

STUDY OF POTATO RESISTANCE AGAINST THE POTATO CYST NEMATODES AND LATE BLIGHT BY MEANS OF DNA MARKERS

Studium rezistence bramboru vůči háďátku bramborovému a plísni bramborové na úrovni DNA markerů

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Souhrn, klíčová slova

Selekce s využitím molekulárních markerů (Marker Assisted Selection – MAS) představuje aktuální trend ve šlechtění rostlin, který umožňuje výrazně urychlit šlechtitelský proces. V tomto příspěvku je prezentována možnost aplikace PCR markeru pro detekci dominantní alely H1 řídící rezistenci bramboru vůči Ro1 patotypu *Globodera rostochiensis*. Metoda CAPS byla použita pro detekci dominantní alely R1 genu rezistence k *Phytophthora infestans*.

brambory, *Solanum tuberosum*, *Globodera rostochiensis*, *Phytophthora infestans*, rezistence, DNA, PCR, CAPS.

Summary, keywords

Marker Assisted Selection is a progressive trend of breeding strategy, which can markedly speed up the breeding process. In this paper is represented the possibility of application of PCR marker for detection of dominant allele H 1 controlling resistance of potato against Ro1 pathotype *Globodera rostochiensis*. The CAPS method was used for detection of dominant allele R1 of resistance against to *Phytophthora infestans*.

Potato, *Solanum tuberosum*, *Globodera rostochiensis*, *Phytophthora infestans*, resistance, DNA, PCR, CAPS.

Introduction

Marker Assisted Selection represents an effective method of unambiguous detection of some major genes controlling studied resistances.

HUIJSMAN (1955) has described dominant controlled resistance against Ro1 pathotype *G. rostochiensis* – gene H1. Gene origin of this resistance was sub-species *S. tuberosum* ssp. *andigena* Hawkes CPC11673. By means of method RFLP was gene H1 mapped by GEBHARDT (1994). In her procedure she has worked with several RFLP probes type cDNA. NIEWÖHNER *et al.* (1995) have performed controversy of RFLP marker to specific PCR (Polymerase Chain Reaction) marker.

Donator of qualitative resistance against late blight (gene R1) is botanic species *Solanum demissum* Lindl. Digesting of monomorphic PCR product for detection of dominant allele R1 corresponding with resistance describe ROUPPE VAN DER VOORT *et al.* (1998) and DE JONG *et al.* (1997).

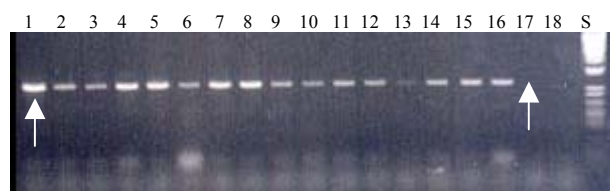
Methods

For analysis was taken 90 variants with declared presence or absence of dominant alleles H1 and R1. For isolation of DNA was used kit GenElute Plant Genomic DNA Kit[™] (Sigma, SRN). For detection of studied alleles were used modified methods according to NIEWÖHNER *et al.* (1995) and DE JONG *et al.* (1997).

Results - discussion

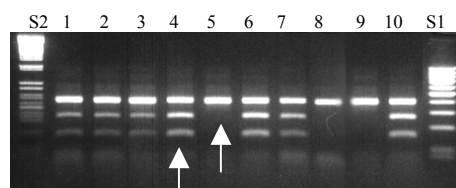
In all of genotypes, which had declared dominant alleles H1 and R1 was by means of these methods confirmed presence of these alleles. On figures 1 a 2 are shown a typical electrophoretic diagrams that corresponds with NIEWÖHNER *et al.* (1995) and DE JONG *et al.* (1997) results. By means of PCR or CAPS markers were confirmed the presences of dominant alleles in all of genotypes, which had dominant alleles H1 and R1 declared.

Figure 1: 760bp PCR marker of dominant allele H1 for resistance against the Ro1 pathotype of *G. rostochiensis*



Resistant cultivars: 1 - Accent, 2 - Arnika, 3 - Berber, 4 - Bettina, 5 - Darwina, 6 - Granola, 7 - Gusta, 8 - Hilda, 9 - Ilse, 10 - Indra, 11 - Lyra, 12 - Mira, 13 - Olga, 14 - Ponto, 15 - Tanja, 16 - Ute. Susceptible cultivars: 17 - Ornela, 18 - Tábor, S - leader λ DNA/Eco47I (AvaII)

Figure 2: CAPS marker SPUD237 (digestion of *AluI*) for detection of resistance against late blight - R1 allele



Resistant cultivars: 1 - Bionta, 2 - Escort, 3 - Fresco, 4 - Hertha, 6 - Panda, 7 - Premiere, 10 - Ukama. Susceptible cultivars: 5 - Karlena, 8 - Rosara, 9 - Rosella, S1 - leader GeneRuler[™] S2 - leader λ DNA/Eco47I (AvaII)

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This paper is result of grants NAZV MZe ČR EP9107, FRVŠ 1341/2001, FRVŠ1347/2001, ČZU 21160/1312/213143 and MSM 412100002