

Priority setting within the BAFN - Albania, *Bosnia-Herzegovina, Macedonia, Serbia*



An Overview - Prof. Ivan N. MINKOV

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Genomics Research Center

- Based mainly on the Department of Plant Physiology and Molecular Biology (7 people in 1989)
- Staff: 35 people
 - 12 Staff Researchers
 - 4 Technicians (staff)
 - 4 Post-docs
 - 10 PhD students
 - 5 Researchers paid by projects

- Projects 2006-2009:
 - FP6 – 7 projects
 - FP7 – 3 projects
 - NSF – 10 projects (1.5 million Euro) – 2% of the 2008 budget 😊
 - NATO – 1 project
 - Swiss NSF – 1 project
 - IAEA – 1 project
 - COST – 2 actions

❖ Main areas of interest

- Oxidative Plant Stress
- Plant-Viroids Interaction
- Epigenetics of Plant Stress and Resurrection Plants
- Bioinformatics of microRNA and oncogenes
- Molecular Evolution and microRNAs
- Molecular Basis of Parasitic Plants-Host Interaction

What was the idea of BAFN project ?

- Producing a Mapping Report for every WBC, participating in the project;
- Performing Expert Panel Meetings in the partner countries

What is the idea of the mapping report ?

- It is a country-specific synthesis of the statistical information available to describe agrifood research
- Sources of information
 - web-assisted survey conducted in the BAFN project frame in 2006 and 2007 (response rate > 50%)
 - *Review Document* prepared by the Ministry of Science and Environmental Protection (Serbia), Faculty of Agriculture at the University of Belgrade, and ETAT S.A.
 - complementary statistics

What is the Expert Panel Meeting?

- It is a **country-specific** meeting,
- **Experts** in agri-food are invited (15-20),
- An experienced person is assigned as a **panelist**,
- An **agenda** of topics for discussion is specified,
- A person for all EPMS is assigned who participates all meeting and writes a **report** (I.M.),
- A **report for all EPMS** for all partners is prepared as a result,
- **Common topic(s)** for all WBC (with European significance) is selected on the basis of the EPMS.

Expert Panel Meetings SWOT

STRENGTH

- ❖ Very good idea
- ❖ “Brain storm” approach
- ❖ Can be representative for the country
- ❖ Adds data to the Mapping Reports

WEEKNESSES

- ❖ Could be not entirely representative (depends of the experts present),
- ❖ Could be a different setup in different countries,
- ❖ Mixed approach used in different countries,
- ❖ Could be influenced by the logistics in the WBC 😊

OPPORTUNITIES

- ❖ Could be a good add-on to the questionnaire approach,
- ❖ Could end up with one-two main priorities for the country,
- ❖ Could end-up with a promotion one topic in WP for the whole WBC area,
- ❖ Can be used for initial consortium building.

Expert Panel Meetings SWOT

TREATS

- ❖ To give different picture compared to other approaches
- ❖ Could be misleading due to construction of the panel
- ❖ Consuming too much of regional indigenous foods and beverages (personal threat) 😊

The agric-food research capacity

1

Well developed scientific areas before 1990

2

Well developed scientific areas today

3

Important scientific areas for the future

4

Well developed areas to be supported by EU

5

Underdeveloped areas to be supported by EU

6

WB Cooperation to be supported by EU

7

Most important projects for the country

Well developed scientific areas before 1990

ALBANIA

- ❖ Agriculture, Forestry, Chemical industry, Medicine;
- ❖ Plant studies;
- ❖ **Genetic improvement of crops and animals;**
- ❖ Soil studies;
- ❖ Crops and animal nutrition;
- ❖ Erosion of forestry;
- ❖ Medical crops.

BOSNIA

- ❖ **Crop selection;**
- ❖ Fruit selection;
- ❖ **Animal husbandry, poultry farming;**
- ❖ **Plant protection;**
- ❖ **Food science;**
- ❖ Meat, dairy, fruit and vegetable technologies;
- ❖ Alcoholic and non-alcoholic drinks;
- ❖ **Food control and analysis;**

MACEDONIA

- ❖ Applied scientific areas;
- ❖ **Agriculture, animal husbandry;**
- ❖ **Agrifood activities;**
- ❖ **Plant protection;**
- ❖ Plant breeding;
- ❖ Animal breeding.

SERBIA

- ❖ Agriculture, plant & animal production;
- ❖ **Animal food technology;**
- ❖ Gene bank of agricultural crops;
- ❖ Plant food technology;
- ❖ **Plant protection.**

Well developed scientific areas today

ALBANIA

- ❖ Agriculture, agro-food industry, tourism;
- ❖ Soil nutrition;
- ❖ Biochemical studies on cereals;
- ❖ **Food safety and security;**
- ❖ **Food biotechnology, microbiology;**
- ❖ Horticulture;
- ❖ Fisheries.

BOSNIA

- ❖ Crop selection;
- ❖ Organic production;
- ❖ Curative herbs;
- ❖ Meat and milk processing science;
- ❖ **Food safety;**
- ❖ **Food science and nutrition;**
- ❖ Revitalisation of poultry farming;
- ❖ Production of food for livestock.
- ❖ **Molecular Genetics**

MACEDONIA

- ❖ **Molecular biology and applied genetics;**
- ❖ Agrarian sciences;
- ❖ Animal husbandry, veterinary, **Food safety;**
- ❖ Agriculture technologies in plant and animal production;
- ❖ **Plant protection;**
- ❖ Plant breeding.

SERBIA

- ❖ **Food technology;**
- ❖ **Plant protection;**
- ❖ **Food quality analysis;**
- ❖ Field crop breeding.

Most important scientific areas in the future

ALBANIA

- ❖ Agro-food industry;
- ❖ **Food quality, safety;**
- ❖ Agriculture;
- ❖ Aquaculture;
- ❖ Livestock;
- ❖ Veterinary medicine;
- ❖ Agro-tourism;
- ❖ Packaging;
- ❖ Biochemistry, toxicology;
- ❖ **Organic foods**
- ❖ Nutrition;
- ❖ **Environment** agriculture.

BOSNIA

- ❖ **Food safety;**
- ❖ Food allergens;
- ❖ **Organic food;**
- ❖ Food contaminants;
- ❖ Food supplements;
- ❖ **Functional food;**
- ❖ GMO monitoring;
- ❖ Nutrition and health promotion;
- ❖ **Protection of products geographical origin;**
- ❖ Automation in production;
- ❖ Bioactive food substances.

MACEDONIA

- ❖ **Food safety,** food security,
- ❖ **Functional food;**
- ❖ Protection of **environment;**
- ❖ GMO;
- ❖ Technology transfer;
- ❖ Geographic Information systems for agricultural management;
- ❖ Agricultural statistics & data analysis.

SERBIA

- ❖ Biotechnology (genomics);
- ❖ **Food safety**
- ❖ **Protection of indigenous species;**
- ❖ Control of nursery stock;
- ❖ Viruses in products of plant and animal origin;
- ❖ Developing and executing priorities of the **national strategy in the agrifood sector.**

Well developed areas to be supported by EU

ALBANIA

- ❖ Food Industry;
- ❖ Agriculture;
- ❖ Tourism;
- ❖ Food policy and safety;
- ❖ **European standards** for agriculture, food and environment;
- ❖ Packaging ;
- ❖ **Food quality**;
- ❖ **Food** biochemistry, microbiology, toxicology and biotechnology.

BOSNIA

- ❖ Fishery;
- ❖ **Food safety** – production of animal and vegetative foodstuff;
- ❖ Strategic planning standards;
- ❖ Nutrition at national level;
- ❖ DNA markers in Food industry;
- ❖ **Preserving of national food reserve.**

MACEDONIA

- ❖ Modern accredited laboratory;
- ❖ Biotechnology (GMO);
- ❖ Veterinary and animal husbandry;
- ❖ Nutrition and dietetic;
- ❖ **Biodiversity, conservation**;
- ❖ Land management;
- ❖ Protection of environment.

SERBIA

- ❖ Agricultural production (excluding the processing industry);
- ❖ Seed stock;
- ❖ **Preservation of indigenous species and traditional food products**;
- ❖ Development of **organic production** (e.g. regarding wine production).

Underdeveloped areas to be supported by EU

ALBANIA

- ❖ Quality and safety;
- ❖ Typical Albanian products;
- ❖ **Zoonoses** influencing human health and in animal production;
- ❖ Quality systems on food technology and biosafety.

BOSNIA

- ❖ Protection of food geographical origin;
- ❖ Sources of **food allergens**

MACEDONIA

- ❖ Biodiversity conservation;
- ❖ **Environmental protection;**
- ❖ Food quality & safety.

SERBIA

- ❖ Food safety;
- ❖ Chemical contaminants in food;
- ❖ Dietary supplements;
- ❖ **Food allergens;**
- ❖ Toxins in food;

WB Cooperation to be supported by EU

ALBANIA

- ❖ Food industry and legislation;
- ❖ Tourism and forestry;
- ❖ Environment;
- ❖ **New technology in food products;**
- ❖ Food safety and quality management systems;
- ❖ **Food technology;**
- ❖ Food quality - HACCP, GMP.

BOSNIA

- ❖ Food safety;
- ❖ **Food product development;**
- ❖ Food quality protection.

MACEDONIA

- ❖ Biotechnical Science (**Food Engineering**, Food Safety);
- ❖ Agriculture, animal husbandry (GMO, Biological Good Feed/Health Food)
- ❖ Veterinary.

SERBIA

- ❖ Conservation/preservation of biodiversity;
- ❖ Improvement of ecological awareness;
- ❖ **Waste management;**
- ❖ Germplasm resources.

WB Cooperation to be supported by EU (Serbia)

- ❖ Establishment of a regional center of **genomics**
- ❖ Development of a **database network** for food consumption
- ❖ Establishment of regional organic food production
- ❖ **Cooperation and development** of a joint **technological platform** based on European initiatives
- ❖ Cooperation in **consumer education and training**, information and behavior with regard to the Balkan diet
- ❖ Production and processing of **traditional food** and harmonization with EU standards and needs
- ❖ Development of a **food safety system network** in the Balkan region, including food safety criteria for novel and GMO food production
- ❖ Establishment of **training centers** for employees in practice – regional network

Most important projects for the country

ALBANIA

- ❖ Albanian traditional food;
- ❖ Defeating **zoonoses**;
- ❖ Exogenous enzymes on food industries;
- ❖ Implementing of **wine production technology**;
- ❖ Study of antioxidants of **extra virgin olive oils**.

BOSNIA

- ❖ Creation of Research Centre for Food Allergens;
- ❖ Depleted uranium in heavily affected areas;
- ❖ Plant extracts with particular emphasis on **rare and endemic species**;
- ❖ Plant secondary metabolites.

SERBIA

- ❖ Improvement of meat production;
- ❖ Food allergens;
- ❖ Nutrition and health promotion: Functional foods: cheeses with reduced fat and salt level as probiotic carriers;
- ❖ **Food safety**;
- ❖ Rational/controlled use of veterinary Products;
- ❖ Safe use of by-products in meat industry;
- ❖ Fast methods for detection of microorganisms

Most important projects for Macedonia

- ❖ Use of **geothermal and mineral waters** in agriculture and in food industry
- ❖ Advance in **nutritive and functional resources** in dairy and meat products
- ❖ **Improving animal health**, product quality and performance of organic and low-input livestock systems through integration of breeding and innovative management techniques
- ❖ **GREEN OIL** - Plants providing oils of the future
- ❖ Improved epidemiological tools for **zoonoses**: application of geographical information for live animals and animal products
- ❖ Assessment of short- and long-term effects of **GMOs** on human and animal health
- ❖ Inventory of **pests and pathogens** on vegetable crops
- ❖ Effective use of **alternative energy sources** for protected crops

Most important projects for Macedonia (Cont.)

- ❖ Revitalisation of sheep breeding
- ❖ Conservation of local landraces
- ❖ Conservation of indigenous breeds of cattle, sheep, pig and poultry
- ❖ Improving on farm efficiency (Feed Conversion Ratio) through raw material (ingredients) quality control.
- ❖ Mining genomics information of farm animals to generate new information on the genetic basis of phenotypes important to sustainable animal production
- ❖ Optical technologies for monitoring the human nutrition status and the onset of nutrition-related health problems
- ❖ Impact of exogenous factors in the development of allergy
- ❖ Establishment of Integrated Soil Management Service (SMS)

Support to agri-food research community

1

Measures to develop the infrastructure

2

Measures to help the human potential

3

Measures to develop the organization of research

4

Most important projects for the country

Measures to develop the infrastructure

ALBANIA

- ❖ **National projects;**
- ❖ CEE supported projects;
- ❖ NATO supported projects;
- ❖ Bilateral scientific projects;
- ❖ Setting up and functioning of scientists groups;
- ❖ **New laws** on education and research;
- ❖ Improvements of food legislations standards.

BOSNIA

- ❖ **Change of legislation;**
- ❖ Law science;
- ❖ Co-operation with multinational corporations in field of food production;
- ❖ Co-financing in purchasing of equipment.

SERBIA

- ❖ International projects;
- ❖ Rationalization of the existing infrastructure;
- ❖ **National programs;**
- ❖ Stimulating models encouraging the industry to participate in equipment purchase;
- ❖ Developing models to encourage knowledge and training program exchange of both researchers and personnel.

Measures to develop the infrastructure (Macedonia)

- ❖ Opening of thematic debate (Forum), meetings with science and economy,
- ❖ Science and government, science and education, science and public;
- ❖ Measurement for support and engagement financial fund for modernization; equipment and training of staff;
- ❖ Effectual information about aging of equipment;
- ❖ Creation of technological centre;
- ❖ Tax relief for technical improvements and scientific equipment;
- ❖ Government support & investment in contemporary and advanced technologies and equipment;
- ❖ Private public partnerships focused on research;
- ❖ Performance oriented financial support.

Measures to help the human potential

ALBANIA

- ❖ Training courses;
- ❖ Participation on summer school;
- ❖ Participation on **international projects**;
- ❖ Including the new scientists within the scientific groups;
- ❖ Supporting by the governments R&D programs;
- ❖ To hire scientists;
- ❖ To include them in projects.

BOSNIA

- ❖ Education of young scientists abroad;
- ❖ Motivation.

SERBIA

- ❖ Offering different kinds and modules of grants and **training** for different levels/ages of , e.g. the so-called “**sandwich**” **PhD** (which implies student mobility);
- ❖ Improvement of motivation of researchers by offering them **higher wages**;
- ❖ Publication of scientific papers in **journals of high scientific impact**;
- ❖ Improvement of **international cooperation**;
- ❖ Scholarships and grants, both national and international.

Measures to help human potential (Macedonia)

- ❖ Employment young scientific staff and their training;
- ❖ Accessible to principal multi European network computer (data processing) for research and education-GEANT;
- ❖ Accessible to scientific review and electronic data-base and electronic review (Science Direct, Web of Science, ISI databases and etc.);
- ❖ Removal of travel barriers (visas, long-expensive procedures etc.);
- ❖ Local – regional training facilities and capacities building;
- ❖ Increased effort on improvement of usage of ICT amongst scientific & research staff;
- ❖ Better facilitation and improvement of regional co-operation.

Measures to develop the organization of research

ALBANIA

- ❖ Increasing the **budget** for scientific research;
- ❖ **Improving the infrastructure of scientific laboratories;**
- ❖ Corporation with national business;
- ❖ **National R&D programs and cooperation within the WB.**

BOSNIA

- ❖ Legislation;
- ❖ Financing;
- ❖ **Reform of University education;**
- ❖ CTT centres.

SERBIA

- ❖ Joint Cooperation between institutions;
- ❖ Return of trained individuals/researchers from abroad;
- ❖ **Education and training of young talented individuals abroad;**
- ❖ Training courses for researchers;
- ❖ Workshops.

Measures for organization of research (Macedonia)

- ❖ Make changes in higher education, rigor in measure to selection profession (with international review and with criterion for publishing in international review);
- ❖ Allocation grant/scholarship to best and talented students;
- ❖ Building mechanism from the part of Ministry of Education and Science for stopping going away of young researcher;
- ❖ Visible, up-to-date database of capacities and competencies;
- ❖ Open, regional structure for publication and exchange of scientific data;
- ❖ Advancement of the mechanisms for improvement of the researchers mobility;
- ❖ Clear and substantial regional/national policies & support for research;
- ❖ Protection of “intellectual property”;
- ❖ Promotion of results, partnerships & co-operation with the business sector & farmers;
- ❖ National strategy.

Most important projects for the country

ALBANIA

- ❖ **Albanian traditional food**;
- ❖ Defeating of zoonoses;
- ❖ Exogenous enzymes on food industries;
- ❖ Implementation of wine production technology;
- ❖ Study of antioxidants of extra virgin olive oils.

BOSNIA

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MACEDONIA

- ❖ Regional agriculture advisors support program;
- ❖ Networking among researchers and scientific workers;
- ❖ Regional centre for non-formal training.

SERBIA

- ❖ **Improvement of research infrastructure**;
- ❖ Inter-institutional **cooperation** and networking;
- ❖ Setting up a system for pesticide residue control in fruit and vegetables in Serbia.

Topics to be suggested to the Commission?

❖ Main Area:

- **Plant and Animal Genomics**

❖ Main Topics

- Preservation of indigenous species and traditional functional food products in the WBC;
- Investigation of regional genetic resources in the WBC (plants, animals and microorganisms);
- Creation of research infrastructure in WBC;
- Food quality and safety in WBC.

A topics to be suggested to the WP 2010 !?

- ❖ **Activity 2.1**: Sustainable production and management of biological resources from land, forest and aquatic environment
- ❖ **Area 2.1.2** Increased sustainability of all production systems (agriculture, forestry, fisheries and aquaculture); plant health and crop protection
- ❖ **Title**:
- ❖ **Exploring Adaptive Mechanisms and Genetic Resources of European Resurrection Plants (WBC, Bulgaria, Greece, Portugal, Spain)**
- ❖ **Type of Project**:
- ❖ *Small (Large) Collaborative Project*

Description of the topic

- ❖ The Balkan Peninsula is characterized by **highly diverse** climatic, geological, topographic and hydrological conditions.
- ❖ This is a prerequisites for the existence in relatively small areas of very **diverse microhabitats** with numerous **endemic and relict species**.
- ❖ In this environment a few plant species managed to develop unique strategies to survive unfavourable climate conditions.
- ❖ The two most famous representatives among them are *Haberlea rhodopensis* Friv. and *Ramonda serbica* Panc.
- ❖ They have the ability to switch **from biosys to anabiosys** with unique strategies to survive under harsh climate changes.
- ❖ In a similar region in Spain another resurrection plant have survived – *Ramonda mycony*.
- ❖ All these species belong to the group of **resurrection plants** and are able to survive severe dehydration, regaining strength and physiological activities rapidly after rehydration.

Justification

- ❖ This **extreme drought tolerance** and the geographic isolation makes them an excellent candidate for isolation of **genes** involved in the mechanism of drought and other stress tolerance.
- ❖ Using the **Functional Genomics** and new methods for massive parallel sequencing (Solexa/Illumina technology), it is possible to do whole genome sequencing and transcriptome analysis to reveal the mechanisms behind their unique stress tolerance.
- ❖ The aim of this topic is to produce an **EST library** of normal and stress-treated resurrection plants.
- ❖ The **differential gene expression** analyses will fish out up- and down-regulated genes in response to stress treatment of plants.
- ❖ The approach will be extended by an analysis of the changes of the **methylation status** during biosis-anabiosis transitions.
- ❖ In addition, this project will connect genes to secondary metabolites by **metabolomics** and a systems biology approach.

Expected Impact

- ❖ Generated EST library will enhance the identification of (new) genes involved in stress resistance of those species.
- ❖ In future, the selected cDNAs will be used for producing of **modified crops** or by implementing **marker assisted selection** to improve crop resistance to stress.
- ❖ Correlations will be drawn between changes in methylation pattern and the switching on or off of genes in plants, i.e. alterations of gene transcription leading to **stress adaptation**.
- ❖ The project will establish in *in vitro* cell cultures of resurrection species for producing improved or **new secondary metabolites** that can be exploit in pharmaceutical, cosmetic or other industries.
- ❖ **Criteria 1, 2, 3, 4, 5**
- ❖ 2. Areas supporting other EU policies/strategies/initiatives such as neighbouring policy
- ❖ 4. Areas supporting global and/or regional challenges and the global responsibility of EU

THANK YOU !

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