

**9th International Conference on
Agricultural Biotechnology: Ten Years After**

organized by the:

**International Consortium on Agricultural Biotechnology Research
(ICABR)**

and the:

**Catholic University of Leuven
CEIS - University of Rome "Tor Vergata"
Centre of Sustainable Resource Development, University of California at Berkeley
Economic Growth Centre, Yale University**

Ravello (Italy), July 6-10, 2005

**“Co-existence of GM and non-GM potato varieties on Finnish potato
farms – potential costs and remedies”**

Jussi Tuomisto,

MTT Economic Research. Luutnantintie 13, FIN-00410 HELSINKI. jussi.tuomisto@mtt.fi

ABSTRACT

The aim of this study is to find costs borne from segregating GM and non-GM potato varieties on farm level production. There is no data available answering directly to such a question, however, we may assert these costs indirectly using a unique potato inspection data collected from Finnish SEED potato production farms. By using the inspection data and farm model calculation we are able to evaluate the costs caused by the segregation. After the recognizing the cost sources and evaluating their levels, the study assesses whether contract production could provide partial remedy for increased costs.

In 1998–2003, the Plant Production Inspection Centre inspected 2,524 seed potato patches, totalling 9,203 hectares. A total of 315,500 tubers were collected from that area. Foreign varieties were detected in 256 tubers, or 0.08% of the inspected volume. In only one seed potato patch there were more than 0.1% foreign strains in the field. The number of patches containing foreign strains was 50. Of these, 35 had had potato production in the same patch three years earlier (and some other plant had been cultivated for the two years between). Potato cultivation dating back three years did not seem to pose the wintered potato problem. The average cultivation distance in potato patches was 57.6 meters. In patches where varieties had been mixed, the distance to another variety patch was less than 3 meters in 74% of the cases. The wintering of the potato and distances of the patches contributed the most strongly to variety mixing.

With the current regulations in Finland, it is possible to isolate GM seed potato from non-GM potato. In seed potato production, the requirement is that two potato cultivation years must be followed by a rotation of (at least) two years of some other plant. Cultivation of two different varieties on one patch in two consecutive years is also forbidden. In food potato production problems differ one of the most difficult being monoculture. If we mimic GM segregation requirements by applying seed potato regulation to food potato production in order to avoid variety mixing, the subsequent increase in the production costs of food potato would be about 130 percent. In food potato production, requiring even one rotation year after a GM cultivation year will render the cultivation non-profitable. Population inspection will increase potato production costs by 2.9%, laboratory inspection (PCR testing) by 2.5%, building a dedicated warehouse by 1.4%, additional cleaning of machines by 1.8%, and product labelling and certification by 2.1%.

Due to segregation requirements GM-cultivation includes some partially irreversible costs i.e., it is costly for a farmer to return to cultivating non-GM potatoes after once taking on a GM variety. Contract production may have a role in alleviating farmers to bear risks and in the same time contracting allows use of improved traceability mechanisms in potato supply chain. Thus introduction of GM technology and segregation requirements seems to contribute to tighter networking of the supply chain. Even today, the Finnish potato supply chain appears quite integrated: 67% of the Finnish seed potato market is covered by the two largest strain representatives. If and when GM potato varieties enter the Finnish market, most likely in the beginning they can only be cultivated by farmers entailed to a certain type of production agreement.

Keywords: gene technology, potato, co-existence, risk, supply chain, contract production, vertical coordination, industrial organization, regulation of biotechnology.