

## **O.63 - Risk assessment of cyst nematode evolution and durability of potato cyst nematode resistance**

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To understand the process that leads to breakdown of a plant resistance gene, we need to understand the processes that govern pathogen evolution. By studying two of the main evolutionary forces (migration and mutation) operating on nematode populations, we show that cyst nematodes appear to present a higher risk than previously thought. In particular we showed that cyst nematodes exhibit a high level of gene flow at the intra-regional level and that parasitism genes tend to accumulate non synonymous substitutions and were subjected to strong diversifying selection pressures. Different oligogenic resistances to the potato cyst nematode *Globodera pallida* were introduced from wild species (*Solanum sparsipilum*, *S. spegazzinii* and *S. vernei*) in cultivated potato. At INRA we have focused most on these 20 last years on the *S. vernei* resistance and the first consumable variety carrying this resistance will be soon available. Its durability was estimated by (1) studying the efficiency of the resistance against the variability of the parasite in its native area, (2) studying the heritability of aggressiveness of hybrids made by crossing virulent and non virulent nematodes and (3) studying the circumvention of the *S. vernei* resistance after five years of continuous selection pressure on a field nematode population. The results strengthen the need to manage the use of these resistances to nematodes, to continue with the development of quarantine measures to avoid any new introduction of PCN in Europe and to increase our knowledge of the processes that govern pathogen evolution.