



**Genetic diversity chances in pea
germplasm collection investigated by
microsatellite markers**

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Genebanks

- **20th century - N. I. Vavilov**
- **today - 7 mil. accessions**
- **CR \pm 47 000**
- **store, maintain, reproduce**
- **core collection**
- **longterm conservation**
- **availability**



N. I. Vavilov (1887 -1943)

Genebanks

- **landraces, cultivars, wild relatives**
- ***ex situ* conservation**
- **genetic erosion – drift**
- **insufficient, inappropriate regeneration**
- **decline of genetic variability**

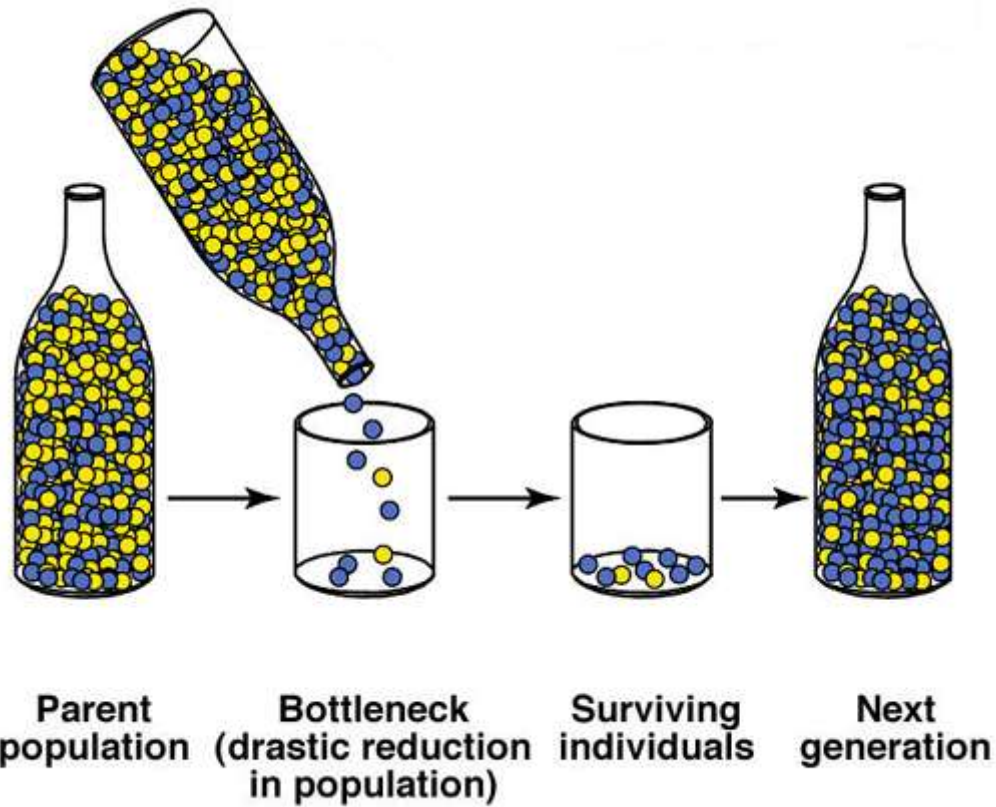


Bottleneck effect

- severe reduction in population size
- reduced genetic variability
- irreversible
- ↑ genetic drift



Bottleneck effect



Microsatellite markers

- widespread, ↑ allelic polymorphism
- commonly used
- distribution (repeats, regulatory regions, introns, intergenic)
- crops (mapping, diversity, phylogeny studies, DUS)
- Pea genome: $2n = 14 = 4000 \text{ Mb}$, 60 % repetitive



Aim of work



To determine the risk of genetic erosion during conservation process of pea (*Pisum sativum* L.) genetic resources by microsatellite markers.

Material and methods

Plant material

- ten accessions of pea (*Pisum sativum* L.):

Arvika, Bohatýr, Český Banán, Hanák, Hrotovický krajový moravský, Klatovský zelený, Moravská krajová, Niké, Raman, Viktoria 75

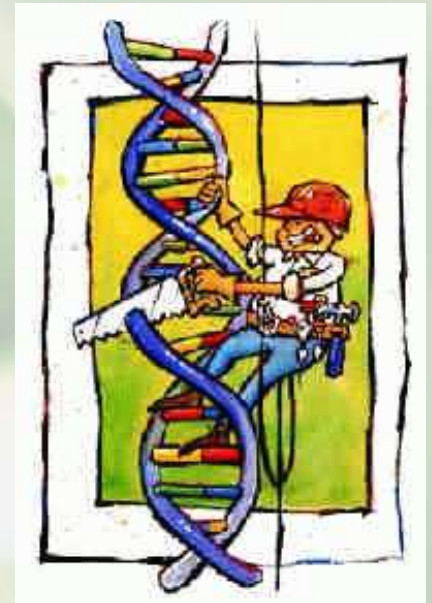
- two temporally different samples
- 20 randomly selected individual seeds



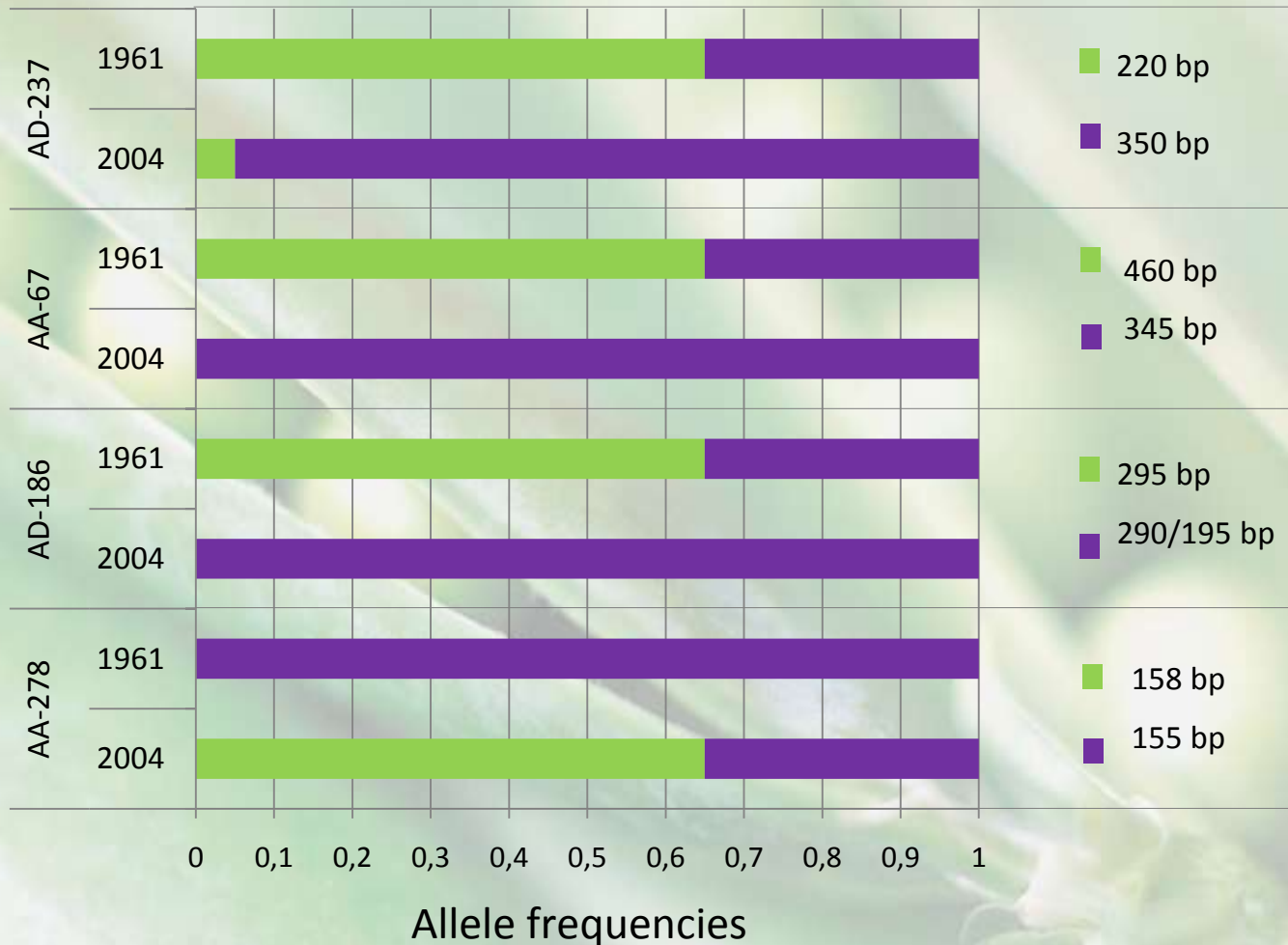
Molecular analysis

Molecular DNA analysis

- genomic DNA isolation
- PCR amplification of 10 SSR loci
- electrophoretic separation - TBE-PAGE
- band scoring – fragment length, polymorphism, frequency counting

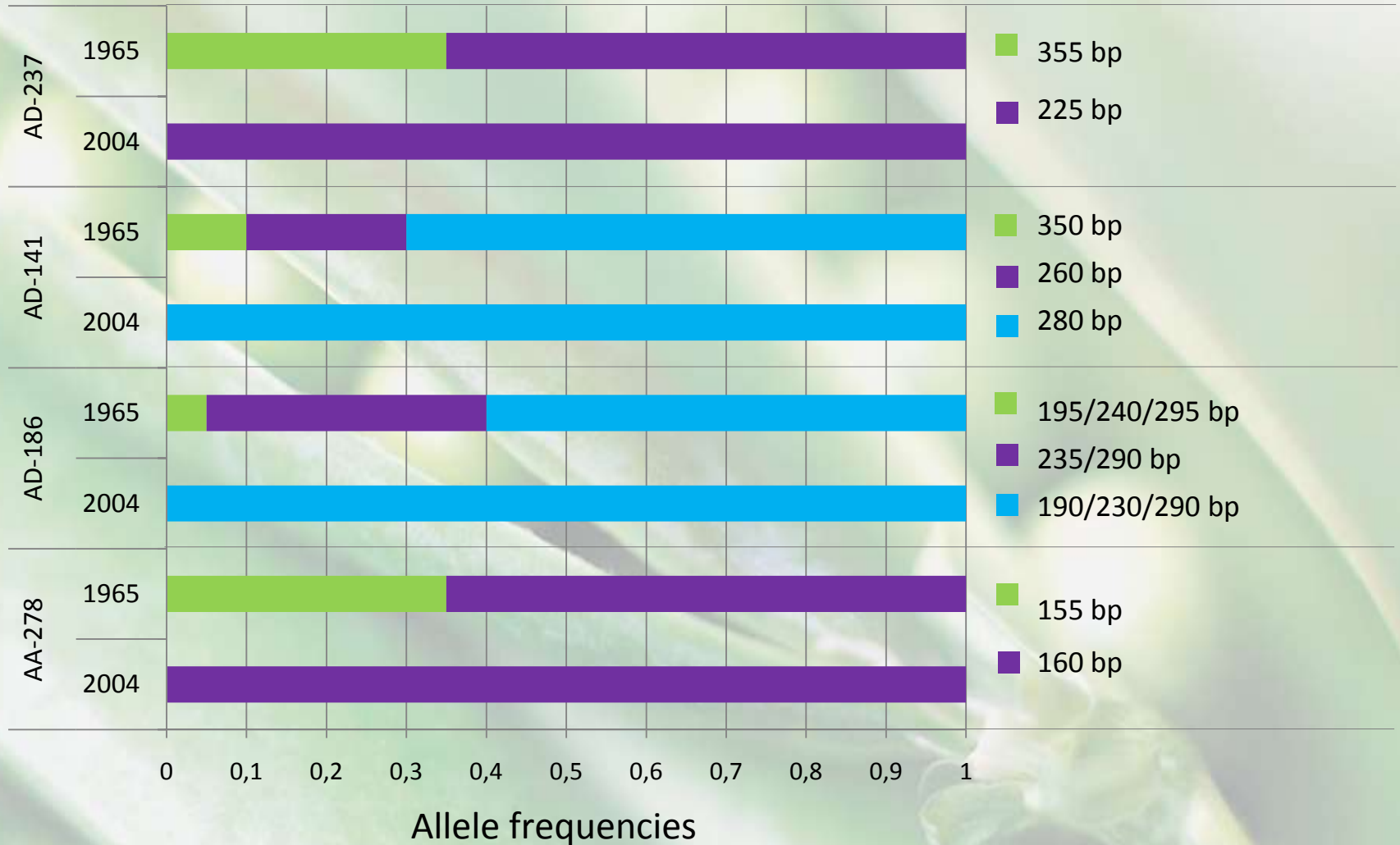


Results



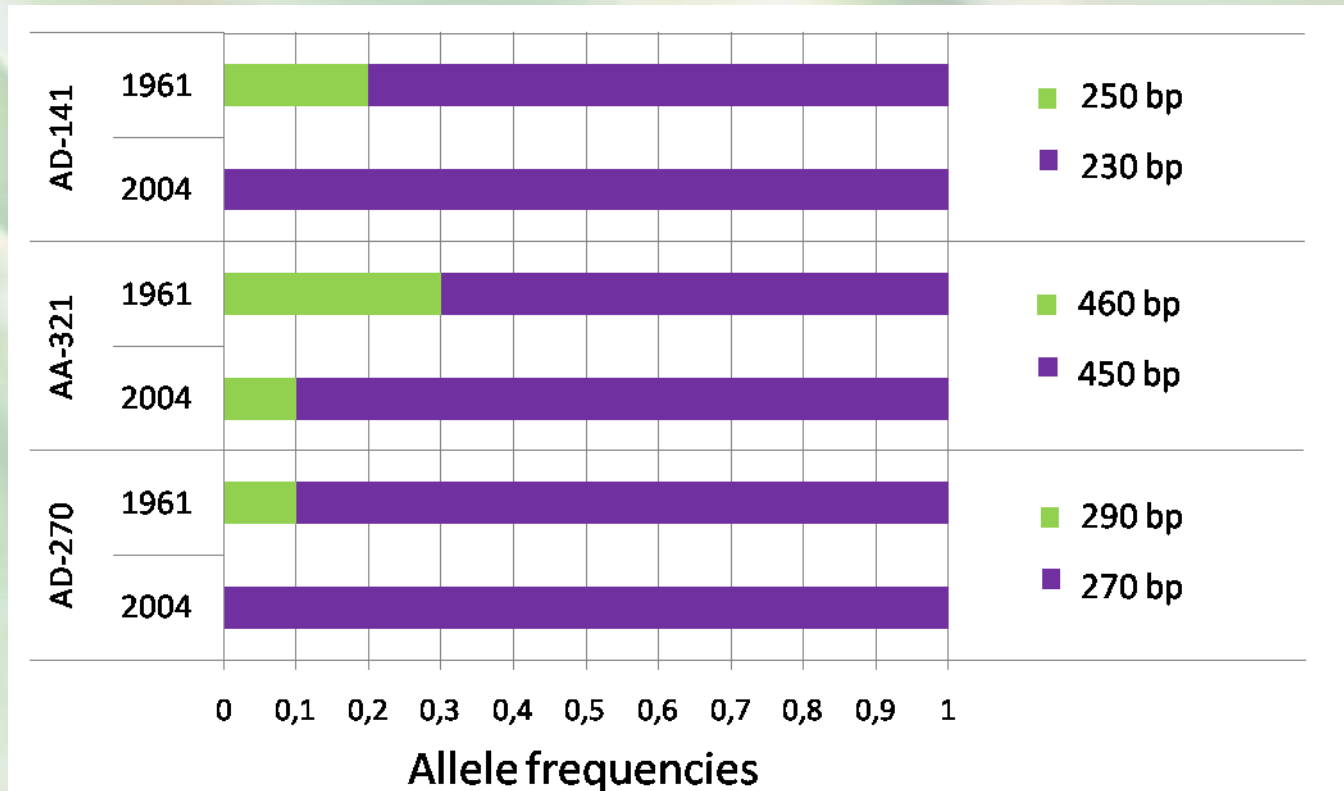
Changes in allele frequencies at AD-237, AA-67, AD-186 and AA-278 loci in accession Český banán.

Results



Changes in allele frequencies at AD-237, AD-141, AD-186 and AA-278 loci in accession Moravský hrotovický krajový.

Results



Changes in allele frequencies at AD-141, AA-321 and AD-270 loci in accession Raman.

Conclusions

- **genetic diversity changes**
- **in 6 out of 10 accessions allele frequency and genetic composition differences**
(Arvika, Bohatýr, Český banán, Moravský hrotovický krajový, Moravská krajová, Raman)
- **decrease** (Český banán, Moravský hrotovický krajový, Raman)
- **increase** (Arvika, Bohatýr, Moravská krajová)
- **very low level of heterozygosity** (Bohatýr 2004, Klatovský zelený)
- **monitoring, protocol improvement needed**

Other Questions

- **stability of microsatellite loci**

10 subsequent generations

- **differences in same accession but different genebanks**

Bohatýr (USDA, Australia, JIC Scotland, Czech)

Molecular evidence of genetic diversity changes in pea (*Pisum sativum* L.) germplasm after long-term maintenance

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Abstract Maintaining germplasm genetic integrity is a key objective of long-term *ex situ* conservation. hrotovický krajový, Raman and Viktoria-75 and f
accessions of colour flowered, fodder pea (*P. sativ*

Acknowledgement



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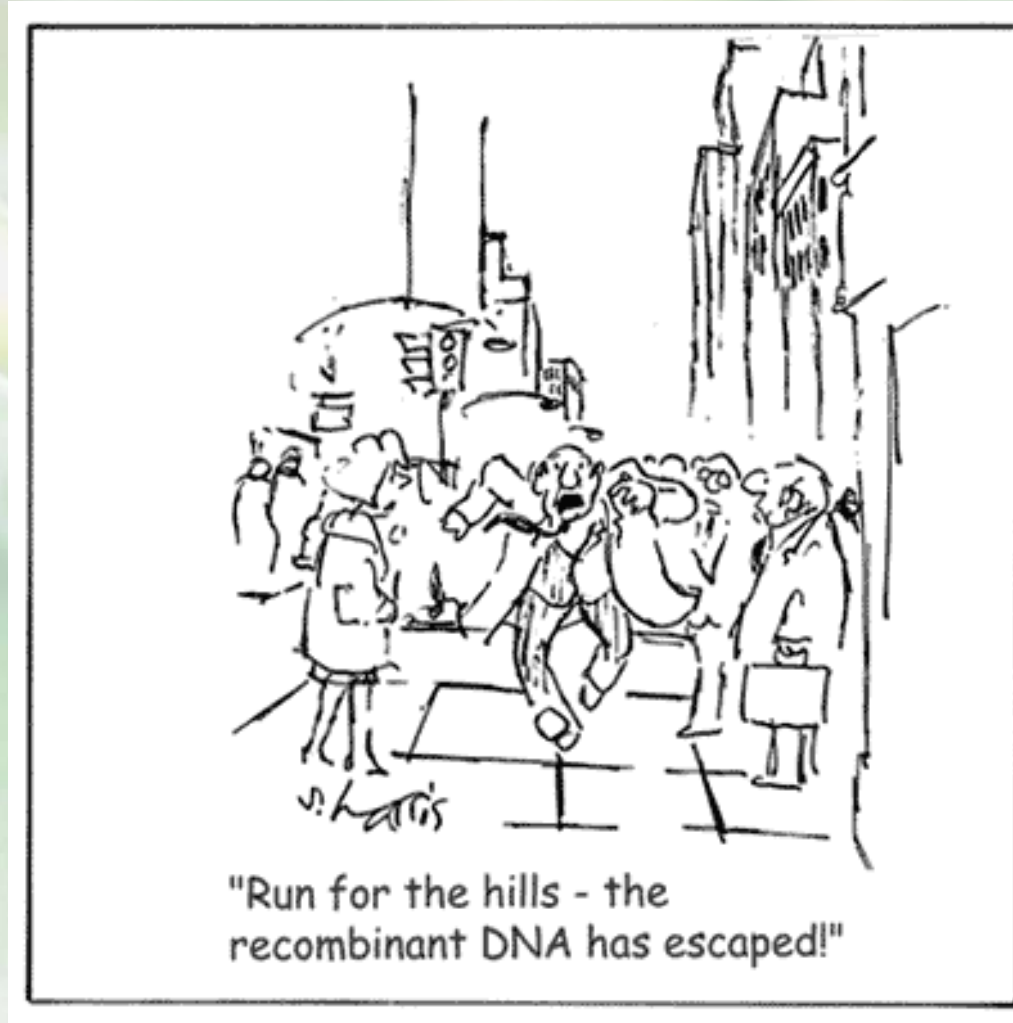


Dr. Petr Smýkal



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Thank you for your attention 😊



Thanks very much to Google Image search for giving my presentation few colours.