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**ESTIMATION OF GENETIC VARIATION AND RELATIONSHIPS IN CULTIVATED
POTATO USING AFLP AND MICROSATELLITE MARKERS**

Document prepared by an expert from Germany

Abstract

The genetic variation of potato cultivars was estimated by using 6 AFLP primer combinations or 26 microsatellite (SSR) primer pairs respectively. In two studies different plant material was analysed: (i.) 69 potato cultivars and advanced clones from a commercial German breeding program; and (ii.) 75 commercial potato cultivars with international origin (North America, Europe and Japan).

AFLP analysis was carried out following the AFLP plant-mapping kit (PE Applied Biosystems). Sequences of the 26 SSR primerpairs (Table 2) used in this study are described by Kawchuk et al (1996) and Milbourne et al. (1998). Fluorescence labelled fragments were separated on an ABI PrismTM 377 DNA sequencer using 5% polyacrylamide gels and analysed semi-automated using GeneScan 2.02 and Genotyper 2.0 software. Cluster and principal coordinate analysis (PCO) were performed with NTSYS vers. 2.1.

With AFLP and SSR markers all genotypes could be clearly distinguished, and in most cases the grouping of related genotypes and the known pedigree information was well reflected in dendrograms. Varying results in grouping genotypes dependent on the marker system used were observed.

Analysing German cultivars and breeding clones showed that AFLP analysis in particular unequivocally differentiated between groups according to their genetic background. Clones with common ancestors were clearly separated from unrelated cultivars.

Independent of the marker system used it was possible to identify groups due to their geographical descent. Cultivars from Central and East Europe formed two overlapping pools. Furthermore an Anglo-American gene pool could be identified. Additionally PCO based on AFLP data uncovered that this pool is subdivided in two groups. One group is more close to the European pools and dominated by cultivars with immediate background of cv. Kathadin. This indicates that AFLP is more sensitive in identifying relationship groups.

Literature

Kawchuk LM, Lynch DR, Thomas B, Penner B, Sillito D, Kulcsar F (1996) Characterization of *Solanum tuberosum* simple sequence repeats and application to potato cultivar identification. Amer Potato J 73: 325-335

Milbourne D, Meyer RC, Collins AJ, Ramsay LD, Gebhardt C, Waugh R (1998) Isolation, characterisation and mapping of simple sequence repeat loci in potato. Mol Gen Genet 259: 233-245

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