



MoravoSeed



Perspectives of Alliums breeding





Breeding is like an art; one never knows what can happen.





Breeding in Moravoseed

- Breeding since 1991
- More than **420 registered varieties**
- Propagation in Poland, France, Italy, China, India, New Zealand, Chile

- 20 varieties of **onion** (long day)
- 3 varieties of **winter onion** (short day)
- 3 varieties of **bunching onion**
- 1 variety of **shallot**
- 9 varieties of **leek**
- 2 varieties of **chives**
- 5 varieties of **garlic**



• 2 breeding stations





Lednice - Mendeleum

Svijanský Újezd





Mikulov - Lednice - Wine Region





20 MOST
CLIMATE FRIENDLY COMPANIES
OVER 2021



Congratulations to
MORAVOSEED CZ A.S.,
CZECHIA
ENVIRONMENTALLY FRIENDLY
SEED TREATMENT

europaseed

Eurpeanseed Awards
20 MOST CLIMATE FRIENDLY
COMPANIES

Inovative technology
Ozon treatment

Optical sorting machine





History and present of breeding in Lednice

- ▶ **1912** - Establishment of **Prince Jan from Lichtenstein J.G. Mendel Plant Breeding Institution in Lednice** (Mendeleum). Established by Jan II from Lichtenstein to honor the founder of genetics, J.G. Mendel.
- ▶ **Franz Frimmel** bred **first hybrid variety of tomato** in Mendeleum
- ▶ **1952** - **Department of Horticulture** in Lednice
- ▶ **1991** - Establishment of **Moravoseed** and Breeding station in Lednice



Breeding of Garlic

- Only vegetative propagation
- Don't produce seeds
- Breeding of new variety even 20 years

Positive and negative
selection

Induction of changes - mutagens (colchicin)
polyploidy induction, demethylating agents

New approach- CRISPR method - genetic scissors



Dukát - 1995





Propagation vegetation field





Selection in the field





Unikat - 2008





Topaz - 2020

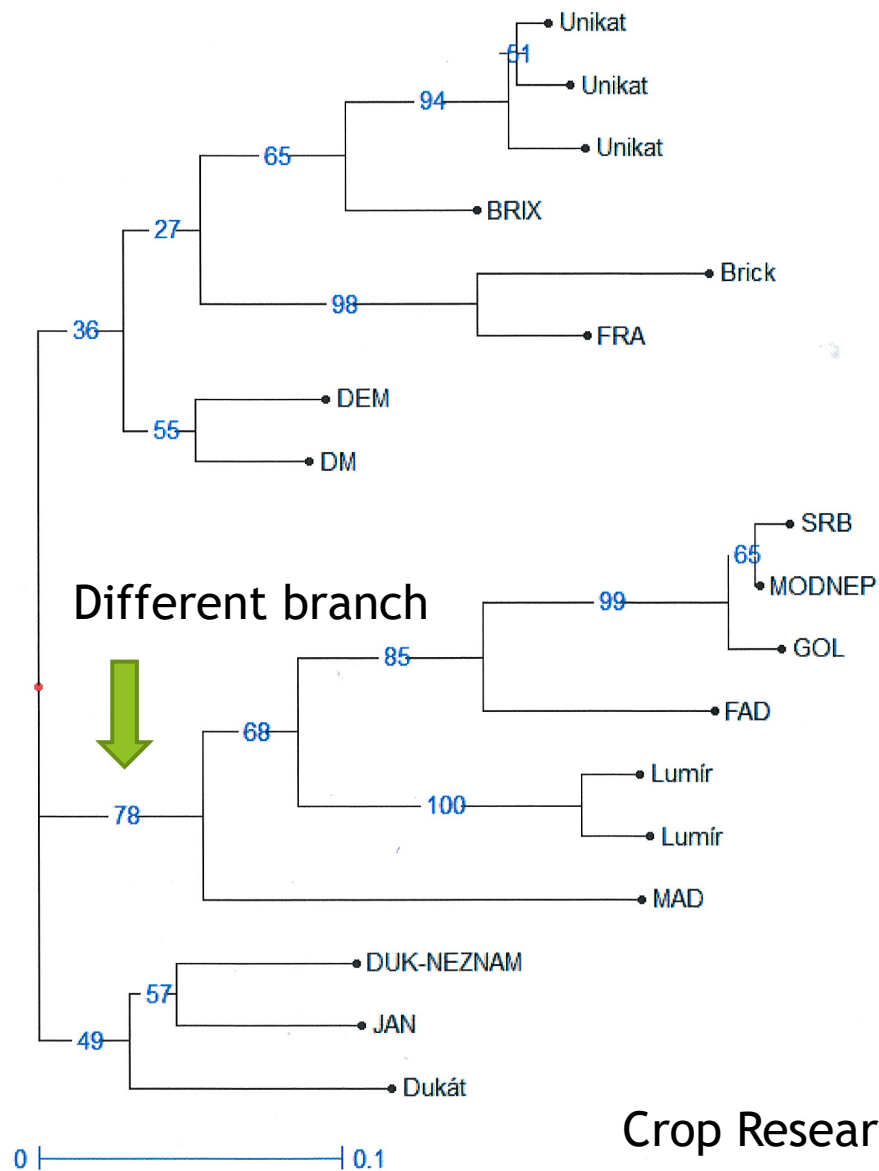


NŠL - GOL





Dendrogram MS





Schelia - 2019





Building of a molecular laboratory



INTERREG V-A
SLOVENSKÁ REPUBLIKA
ČESKÁ REPUBLIKA



EURÓPSKA ÚNIA

Borderline cooperation of shared laboratories to enhance competitiveness of Czech and Slovak vegetable producers.



Classical breeding methods

Positive and negative
selection

More than 100 working
genotypes

Basic breeding material
mainly from regional and
local sources





Challenges for breeding

- ▶ **Climate change** (very significant in last decade)
- ▶ **Changes** in garlic characteristics (Dukát from 5-7 cloves to 4 cloves per bulb)
- ▶ Characteristics **could be lost** in time
- ▶ **Plasticity** of varieties (climate, latitude, altitude)
- ▶ **Resistance** against **biotic** and **abiotic** elements
- ▶ Especially **drought**, changes in **length of vegetation**



Challenges for breeding-Legislation

- **List of pesticides** and registered products shorten every year
- **0 products** for **garlic coating**
- Legislative of registration demand **virus-free bulbs**
- Up to 1% of symptomatic plants in propagation vegetation field
- Re-infection healed plants - serious impact on yield
- **Legislation vs practice?**
- Tolerance to viruses - future



Cooperation with gene banks

- ▶ Cooperation with Olomouc gene bank
- ▶ Joint projects
- ▶ Almost no cooperation with foreign gene banks

- ▶ Simplification of legislative process of requesting gene bank items
- ▶ Well- arranged catalog (online) with items
- ▶ Genotype description - utility properties
- ▶ Description of resistances and tolerances
- ▶ Research on garlic flowering (CRISPR) and subsequent genotype's crossing



Vision of new variety

- Resistance against **drought**
- Tolerance to **virus diseases**
- Long vegetation period
- 8 - 10 cloves - ideal propagation coefficient
- Non-attractive for **nematodes**
- High plasticity
- Long **shelf life**





Thank you for your attention!





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