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## **GENETICS AND PLANT BREEDING**

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# **Czech J. Genet. Plant Breed.**

Smýkal P., Hýbl M.:

# Effect of environmental and genetic factors on the stability of pea (*Pisum sativum* L.) isozyme and DNA markers

Czech J. Genet. Plant Breed., 45 (2009): 57-71

Environmental (geographic location, year-to-year effect) and genetic (intravarietal variation) effects on the stability of the isozyme patterns of esterase (EST), acid phosphatase (ACP), alcohol dehydrogenase (ADH), leucine aminopeptidase (LAP), shikimate dehydrogenase (SDH) and glucose-6-phosphate isomerase (PGI) used for pea cultivar genotyping were studied. In addition, selected DNA markers (RAPD, SSR, ISSR, IRAP) were used to study intravarietal genetic homogeneity/variation at a DNA level.

five commercial dry-seed pea (*Pisum sativum* L.) cultivars Canis, Gotik, Komet, Sonet and Zekon were grown during four years (2001 – 2004) in three locations in the Czech Republic (Šumperk, Čáslav, Uherský Ostroh) that differed in soil and climatic characteristics. Mature dry seeds were used as a standard input sample for analyses. No variation in isozyme spectra was found within particular cultivars between years, locations and fruiting nodes in enzymes providing in general a low polymorphism in pea cultivars (ACP, ADH, LAP, SDH, PGI); similarly, these enzymes also exhibited high stability as related to intravarietal variation. In contrast, EST – highly polymorphic in pea cultivars – showed certain qualitative variation within particular cultivars as related to both environmental and genetic factors. The intravarietal variation detected by selected DNA markers was negligible and mostly quantitative. Possible reasons for the instability/variation of isozyme markers are discussed from the aspect of cultivar genotyping used in pea breeding and seed production.

**Keywords:**

intravarietal variation; isozymes;  
microsatellites; *Pisum sativum*;  
retrotransposons; seed proteins

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