

# SSRs in pea: first experience of a breeding company

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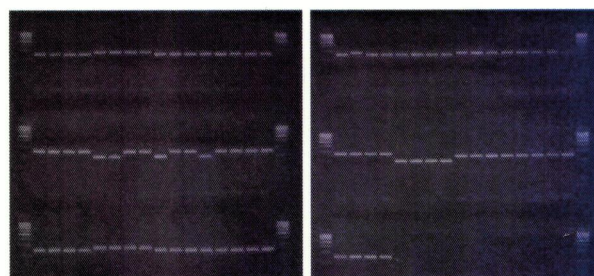
At Svalöf Weibull (SW) breeding strategies are increasingly involving the use of molecular markers. In particular microsatellites (SSRs) are attractive because they are abundant, have high level of polymorphism are wide dispersed throughout the genome and co-dominant. The ease of assay by the polymerase chain reaction (PCR) which can be operated through an automated system further makes SSRs ideal for large-scale analysis. Our interest in pea SSRs are for two main purposes: 1) fingerprinting SW cultivars which is becoming increasingly important in order to protect germplasm and 2) linkage to genes of interest for marker assisted breeding of important genes.

This poster summarises our first experience with 40 pea SSR markers recently identified as being polymorphic in five model genotypes at Agrogene.

**Table 1.**  
Pea lines used for studying SSR polymorphism in breeders material.

Pea line	Cross	Comments
SW Carneval	Rigel x Bohatyr	Important in Canada and Sweden
SW Rigel	Jl 143 x Birte	First semi leafless cultivar from Svalof AB
Bohatyr	Breeder Oseva	Stiff straw with leaves
SW Majoret	Fjord x Bohatyr	Important in Canada and US, green seed
SW Karita	Fjord x Bohatyr	Green seed, for Finnish peasoup
SW Fjord	Jl 113 x Birte	Green seed
SW Canis	Bohatyr x Sv U 51041	Good yield, bad seedcoat, done well in Denmark
SW Bravo	9590 x Carneval	New, doing well in Canada
SW Parade	(9591 x Carneval) x Orb	New, doing well in Canada, green seed
SW Highlight	Rigel x Timo	Resistant to powdery mildew for Canada
SW Timo	Hero x Parvus	Old, long, weak straw, forage pea
SW Parvus	Monopol x Ambrosia	Even older, long weak straw, forage pea
SW 94594	Highlight x Patriot	Powdery mildew resistant, official trials in Canada
SW 955180	Rigel x Bohatyr	Powdery mildew resistant.
SW Nessie	Majoret x Solara	Official trials in UK
SW Universal (95577)	Loto x Majoret	New cultivar in Sweden, good in US
SW Ceine (965222)	Bridge x SW 92519	Official trials in Sweden, promising
SW 975607	(Carneval x SW 92536) x Exchequer	Official trials in Denmark
SW 975496	9592 x Carneval	Official trials in Sweden, Germany, Austria
CDC 9507	Breeder CDC	Resistant to powdery mildew
Carrera	Breeder Cebecco	Good seed quality, highyield
Klungs		
Kelvedon Wonder	Breeder Hursts	Gardenpea

**Fig. 1**  
PCR fragments from Agrogene pea SSR marker PSMSD21 detected in MetaPhor gel. Four individuals were used per pea line. Note that three lines segregated at this locus.



## Results

Using 22 forage pea lines and one gardenpea cultivar 33 SSRs were polymorphic 6 SSRs were monomorphic and one SSR did not amplify.

2-4 alleles were detected per SSR marker. The average numbers of alleles were 2.6 per locus.

A dendrogram (Fig. 2) was in accordance with the breeding history in a few cases. For example: SW 955180 and Carneval share a common subgroup and SW 955180 was recently extracted as a mildew resistant line from Carneval.

The dendrogram did not reflect the breeding background in some cases. For example: Majoret and Karita are sister lines but are genetically distant from each other and from both parents Fjord and Bohatyr. A possible explanation could be polymorphism within pea lines (Fig. 1).

## Conclusions

The Agrogene SSRs could be used successfully to detect DNA polymorphism in breeders material.

Pea genotypes could easily be distinguished based on their SSR profiles.

Mapping populations can be created from modern lines for identifying SSR markers linked to important genes.

The agarose detection system that we are using did not reveal the full potential of the SSR markers. Our next experience with pea SSR will be using a multiple capillary detection system (SCE9610) for future automated pea microsatellite analysis.

## Acknowledgement

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**Fig. 2.**  
The relative genetic distance between 24 pea lines based on 21 polymorphic loci. The dendrogram based on Nei's genetic distances using UPGMA was drawn using Popgene version 1.31 software.

