



Monitoring of fungal inoculum in air samples – an important tool of IPM in Central Europe



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Where is the centre of Europe?



Where is the centre of Europe?



The location of the **geographical centre of Europe** depends on the definition of the borders of Europe, mainly whether remote islands are included to define the extreme points of Europe, and on the method of calculating the final result. Several places claim to host this hypothetical centre.

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- Toruń, north-central Poland;



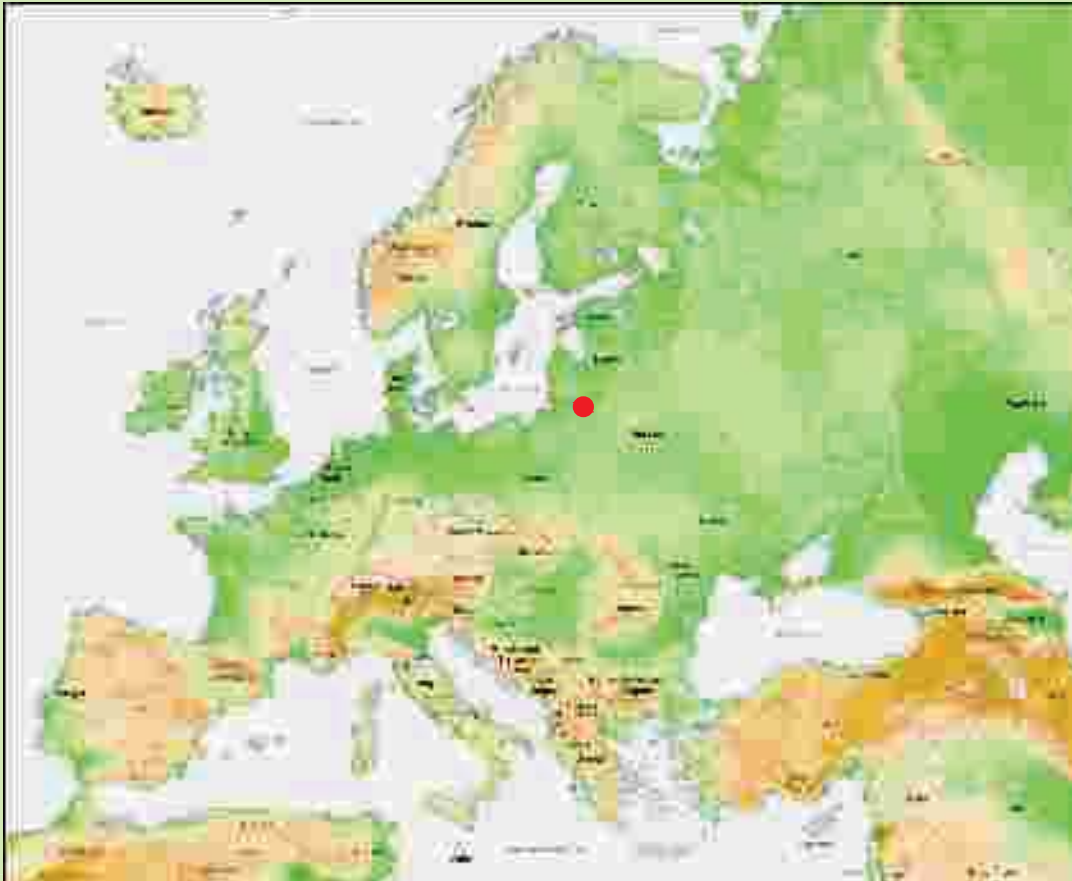
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- Toruń, north-central Poland;
- Piatek east of Warsaw or Suchowola near Bialystok, Poland
- a memorial near Tállya, Hungary.
- village of Krahule near Kremnica, central Slovakia;
- village Dilove near Rakhiv, western Ukraine;
- a point near Polotsk, Belarus;
- island Saaremaa, Estonia;
- Bernotai or Purnuškes near Vilnius, Lithuania

Where is the centre of Europe?



Bernotai, Lithuania



Oilseed rape in Central Europe



Harvest production
in thous. tonnes:

Sweden:	280
Estonia:	40
Lithuania:	420
Latvia:	225
Belarus:	375
Poland:	2150
Ukraine:	1470
Czech Republic:	1040
Slovakia:	330
Hungary:	565
Rumania:	990
Bulgaria:	545
Slovenia:	20

8450

Europe	23.1 MT	36.6%
EU	20.4 MT	41.5%



Monocultures of oilseed rape (OSR)



Stem canker (blackleg) of OSR



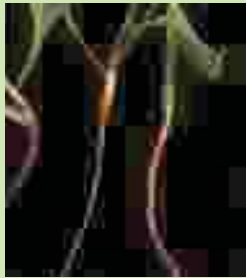
Genus *Leptosphaeria*

Yearly yield loss \approx 10-15%



Severe stem canker kills rapeseed plants moderate symptoms cause yield loss

Infection
from seeds



Infected
cotyledons



Stem canker symptoms
at flowering stage



Symptoms caused
by *L. biglobosa*



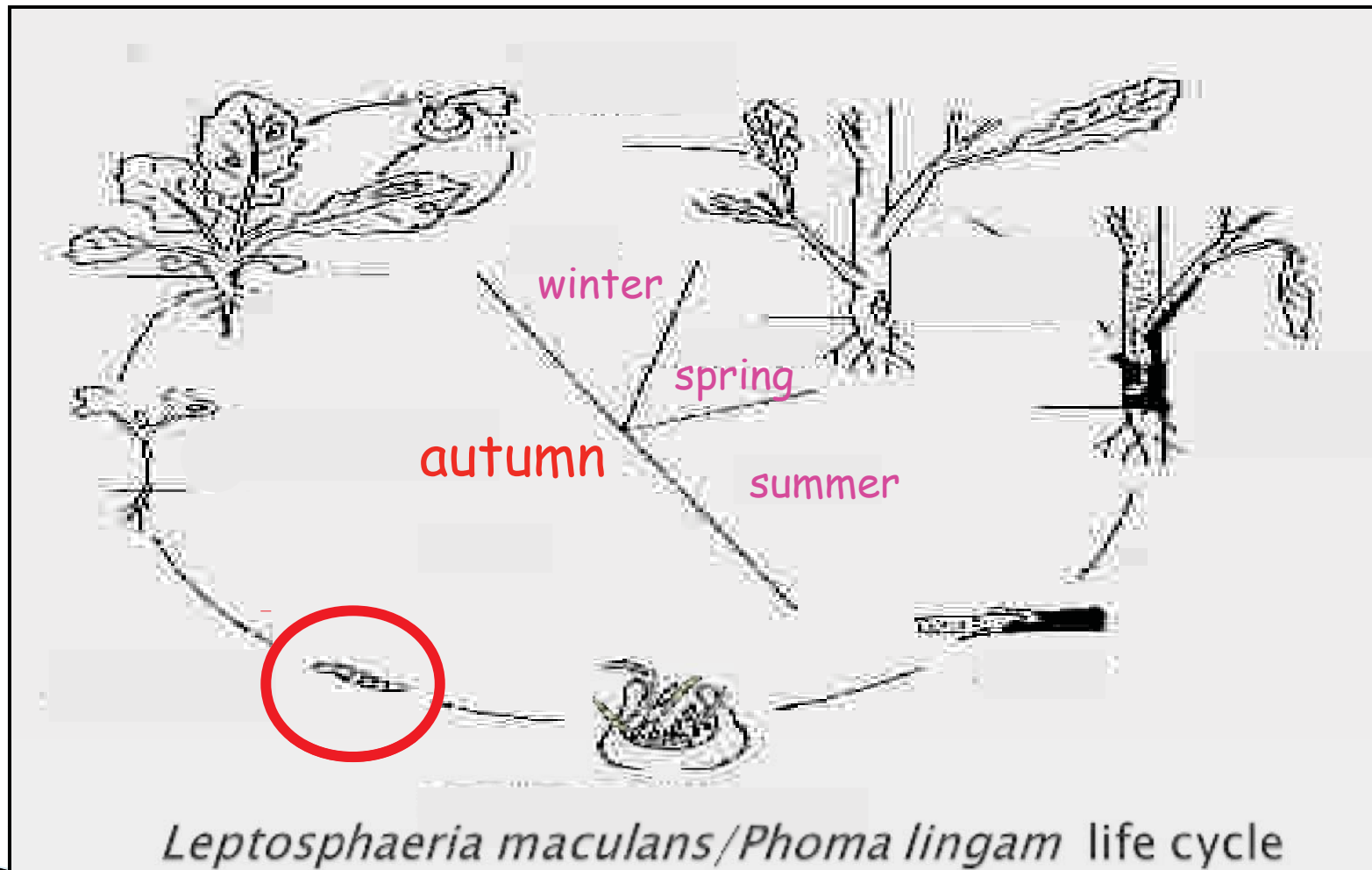
Infected stems



How to protect OSR from blackleg?



Importance of primary inoculum



Races of *L. maculans* in Europe

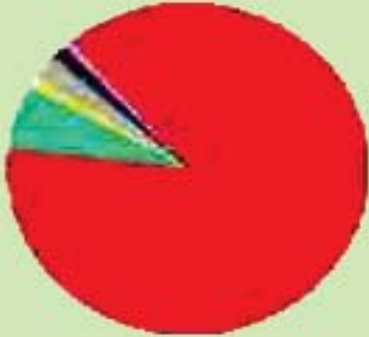


Europe

R1 R2 R3 R4 **R5 R6 R7** R9

Canada

R1 R2 R3 R4 **R5 R6** R7 R9



Prevailing races (90 % isolate population) in Europe (2003)

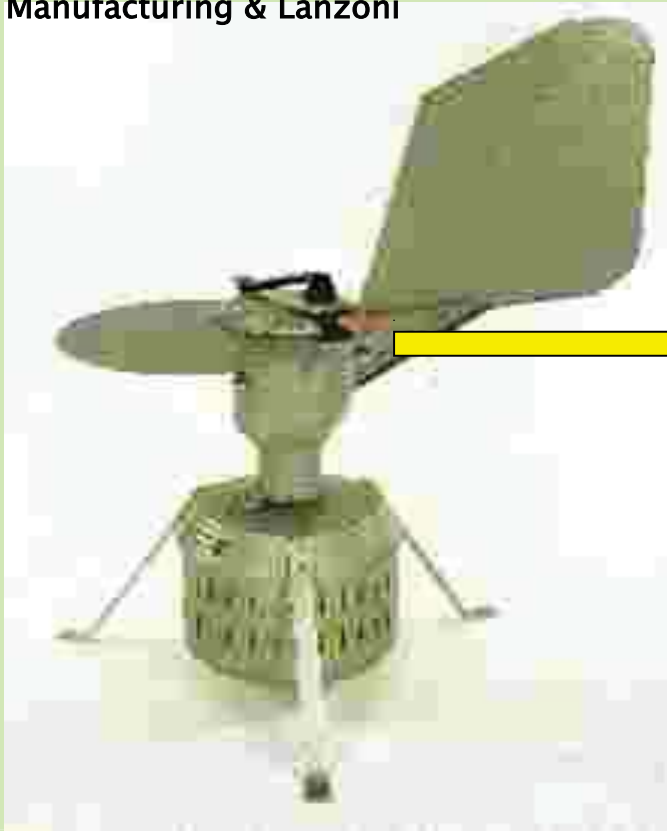
- **Av 5-6-7** - 77 %
- **Av 6-7** - 13 %



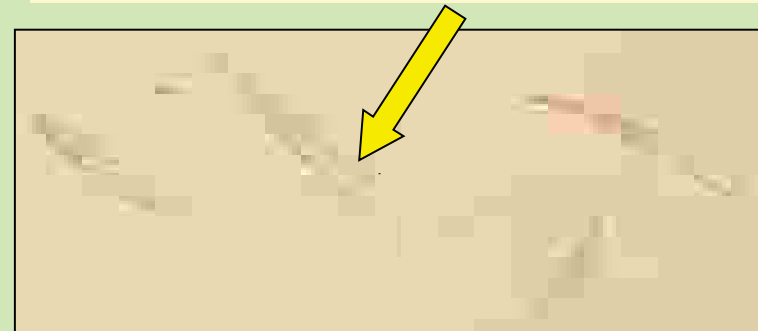
How we catch fungal spores?

Seven day volumetric spore trap

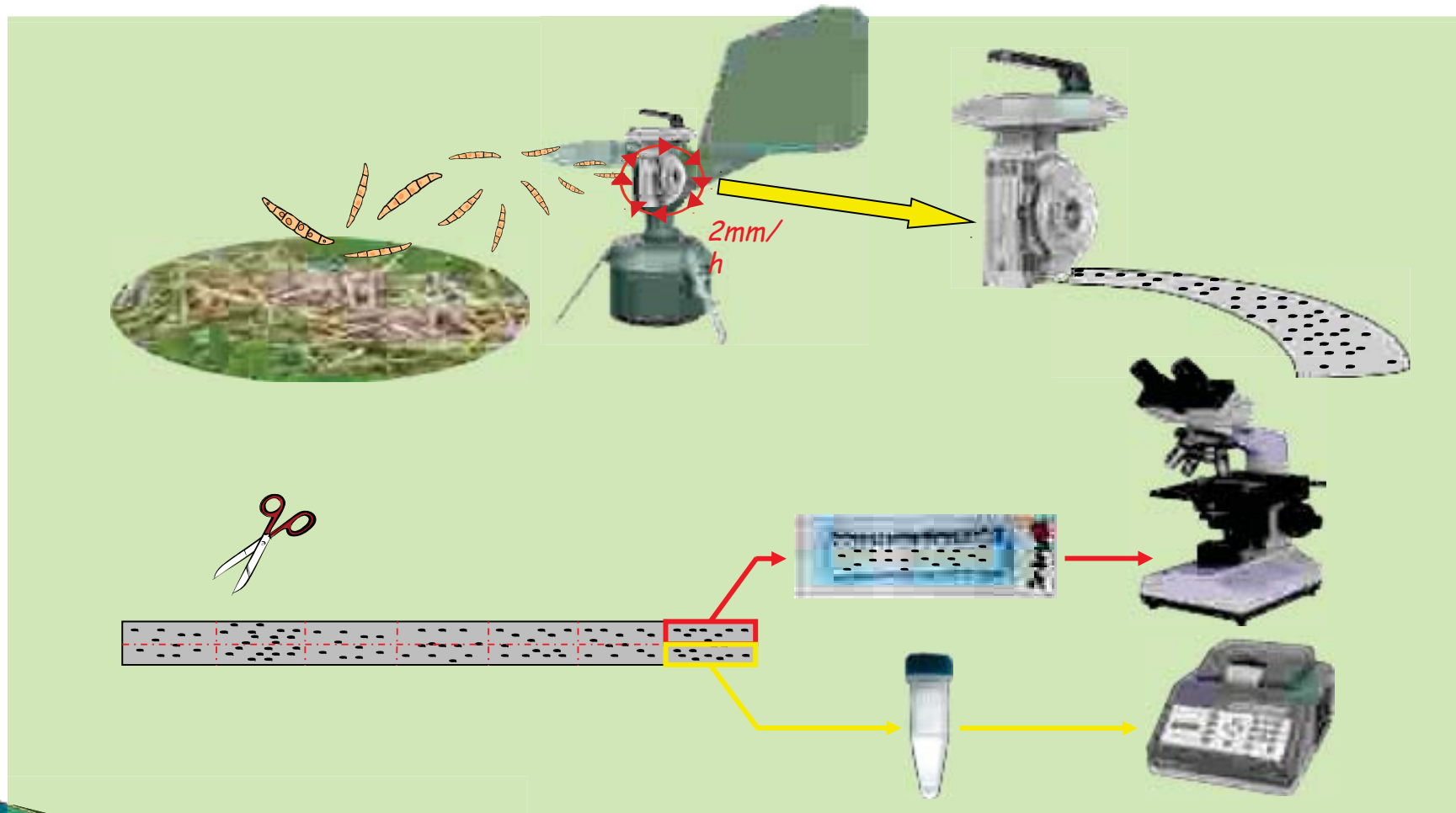
Burkard Manufacturing & Lanzoni




Drum
(rotates 2 mm/h)



How we detect fungal spores?



17 spore traps already working



Jordbruksverket
Svejsk Board of Agriculture, Plant Protection Centre, Alnarp, SWEDEN

IGR PAN
Institute of Plant Genetics, Polish Academy of Sciences, Poznan, POLAND

DUPONT
DuPont Poland Ltd., Warsaw, POLAND

AF
AGRO-Fund Mazuria, Drogosze, POLAND

Alantica
ARENDA Ltd., Charbielin, POLAND

UR
Resovia University, Rzeszow, POLAND

AMMUE
Institute of Agriculture, Lithuanian Research Centre for Agriculture and Forestry, Kedainiai, LITHUANIA

OSEVA
OSEVA Research and Development Ltd., Opava, the CZECH REPUBLIC

VZU
Plant Protection Department, Czech Agricultural University, Praha, the CZECH REPUBLIC

agritec plant research
AGRITEC Plant Research, Šumperk, the CZECH REPUBLIC

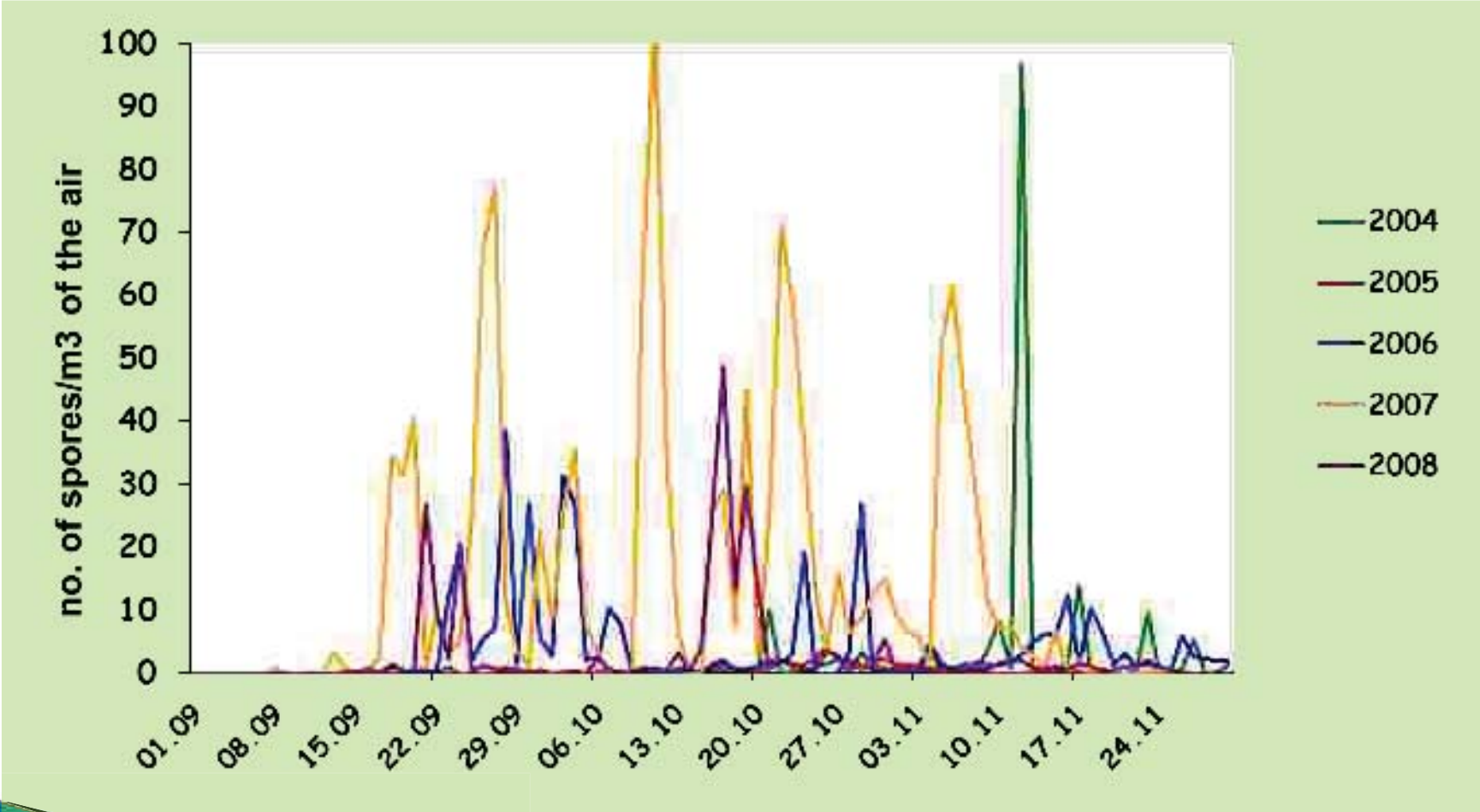
Mendelova univerzita v Brně
Mendel University of Agriculture and Forestry, Brno, the CZECH REPUBLIC

Agrotest Fyto Ltd.
Agrotest Fyto Ltd., Kroměříž, the CZECH REPUBLIC

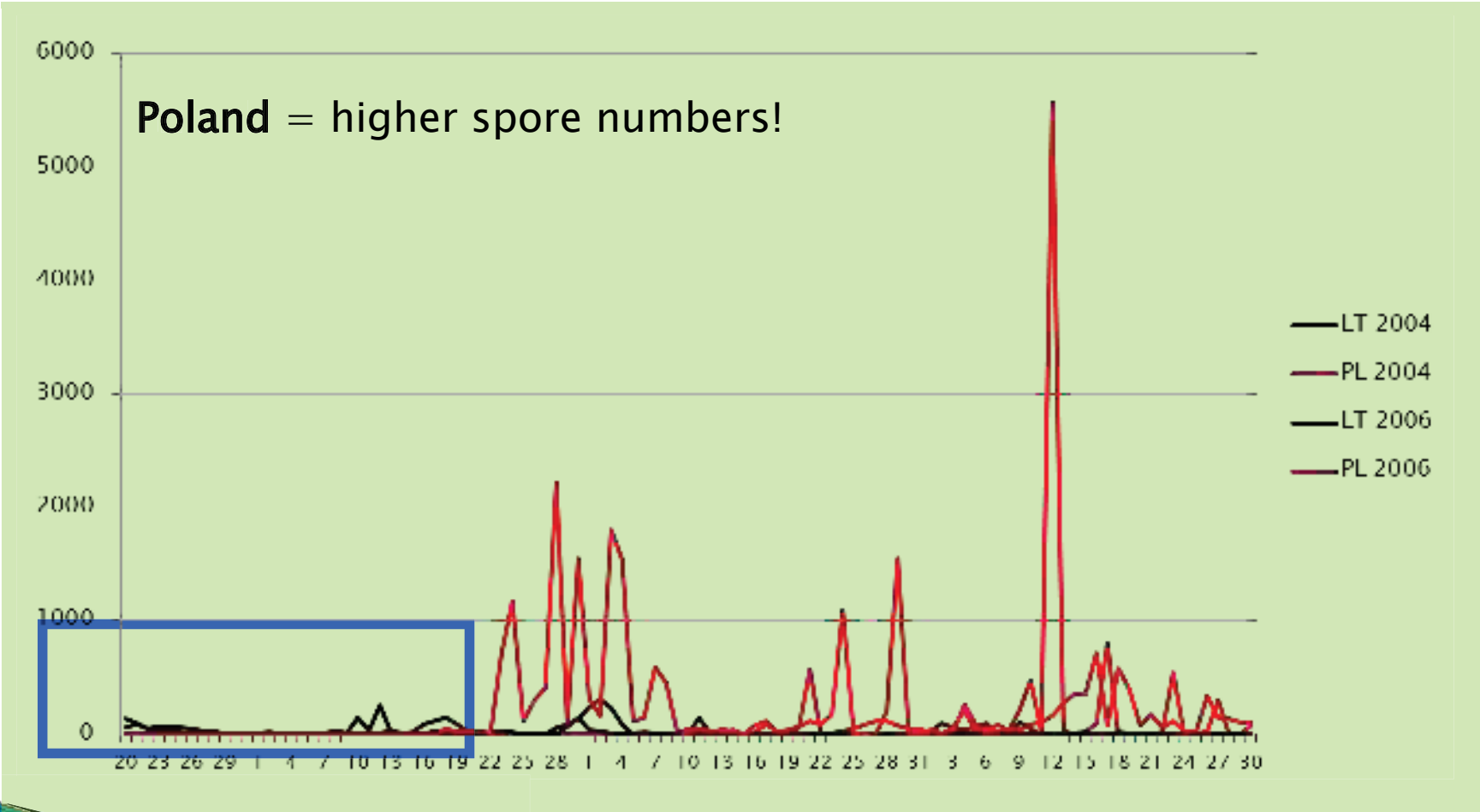
Trade mark of the SPEC system



Different spore pattern each year



Differences between countries



August

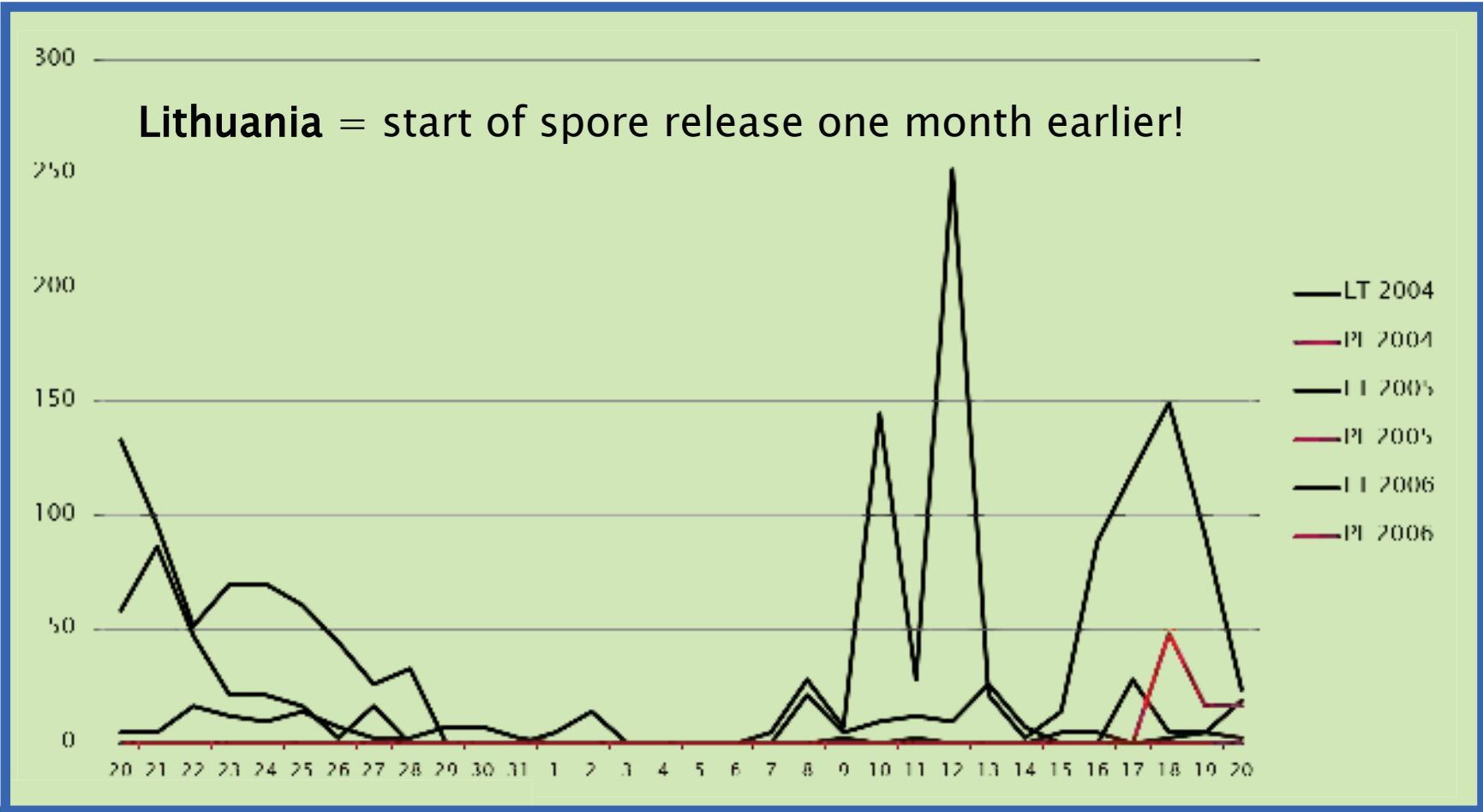
September

October

November



Differences between countries

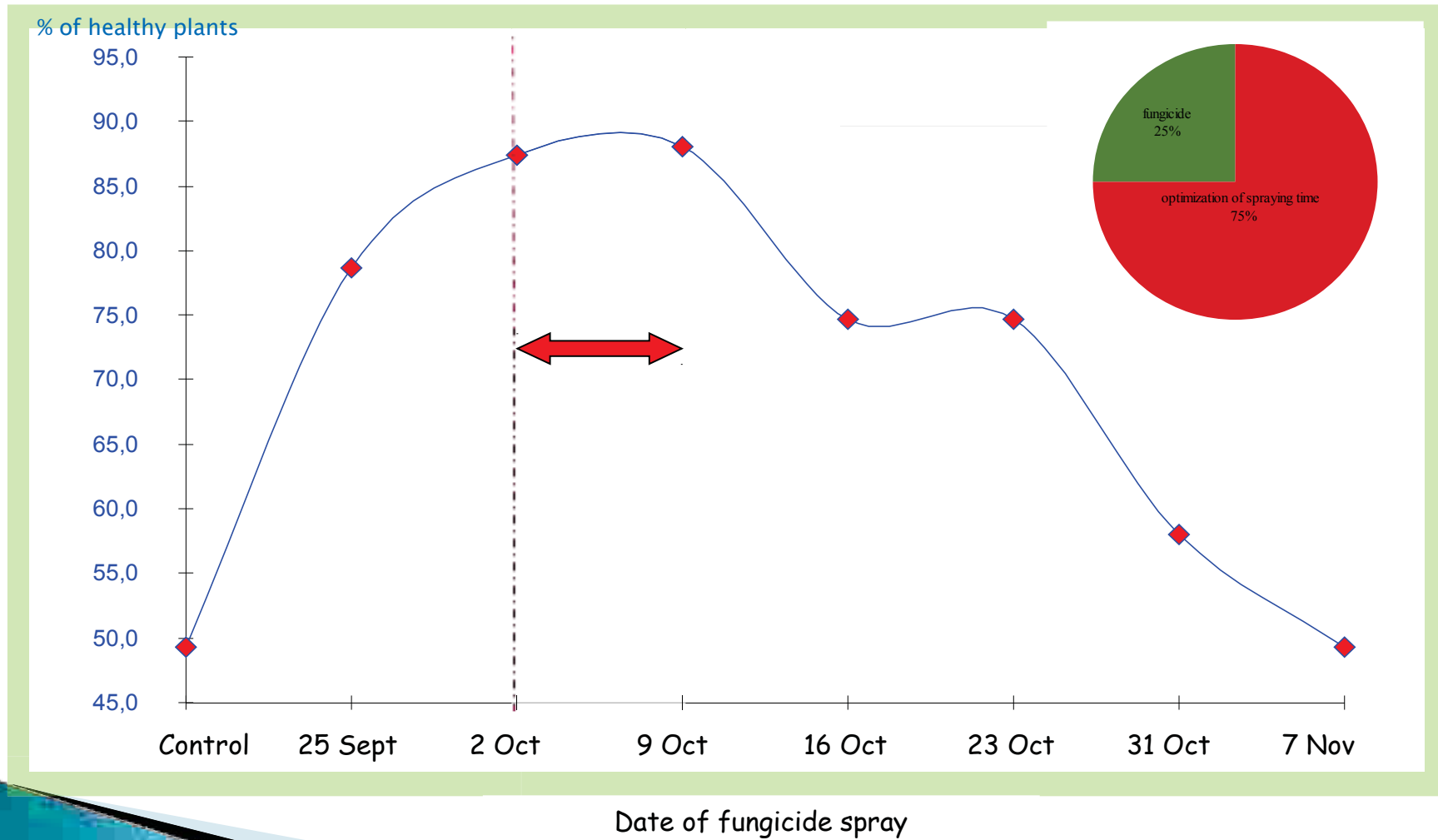


August

September

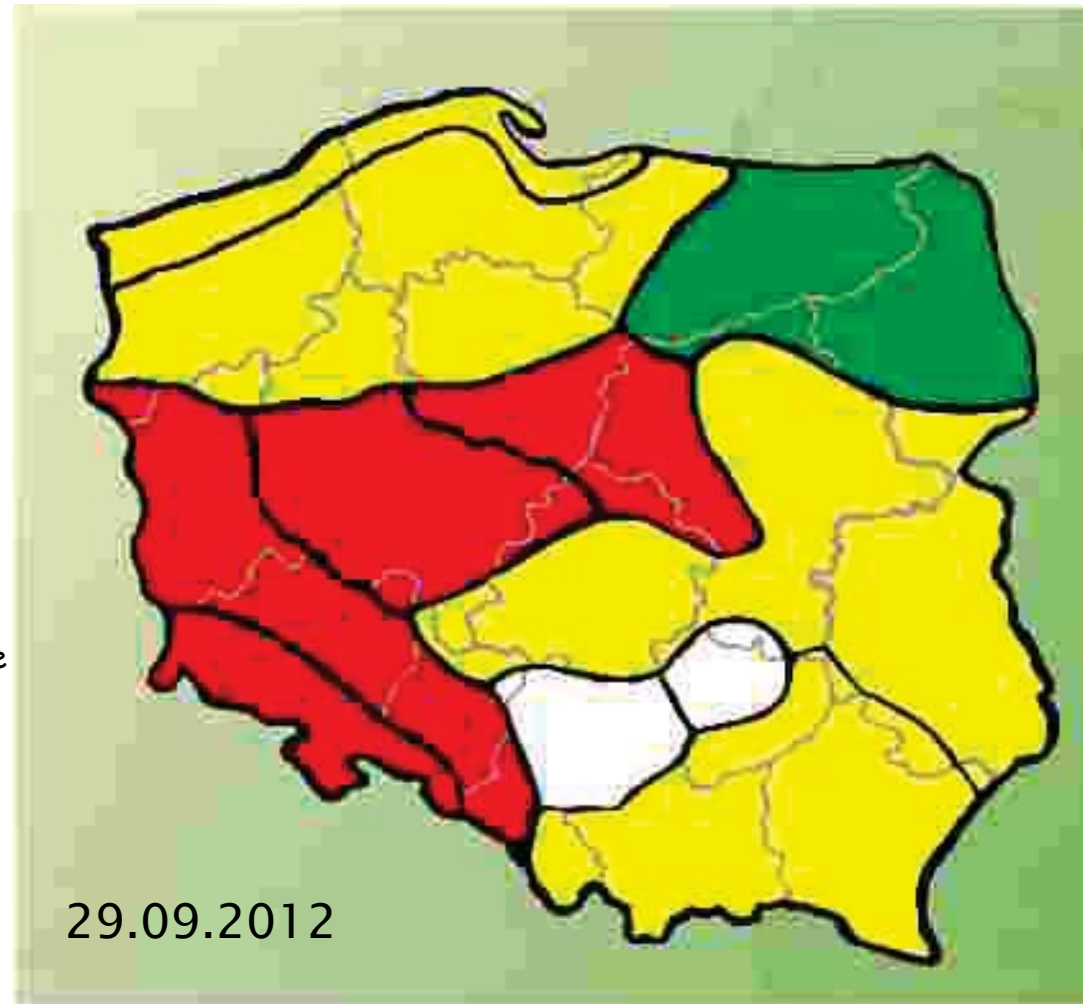


Profits from the proper protection of oilseed rape against stem canker



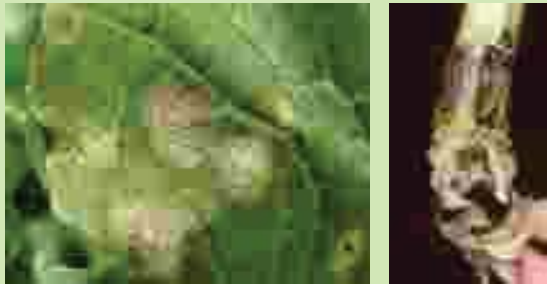
Recent data from Poland (2012)

-  **No risk** = no ascospore release
-  **Alert** = release of the first ascospores
-  **Spray** \approx 10 days after a sudden increase of ascospore concentration

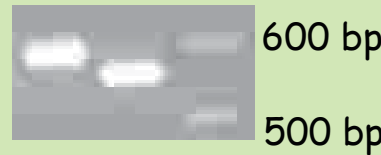
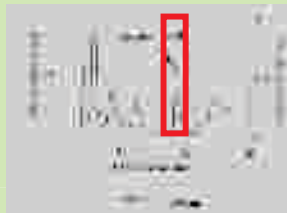
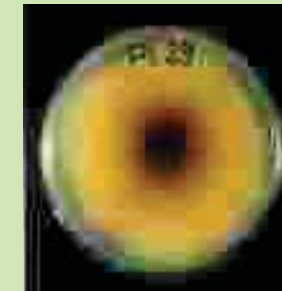
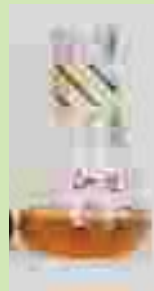


Different species, similar spores

Leptosphaeria maculans

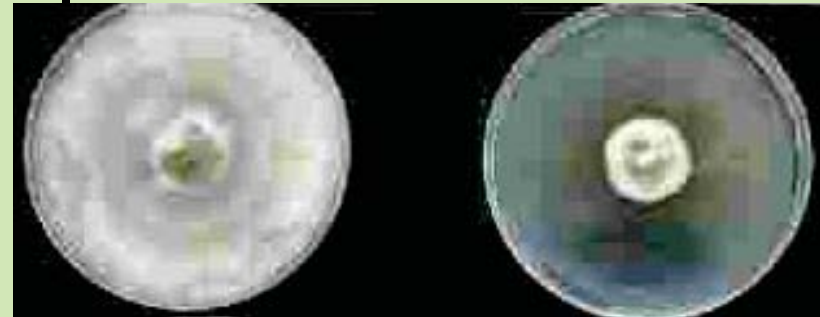
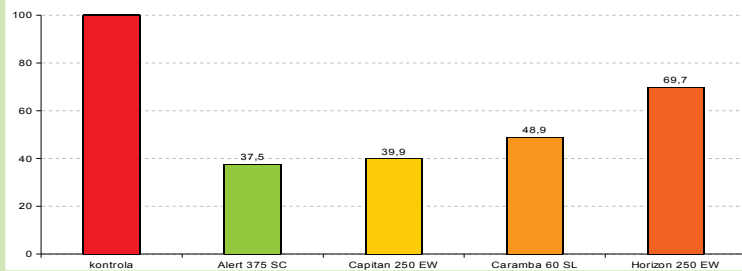


Leptosphaeria biglobosa

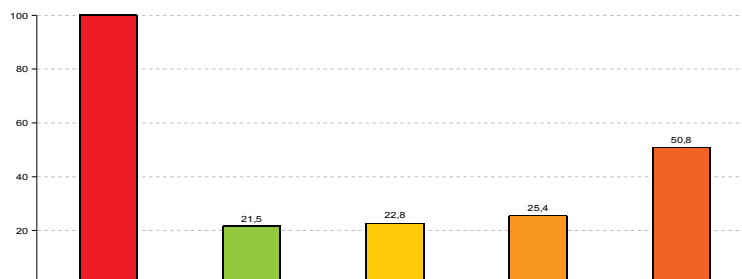


Susceptibility to fungicides

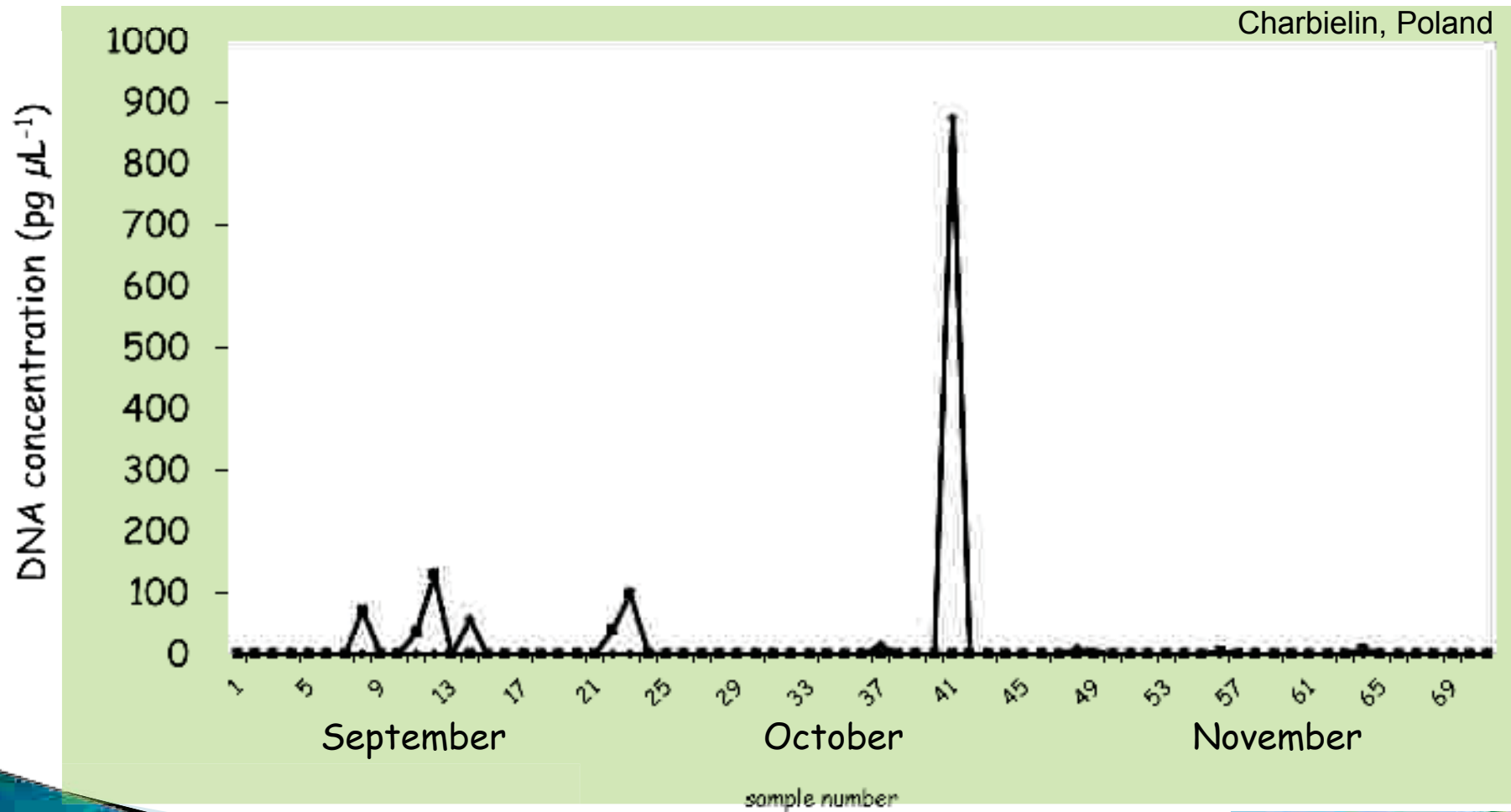
The colony diameter of *L. biglobosa* on PDA medium supplemented with 0,3 ppm of the fungicides



The colony diameter of *L. maculans* on PDA medium supplemented with 0,3 ppm of the fungicides

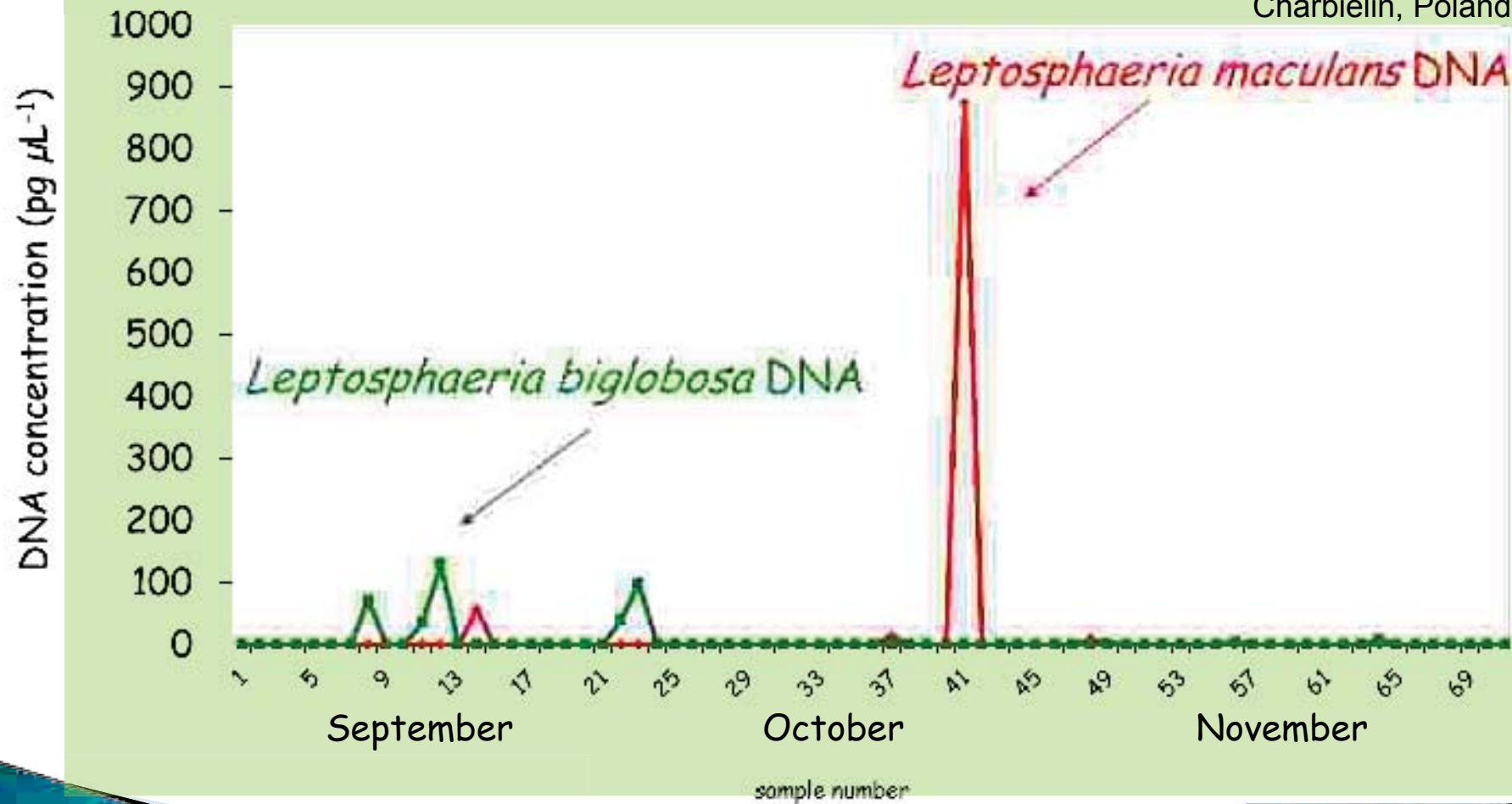


Visual (microscope) detection of *Leptosphaeria* spp.

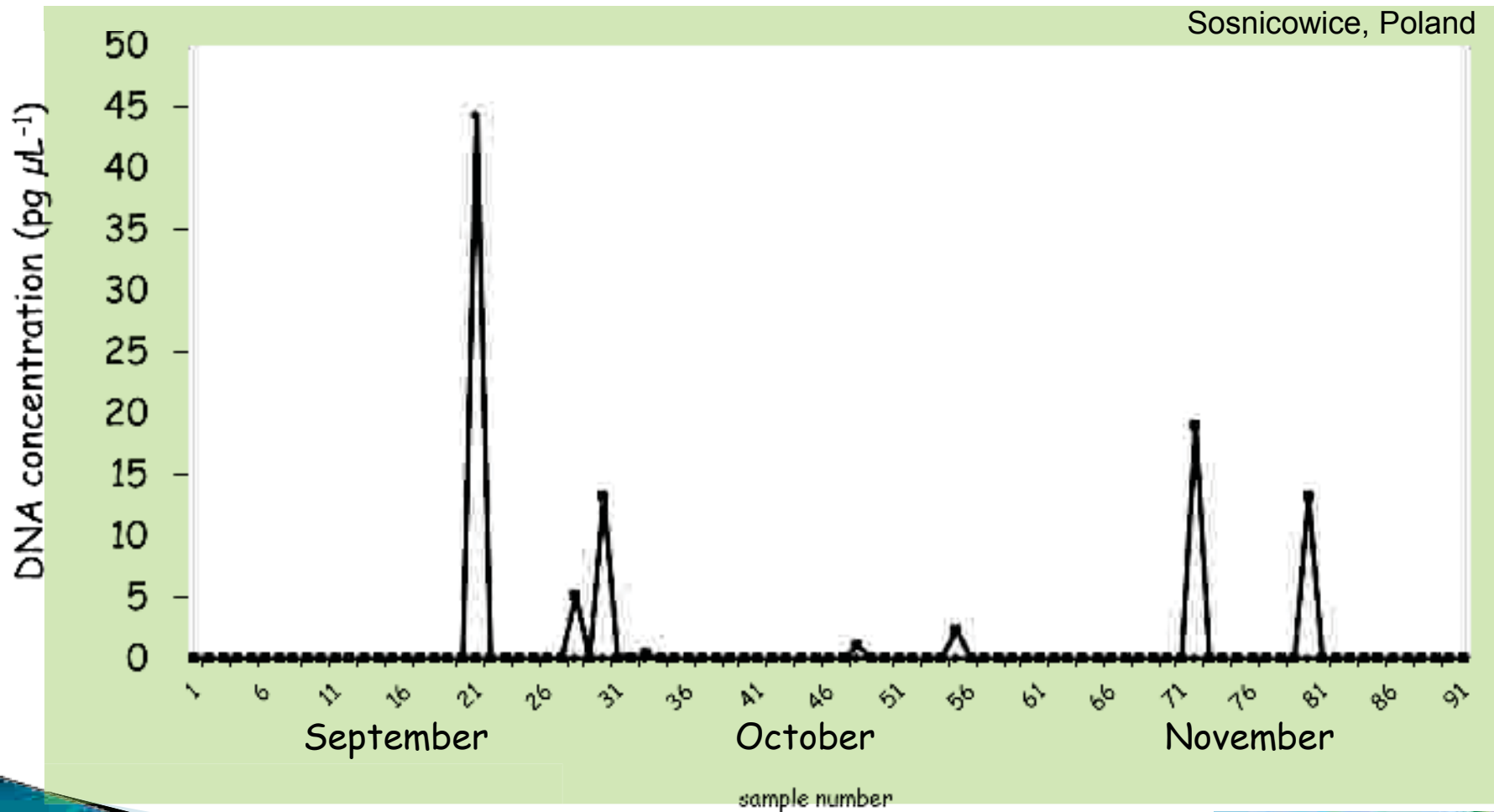


Real time PCR detection of *L. maculans* and *L. biglobosa* DNA

Charbielin, Poland

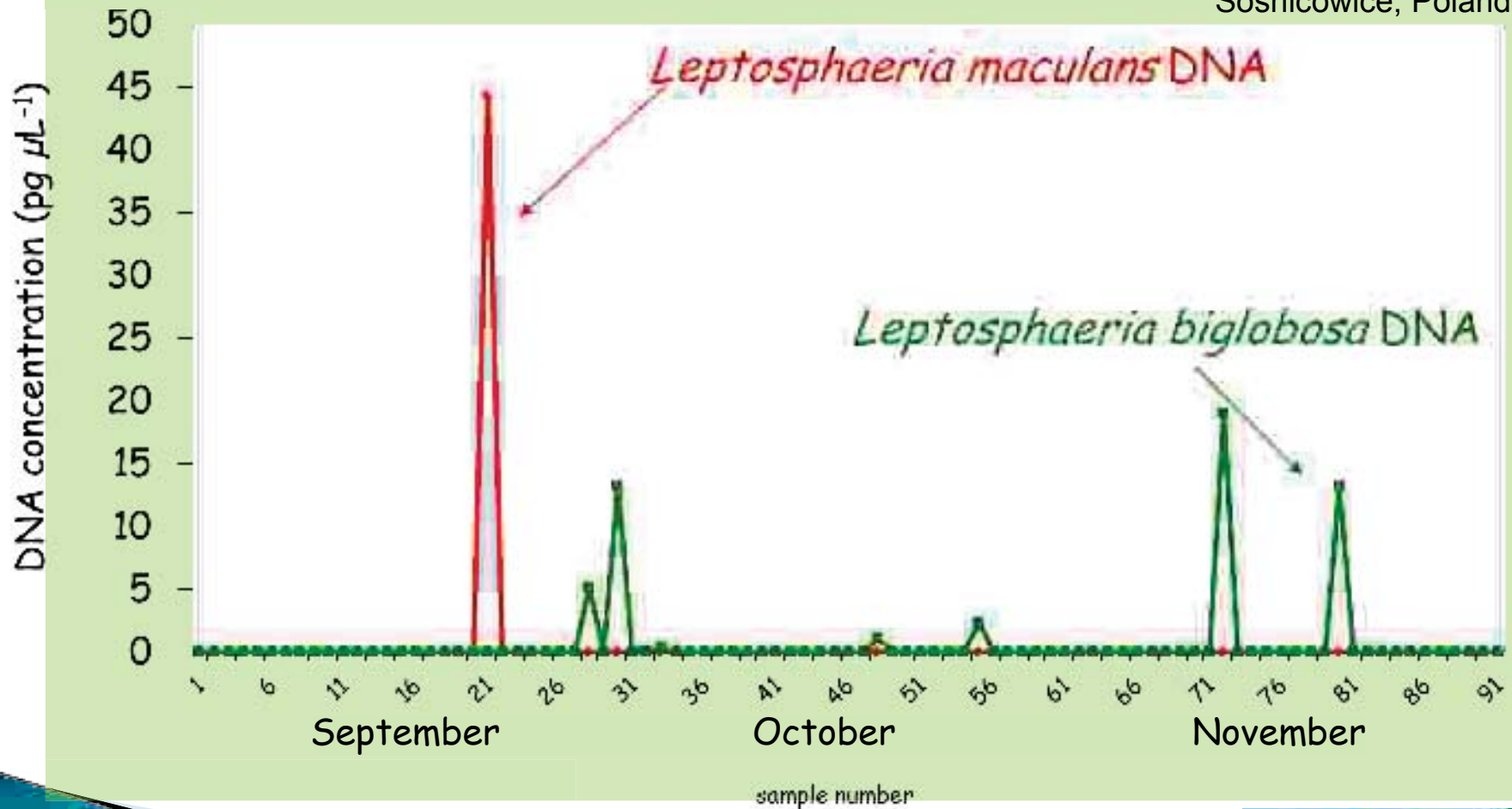


Visual (microscope) detection of *Leptosphaeria* spp.



Real time PCR detection of *L. maculans* and *L. biglobosa* DNA

Sosnicowice, Poland



Optimal spray time (& plant size) differs between regions

•



Protection depends on region and season
Rate and composition of active compounds should differ
Influence of the pathogen population



Family: *Asteraceae*
Genus: *Ambrosia*

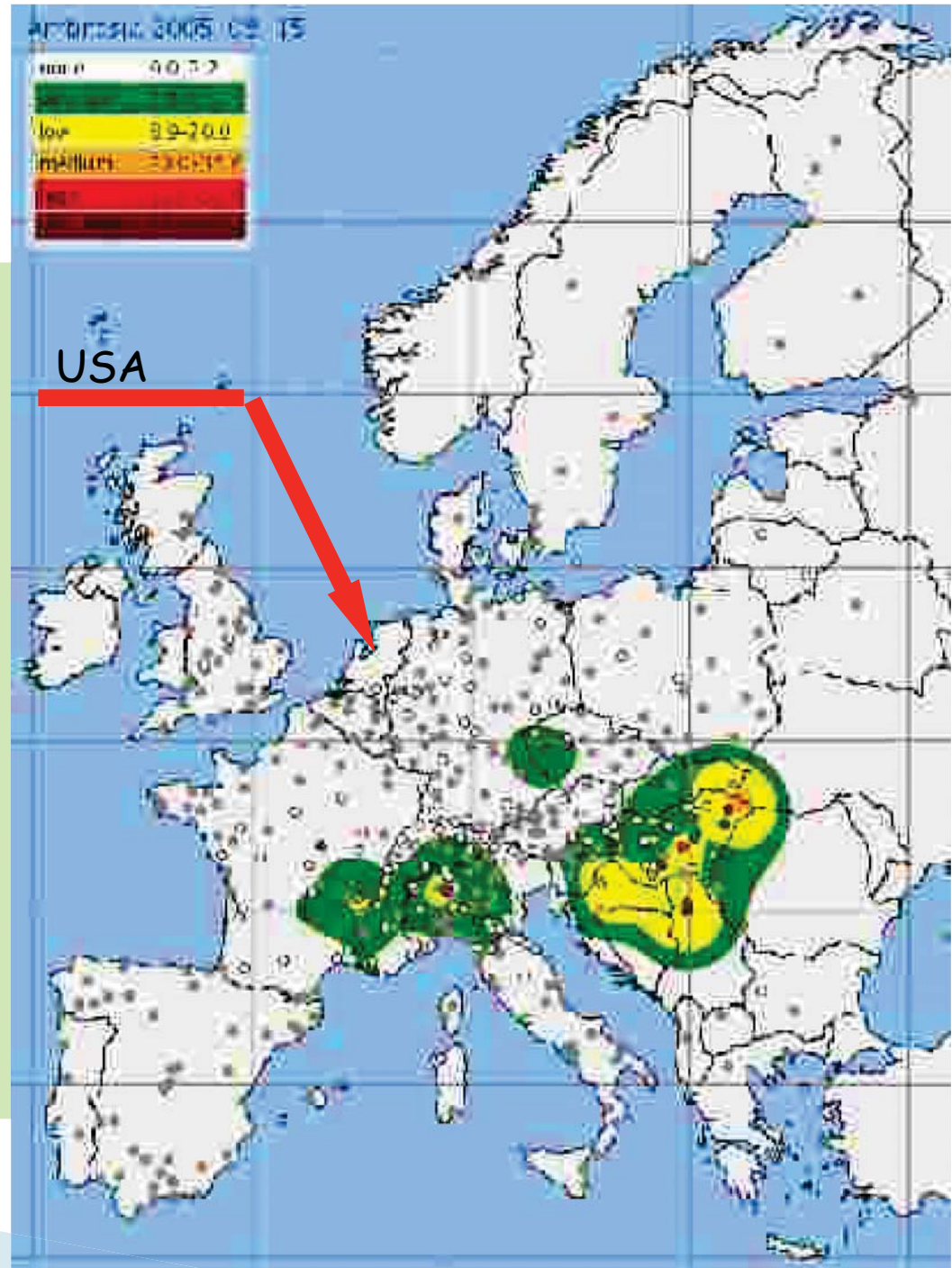


A. artemisiifolia
A. tenuifolia

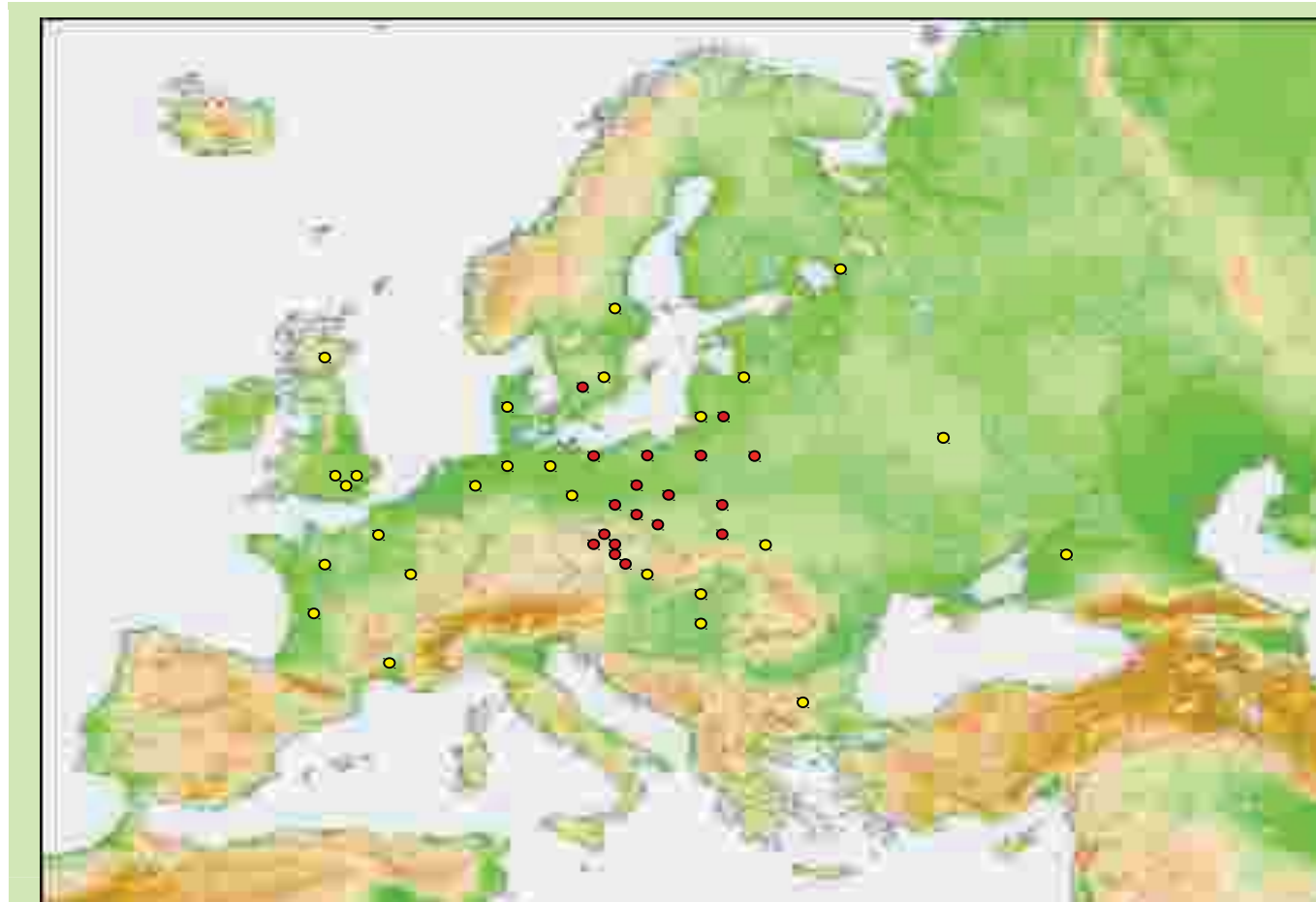
A. trifida
A. maritima

Strong symptoms of allergy starting
from 40 pollen grains /m³

Ruderal weed, seeds transported with cereal
grains, found at railway stations and along
railroads and cereal silo



Time to expand !



Existing spore traps:

- UK
- France
- Germany?
- Denmark?
- Netherlands?

Interested:

- Latvia
- Russia
- Bulgaria
- Belarus
- Slovakia?
- Australia
- Canada

Cooperation at international level

Joanna Kaczmarek, Gunilla Berg, Eva Plachká, Jana Poslušná, Irena Brazauskienė, Pavel Ryšánek, Radovan Pokorný, Tomáš Spitzer, Zbigniew Karolewski, Jean-Noël Aubertot, Akinwunmi Olumide Latunde-Dada, Adam Dawidziuk, Johanna Holmblad, Egle Petraitienė, Jana Mazaková, Zdeněk Krédl, Agne Piliponyte, Andrzej Brachaczek, Malgorzata Jedryczka

