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Agricultural biodiversity for consumer needs in Poland

Mariusz K. Piskula

**Institute of Animal Reproduction and Food Research
of Polish Academy of Sciences
Olsztyn, Poland**

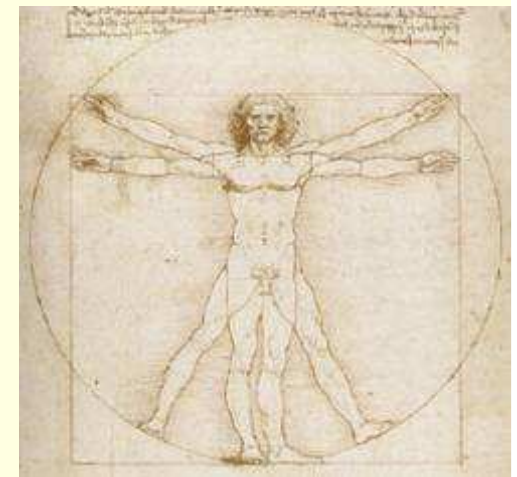


Changes in the attitude toward food function

Time/economic status



- survival
- satiety
- lack of adverse effects
- well-being and health protection





Factors stimulating consumer health oriented behaviour

- ❖ epidemiology data
- ❖ growing number of data pointing to a direct relation between the type of diet, lifestyle and health
- ❖ media
- ❖ improvement in economic status
- ❖ education
- ❖ tradition (family, regional, national)
- ❖ available leisure time



1 new message





Consumer needs and biodiversity

Food is expected to be:

Safe

Cheap

Whole year available

Easy to prepare

Providing high energy load

Creates high human pressure
on agricultural biodiversity



Pro-health

Diverse

Enjoyable

Of high nutritional value

Supports agricultural diversity





Functional food and biodiversity

Functional food

Any food claimed to exhibit health-promoting or disease-preventing action on the consumer **beyond the basic function of nutrient supply**.

It includes foods fortified with **health-promoting compounds**.

Food **with live bacteria cultures** is also considered to be functional food with probiotic benefits.



Functional food as a driving force for biodiversity protection:

- constant search for new bioactive food ingredients
- demand for new sources of bioactive compounds
- demand for natural food
- anxiety over GMO food



Local food and biodiversity

- ❑ prepared according to traditional practices
- ❑ unique character depends on the used local plant varieties and livestock (often using traditional ecotypes or endangered varieties)
- ❑ constantly increasing demand sustains local resources
- ❑ when registered as protected by law (methods of production, origin)
- ❑ Slow Food movement





Dimensions of agricultural biodiversity

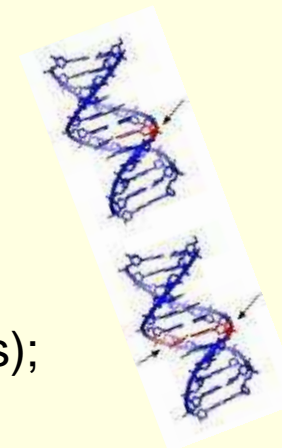
COP V/5 of Convention on Biological Diversity

➡ **Genetic resources for food and agriculture**
(plant, animal, microbial and fungal genetic resources);

Components of agricultural biodiversity
(diverse range of organisms in agricultural production systems);

Abiotic factors;

➡ **Socio-economic and cultural dimensions**
(traditional and local knowledge of agricultural biodiversity, tourism associated with agricultural landscapes);



Photos: Wikimedia Commons



FAO

Biodiversity and nutrition rationale



Wild species and infraspecies biodiversity have a key role in global nutrition security.

Different varieties of the same species have statistically different nutrient contents.

Acquiring nutrient data on existing biodiversity needs to be a prerequisite for decision making in GMO work.

Nutrient content needs to be among the criteria in cultivar promotion.

Nutrient data for wild foods and cultivars need to be systematically generated, centrally compiled and widely disseminated.

Biodiversity questions and/or prompts need to be included in food consumption surveys.

Acquiring nutrient data and intake data for varieties is essential in order to understand the impact of biodiversity on food and nutrition security.

Types of agriculture and biodiversity

<Old> EU countries

Domination of:

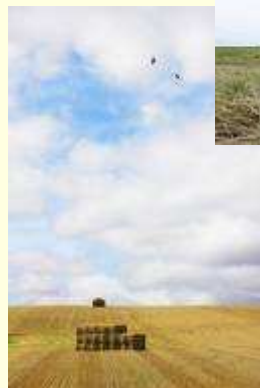
Large monoculture fields
Intensive production
Standardised agriculture
Habitat loss



Poland

Domination of:

Small scale farms
Low input farming
Organic production
Traditional production patterns



POLISH NATIONAL STRATEGY FOR THE CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY



Food related operational objectives

- ❑ Intensification of actions to implement the ways of farming contributing to the conservation and sustainable use of biodiversity.
- ❑ Implementation of the ecosystem approach in farming.
- ❑ Supporting of actions to preserve *ex-situ* genetic resources for food and agriculture.
- ❑ Intensification of actions for *in-situ* conservation of biodiversity, particularly the genetic resources of local crop plant varieties and native livestock breeds.
- ❑ Ensuring the economic viability of the growing and breeding of traditional native crop plant varieties and livestock breeds.



Agricultural biodiversity for nutrition and health

Activities in Poland

What do we do at the Institute of Animal Reproduction and Food Research?

Institute of Animal Reproduction and Food Research of Polish Academy of Sciences

Division of Food Science

Division of Reproductive Endocrinology
and Pathophysiology

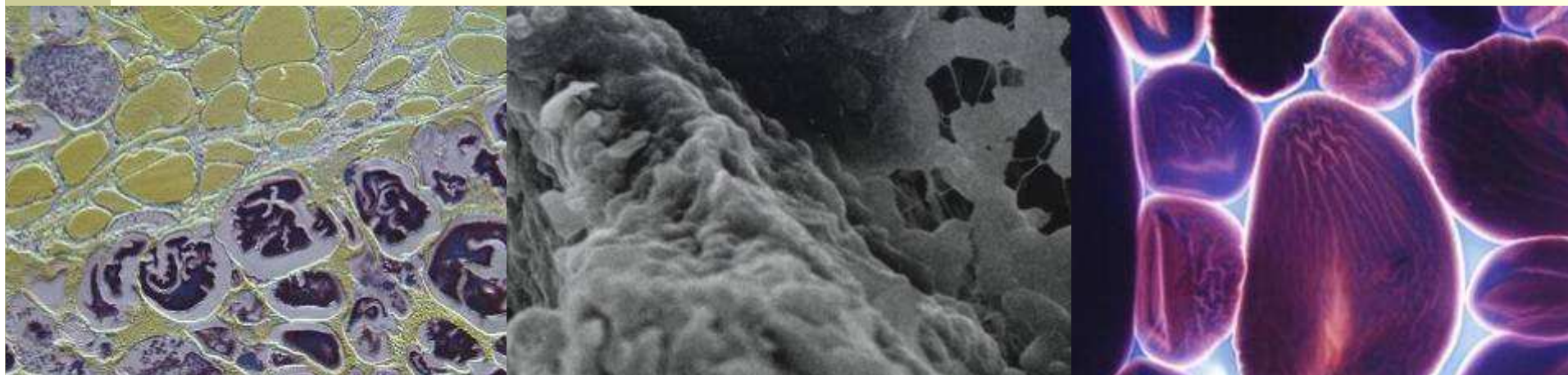
**Centre of Excellence
CENEXFOOD**

**Centre of Excellence
BIOANIREP**





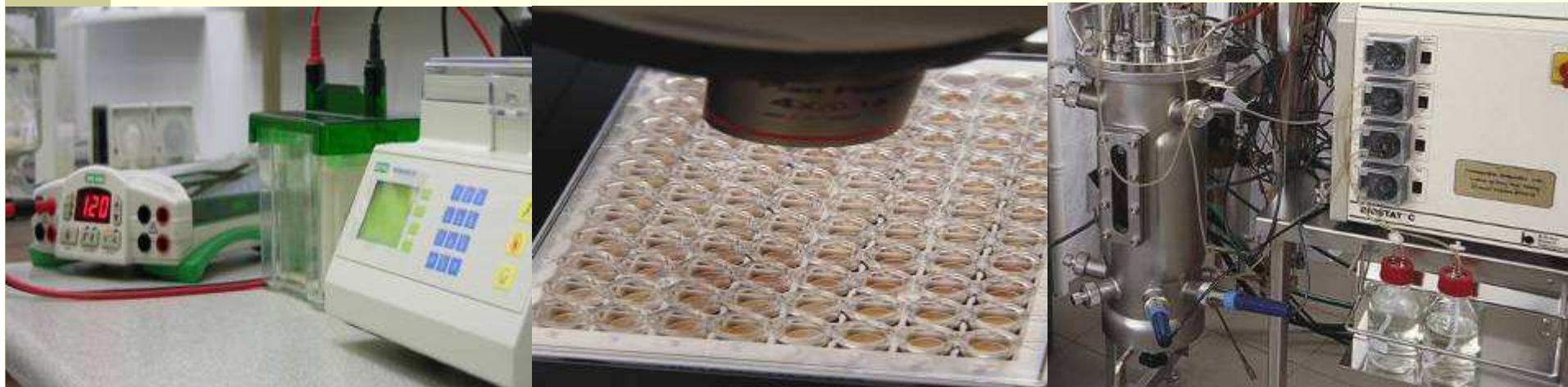
Microstructure analysis



Biosensors development



Immunology and microbiology



Chemistry and biodynamics of food



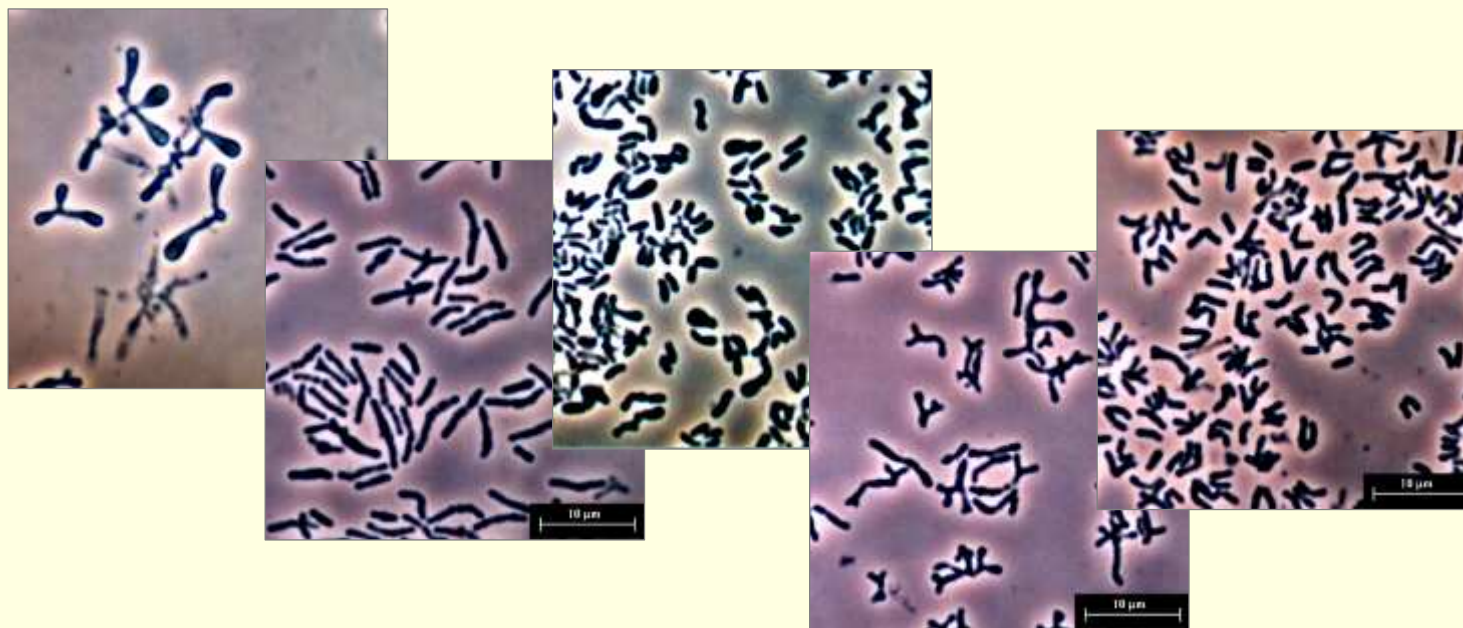
Biological functions of food



Gamete and embryo biology



Genetic resources *ex-situ* preservation- a microorganisms collection

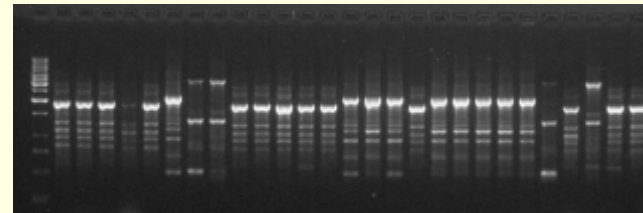


500 probiotic bacteria strains belonging to 10 genera

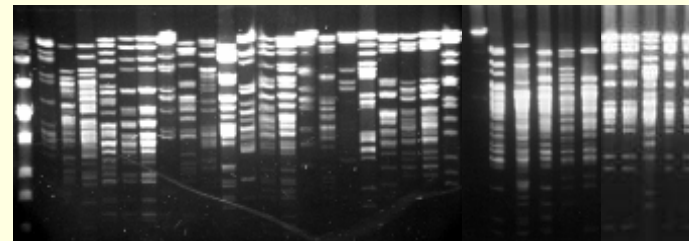
Biodiversity identification

Molecular typing and identification

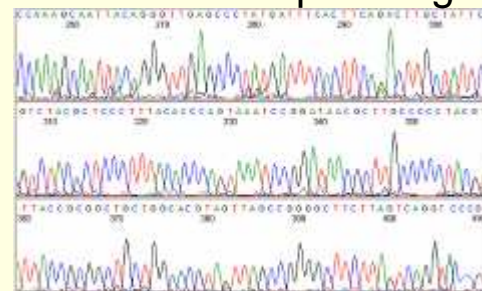
RAPD



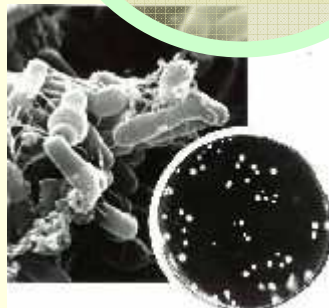
PFGE



16S rDNA sequencing



Phenotypic,
biochemical
and molecular
analysis





Genetic resources *ex-situ* preservation- a fish sperm bank

Germplasm preservation

Breeding

carp strains, trout selects
sex-reversed trouts

Endangered species

sturgeon
Danube salmon
salmon
whitefish
vendance
smelt



Actions for *in-situ* conservation

Sturgeon caught in the Vistula river in 1965.



photo J. Waluga



Eurasian grouse
(*Tetrao urogallus*)

Current count: 500 birds, the lowest number after WW2



Black grouse
(*Tetrao tetrix*)

Current count: 2000 – 2500 birds
During the last 30 years
95% of population has become extinct

Actions for *in-situ* conservation



Professor Andrzej Ciereszko and his team





Agricultural biodiversity for nutrition and health

Activities in Poland

Gene banks



Plant Breeding and Acclimatization
Institute



National Centre
for Plant Genetic Resources



Botanical Garden
Centre for Biological
Diversity Conservation

Important collection
of rare and endangered plants
European Seed
Conservation Network



Agricultural biodiversity for nutrition and health

Activities in Poland



Programme of old traditional apple varieties reintroduction

The collection holds almost 300 apple varieties;
Ca. another 200 varieties still grow in old orchards



Research Institute of Vegetable Crops

Collection of vegetables genetic resources

Allium

Umbeliferae

Solanaceae



Photos: Wikimedia Commons

Agricultural biodiversity for nutrition and health

Activities in Poland



National Database on Farm Animals Genetic Resources

Cattle
Pigs
Horses
Ship
Poultry
Furry animals
Fish
Bees





Agricultural biodiversity for nutrition and health

Activities in Poland

Back to tradition - reintroduction of old crops for consumer use

spelt



grapes



amaranth



amaranth

wheat



Thank you for your attention
