				
DAY 9	7.7.2016.	08:00 – 09:00	Non pesticide management of insect pests	Darija Lemić
		09:00 – 10:00	Area wide pest management by mass trapping – ecologically acceptable method of pest control	Renata Bažok
		10:00 – 11:00	Push-pull strategy as alternative (non chemical) measure of pest control	Ivan Juran
		11:00 – 12:00	Sterile Insect Technique	Ivana Pajač Živković
		12:00 – 13:30	Break	
		13:30 – 14:30	Mating disruption - useful method in insect management	Ivana Pajač Živković
		14:30 – 15:30	Botanical insecticides - natural insecticides inside plants	Maja Čačija
DAY 10	8.7.2016.	08:00 – 09:00	Biological pesticides based on pathogenic microorganisms and naturalites	Renata Bažok
		09:00 – 10:00	Entomopathogenic nematodes (EPN)	Dinka Grubišić
		10:00 – 11:00	Systematic and morphology of major orders of natural enemies	Ivan Juran
		11:00 – 12:00	Parasitoid wasps: natural enemies of insects	Maja Čačija
		12:00 – 13:30	Break	
		13:30 – 14:30	Natural enemies: Predaceous ground beetles	Darija Lemić
		14:30 – 15:30	Predatory true bugs in biological control of agricultural pests	Ivana Pajač Živković

<i>b) Plant Pathology</i>				
DAY II	11.7.2016.	08:00 – 09:00	Plant pathogens and their control - efforts for ecological sustainability under rapid microbial evolution and local adaptation	Edyta Đermić
		09:00 – 10:00	Plant disease management: The perplexity of the problems (basics)	Edyta Đermić
		10:00 – 12:00	Importance of monitoring and forecasting in plant pathogens control	Edyta Đermić
		12:00 – 13:30	Break	
		13:30 – 14:30	Control of fungal diseases in organic farming	Dario Ivić
		14:30 – 15:30	Plant – parasitic nematodes - importance and control. Ecologically acceptable nematode control measures.	Dinka Grubišić
<i>c) Herbology</i>				
DAY I2	12.7.2016.	08:00 – 09:00	Weed management - ecological approach	Maja Šćepanović
		09:00 – 10:00	Determination of broad-leaf weeds species in cotyledon stages. Determination of grass weeds in a young stage of development	Ana Pintar
		10:00 – 11:00	Forecasting models of weed sprout to determine the optimal timing of weed control	Maja Šćepanović
		11:00 – 12:00	Analysis of weed seeds in the soil and seed viability	Maja Šćepanović, Ana Pintar
		12:00 – 13:30	Break	
		13:30 – 14:30	Non-chemical weed control measures (physical, mechanical, biological)	Maja Šćepanović
		14:30 – 15:30	Slug and snails in agriculture. Ecologically acceptable slug control measures	Dinka Grubišić

DAY 13	13.7.2016.	08:00 – 20:00	<b>Field excursion / Open field school - visiting an organic farm</b> <ul style="list-style-type: none"> <li>• discussion with farm manager the topics related to:</li> <li>• organization and planning in ecological production,</li> <li>• soil management, choice of varieties, agro technical measures, plant protection problems</li> <li>• market opportunities</li> </ul>	Ivica Kisić Marija Cerjak Renata Bažok
DAY 14	14.7.2016.	Free day	Student individual work <ul style="list-style-type: none"> <li>• Short seminar / Oral presentations preparation (PPT)</li> <li>• Written exam preparation</li> </ul>	
DAY 15	15.7.2016.	08:00 – 10:00	Written exam	Ivica Kisić Marija Cerjak Renata Bažok
		10:00 – 12:00	Group I: Oral presentations (PPT – Each student has 5 minutes for presentation + 5 minutes for discussion)	
		12:00 – 13:30	Break	
		13:30 – 14:30	Group II: Oral presentations (PPT – Each student has 5 minutes for presentation + 5 minutes for discussion)	
		14:30 – 15:30	Ccurriculum / teachers evaluation questionnaires	
			Results and Certificate award	

## INTERNATIONAL SUMMER SCHOOL „Organic agriculture : From Field to Fork – OrganicF2F“

### LECTURE SUMMARY

#### PART I – Organic agriculture

##### Introduction to organic agriculture

*Ivica Kisić*

- Organic farming has become an established part of farming scene, but in spite of the considerable media attention there is still very little in way of published information on the subject, especially in this part of Europe. The recent increase in interest in organic farming in all Worlds makes this term very popular. Organic farming took on a new lease of life during the 1980s, especially after the appearance of mad cow disease in Europe. Since that time, people begin to think what they eat. The problems of overproduction in the industrialised countries, underproduction in developing countries and environmental impact of agriculture have concentrated minds and brought about a dramatic reassessment of the achievements of the post 1945 era. In this presentation I will talk about difference between conventional and organic farming. Soil fertility in organic farming systems, crop agronomy in organic agriculture, how solves problems of weed in organic agriculture, organic standards and certification, how recognize organic food on market, mitigation of climate change with organic farming and biodynamic agriculture today.

##### Global ecology

*Željka Zgorelec*

- The Lecture will give a basic introduction and the Scope of the Global Ecology, interdisciplinary study and terms used in Natural, Life and Environmental Science. Lecture will provide holistic approach to Earth understanding from molecules to ecosystems, from regional to global, from theory to practice. Agenda: History – Ecology; Ecology/Environment/Nature; Abiotic and biotic factors; Ecological Levels-of-Organization Hierarchy; Subject matter of ecology; Global Ecology,/Agroecology, Organic Ecology/Sustainable Ecology; Soil and Soil Health; System Ecology : Energy & matter/nutrients in Ecological systems; Biogeochemistry (C, N cycles); Ecological footprint





## **Sampling and data processing in order to provide rational soil use in organic agriculture**

*Igor Bogunović*

- Soil is fundamental key for life on planet Earth, and knowledge about soils provides understanding for the key functions in soils. Soil plays a significant role in providing vital ecosystem services to support human well-being. But, notable studies have documented that soil properties vary across natural ecosystems. Spatial variability of soil properties in ecosystems is a direct result of the five soil forming factors: climate, organisms, relief, parent material, and time. Soils variability occurs also in agroecosystems, causing spatial variability in crop yields. Spatial variability of soil properties in agroecosystems may be related to combined action of soil forming factors as well as anthropogenic land use patterns, which vary in space and time across the landscape. Therefore, importance of spatio-temporal monitoring of soil functions in agroecosystems is necessary in order to better understand the state of their agricultural productivity. Standard soil sampling procedures do not provide qualitative information for precise management and monitoring of soil productivity. Therefore new ways of sampling and data processing (which include GIS and geostatistics) provide opportunity for better understanding spatial variability of soil properties and for rational use of soil amendments. Those new technologies provide us opportunities for reducing in-field crop and soil variability, which finally producer can avoid higher economic cost, reduce potential environmental problem and provide unique conditions for crops.

## **Adulteration of bee products as a threat to the ecological beekeeping**

*Lidija Svečnjak*

- Honey bee products (honey, beeswax, propolis, royal jelly, bee venom) represent valuable biological substances produced by the honeybees (*Apis mellifera* L.). Due to their increasing commercial relevance on the international market, high price and unique quality attributes, these products are often a target of adulteration with low quality/price substances. The type and level of adulteration can vary significantly, from simple addition of sugar syrup into honey to more complex addition of chemically inert compounds that cannot be identified and/or detected easily. One of the most represented xenobiotic in modern apiculture nowadays is paraffin (petroleum derivative), commonly utilized for adulteration of beeswax (comb) foundations on which honey bees built their home - honeycombs. Given that honeycombs are being used for food storage and brood development in the hive, beeswax adulteration with paraffin has negative effect on honey bee colony and the entire beekeeping technology process because it can result with disorder in honey bee colony chemical communication, abnormalities of brood development, deformations of



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constructed combs, and questionable quality of honey stored in adulterated combs. Although beeswax adulteration represents one of the main beeswax quality issues today, there are still no internationally standardized analytical methods for its authenticity / quality control. Therefore, we have developed an approach for routine analytical detection of beeswax adulteration using FTIR-ATR spectroscopy, as a chemical fingerprinting tool providing reliable results on paraffin (and other adulterants) share in beeswax.

### **Ecological footprint of aquaculture**

*Daniel Matulić*

- The concept of ecological footprint has helped to visualize the impact of human activities on the environment (including aquaculture) and to sensitize the sector towards environmental sustainability. Environmental sustainability of freshwater and marine aquaculture is, like the most of the other food production systems, compromised by certain risks. Research of "ecological footprint" of aquaculture indicated many insights on the environmental impact of aquaculture. The risks inherent in aquaculture are: alternation or destruction of habitats; excessive consumption of fresh water; organic pollution and eutrophication; chemical contamination by pesticides and drugs; infection with diseased organisms; the risk of genetic contamination of open water with organisms that fled; the introduction of exotic species; depletion of wild fish stocks by collecting wild seeds and natural fish feed.

### **Challenges in front of recreational fishing**

*Tomislav Treer*

- There are 25 millions of anglers in Europe. European sector of recreational fishing employs 60 thousand people. Its financial value in many countries surpasses the aquaculture one. There are 60 thousand of registered anglers in Croatia together with 20 thousand anglers who occasionally buy licences for either a day, week or month. The indirect benefits of recreational fishing include angling tourism and social and health benefits, especially for the veterans of war. However, modern recreational fishing faces series of challenges. Some of them relate to the ecology: the water pollution, dams with dysfunctional fish passes, poaching and bad management. Sometimes, anglers compete with professional fishermen and other water users. Recently, the ethical questions are becoming more important, particularly in developed countries. All these issues call for the cooperation of all the stakeholders involved.



## Hybrid fishes - problems and solutions

*Tea Tomljanović*

- Effects of stocking with alien fish haplotypes and also implications for conservation and fisheries management will be discussed. Diversity of *Salmo* spp. and common carp in Western Balkans which are most important for recreational fishing and for fish production will be described. The Balkan Peninsula is believed to harbour a great deal of phenotypic diversity, and thus is considered as a hotspot in the evolution of many European species. This is reflected in numerous nominal trout taxa that have been described for the region, but their taxonomic status was uncertain until newly research by molecular techniques. This statement will be analysed by several fish species.

## ARE WE LOSING OUR FISH DIVERSITY?

### Introductions of alien freshwater fish species in Balkans (Europe), risk assessment and the impact of exotic invasions

*Marina Piria*

- Balkans belongs to the one of 35 biodiversity hotspots and together with the Mediterranean peninsulas of Iberia and Apenines, it contains much of genetic and species diversity. Many aquatic animals are long-established in the Balkans, but there are some recently introduced species even in isolated lakes. Surveys from several Balkan countries revealed that, 15-23 % of their fishes are non-native, including some specific cases, as River Danube, with more than 50 % of introduced fishes. The idea of transferring fish from other continents probably also arose during Renaissance times. However, documentation of fish introductions into Balkan area began in 19<sup>th</sup> century with common carp and goldfish *Carassius auratus* (Linnaeus, 1758) introductions. Primary motivation of introductions in Balkan countries was aquaculture and recreational fishing, followed by ornamental (garden and aquarium) purposes, biocontrol agents and to fill 'a vacant niche'. In most of Balkans countries, there are still no effective measures to control introductions or translocations of non-native fish species. Due to high level of endemism and great conservational value of inland water fish species in this region, especially in isolated and short rivers, introductions can cause real threat to ichthyofaunistic diversity. Thus, history of introductions, current dispersal, present status of alien fish species, their impact and compromise between organic aquaculture with alien and native fishes will be discussed.



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## **Organic farming and climate change**

*Darija Bilandžija*

- Climate change and variability are a considerable threat to agricultural communities. The lecture will outline the main challenges posed by climate change and variability that can be addressed by organic agriculture as an adaptation and mitigation strategy after a short introduction to organic agriculture and climate change.

## **Organic production of vegetables**

*Sanja Radman*

- Lecture Organic production of vegetables will be divided into four parts. The first part will deal with some specific rules (general and special) in organic production of vegetables. In this part the current phase of organic farming in the Republic of Croatia will be presented (statistical data, the area under organic production of vegetables). The second part will focus on seed and reproductive material, only allowed in organic production of vegetables. The third part will cover some measures to protect vegetables from pests and diseases in organic agriculture, while in the last part the legislation as well as steps to eco sign will be described.

## **Disease-resistant cultivars as a solution for organic viticulture**

*Jasminka Karoglan Kontić*

- Grapevine (*Vitis vinifera* L.) is a species that originated from the European continent. In the mid-1800s, viticulture in Europe was afflicted with numerous grapevine pests that originated from North America, including powdery mildew (*E. necator*) and downy mildew (*P. viticola*). Since then, a regular plant protection program with various active ingredients is mandatory in grape production. In organic viticulture, the list of allowed plant protection products is very restricted and the problem of fungal diseases is the main obstacle for further increase of share of organic vineyards in the total grape growing area. As the most appropriate solution for this problem, guidelines for organic viticulture recommend growing of resistant varieties. These cultivars originated from crosses between American species and the European *V. vinifera* cultivars. In this lecture, the history of resistance breeding of grapevine will be explained together with the reason for the bad reputation still connected with resistant varieties. The new generation of resistant varieties that originated from breeding programs in Germany, Hungary and Serbia will be presented. The regulation of using resistant grapevine varieties for production of wine with protected geographic origin will be discussed.



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## **The Role of Agriculture and Related Activities in Protected Areas**

*Aleksandra Perčin*

- Lecture will define the role and importance of protected areas (PAs). They are essential providers of ecosystem services and biological resources; key components in climate change mitigation strategies; and in some cases also vehicles for protecting threatened human communities or sites of great cultural and spiritual value. Covering almost 12 percent of the world's land surface, the global protected area system represents a unique commitment to the future; a beacon of hope in what sometimes seems to be a depressing slide into environmental and social decline. PAs are also a key element of biodiversity conservation. PAs provide ecosystem services necessary for food production now and in the future. In lecture teacher will also define the IUCN (International Union for Conservation of Nature) protected area definition and categories, but also categories according to the Croatian's laws. The main feature of agriculture in protected areas is to preserve biodiversity through principles of good agricultural practice. In the protected areas of Croatia primarily allowed forms of agricultural practice is traditional agriculture. Lecture will also provide examples and experiences of organic farming and traditional agriculture in PAs all over the world and methods how to achieve a crop production compatible with the other ecosystem services. It will be emphasized the importance of traditional agriculture, which is developed in a way that was consistent with environmental and social circumstances and based on the maintenance of biodiversity. Upon completion of the course students will be able to compare the traditional, intensive and organic farming in terms of soil and water contamination in environmentally sensitive areas respectively in protected areas.

## **Medicinal and aromatic plants: conservation, utilization and use**

*Zlatko Šatović; Martina Grdiša and Klaudija Carović-Stanko*

- The use of medicinal and aromatic plants (MAP) in Croatia has a very long tradition. Natural MAP populations show great biodiversity in morphological, biochemical and genetic level. The assessment of biodiversity is a starting point for efficient conservation of plant genetic resources and its use in plant breeding programmes. Current production of medicinal and aromatic crops in Croatia is very limited with tendency to grow. MAP producers and processors generally agree that marketing opportunities do exist in case of a number of species. They are source of a wide range of secondary metabolites which can be used for various purposes. Many of them are used in traditional and modern medicine as well as a spice, but also many of them show great potential as natural insecticide.

## PART II – Management in organic agriculture

### Marketing trends in agribusiness

#### Overview of world organic food market

*Marija Cerjak*

- In order to better understand market developments and to adopt own business to changing market conditions it is necessary to recognise emerging marketing trends and to be familiar with national and global overview of a particular market. The goal of this lecture is to discuss recent marketing trends in agribusiness sector with a particular attention to organic sector as well as to present current state-of-the-art of the world organic food market.

#### Market-driven marketing strategy for organic agri-food products

*Marija Cerjak*

- In a highly competitive agribusiness environment focusing on the needs of the customers can ensure competitive advantage to organic food producers. Therefore, apart from analyzing internal and external business environment, marketing strategy should be geared toward reaching those customers who would benefit the most from company's product or service. A market-driven marketing strategy includes elements like identifying target market and reacting to their needs.

### Market segmentation

#### Organic food consumers' motives and obstacles

*Marija Cerjak*

- One organisation cannot satisfy all consumers due to their various needs and wants. Therefore it is necessary to divide the market into sections e.g. segments to enable a business to better target its products to the relevant customers. Companies commonly split the market based on demographics, income, geography, behaviour and psychographics. In this lecture will be present principles of market segmentation and common variables used to segment agri-food market. Main motives and obstacles of organic food consumers will be also discussed.



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## **Product policy and product market combination**

*Marina Tomić*



- During this lecture will be discussed the concept of organic product including core, actual and enriched product, product line and assortment as well as product life cycle concept. A product-market combination will be explained.

## **Organic food labelling and certification**

*Marina Tomić*

- Labeling is an important process in the food processing chain as labels are used to identify one product from another. Therefore, a label is an important marketing tool for food products and this is especially true for organic labels as they enable consumers to easily distinguish organic from conventional products. During this lecture students will learn about food labelling in general as well as about recognised organic labels and certificates.

## **Students' presentation of the state-of-the-art of organic agriculture in their countries**

*Marija Cerjak*

- Before coming to this lecture, students will have to prepare a presentation about the state-of-the-art of organic agriculture in their countries. After students' presentations will be organised discussion about similarities and differences in organic food markets in students' countries.

## **Pricing strategy for organic agri-food products**

*Marina Tomić*

- Setting prices is one of the most difficult tasks in organic farming as there is no single resource that would help in defining selling price. During this lectures students will be introduced to pricing strategies that could be used in organic agri-food sector.



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## **Marketing channels for organic agri-food products**

*Marina Tomić*



- Today's consumers are very demanding regarding food quality and safety, but also regarding their purchasing requests. The way that consumers make purchasing decisions has dramatically altered in the last decades what leads to a number of changes in selling channels. In this lecture students will be introduced to different possibilities in sale of organic produce as well as advantages and disadvantages of various selling channels.

## **Promotion strategy of organic agri-food products**

*Marija Cerjak*

- Promotion includes all activities that involve communication to consumers about product and its benefits and features. The main aim of promotional activities is to attract customer's attention and to give customer enough reason to buy the product. In this lecture will be discussed different promotional strategies and tools used in organic food market.

## **Business results of organic farming in the EU**

*Josip Juračak*

- Since 1980-es the market niche for organic farming products in developed countries steadily grows. More and more farmers look at this trend as a business opportunity. This is especially interesting in cases where the economy of size is not achievable due to many barriers. The knowledge of business results recently achieved in organic farming is needed as an input for making decision about starting the organic farming.

## **Organic farming versus conventional farming: the comparison of business indicators**

*Josip Juračak*

- The organic farming is getting in share and importance in last few decades. Meanwhile, the debate about its economic and financial viability is continuously going on. Since today we have available different multiannual data sets and publications dealing with the financial efficiency of organic production, we can compare this type of farming with the conventional. This comparison is important for business and market, as well as for the policy makers.





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## Planning of business projects in organic farming

*Branka Šakić Bobić*



- In most of cases the process of starting organic production is quite demanding regarding to financial and human resources. Either conventional farmers or a newcomers that plan to produce for market, must be aware that this process in its core is a business project Therefore, the knowledge of business planning steps and techniques is needed to avoid mistakes in activities intended.

### Application of budgeting techniques in the business plan

*Branka Šakić Bobić*

- Probably the most important part of the business plan, beside the definition of market, is the financial plan. However, the financial plan cannot be developed without knowledge of budgeting and budget planning. The topic will include terms like costs, revenues, income, profit, and business ratios.

### Time preference of money in the assessment of long-term projects

*Josip Juračak*

- The establishment of organic farming enterprise is the project that will generate benefits and costs in a long term. In the business planning benefits and costs are expressed in money terms. Since the level of prices, interests and exchange rates vary through the time; the variation must be taken into account in order to get realistic project assessment. The time preference of money implies the understanding of compound interest, discount rate, and discount factor.



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**Assessing the financial viability of projects in organic farming**

*Branka Šakić Bobić*



- The financial and economic analysis of business projects is based on a set of commonly used business ratios and investment appraisal techniques. There are numerous business ratios used to evaluate business activity level, productivity, indebtedness, and profitability. Investment appraisal techniques are based on the concept of time preference of money. The most commonly used are net present value and internal rate of return.

### **Risk assessment and sensitivity of investments**

*Josip Juračak*

- Like any other type of business, the organic farming is subject to various types of risks. The assessment of different risk sources and their expected impact on the future project is an inevitably part of investment analysis. It has to be taken into account during the project sensitivity analysis. The sensitivity analysis helps us to estimate the impact of negative changes in key assumed parameters on the project results.

## PART III – Plant protection measures in organic agriculture

### Non pesticide management of insect pests

*Darija Lemić*

- Non-pesticide management (NPM) describes various pest-control techniques which do not rely on pesticides. NPM is a system that maintains insect populations at levels below those that can potentially damage a crop and cause economic injury, by having healthy crop and managing the population dynamics in the crop ecosystem. This involves understanding pests and predators life cycle. NPM also means shift from plant-pest relationship to pest-ecosystem relationship, from external inputs to local natural resources. It presents integration of all suitable management techniques in a harmonious manner with natural regulating and limiting elements of the environment to prevent insects from reaching damaging stage and damaging proportions. Students will evaluate the importance of non-pesticide measures in agricultural systems. They will learn about the techniques and methods of preventing insects to reach economic thresholds without using chemicals.

### Area wide pest management by mass trapping – ecologically acceptable method of pest control

*Renata Bažok*

- Integrated pest management (IPM) was developed 50 years ago as a system approach that provides an ecologically based solution to pest control problems. IPM is defined as a sustainable approach to managing pests that combines biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risk. Area wide (AW) is a form of IPM program that aims to reduce pests in a particular area underneath those numbers that can cause damage. The goal of this program is a long-term solution, as opposed to individual combat, aimed covers substantially less area with short-term elimination of damage. It is an organized system of pest control in which producers of similar or identical crops team up and operate on wide growing areas. Mass trapping using odor-baited traps is one of the older approaches to direct control of insects for population suppression and eradication (Steiner 1952). The aim of the lecture is to explain the basic principles of AW pest control and analyze the successful attempts to pest control by using AW approach and the used methods. The particular attention to the mass trapping will be given and potential opportunities for the use of certain attractants will be identified. The results of the four year AW control of sugar beet weevil will be presented and analyzed as a case study.



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## **Push-pull strategy as alternative (non chemical) measure of pest control**

*Ivan Juran*

- The term push-pull was first conceived as strategy for insect pest management (IPM) in Australia in 1987. The use of repellent and attractive stimuli to manipulate the distribution of *Helicoverpa* spp. in cotton was investigated, thereby reducing reliance on insecticides, to which the moths were becoming resistant. Within the course the principles of the push-pull strategy, list of the potential components and present case studies reviewing work on the development and use of push-pull strategies in each of the major areas of pest control will be described.

## **Sterile Insect Technique**

*Ivana Pajač Živković*

- The Sterile Insect Technique (SIT/SIRM) is a biologically-based method for the management of common crop pests or human and animal pests. The method was first developed in the USA, and it has been used for 50 years. SIT involves releasing millions of sterile insects over a wide area to mate with the native insects present which results in infertile eggs being laid. Application of this safe and environmentally friendly method improves the quality and quantity of fruit production while reducing pesticide use and promoting integrated pest management. Participants of this lecture will be introduced with the method and the history of its application in the world and will get basic information about pests which can be controlled in this way.

## **Mating disruption - useful method in insect management**

*Ivana Pajač Živković*

- Mating disruption using synthetic sex pheromones is an effective and environmentally friendly method in control of some insect pests. Reducing the use of insecticides can have additional benefits for pesticide resistance management and for preservation of beneficial insects, mites and spiders. Currently, mating disruption products are available for moth pests and primarily for use in orchards and vineyards. Participants of this lecture will be introduced to the method and products for mating disruption using the example of economically important pests in orchards and vineyards and will get basic information about advantages and disadvantages of applying this method.



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### **Botanical insecticides - natural insecticides inside plants**

*Maja Čačija*

- Many plants have insecticidal properties; that is, they are toxic to insects. Botanical insecticides are naturally occurring chemicals (insect toxins) extracted or derived from plants. They are also called natural insecticides or botanicals. Botanical insecticides have long been touted as attractive alternatives to synthetic chemical insecticides for pest management because they pose little threat to the environment or to human health. In general, they act quickly, degrade rapidly and have, with a few exceptions, low mammalian toxicity. However, botanicals tend to be more expensive than synthetic pesticides, and some are not as widely available. Common botanical insecticides include pyrethrum and pyrethrins, rotenone, sabadilla, ryania, limonene and linalool, nicotine, neem and some essential plant oils. Most of these natural insecticides can be produced commercially and used in management of many different pests. Students will learn about the basic characteristic of botanical insecticides, their source plant, mode of action and use against different groups of insect pests. The main advantages and disadvantages of most important botanical insecticides will be explained and discussed. The examples of practical experiences will be presented.

### **Biological pesticides based on pathogenic microorganisms and naturalites**

*Renata Bažok*

- Biopesticides are biochemical pesticides that are naturally occurring substances that control pests by nontoxic mechanisms. They are living organisms (natural enemies) or their products (phytochemicals, microbial products) or by products (semiochemicals) which can be used for the management of pests that are injurious to crop plants. They are biological or biologically-derived agents that are usually applied in a manner similar to chemical pesticides, but achieve pest management in an environmentally friendly way. They pose less threat to the environment and to human health. The most commonly used biopesticides are living organisms, which are pathogenic for the pest of interest. These include biofungicides (*Trichoderma*), bioherbicides (*Phytophthora*) and bioinsecticides (*Bacillus thuringiensis*, *B. sphaericus*). Students will learn about the basic characteristic of plant protection products based on pathogenic microorganisms and naturalites. Special emphasis will be given to *Bacillus thuringiensis* based products and spinosyns. The main advantages and disadvantages of each active ingredient will be explained and discussed. The examples of practical experiences will be presented.



## **Entomopathogenic nematodes (EPN)**

*Dinka Grubišić*

- Entomopathogenic nematodes (EPN) represent a group of soil-inhabiting nematodes that parasitize a wide range of insects. These nematodes belong to two families: Steinernematidae and Heterorhabditidae. Until now, more than 70 species have been described in the Steinernematidae and about 20 species of Heterorhabditidae. This lecture will present the most important EPN species which are used for pest control and methods of their application in plant protection. The most common technique considered for collecting EPN from soil, the modified White trap technique, which is used for the recovery of these nematodes from infected insects will be presented.

## **Systematic and morphology of major orders of natural enemies**

*Ivan Juran*

- The morphology of insects is the study and description of the form and structure of insects. There is a large variation in the modifications that have been made by various taxa to the basic insect body structure. This is a result of the high rate of speciation, short generations, and long lineages of the class of insects. In this lecture morphological features and systematic of natural enemies from orders Mantodea, Orthoptera, Dermaptera, Thysanoptera, Heteroptera, Hymenoptera, Coleoptera, Neuroptera and Diptera will be described.

## **Parasitoid wasps: natural enemies of insects**

*Maja Čačija*

- Parasitoid wasps are the natural enemies of arthropod hosts in natural ecosystems and can be used as biological control agents against insect pests in agro-ecosystems. They are highly diverse insects of order Hymenoptera and specialized to attack a particular host life stage (egg, larvae, pupae and adults), mainly of phytophagous hosts which are on or inside host plants. The wasps need the presence of hosts for their feeding, survival and reproduction, as they lay eggs on or inside other insects. Parasitoid larvae then eat their prey from the inside out, usually emerging from the prey carcass as a pupa or adult. The most important families of parasitoid wasps include Ichneumonidae, Braconidae, Trichogrammatidae and Aphidiidae. Many of the species can be produced commercially, purchased and released in pest infested areas. Pest management using parasitoid wasps as means of biological control represents no threat to humans, animals or the environment. Students will learn about the morphology, biology and ecology of most important parasitoid wasps, their choice of hosts and the process of parasitism. Special emphasis will be given to *Encarsia formosa* and means of this species' production and practical use in agriculture. The advantages and disadvantages of using parasitoid wasps as natural enemies in biological control of pests will be discussed.



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### **Natural enemies: Predaceous ground beetle**

*Darija Lemić*

- Predaceous ground beetles, or carabids, belong to a large family of beneficial beetles called the Carabidae whose adults are medium to large soil-dwelling beetles and live as long as two to four years. Carabid beetles are important polyphagous natural enemies in agricultural landscapes with the potential of restraining many pest species. They are generalist predators whose adults and larvae feed on soil dwelling insect larvae and pupae, other invertebrates such as snails and slugs, and sometimes on weed seeds and organic litter. Over 2,500 species are known as natural enemies of agricultural pests. Their shape and color varies greatly. As a general rule, while common agricultural practices such as pesticide applications and tillage frequently reduce carabid beetle abundance organic and low-input production systems usually sustain more abundant beetle communities than conventional systems. Students will evaluate the importance of carabid beetles as predators in agricultural systems. They will learn about the morphology, biology and ecology of most important carabid species in agriculture production. Student will learn the ways of through habitat manipulations and cultural practices which can enhance the natural regulation of arthropod pest and weed populations, and reduce the need for chemical controls. The examples of practical experiences will be presented.

### **Predatory true bugs in biological control of agricultural pests**

*Ivana Pajač Živković*

- True bugs are members of the order Hemiptera and suborder Heteroptera. There are more than 38, 000 species of true bugs, and although some true bugs are considered pests, about one-third are predaceous. The lecture will cover the morphology and life cycle of true bugs. Participants of this lecture will be introduced to the most important families of predatory true bugs (Reduviidae, Anthocoridae, Miridae, Geocoridae, Pentatomidae and Nabidae) and will get basic information about the products on the market that are used in pest control in agriculture.

### **Plant pathogens and their control - efforts for ecological sustainability under rapid microbial evolution and local adaptation**

*Edyta Dermić*

- Introduction to the component based on the preface to the different groups of plant pathogens. Through examples, participants will become familiar with the various groups of pathogens and their importance, together with the specifics of the disease caused by different groups of pathogens. On examples of bacterial diseases and viroses the basic ecological and epidemiological characteristics of plant pathogens will be shown. Stages in their development where they can be most effectively controlled, together with minimal environmental risk, will be emphasized.



### **Plant disease management: The perplexity of the problems (basics)**

*Edyta Dermić*

- The available indirect and direct control measures for control of prokaryotic and acellular pathogens in organic production will be presented. Special attention will be paid to the quick dieback of olives (caused by *Xylella fastidiosa*) and to available control measures.

### **Importance of monitoring and forecasting in plant pathogens control**

*Edyta Dermić*

- Within this unit, key steps in the pathogenesis of fire blight of apple and pear (pathogen *Erwinia amylovora*) and measures for its control (usually based on field monitoring and forecasting) will be covered. Basic principles of forecasting in phytobacteriology will be presented.

### **Control of fungal diseases in organic farming**

*Dario Ivić*

- Participants will be introduced with the significance and occurrence of fungal diseases in organic farming, with the special reference to general principles of disease control measures. The main agro-technical, mechanical and biological measures used in organic farming shall be presented. Plant protection products authorized for use in organic farming shall be elaborated, along with future perspectives of such products.

### **Plant – parasitic nematodes - importance and control. Ecologically acceptable nematode control measures.**

*Dinka Grubišić*

- Nematodes are a diverse group of worm-like animals. They are found in virtually every environment, both as parasites and as free-living organisms. This lecture focuses specifically on plant parasitic nematodes, which are very small or microscopic, can cause significant damage to crops and are extremely widespread. Because nematodes are difficult or impossible to see in the field, and their symptoms are often non-specific, the damage they cause is often attributed to other, more visible causes. Farmers alike often underestimate their effects. In this lecture the main plant parasitic nematodes as aerial and root and tuber parasites and symptoms of nematode damage will be presented. Also ecologically acceptable nematode control measures will be presented as follows: Cultural practices: crop rotation, tillage, planting date adjustment and planting resistant and tolerant varieties, weed control, irrigation (sinking) production areas, trap crops, antagonistic plants; Biopesticides: application of antagonistic fungi and bacteria; Physical control measures: soil solarization, thermal sterilization of the soil and plant material.





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### **Weed management - ecological approach**

*Maja Šćepanović*

- Participants will learn about basic weeds management methods as well as the importance of knowledge of the biological and ecological characteristics of weeds in order to protect and preserve the integrity of the ecosystem.

### **Determination of broad-leaf weed species in cotyledon stages. Determination of grass weeds in a young stage of development**

*Ana Pintar*

- Participants will be explained the keys to identify broadleaf and annual grass weeds in the early developmental stage when performing their control. To participants will be available live plant material – cotyledons of broadleaf and annual grass weeds and after the introductory theoretical part participants will practice determining weed species in the early development stage.

### **Forecasting models of weed sprout to determine the optimal timing of weed control**

*Maja Šćepanović*

- Introduce participants to the basic types of reproduction of annual and perennial weeds which are the basis for the proper determination of their control. Define the dormancy of weed seeds and other mechanisms that influence the germination of weeds in different ecological conditions. In particular will be processed possibility for forecasts weediness (determine the bank of weed seeds) and application of forecasting models of emergence of weeds in determining the optimal time for their control.

### **Analysis of weed seeds in the soil and seed viability**

*Maja Šćepanović*

- Participants will be familiar with laboratory method for analysis weed seeds from bank of seeds by rinsing samples. Obtained seeds of weeds participants will determine and testing their germination by Crush test.



### **Non-chemical weed control measures (physical, mechanical, biological)**

*Maja Šćepanović*

- Within this methodical unit students will be familiar with the basic non-chemical weed control measures: physical (flaming, flooding), mechanical (tillage, weeding, grazing, shading, depletion) and biological - biopesticides (macrobiological, microbiological, allelopathy, natural pesticides, naturalites).

### **Slug and snails in agriculture. Ecologically acceptable slug control measures**

*Dinka Grubišić*

- Slugs and snails are serious pests of many agricultural crops. They cause damage of plants and pollute products by mucus and feces. Current control methods rely on chemical molluscicides, that are often ineffective and can harm non-target organisms. Novel approaches for slug and snail control that do not rely on chemical pesticides and are suitable in organic production. So the lecture will provide knowledge about: Cultural practices – crop rotation, tillage, spatial isolation of the fields, adjusting planting date, antagonistic plants; Biopesticides–antagonistic plant products with repellent performance, parasitic nematodes; Mechanical control measures and Biotechnological plant protection measures:

INTERNATIONAL SUMMER SCHOOL  
„Organic agriculture : From Field to Fork – OrganicF2F“

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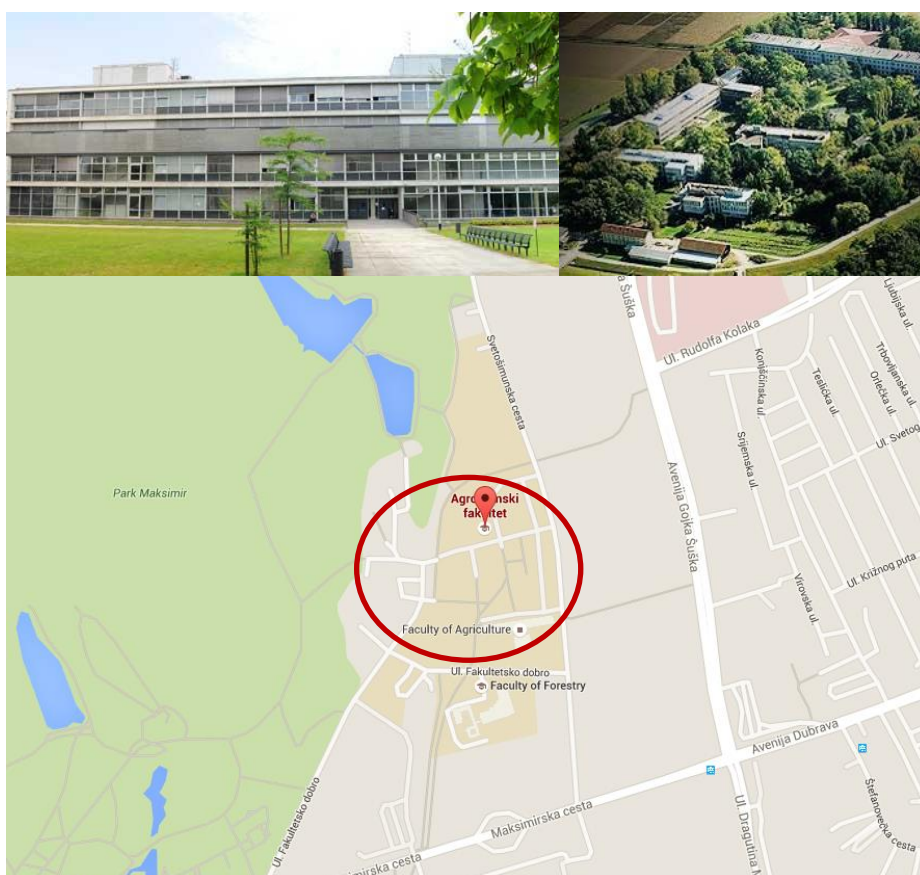
## INTERNATIONAL SUMMER SCHOOL „Organic Agriculture : From Field to Fork – OrganicF2F“

### VENUE

The International Summer School „Organic Agriculture : From Field to Fork – OrganicF2F“ is hosted by the University of Zagreb Faculty of Agriculture.

Address: Svetosimunska 25, HR-10000 Zagreb, Croatia.

URL HR: <http://www.agr.hr/>



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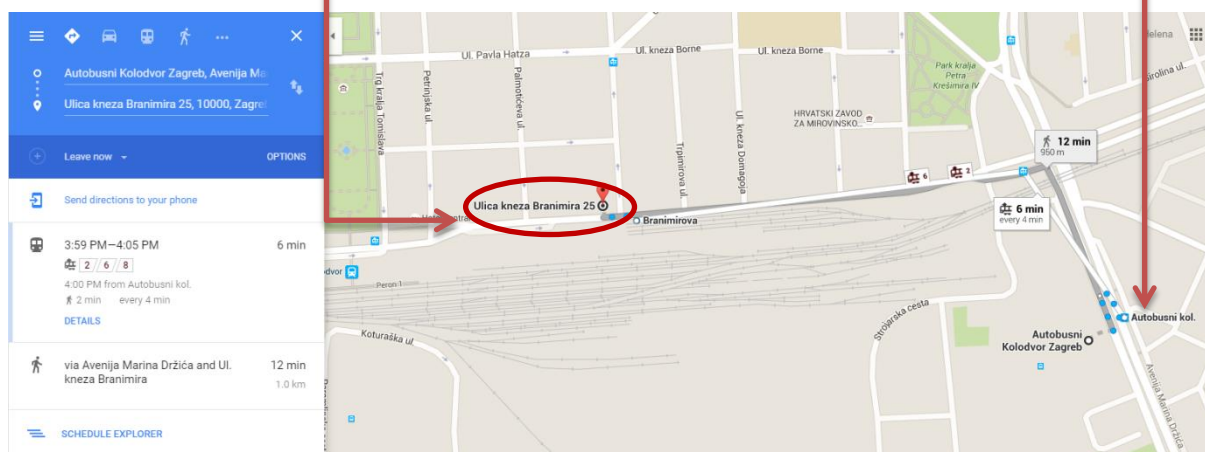
**Web site:** <http://lifeada.agr.hr/>

**FB page:** <https://www.facebook.com/LifeADA?ref=hl>

## Arrival in Zagreb

### By plane

Zagreb Airport "Pleso" is located 17 km south of the city Centre. Once you have reached "Pleso" take a **Croatia Airlines bus** that will drop you off at the Central Bus Station (Autobusni kolodvor). For Hostel Palmers Lodge (<http://palmerslodge.com.hr/>) a walking distance from Central Bus Station is about 7 minutes down the Držičeva and left down the Branimirova street, or take the tram, number 2, 6 or 8 towards downtown, and two tram stations away, you get off just across the hostel.



If you get lost, just contact Hostel Palmers Lodge and they will help you!

**Phone:** +385 1 8892 868

**Mobile:** +385 95 757 5000

**Skype:** Palmerslodge\_zg

\* **Airport bus costs 30,00 kn (~4,00 EUR)** and departs daily every half-hour. You can also catch a taxi in front of the international arrivals but the **taxi is very expensive (~25,00 EUR)**.

**Changing currency:** An ATM is outside international arrivals, the Zagrebačka banka office (open 08:00-21:00) and an exchange in the post office (open 08:00-19:00) in the centre of the airport. Timetable of Zagreb Airport (<http://www.zagreb-airport.hr/home>) Croatia Airlines bus schedule (<http://www.plesoprijevoz.hr/en>)

### By bus

From Central Bus Station (Autobusni kolodvor) For Hostel Palmers Lodge (see directions above).

### By car

Depending on direction you are coming from please see the Zagreb city map and get directions. Zagreb city map (<http://www.karta-zagreba.com/karta-zagreba/>) Google maps (<https://maps.google.com/>)

### Public Transportation

There are three ways of public transportation - trams, buses and city railway. They operate all day (every few minutes) and night (every hour). Tickets can be bought on board (10 kn) or at newsstands (10 kn). Make sure that you stamp your ticket once you board: an unstamped ticket is as good as no ticket at all. Daily tickets are available at a price of 30 kn.

## ZET tram map

<http://www.zet.hr/UserDocsImages/Prilozi/PDF/dnevna%2otram%2omre%C5%BEa.pdf>

## Taxi

You can find taxis in front of all major hotels, the train and bus stations and at numerous other central locations. You can also order taxi online (see the links below).

## Radio Taxi Zagreb

+385 1 1717, <http://www.radio-taksi-zagreb.hr/>

PRICES: Start 10.00 kn, Per km 6,00 kn

## Taxi Cammeo

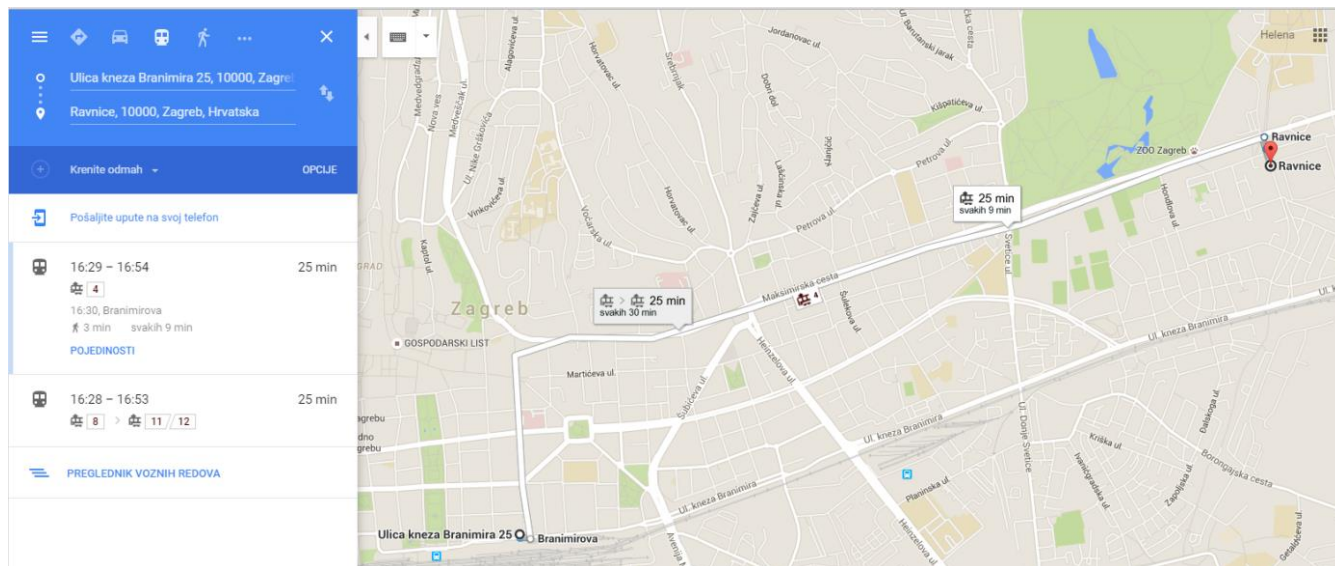
+385 1 1212, <http://taxi-cammeo.hr/home/>

PRICES: Start/including first 2 km = 15,00kn, every next km = 6,00 kn

## Arrival at the Faculty of Agriculture (from Hostel or Coty Centre)

From city center or Hostel take adequate tram number (direction: **Dubec 4, 11** or **Dubrava 7, 12**) and take off at station called **RAVNICE**. Follow the sign of Faculty of Agriculture (Agronomski fakultet). After 300 meters you will see Faculty of Agriculture (don't turn to yellow-green-red buildings on your right – that is Faculty of Forestry!). Just follow the path straight ahead until you reach white-gray glassy building.

On the first day someone will pick you up at the Hostel. You will receive additional information by e-mail.





### City of Zagreb

Information on the city of Zagreb: <http://www.zagreb-touristinfo.hr/>

### Entry in Croatia

Passport, ID card or some other internationally recognized identification document which proves your identity and citizenship, issued by governmental authorities of your home or resident country is required to entry in the Republic of Croatia. Tourists may remain in Croatia for up to three months.

### Visas

A foreign citizen is required to get a visa before entering the Republic of Croatia, in accordance with the visa system prescribed by the Croatian government.

Visas are normally issued by the diplomatic mission or the consular office of the Republic of Croatia.

Visa requirements overview: <http://www.mfa.hr/>

Diplomatic Missions and Consular Offices of Croatia: <http://www.mfa.hr/>

### FAQ

#### Currency:

Official Croatian currency is the Croatian Kuna (1 Kn = 100 Lipa). Nominal values are 1, 2, 5, 10, 20, 50 Lipa coins, 1, 2, 5 and 25 Kuna coins; and 10, 20, 50, 100, 200, 500 and 1,000 Kuna banknotes.

Currency regulations: Foreign currencies can be imported and exported freely.

Foreign currencies can be exchanged at banks, exchange offices, post offices and at most tourist agencies and hotels.

On-line currency exchange (<http://www.mjenjacnice.com/>)

#### Time zone:

Central-European time GMT + one hour (during summer: GMT + two hours).

#### Climate and Weather:

Continental climate (average summer temperature: 20° C; average winter temperature: 1° C)

Weather forecast Meteorological and Hydrological Service (<http://meteo.hr/>)

#### Electricity:

Voltage of city power grid – 220V, frequency 50HZ

#### Water:

Tap water is potable throughout Croatia.

Croatian-English online dictionary (<http://www.rjecnik.net/>)