



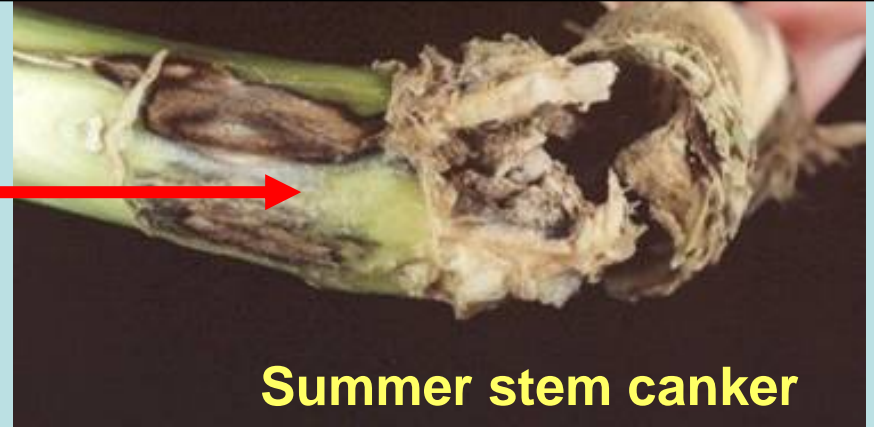
*Oilseed
RapE
Genetic
Improvement
Network*



www.oregin.info

Major UK OSR diseases

1. Phoma stem canker – *Leptosphaeria maculans*



2. Light leaf spot – *Pyrenopeziza brassicae*



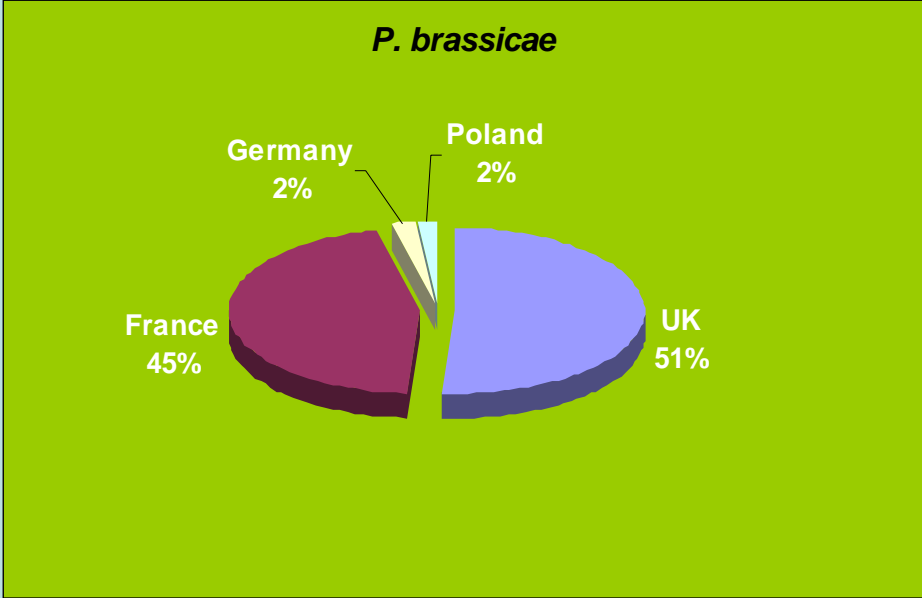
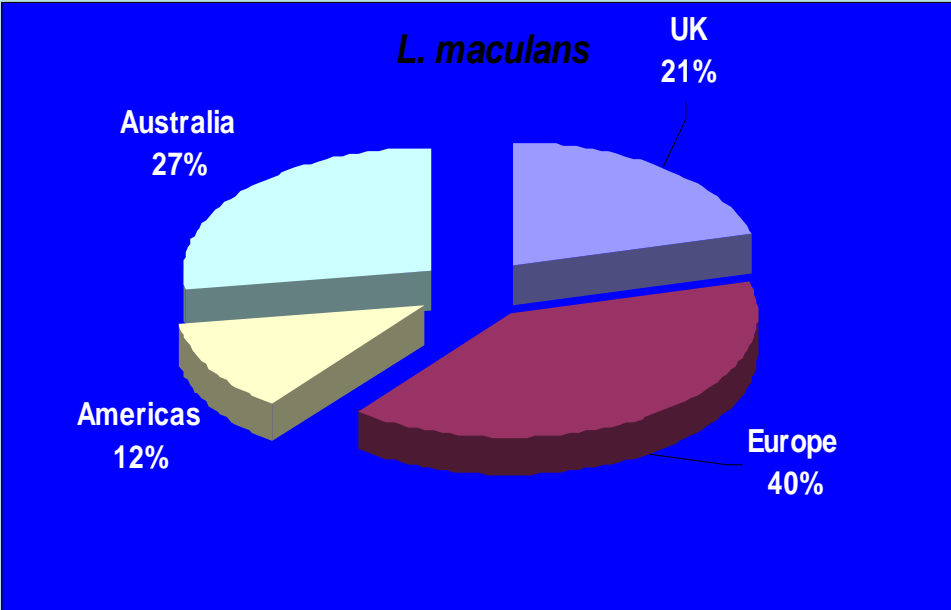
Leptosphaeria maculans



Pyrenopeziza brassicae



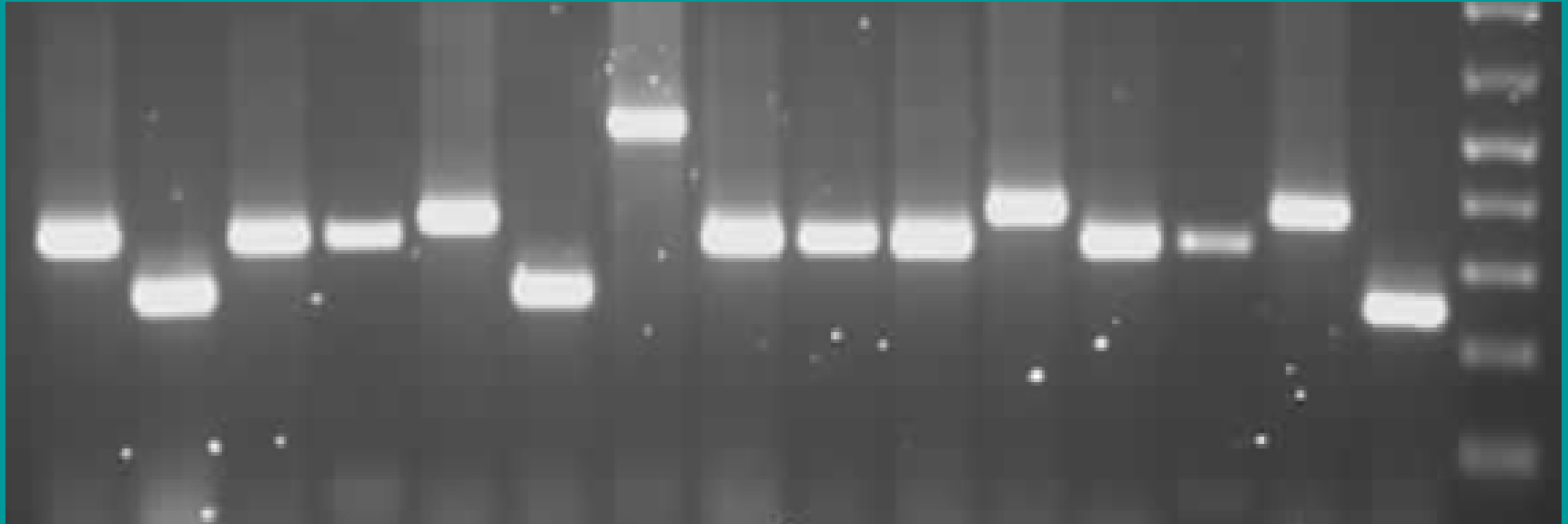
DEFRA OREGIN culture collection



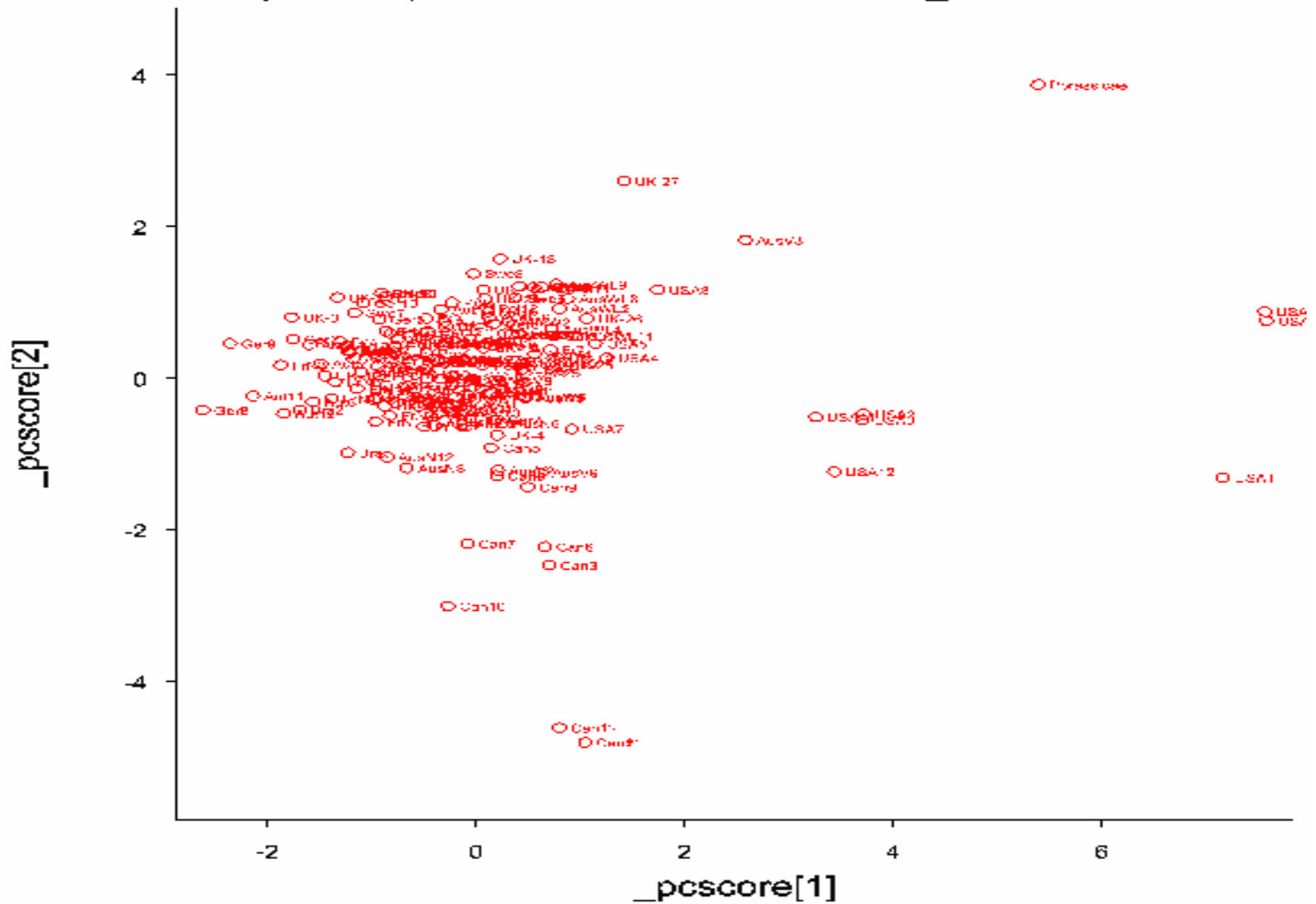
Progress & Attainment

- Over 500 *L. maculans* isolates collected, cultured and kept in secure storage at both RRES and WHRI
- Over 250 *P. brassicae* isolates collected, cultured and kept in secure storage at both RRES and WHRI
- Database of information on isolates available on the OREGIN website, efficient method of isolate dissemination established
- DNA extracted from all isolates and stored
- Minisatellite fingerprinting and data analysis concluded; AFLP analysis concluded
- Selection of subsets of characterised fungal populations ongoing

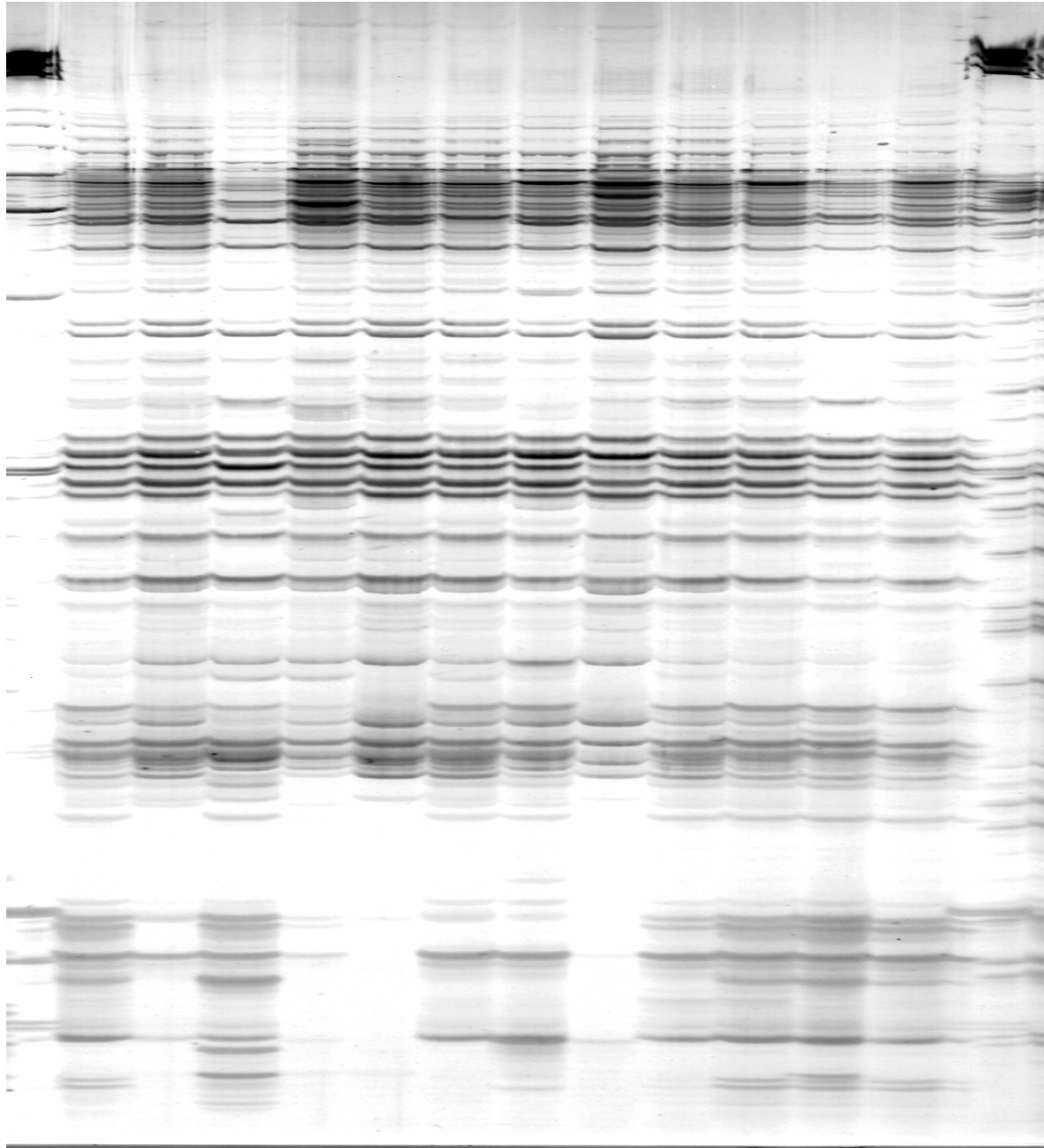
MinLm2 polymorphism



Principal Component Analysis for *L. maculans* minisatellite loci

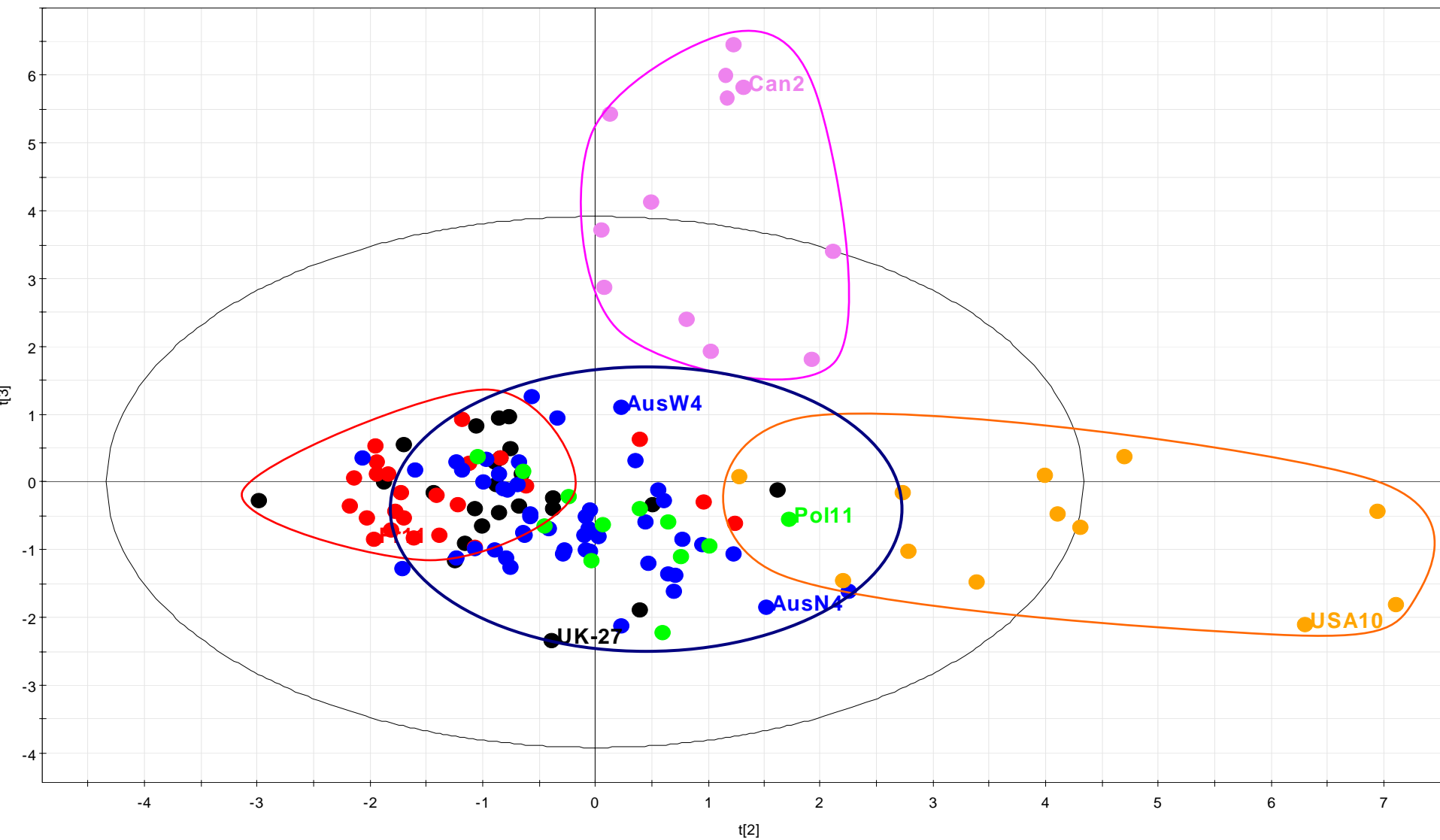


AFLP banding patterns in OREGIN *L. maculans* isolates from W Australia



Lm_minis_AFLP.M1 (PLS-DA)
t[Comp. 2]/t[Comp. 3]
Colored according to classes in M1

- Class
- Class
- Class
- Class
- Class
- Class



R2X[2] = 0.0880729 R2X[3] = 0.0714309
Ellipse: Hotelling T2 (0.95)

L. maculans groups and fingerprint

<u>Isolate</u>	<u>Group</u>	<u>Minisatellite Fingerprint</u>
• UK-1	1	2-10-3-3-5-4
• UK-2	3	6-10-3-3-5-3
• FR1	1	4-11-3-3-5-4
• POL3	3	2-5-3-3-4-4
• CAN1	6	2-40-23-3-6-3
• GER1	2	6-8-3-3-5-5
• USA1	8	0-17-50-0-3-0

Selecting a subset of *L. maculans* isolates

- **OSR differential cultivars and lines:**

Westar, Bristol, Columbus, Darmor MX, 99.150.2.1, 01.190.1.1, 02.22.2.1, 01.23.2.1, 01.189.1.1

- **OREGIN *L. maculans* isolates:**

UK-1, UK-2, POL3, FR1, CAN1, AUSN11, AUSV1

- **Inoculation:**

2-wk-old seedlings, 5 replicates, 10 μ l 1×10^7 ml⁻¹ conidial suspension on to wounded cotyledons, 20 °C/18 °C, 16 h photoperiod, humid chamber

- **Assessment:**

Host reaction type rated on a 0-6 visual scale, fungal colonization determined by qPCR, *AvrLm* alleles in isolates matched against *Rlm* genes in differential set

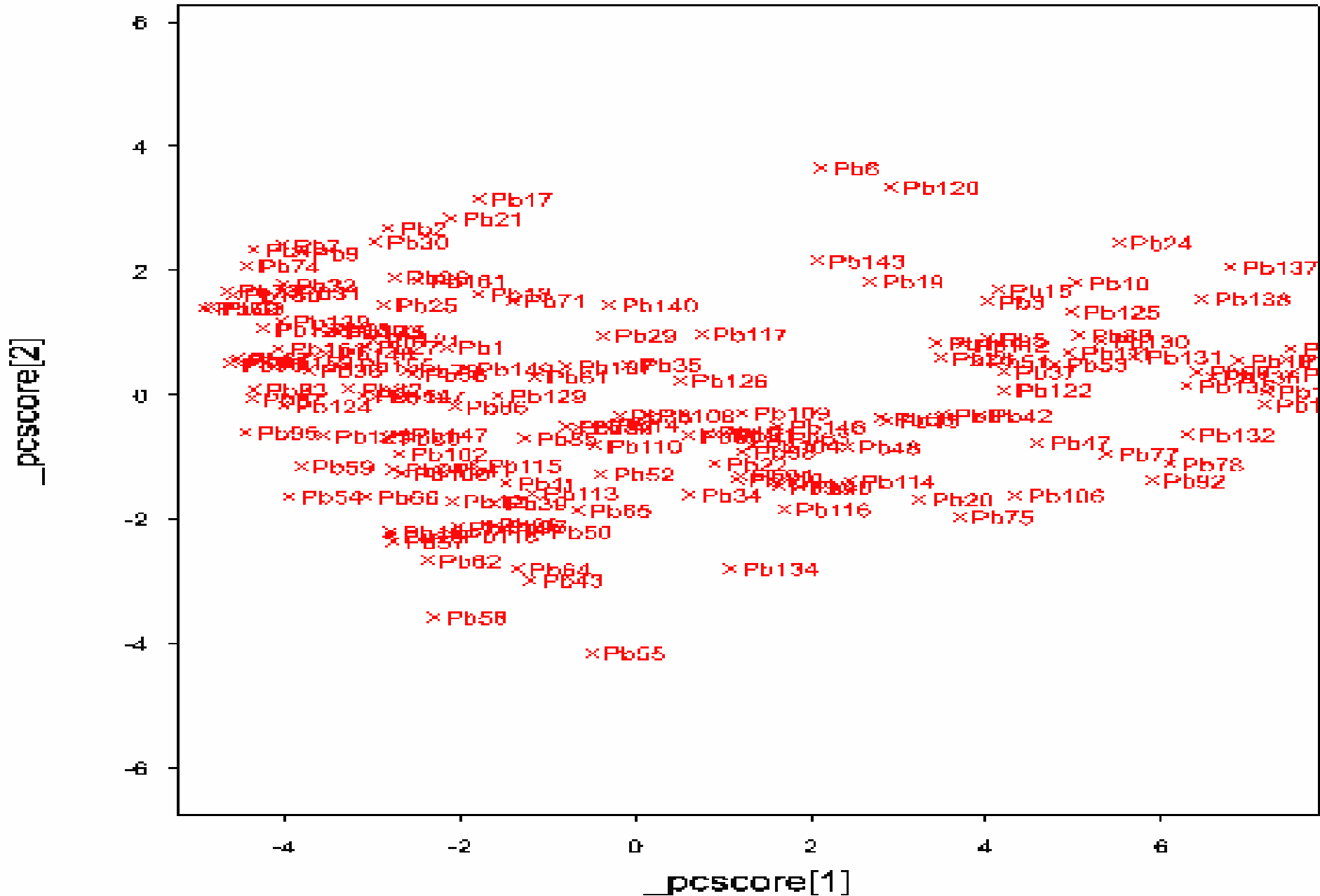
Selecting a subset of *L. maculans* isolates



Selecting a subset of *L. maculans* isolates



Principal Component Analysis of OREGIN *P. brassicae* AFLP bands



Selecting a subset of *P. brassicae* isolates

Isolate Group

- Pb1 1
- Pb2 2
- Pb3 8
- Pb4 2
- Pb5 9
- Pb6 10
- Pb7 2
- Pb8 9
- Pb9 2
- Pb10 9
- Pb11 3
- Pb12 5
- Pb13 11
- Pb14 4
- Pb15 9

Selecting a subset of *P. brassicae* isolates

- **5 RL OSR cultivars:**

Imola, Elan, MK Bravour, Bristol, Hearty

- **OREGIN *P. brassicae* isolates:**

Pb7, Pb16, Pb70, Pb84, Pb132, Pb144, Pb154

- **Inoculation:**

4-wk-old seedlings, sprayed with $1 \times 10^6 \text{ ml}^{-1}$ conidial suspension, 16 °C/14 °C, 16 h photoperiod

- **Assessment:**

Host reaction type rated on a visual scale, fungal colonization determined by qPCR, pathogenicity grouping erected?

2007/2008 and beyond

- **GLOBAL WARMING**

New fungal disease problems on oilseed rape

...*L. biglobosa*, and species of *Alternaria*, *Sclerotinia* and *Verticillium*

....necessitating the assembly and characterisation of pathogen isolates

.....and evaluation of host response to phoma stem canker and light leaf spot at elevated temperatures

- **SUSTAINABILITY**

Utilising the genome sequence of *L. maculans* in driving knowledge-based choice of cultivars and cultivar mixtures best suited for regions of the UK

Comparative genomics to aid identification of common determinants of virulence and pathogenicity as well as effectors of resistance and susceptibility

Active participation in the annotation of the genome of *L. maculans*