SCIENTIFIC INVESTIGATIONS IN VEGETABLE CROPS IN BULGARIA – STATUS, PRIORITIES AND PROPOSALS FOR JOINT CO-OPERATION
Maritsa Vegetable Crops Research Institute - Plovdiv http://vcri-maritsa.org/

Experimental Station for Potato – Samokov

Institute of Plant Genetic Resources “K. Malkov”- Sadovo http://www.ipgrbg.com/

Institute of Soil Science “Nikola Poushkarov”- Sofia http://www.iss-poushkarov.org/

Canning Research Institute - Plovdiv http://www.canri.org/

Plant Protection Institute Kostinbroad http://www.ppi-bg.org/


Agricultural University – Plovdiv http://www.au-plovdiv.bg/
Management and assessment of vegetable genetic resources
Strong sides:

✓ Collection of 2,252 varieties local forms in three variants of storage
✓ Collection of breeding materials in the Maritsa Vegetable Crops Research Institute – Plovdiv, Institute of Genetics – Sofia and Institute for Plant and Genetic Resources – Sadovo
✓ Most of the genetic resources have been described and assessed
Weak sides:

- Insufficiently studied gene pools of biodiversity in some of Bulgarian regions

- There is no a specialized assessment including biochemical characteristics, resistance to biotic and abiotic stress in significant part of the genetic resources

- Popularizing of the information concerning quality of the stored genetic resources is insignificant.
Priority investigations

research teams from
Institute for Plant and Genetic Resources – Sadovo;
Maritsa Vegetable Crops Research Institute – Plovdiv
Institute of Genetics – Sofia
Making of inventory of the existing genetic resources that are not used in the current breeding process
Additional enrichment of the vegetable crops and potato collections by organizing of expeditions in slightly studied regions in Bulgaria
Enrichment with new gene plasma obtained by the classic breeding, plant technology and by introduction
Development of data basis for the structure and conservation status of the accessions for the visited locations and regions in Bulgaria
Model proposals for co-operation with the countries from the Balkans

Exchange of gene plasma

Expanding of electronic network between the specialists in vegetable crops in the Balkans

Management and use of the collected and described local Balkan varieties, populations and accessions from vegetable crops and potato
Pest risk management of vegetable crops
**Strong sides:**

- Identification of economically important diseases
- The strain and race composition in virus, bacterial and fungal diseases
- It has been determined economically important pests
- The quarantine pests that are real danger to the country
- Good scientific and research experimental basis and modern methods for pest diagnostics and identification
- Integrated schemes for pest control under greenhouses
- Resistant/tolerant vegetable crops varieties and lines
Weak sides:

✓ Complete system including data base for economically important pests in vegetable crops is not developed
✓ Systems for integrated control on the pests in vegetable crops grown in open field are not developed
✓ Products for soil disinfection registered in the country are limited
✓ Collected sources of resistance and tolerance are insufficient
✓ Studies on useful species are also insufficient
Priority investigations

research teams from
Maritsa Vegetable Crops Research Institute – Plovdiv
Plant Protection Institute – Kostinbrod
Agrarian University – Plovdiv
Institute of Genetics – Sofia
Monitoring of economically important pests on vegetable crops
Development of data basis and carding (mapping) of economically important pests on vegetable crops in Bulgaria
Study on bioecology, species, race and strain composition of economically important and newly appeared pests
Risk evaluation from quarantine pests

strict following of the directive 95/44 of the EU
Development and improvement of integrated systems for pest control in vegetable crops.
Control on soil pests – disinfection in cultivation facilities and in open field
Search of sources for resistance to economically important pests.
Identification and study of useful species (entomophags, acarofags and entomophatogens)
Model proposals for collaborative co-operation with other countries from Balkan region:

Joint estimation of risk from quarantine pests in the region

Information data basis for the status – species composition, races and strains of non-quarantine and quarantine pests on vegetable crops and potato in the countries from the Balkans
Breeding, variety maintenance and seed production of vegetable crops
Strong sides:
✓ Rich breeding gene pool
✓ Development of high productive varieties and hybrids with saved traditional Bulgarian taste
✓ Development of technologies and schemes for variety maintenance and seed production
✓ Interdisciplinary approach of the investigations
✓ Strong orientation of the Bulgarian breeding to increase of the competitive power of the scientific products
Weak sides:

✓ Breeding for high biological value is only in some vegetable crops
✓ Breeding for resistance to the factors of biotic stress is insufficiently active
✓ No varieties with tolerance to high temperatures or drying
✓ The application of modern molecular techniques is very slight or they are not applied
✓ Organic breeding and production of organic seeds are insufficient
✓ Constantly appearing problems in variety maintenance and seed production
Priority investigations

research teams from
Maritsa Vegetable Crops Research Institute – Plovdiv
Institute for Plant and Genetic Resources – Sadovo
Institute of Genetics – Sofia
Dobrudzha Agricultural Institute - General Toshevo
Agrarian University – Plovdiv
Breeding of lines, varieties and hybrids with high biological value

β-carotene

lycopene

high pigment content

vitamin C
Breeding for resistance to the factors of biotic stress

Breeding for tolerance and resistance to viruses

Tomato mosaic virus
Cucumber mosaic virus
Bean Common Mosaic Virus

Cucumber mosaic virus
Tomato spotted wilt virus
Potato leafroll virus
Potato virus Y
Potato virus S
Breeding for resistance to bacterial diseases

*Pseudomonas syringae* pv. *tomato* race 0
*Xanthomonas vesicatoria* race T1 and T3
*Xanthomonas axanopodis* pv. *phaseoli* (XB 9913-2 and XB 9622-1)

*Pseudomonas syringae* pv. *tomato* race 1
*Xanthomonas vesicatoria* race T1, T2 and T3.

*Clavibacter michiganensis* subsp. *michiganensis*
Breeding for resistance to fungal pathogens

Verticillium dahliae race 1
Verticillium dahliae
Fusarium oxysporum f. sp. lycopersici race 1
Phytophthora infestans race T0
Pseudoperonospora cubensis
Sphaerotheca fuliginea race 1
Peronospora parasitica
Botrytis allii

Fusarium oxysporum f. sp. lycopersici race 2
Phytophthora infestans paca race T1
Phytophthora capsici
Peronospora parasitica
Botrytis allii
Complex Resistance

Fusarium oxysporum f. sp. lycopersici race 1 and Verticillium dahliae race 1

Pseudoperonospora cubensis and Sphaerotheca fuliginea race 1

Xanthomonas axanopodis pv. phaseoli (XB 9913-2 and XB 9622-1), Pseudomonas savastanoi pv. phaseolicola race 1 and 6, Colletotrichum lindemuthianum race 81 and 6 and Uromyces appendiculatus race 20-0, 20-2 and 20-3
Breeding of resistance to pests

_Acanthoscelides obtectus_

_Globodera rostochiensis_  Ro1 and Ro 3

_Meloidogyne arenaria_
_Globodera pallida_
_Brevicoryne brassicae_
_Pieris brassicae_
_Pieris rapae_
_Mamestra brassicae_
Breeding of tolerance to abiotic stress
Organic breeding
Improvement and optimization of the schemes for variety maintenance
Improvement of the seed production system
Development of technological decisions for production of organic seeds
Model proposals for co-operation with the countries from the Balkans

Development of general information data base for presenting of new achievements of the breeding in the countries from the Balkans
Searching of high biological value sources as well as sources for resistance to the factors of biotic and abiotic stress
Collaboration in the field of the organic breeding and organic seed production on the methodical and expert basis
Management of soil fertility concerning the vegetable growing
Strong sides:

✓ Scientific developments for soil resources in Bulgaria
✓ Scientific developments for the requirements of vegetable crops to nutritional regime
✓ Scientific developments for chemical status of the main vegetable crops
✓ Change of the scientific priorities in direction that is important for the production and development of decisions with practical orientation
Weak sides:

✔ Lack of systems for monitoring of agrochemical properties of the soil and scientifically based recommendations for fertilization
✔ Lack of monitoring in water for irrigation
✔ There is no an agronomical estimation of the soils for the priority vegetable crops in Bulgaria
✔ Information data base for Bulgarian soil resources and there suitability for vegetable production is not developed
✔ Scientific developments in the field of organic vegetable production are insufficient
Priority investigations

research teams from
Maritsa Vegetable Crops Research Institute – Plovdiv
Institute of Soil Science - Sofia
Information data base for soil resources in Bulgaria and their suitability for the vegetable production
Development and transfer of innovative and alternative decisions for preventive control and management of soil fertility
Development of products and methods for support and improvement of the biological factor of the soil fertility
Model proposals for co-operation with the countries from the Balkans

Ecological decisions for decrease of the losses from organic carbon in the soil
Development of biotechnological decisions of the problems concerned with soil acidity
Development of products and methods for maintenance and improvement of the biological factor of soil fertility
Management of soil fertility

Pest risk management

Breeding, variety maintenance and seed production

Genetic resources

Management of soil fertility
What is the relationships between the research and practice?

✓ Demonstrative experiments
✓ Technologies
✓ Consultations
✓ Recommendations
What could be done for improvement?

- Workshops
- Breeding with farmers
- Genetic resources on farm
- Information for changes in the field of plant protection
- Demonstration of the simulated models for management of the nutrition of vegetable crops
- Advertising of the new achievements in the real farmer’s field
- Creation of accessible information area for the new achievements
- Training work
- The Technology Transfer Centre
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THANK YOU FOR YOUR ATTENTION