

Centre of Excellence for Biodiversity and Molecular Plant Breeding (CoE CroP-BioDiv): Objectives and Activities

Zlatko Šatović

University of Zagreb, Faculty of Agriculture, Zagreb, Croatia
Centre of Excellence for Biodiversity and Molecular Plant Breeding
(CoE CroP-BioDiv), Zagreb, Croatia

E-mail: zsatovic@agr.hr

CENTERS OF EXCELLENCE

2014/2015

- 13 Centers of Excellence have been established

No.	Centre	Field
1	CoE for Advanced Materials and Sensing Devices	Natural Sciences
2	CoE for Science and Technology	Natural Sciences
3	CoE for Quantum and Complex Systems and Representation of Lie Algebras	Natural Sciences
4	CoE for Reproductive and Regenerative Medicine	Biomedicine
5	CoE for Research in Viral Immunology and the Development of New Vaccines	Biomedicine
6	CoE for Basic, Clinical and Translational Neuroscience	Biomedicine
7	CoE for Biodiversity and Molecular Plant Breeding	Biotechnical Sciences
8	CoE for Marine Bioprospecting	Biotechnical Sciences
9	CoE for Personalised Health Care	Inter-disciplinary
10	CoE for Data Science and Cooperative Systems	Technical Sciences
11	CoE for Integrative Bioethics	Humanities
12	CoE for Croatian Glagolitism	Humanities
13	CoE for School Effectiveness and Management	Humanities

- established for a period of five years

- status of the CoE may be prolonged for the next five years

THE PROJECT

2017

- call for projects

 - financed by Ministry of Regional Development and EU Funds
(European Structural and Investment Funds;

 - Operational Programme Competitiveness and Cohesion 2014/20)

- for 10 CoE from a STEM field

- overall budget: ~50,000,000.00 EUR

- project

 - Biodiversity and Molecular Plant Breeding

 - Coordinated by: CoE CroP-BioDiv

 - Start of project : 01/01/2018

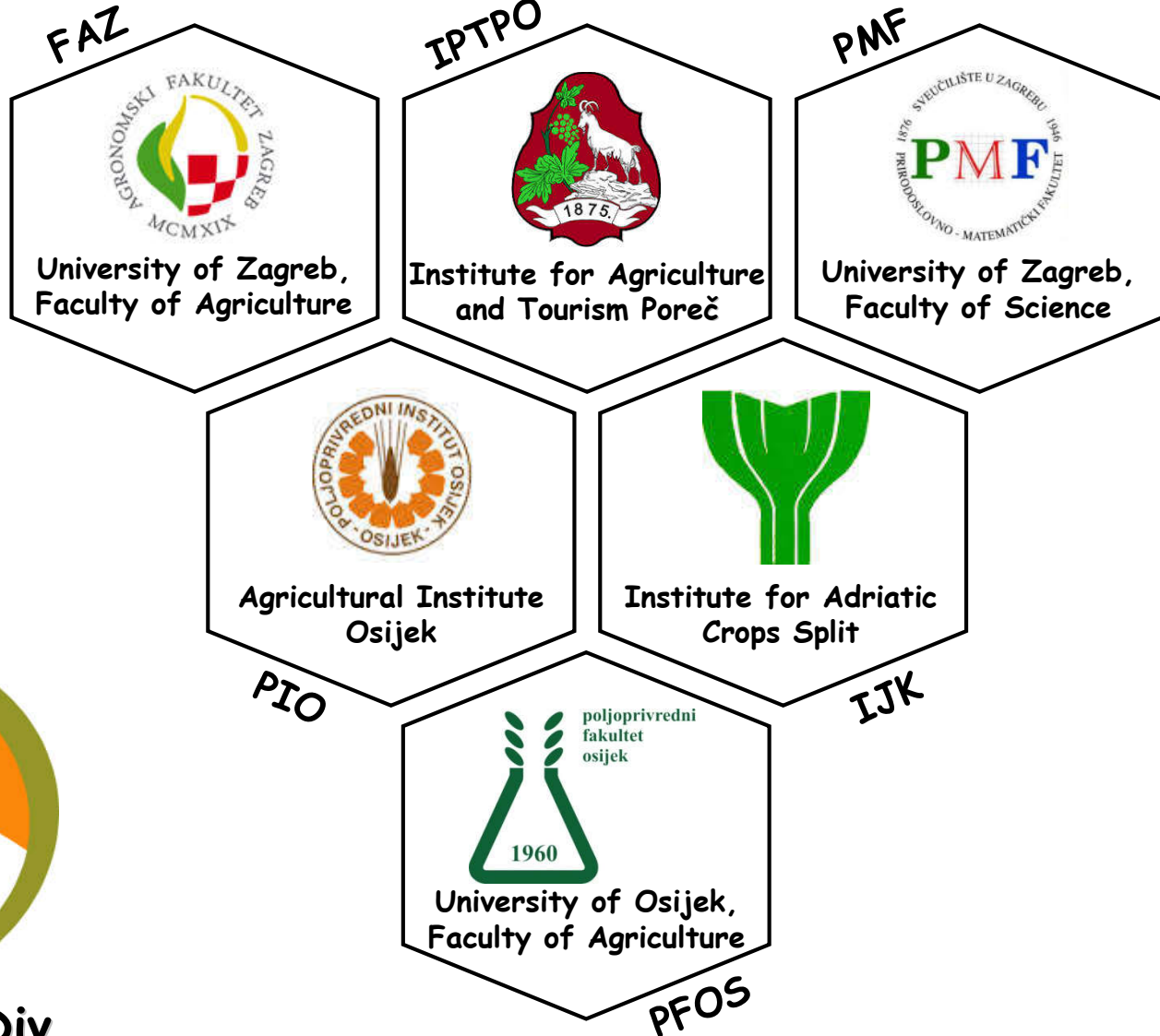
 - Duration: 5 years

 - Budget: ~5,000,000.00 EUR

CoE CroP-BioDiv

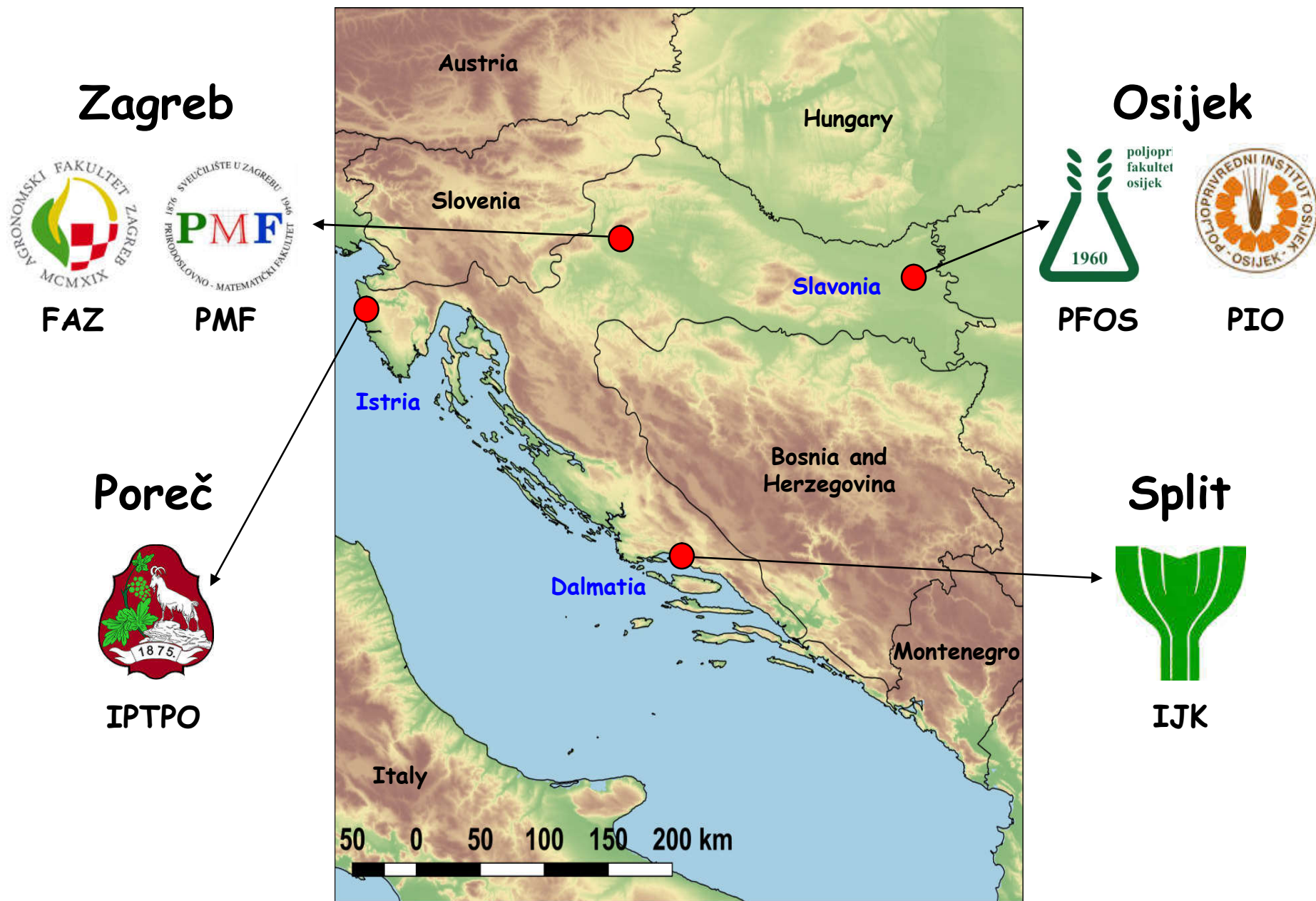
+ 5 Member Institutions

Host
Institution

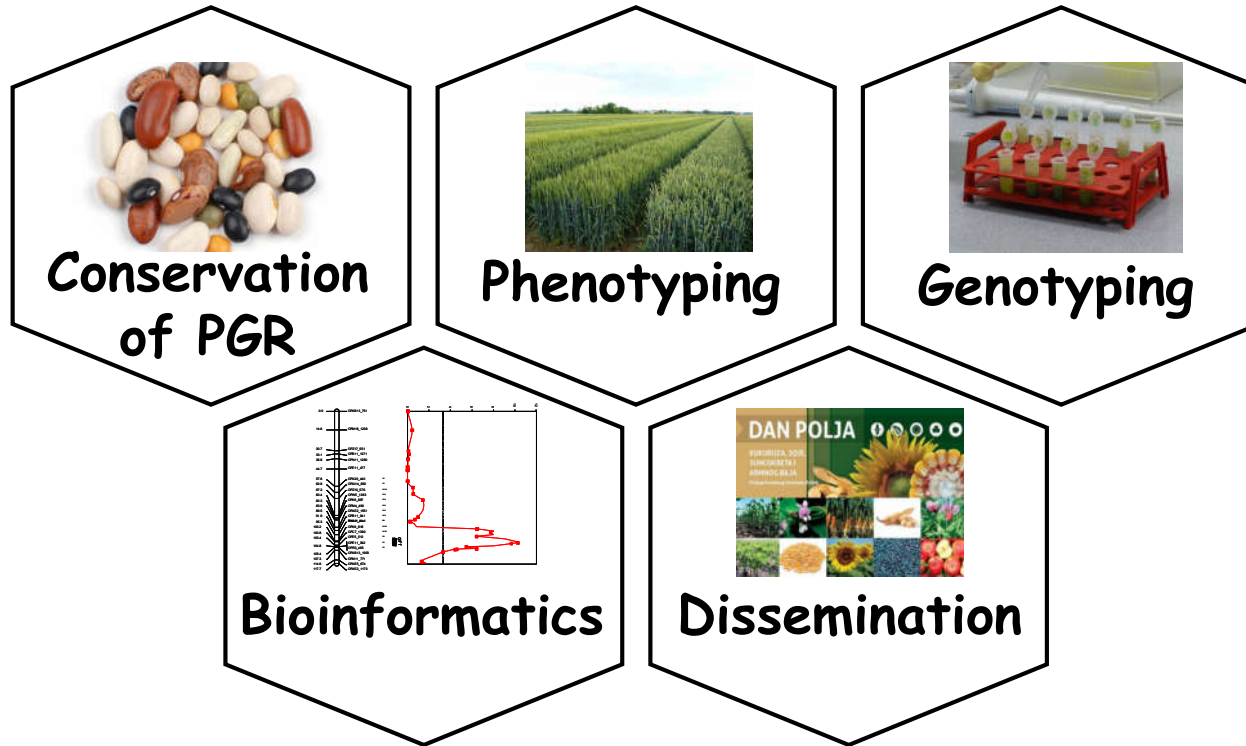


CoE CroP-BioDiv

CoE CroP-BioDiv >> Regions



OBJECTIVES



Conservation of Plant Genetic Resources >> increase the benefits

Phenotyping >> high-throughput phenotyping (HTP) platforms

Genotyping >> next-generation sequencing (NGS) techniques

Bioinformatics >> genome-wide association studies (GWAS)

Dissemination >> workshops, summer schools

1 CONSERVATION OF PGR

Objective:

Increase of benefits arising out of use of plant genetic resources for food and agriculture

Background:

National Programme for Conservation and Sustainable Use of PGRFA

- numerous collections / limited budget

Tasks:

1. Further characterization and evaluation of accessions on agronomic, biochemical and genetic levels
2. Create a strong link between germplasm collections, scientific research and breeding programmes

2 PHENOTYPING

Objective:

Apply novel phenotypic tools for the analysis of plant traits

Background:

- research infrastructure: many small research groups, underutilized equipment, obsolete technology
- new solutions: high-throughput phenotyping

Tasks:

1. Optimization of phenotyping protocols
2. Establish links with key institutions possessing infrastructure for high-throughput phenotyping

3 GENOTYPING

Objective:

Introduce novel genotyping methods

Background:

- reseach infrastructure: many small reseach groups, underutilized equipment, obsolete technology
- new solutions: next-generation sequencing techniques

Tasks:

1. Otpimization of genotyping protocols
2. Evaluate and compare new genotyping methods accoring to the specific needs

4 BIOINFORMATICS

Objective:

Implement novel statistical methodology

Background:

- hundreds of PCs; underutilized facilities at the University Computing Centre (SRCE) in Zagreb
- new solutions: genome-wide association studies (GWAS)

Tasks:

1. Relocate the data management and analysis processes from servers and PCs to computer clusters
2. Develop pipelines for big data bioinformatics

5 DISSEMINATION

Objective:

Communicate the activities of the CoE

Background:

- small and disconnected research groups
- ineffective transfer of knowledge
- general public: misconceptions about plant breeding

Tasks:

1. Academia: scientific papers, workshops, summer schools, scientific conference
2. Farmers and entrepreneurs in agriculture: joint activities, round tables
3. General public: popular articles, internet, radio, TV

MODEL PLANT SPECIES

Major Crops



Maize



Wheat



Soybean

Traditional Crops



Grape vine



Olives

Promising Crops



**Brassicas
Alliums**



Common bean



**Dalmatian pyrethrum
Dalmatian sage**

1 MAJOR CROPS

- maiz, wheat, soybean

Background:

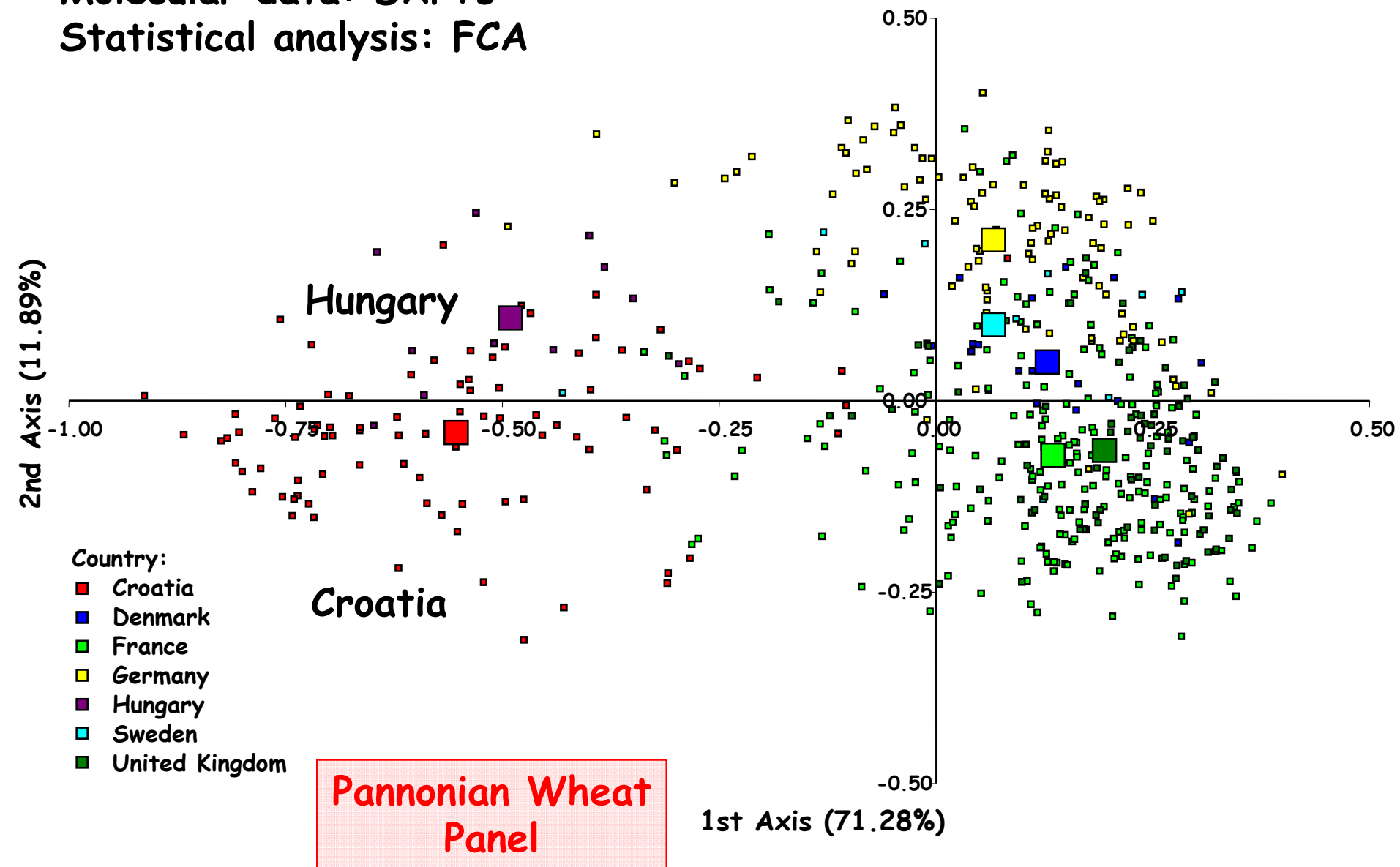
- plant breeding programmes based on classical breeding methods

Goal:

- introduction of molecular breeding methods
- next-generation sequencing; *GWAS*
- traits: physiological traits
quality traits
resistance traits

e.g. WHEAT

Molecular data: DArTs
Statistical analysis: FCA



2 TRADITIONAL CROPS

- grape vine, olives

Background:

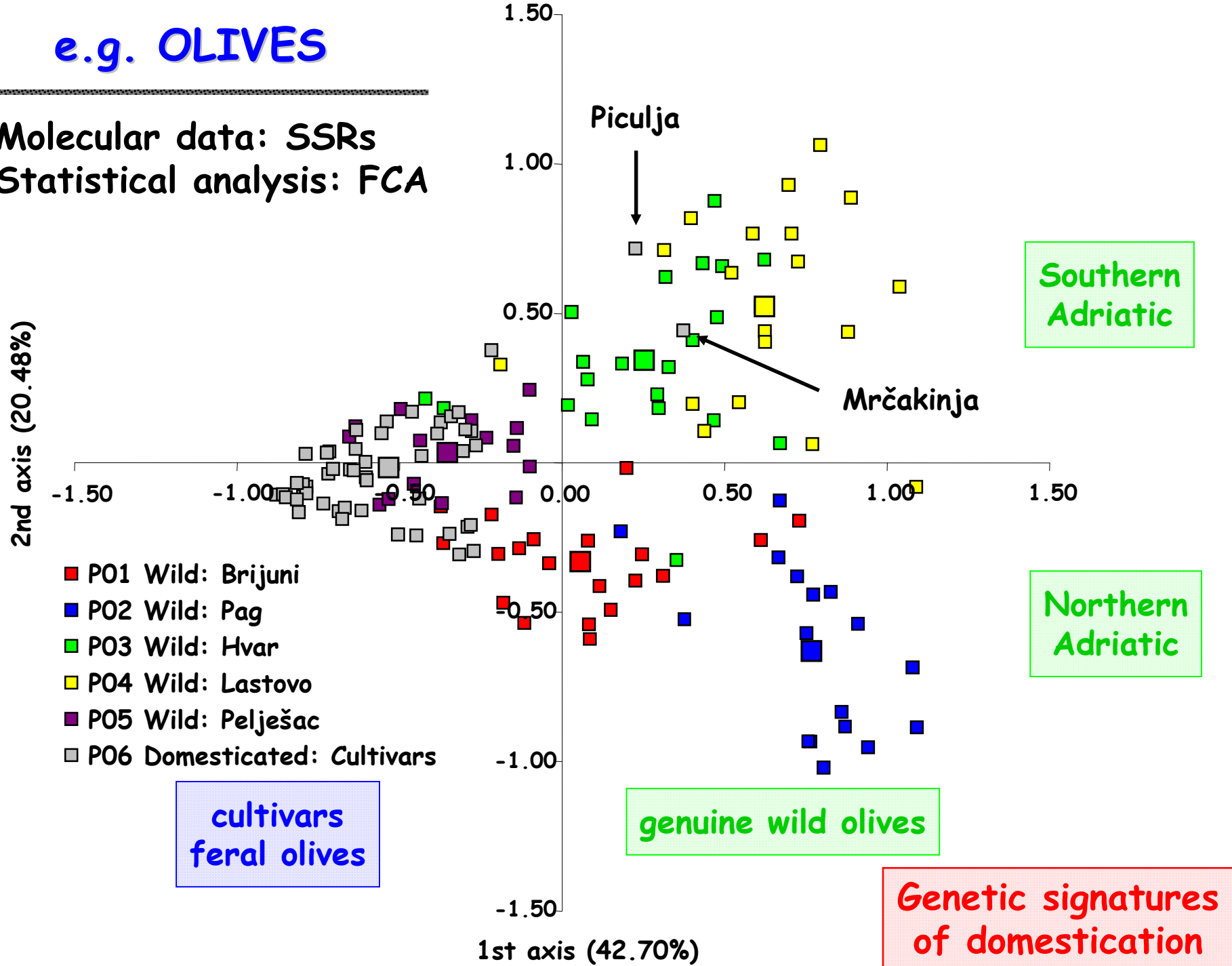
- numerous traditional cultivars
- nursery production

Goal:

- detailed characterization of traditional cultivars (homonymy, synonymy, intracultivar diversity)
- introduction of molecular markers techniques in nursery production
- olives: phenotyping/genotyping of wild olive genetic resources

e.g. OLIVES

Molecular data: SSRs
Statistical analysis: FCA



3 PROMISING CROPS

- Brassicas/Alliums, common bean, Dalmatian pyrethrum/sage

Background:

- no breeding programme
- richness of plant genetic resources

Brassicas: traditional cultivars (collard greens: *B. oleracea* var. *acephala*)
wild relatives (*B. incana*, *B. botterii*, *B. cazzae*, *B. mollis*)

Alliums: traditional cultivars (onion, garlic, shallot...)

Common bean: traditional cultivars

Dalmatian pyrethrum/sage: wild populations

Goal:

Brassicas/Alliums: biochemical/genetic analyses; phylogeny

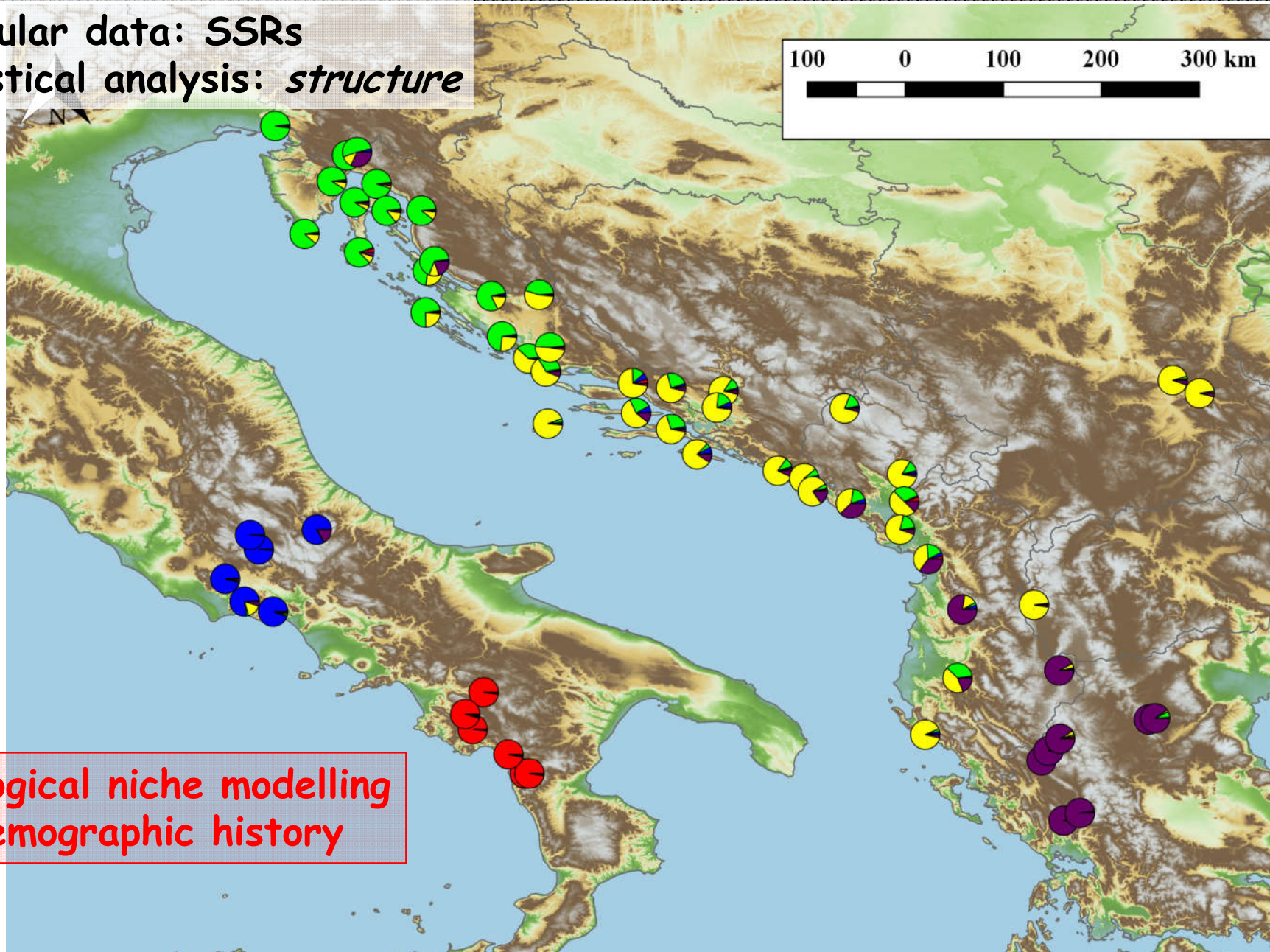
Common bean: QTL for bioactive nutrient content

Dalmatian pyrethrum: population genetics; pyrethrins

Dalmatian sage: population genetics; chemotypes

e.g. DALMATIAN SAGE

Molecular data: SSRs
Statistical analysis: *structure*



Ecological niche modelling
Demographic history



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Please visit: <http://biodiv.iptpo.hr>



CroP-BioDiv



Europska unija
Zajedno do fondova EU

