Phytophthora infestans

- the next generation

- a field trial

A-K Widmark[1], B Andersson[1] & M Sandström[2]

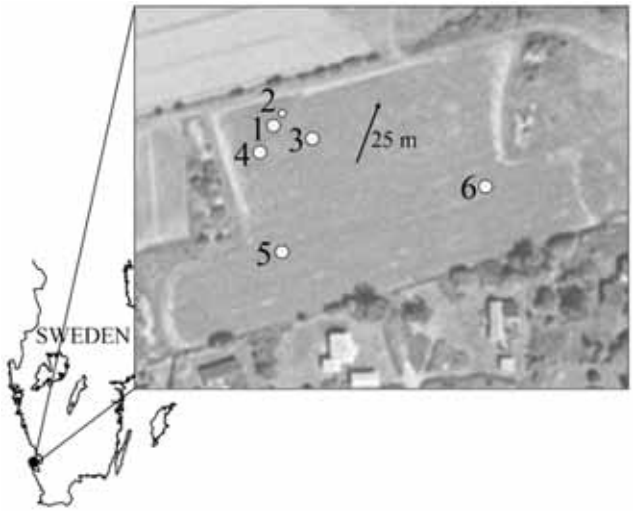
[1]SLU, Department of Forest Mycology and Pathology
[2]Swedish Board of Agriculture

FIELD TRIAL

Certified seed tubers (Bintje) were planted 1 June 2001
in a field near SLU, Uppsala

INOCULATION

21 May – blight sampling



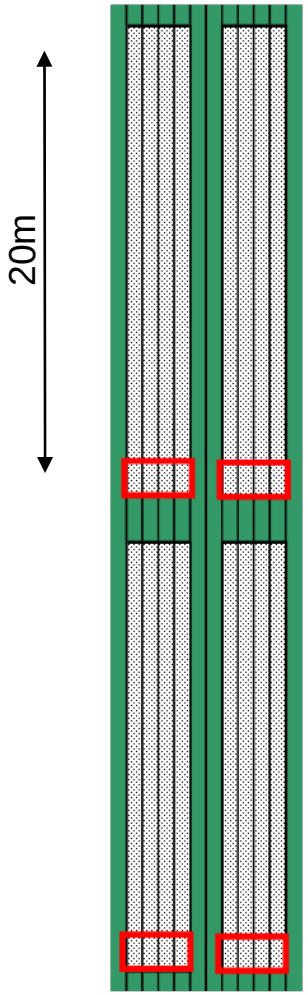
Isolate nr	Mating type
12	A1
27	A1
35	A2
39	A1
55	A2
65	A1

Torekov, South Sweden

Inoculation with six isolates collected from a potato field in south-west Sweden from six distinct foci in one field

17 July - inoculation

4 rows

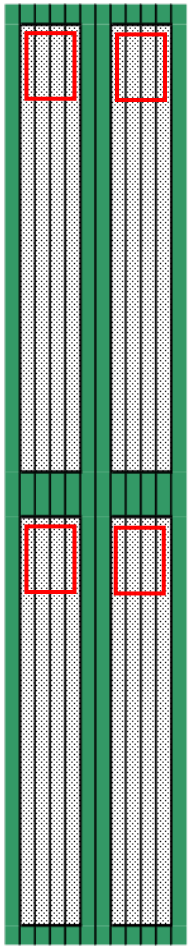


Uppsala, Mid Sweden

Each block was covered with fleece to avoid interference from air-borne inoculum from other fields

(The picture is from the end of the season)

ISOLATE SAMPLING



7 AUGUST 2001

Leaf samples collected
50 from each block ca 20%
A1 and 80% A2

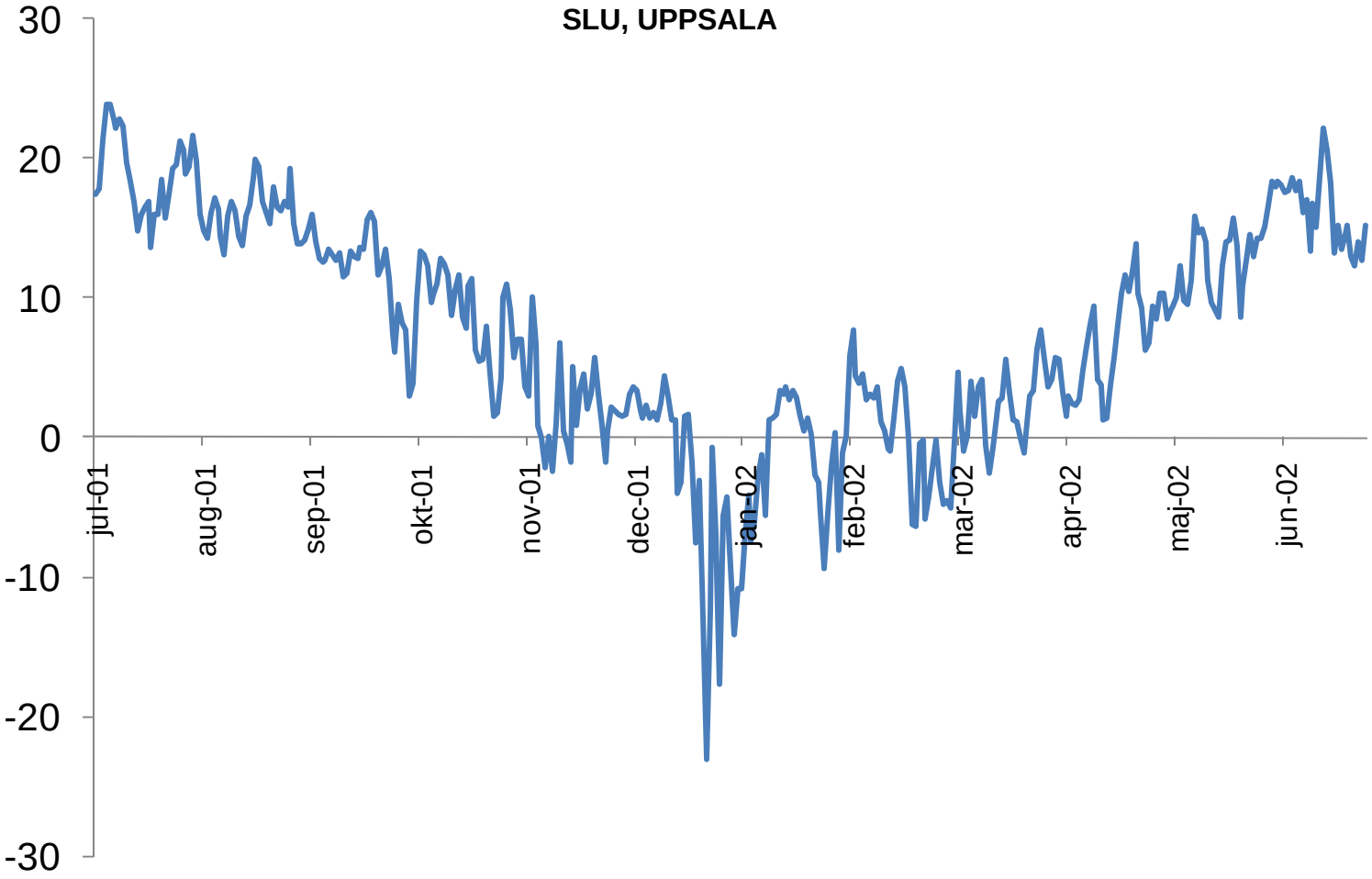
Large numbers of oospores
were observed in samples
from all four plots

Four weeks later, 7 September


winter

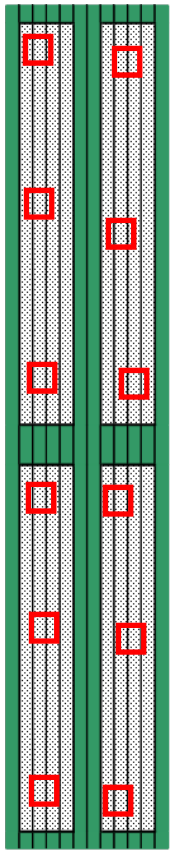
TEMPERATURE

SLU, UPPSALA



ISOLATE CAPTURE

17 June 2002



Soil samples collected.

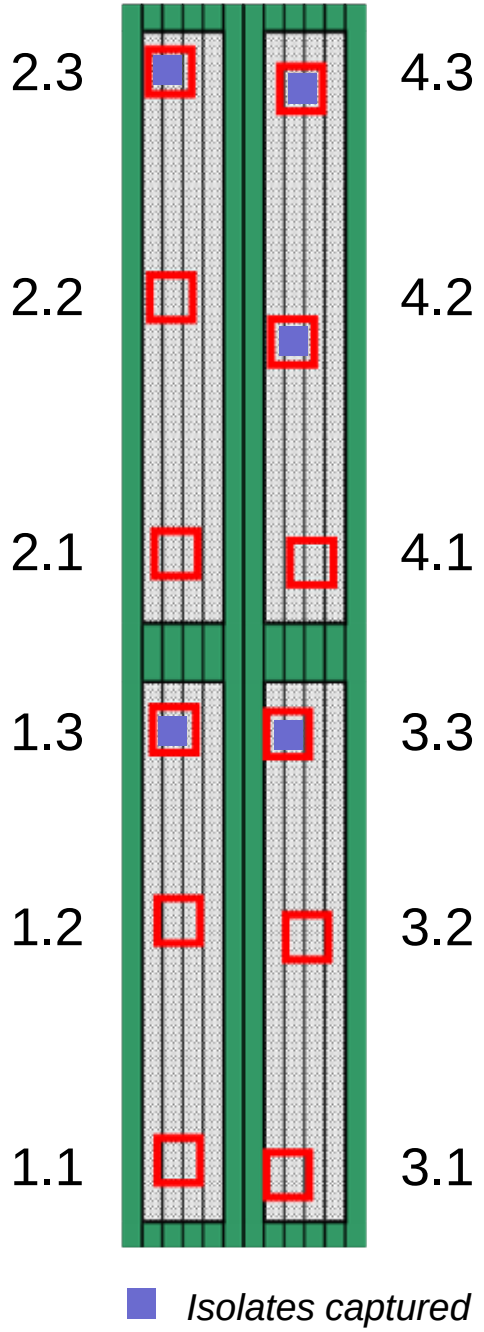
Three samples from each plot

Bioassay-Floating disk method
Zoospores have negative geotaxis

ISOLATE CAPTURE

In 5 of the 12 plots

P. infestans isolates were captured from the soil

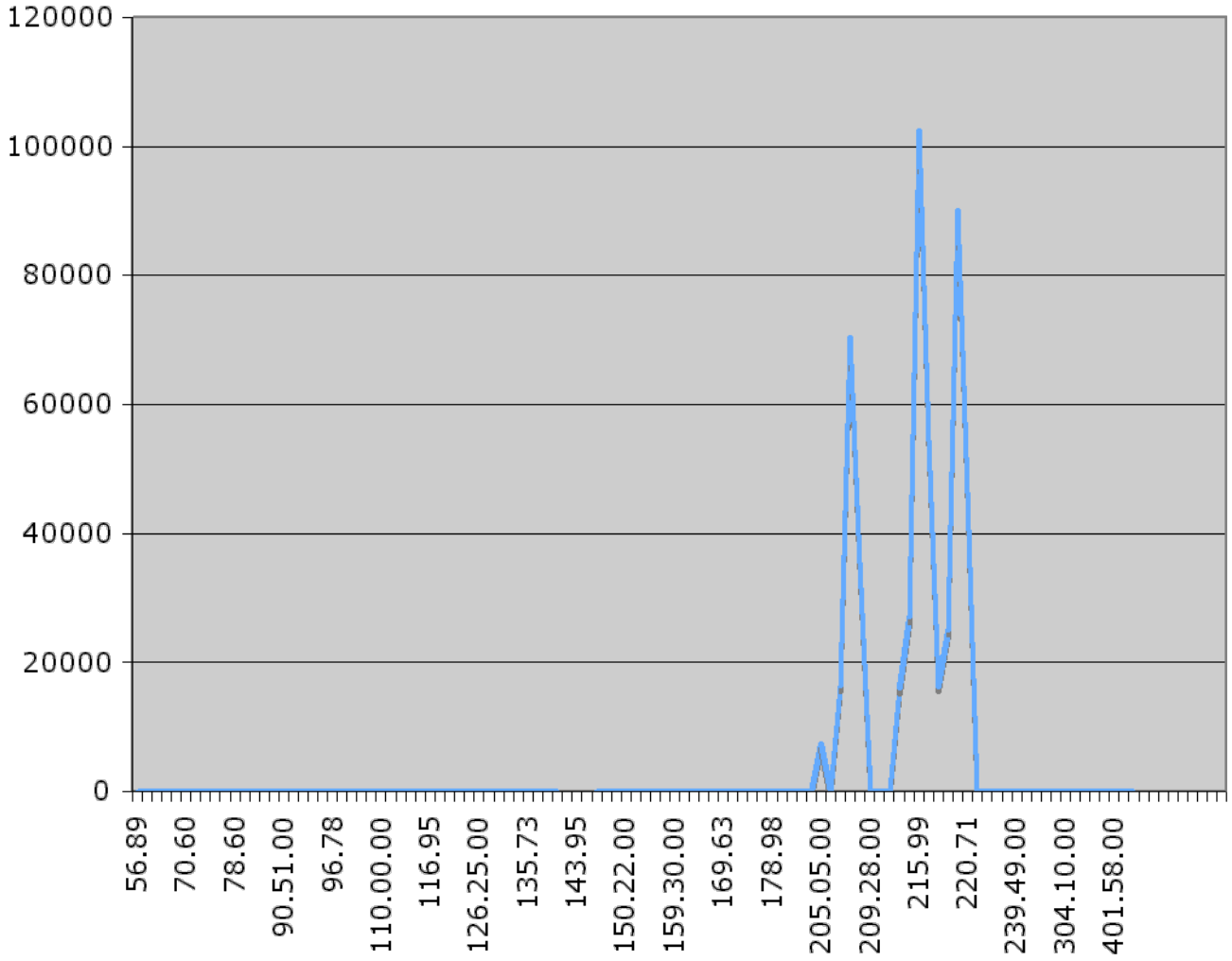


OBSERVED ALLELE SIZES (BP) FOR SSR MARKERS OBTAINED WITH DIFFERENT ANALYSIS SYSTEMS

Marker	SCRI	SLU	Rudbeck laboratory
4B	217 213 205	220 216 208	217 213 204
G11	162 160 142	163 161 143	161 159 140
Pi16	178 176	178 176	176 174
Pi56	176 174	177 175	175 173
Pi63	157 148	157 148	155 145
P170	195 192	195 192	193 190

SCRI: ABI Prism 377 DNA sequencer (Applied Biosystem)
SLU: Beckman Coulter CEQ TM 8000 Genetic Analysis System (Beckman-Coulter)
Rudbeck: ABI Prism 3700 DNA analyzer (Applied Biosystem)

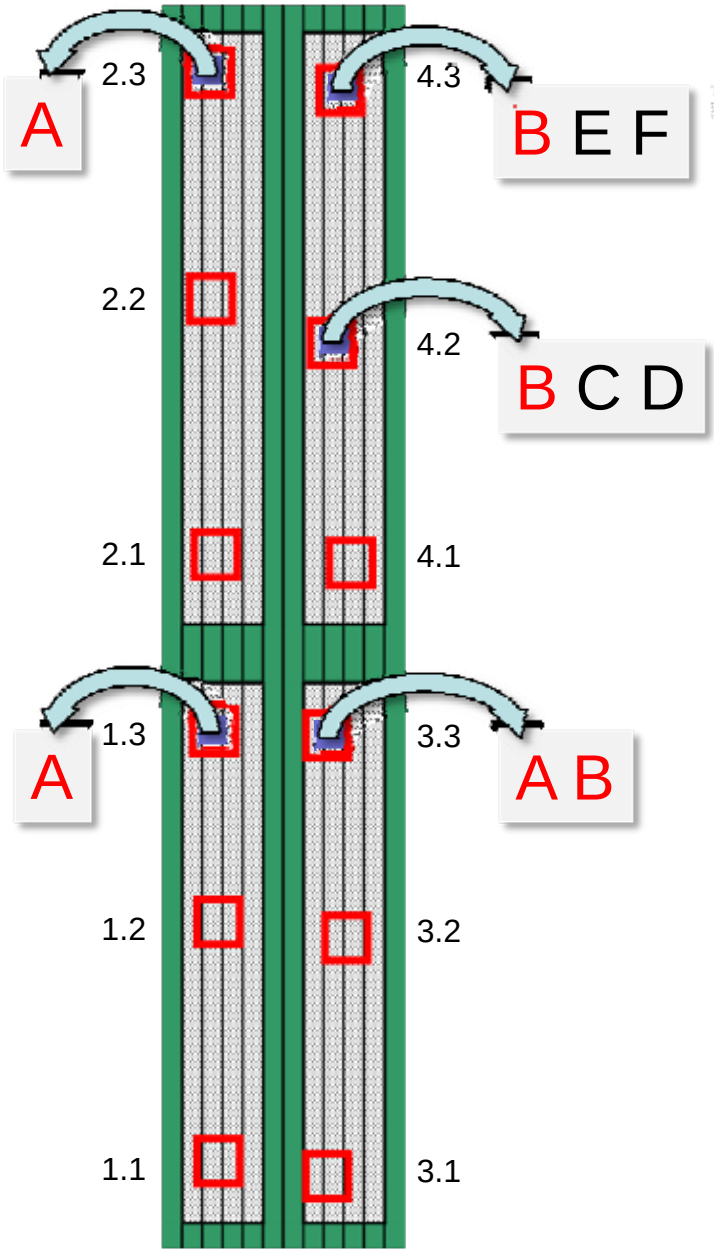
THREE ALLELES DETECTED IN LOCUS 4B IN TWO ISOLATES CAPTURED FROM SOIL



ISOLATE TRACKING

Plot	Mating type	4B	G11	Pi16	Pi56	Pi63	Pi70	SSR-genotypes
1.3	A2	217/217	160/160	178/178	176/174	157/157	195/192	A
2.3	A2	217/217	160/160	178/178	176/174	157/157	195/192	A
3.3	A2	217/217	160/160	178/178	176/174	157/157	195/192	A
3.3	A1	217/213	160/160	178/178	176/176	157/157	195/192	B
3.3	A2	217/213	160/160	178/178	176/176	157/157	195/192	B
4.2	A2	217/213	160/160	178/178	176/176	157/157	195/192	B
4.2	A2	217/213	160/160	178/178	176/174	157/157	195/192	C
4.2	A2	217/205*	160/156*	178/178	176/176	157/157	192/192	D
4.3	A2	217/213	160/160	178/178	176/176	157/157	195/192	B
4.3	A2	217/213/205*	160/160	178/176	176/174	157/157	195/192	E
4.3	A2	217/213/205*	160/160	178/178	176/174	157/157	195/192	F

Genotype A and B:
recombinants of inoculum genotypes



CONCLUSIONS

- *P. infestans* oospores can survive Swedish winter in the soil.
- Overwintered oospores can germinate and cause infection.
- Very few oospores produced during summer season give rise to new progeny the next season.
- Control isolates are necessary to compare results from different laboratories.
- SSR markers is a good tool for population studies of *P. infestans*