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- State Research Institute in Radzikow
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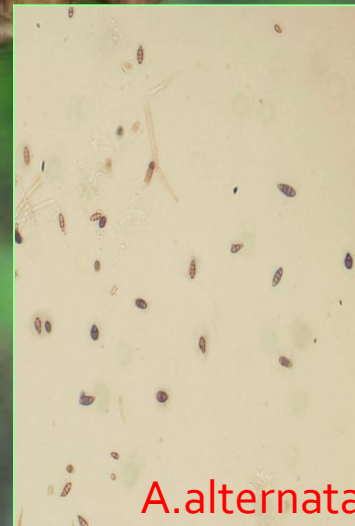
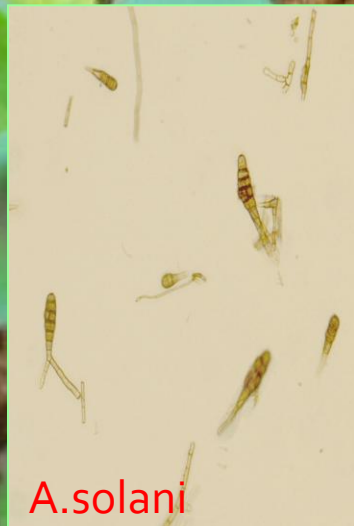
Seasonal changes of *Alternaria* population in the North of Poland

EuroBlight Workshop, Limassol, Cyprus 12-15 May 2013

Aim: Characterization of *Alternaria* changes in „time” and „space”

- Monitoring of early blight problem in potato crops around the Poland,
- Seasonal changes of *Alternaria* population composition in the North of Poland
- Local changes of *Alternaria* population composition in the North of Poland

The causal agents of potato early blight in Poland:
two species of fungus *Alternaria*:
A.solani & *A.alternata*



**Monitoring:
Risk of early blight
occurrence in potato
crops in Poland**
(based on questionnaires)



Year	Number of observed fields	Incidence of early blight symptoms (% of fields)
1998	138	78,3
1999	93	88,0
2000	56	91,1
2001	50	96,0
2002	64	90,6
2003	34	85,3
2004	25	87,5
2005	23	86,0
2006	20	78,9
2007	20	90,0
2008	25	84,0
2009	21	80,8
2010	25	80,0
2011	62	93,5
2012	31	71,0
Σ / mean	687	85,4



early blight



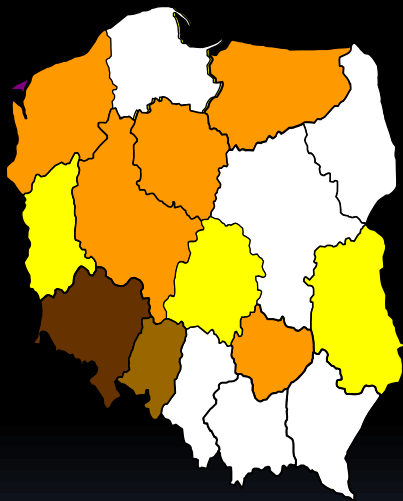
late blight

Monitoring: Date of the first infections of early and late blight reported in Poland since 1998

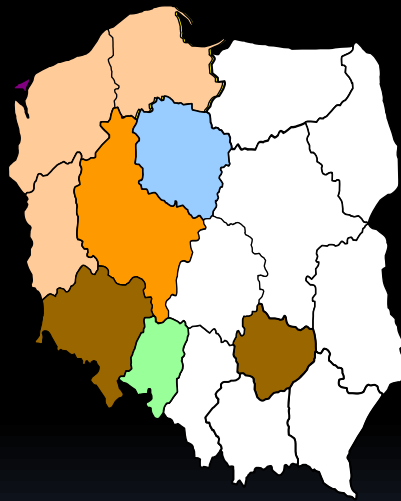
Disease	Year of observations														
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Early blight	20.05.	21.05.	31.05.	01.06.	20.05.	27.05.	04.06.	02.06.	04.06.	28.05.	27.05.	29.05.	02.06.	01.06.	28.05.
Late blight	23.06.	02.06.	07.06.	06.06.	21.05.	29.05.	09.06.	10.06.	05.06.	01.06.	27.05.	04.06.	25.05.	04.06.	10.06.

Monitoring: Regions where the first infections of early blight were reported in Poland in 2009 - 2012

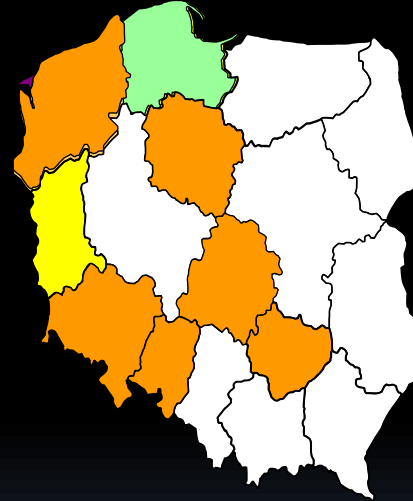
2009



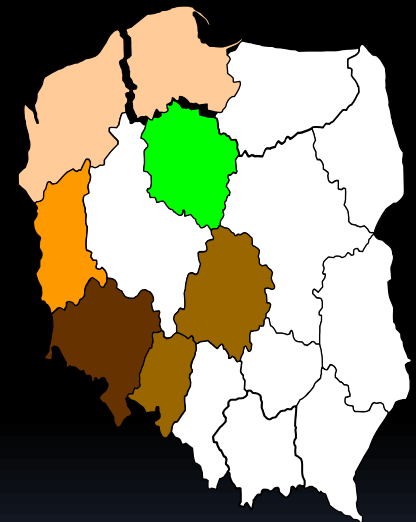
2010



2011



2012

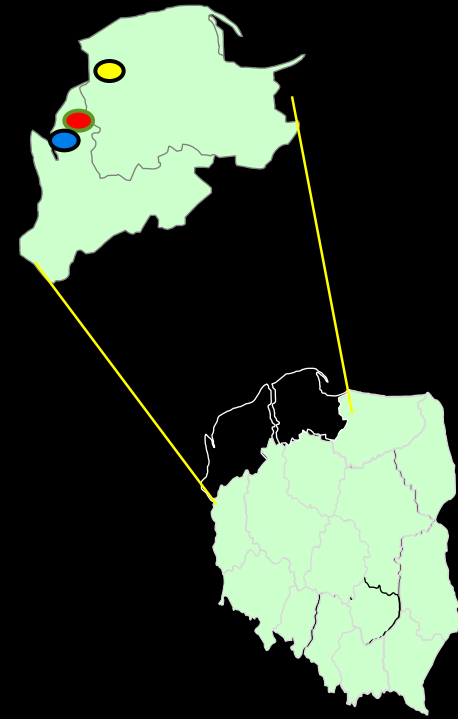


<20	21-31.	1-10.	11-20.	21-30.	1-10.	11-20.	21-31.	1-10.	11-20.	21-31.	No data
MAY		JUNE			JULY			AUGUST			No data

Monitoring of early blight in Poland in 2009-2012

	Year			
	2009	2010	2011	2012
1. Early blight infections the earliest in the season	29.05.	02.06.	12.06.	28.05.
2. Early blight infections at the latest in the season	28.07.	02.08.	19.07.	30.07.
Difference between 1. and 2. (days)	60	61	37	63





Material and methods:

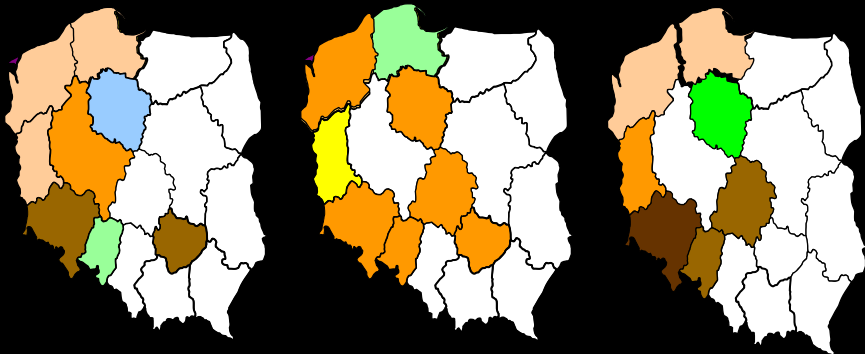
Observations were carried out in the 2011-2012 ,
in potato fields in 3 localities:

Bonin (voivodship zachodniopomorskie)

Przytoko (voivodship pomorskie)

Mierzym (voivodship zachodniopomorskie)

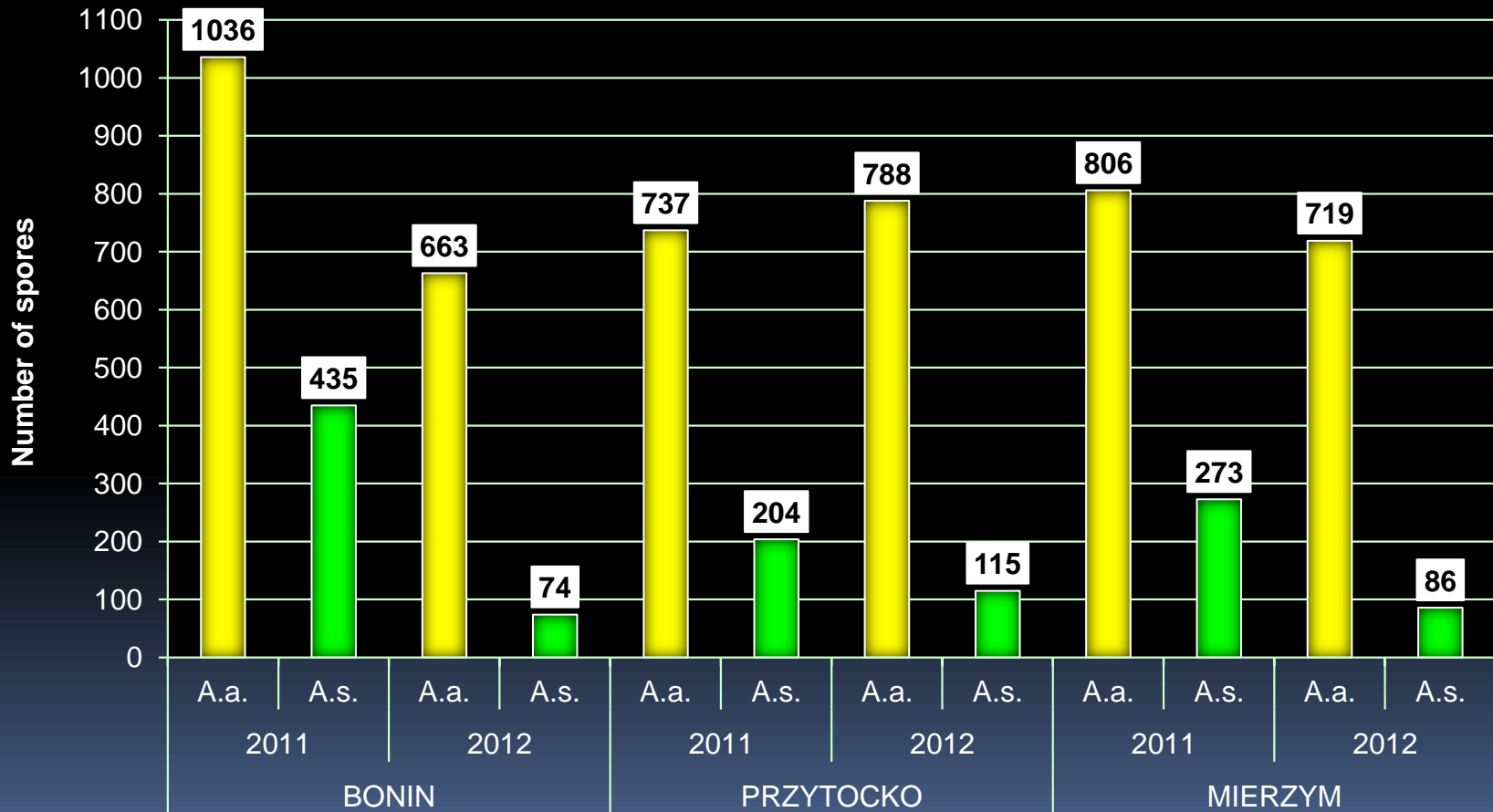
- Frequency of spores of both *Alternaria* species were examined with the help of homemade traps, placed in various parts of potato field, at two heights: 90 & 150 cm,
- Observations and assessment were repeated each 7- days during all season, since beginning of June to harvest time,
- Mean number of *A.a.* and *A.s.* spores were evaluated on 1cm² surface of microscopic glass in trap.

2010**2011****2012**

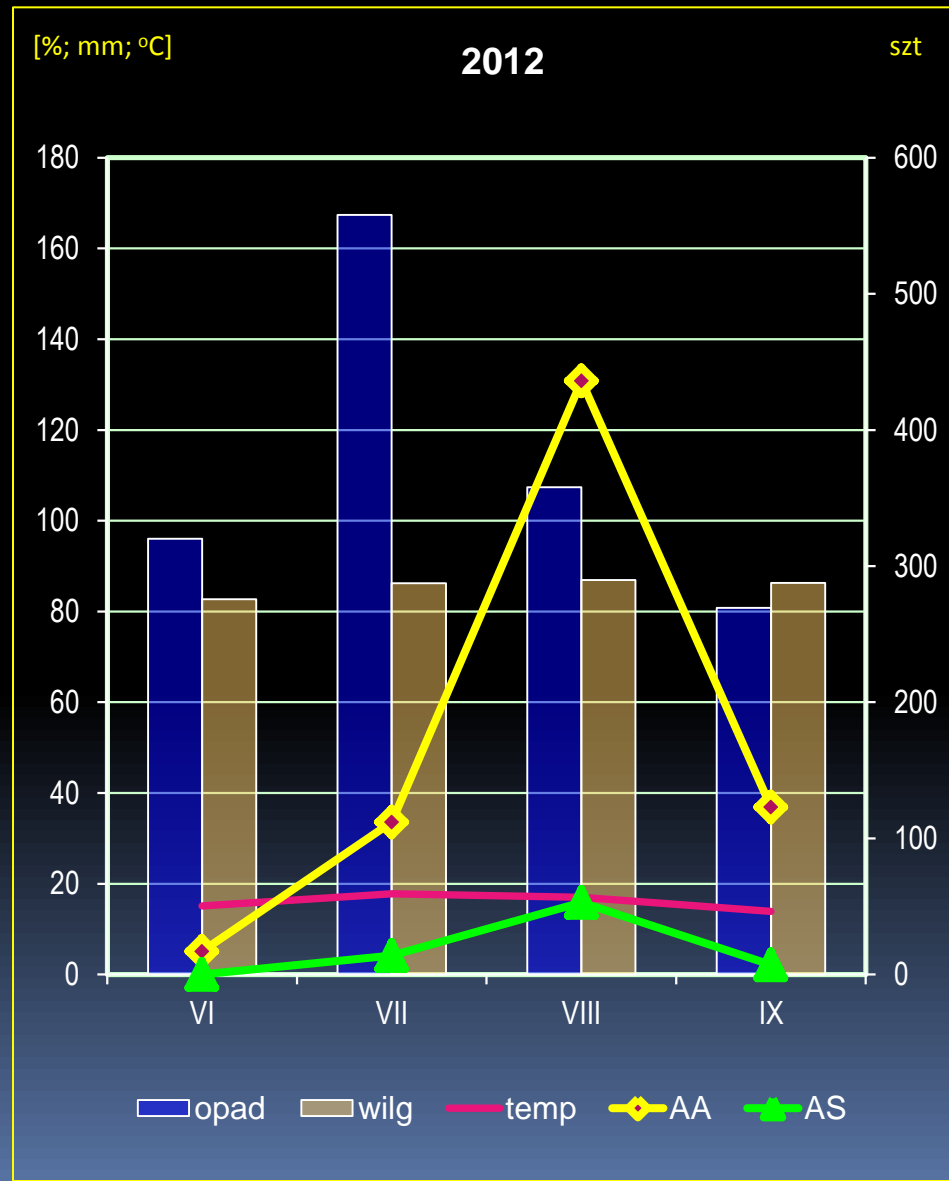
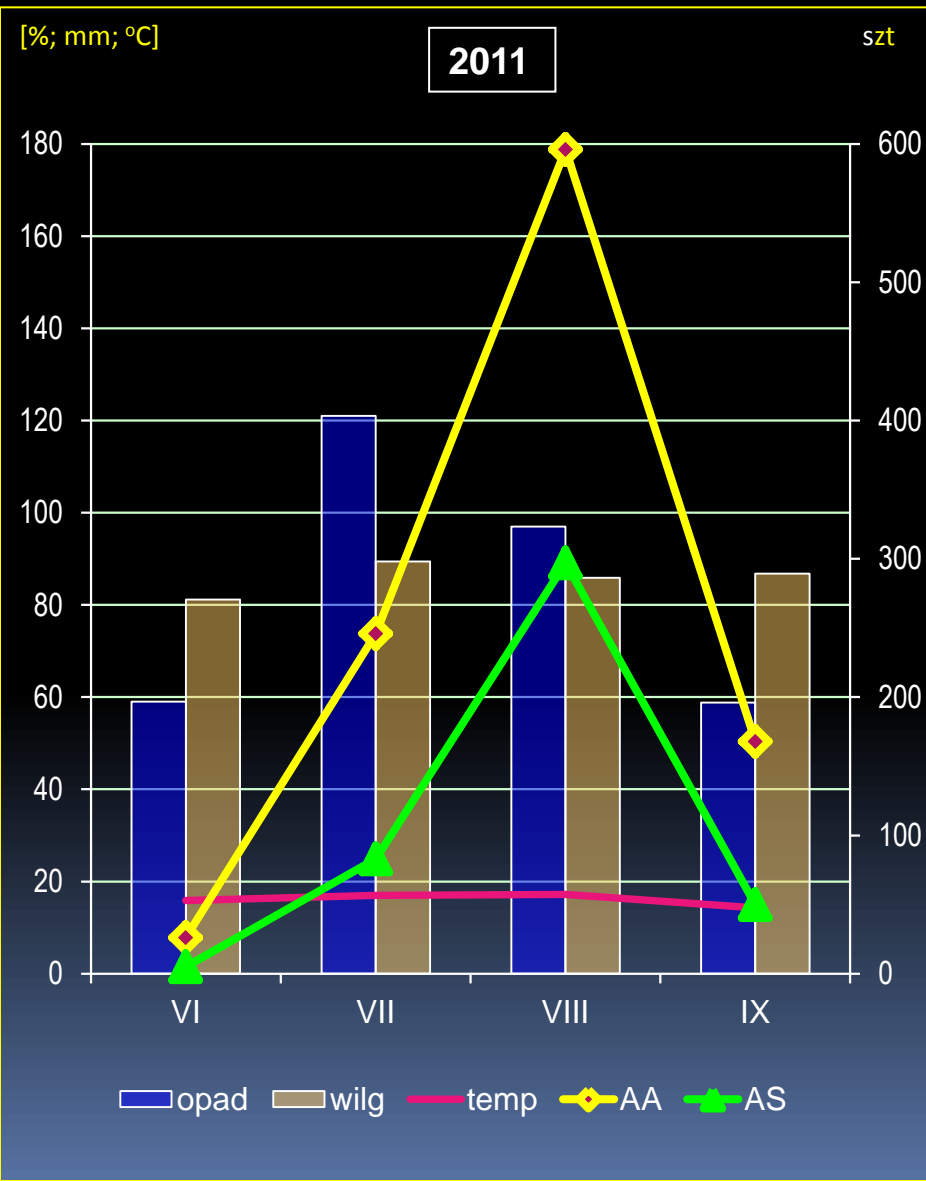
Date of early blight appearance at field trials in the North of Poland

Locality	Year		
	2010	2011	2012
Bonin	24.06	21.06	18.06
Przytocko	23.06	20.06	20.06
Mierzym	27.06	18.06	19.06

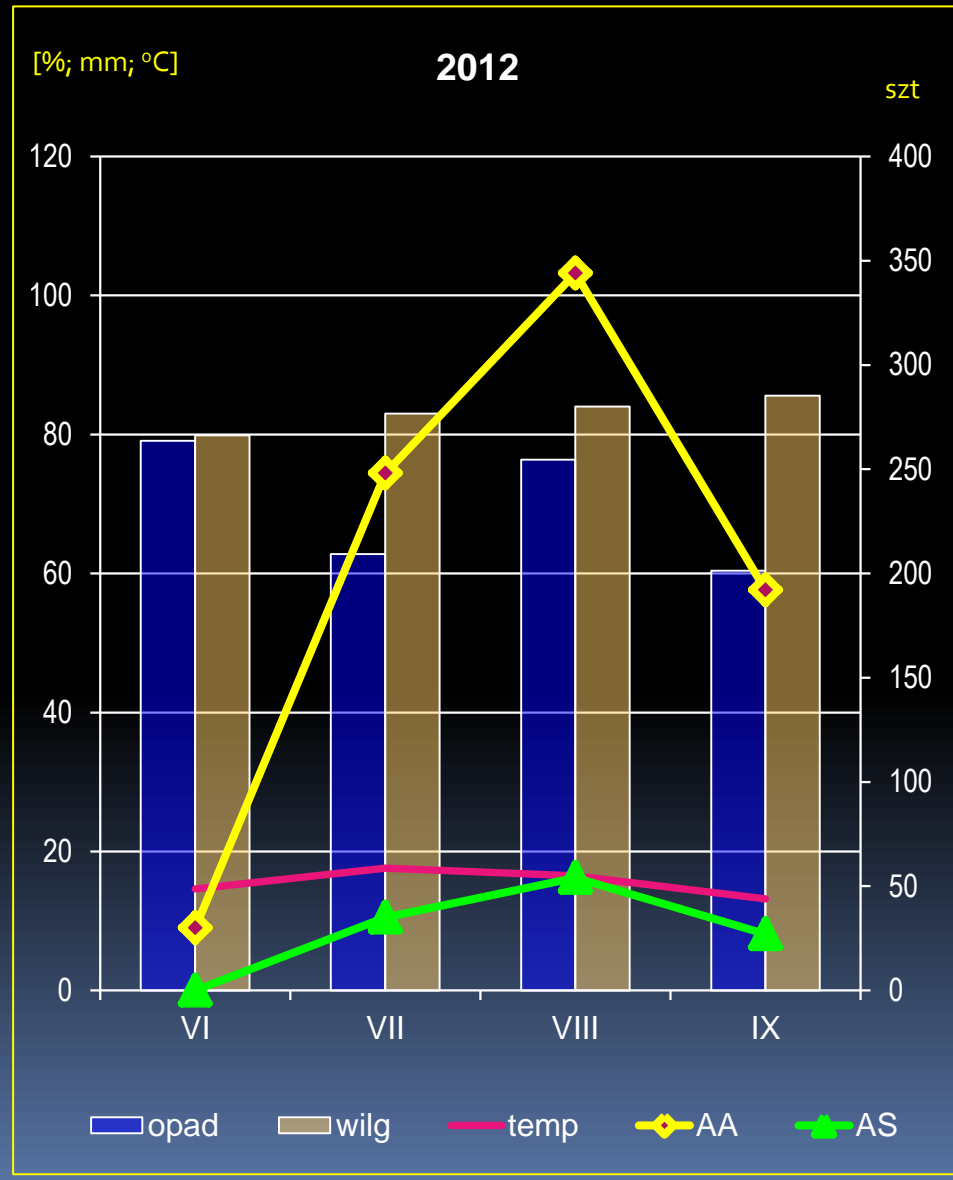
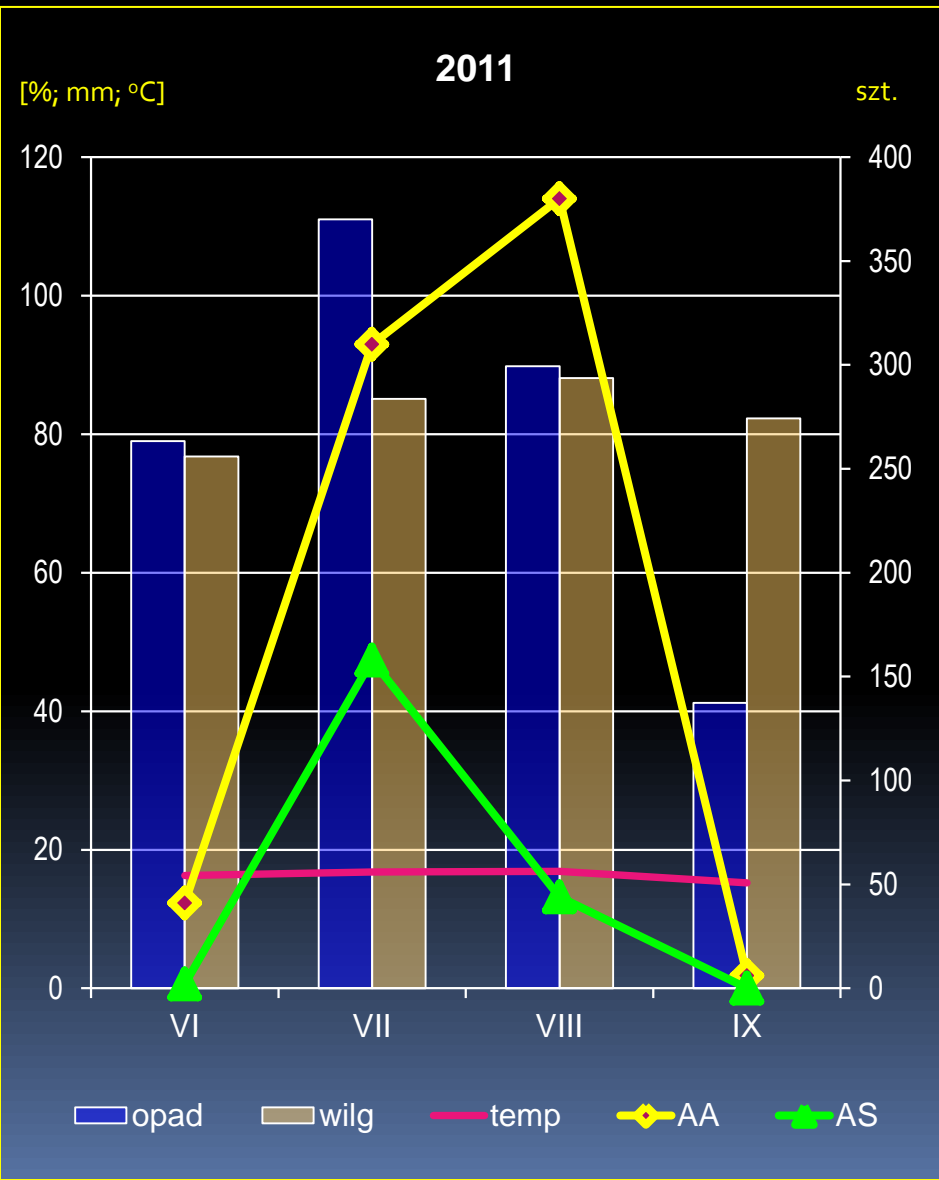
Number of *Alternaria* spores caught during growing season (on 1 cm² area of microscope glass)



Density of *Alternaria* spores during the season in potato field in Bonin

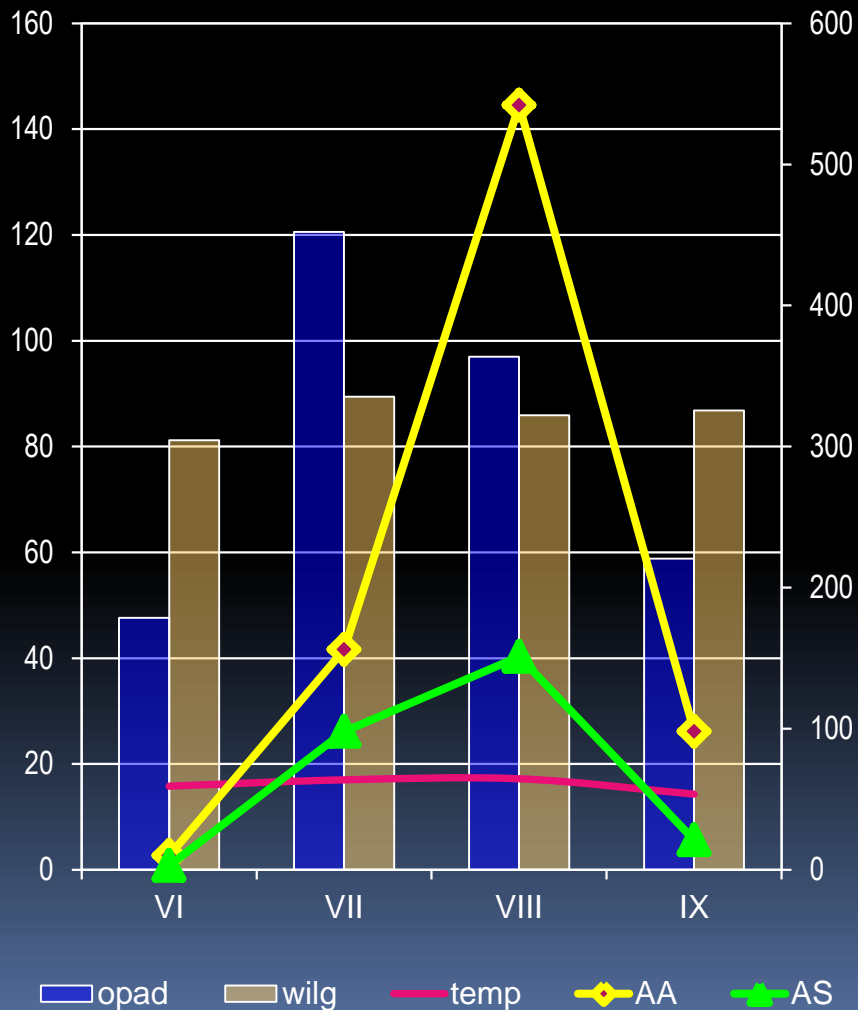


Density of *Alternaria* spores during the season in potato field in Przytockø

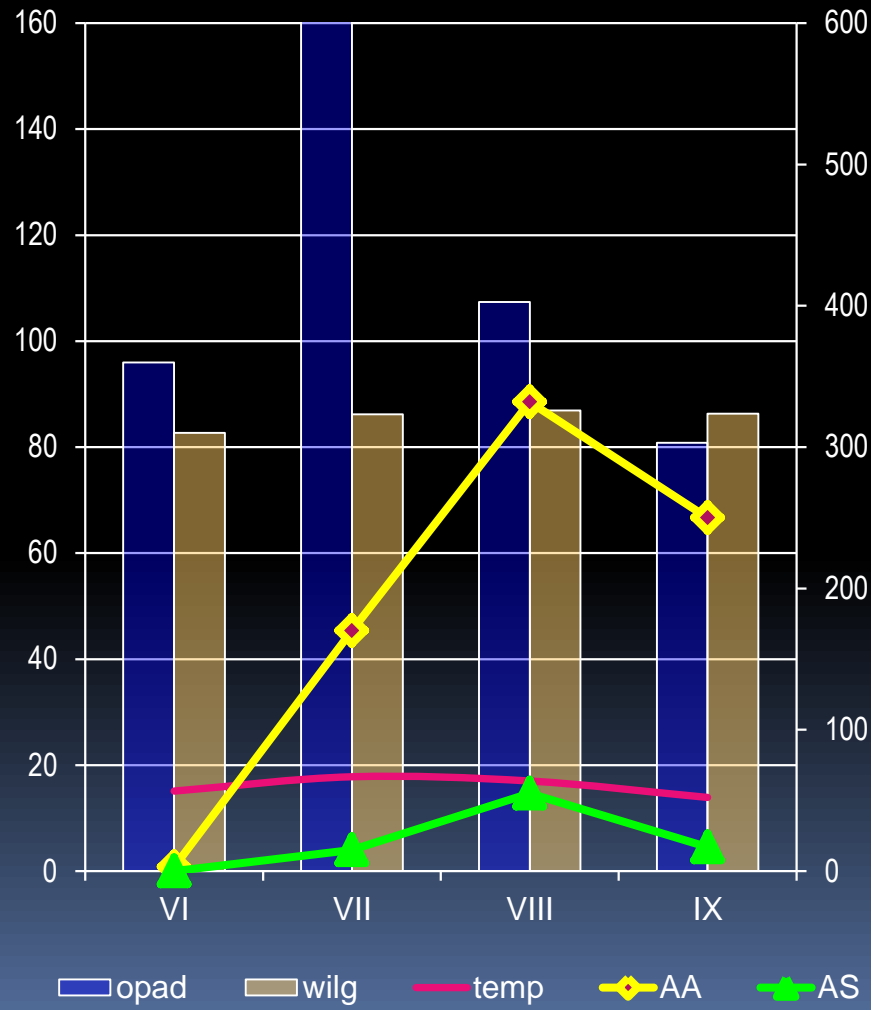


Density of *Alternaria* spores during the season in potato field in Mierzym

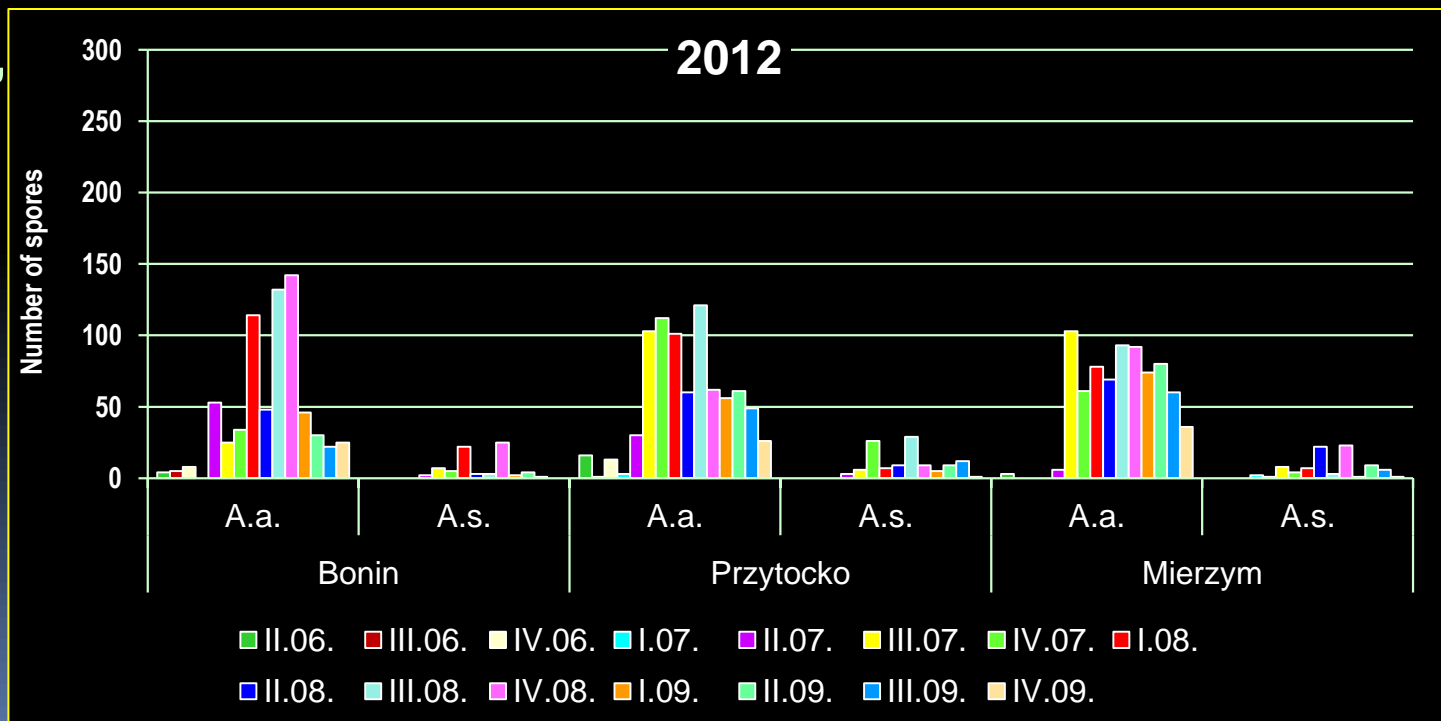
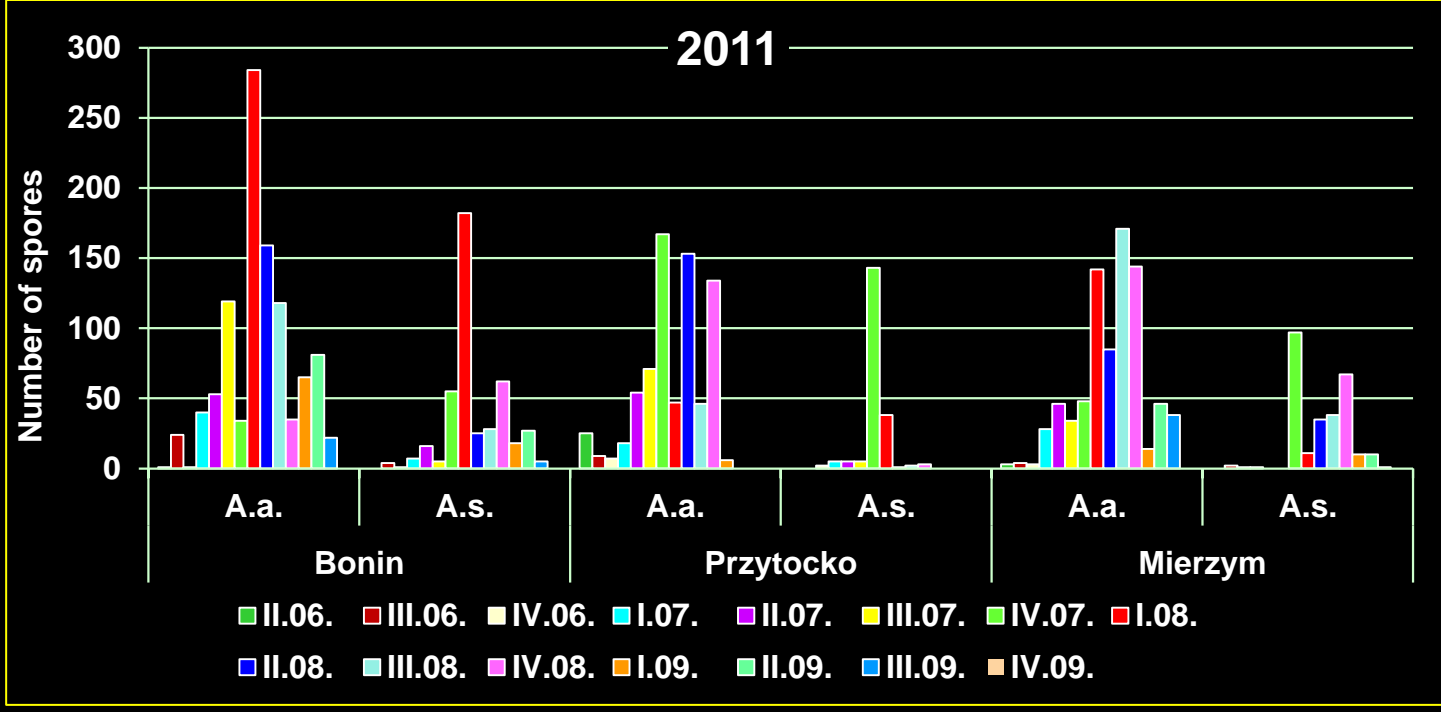
[%; mm; °C] **2011** no



[%; mm; °C] **2012** szt



**Changes
in the quantity
of *Alternaria* spores
in „time” and „space”**



Correlation between number of *Alternaria* spores and weather factors (correlation index)

<i>Alternaria</i> species	Weather factors			
	Rainfall	Air temperature	Humidity	Hydrothermal index of Sielianinov *
<i>A. alternata</i>	0.0461	0.5941	- 0.6564	0.0348
<i>A. solani</i>	- 0.0020	0.6784	- 0.6698	0.1174

* Hydrothermal index of Sielianinov was calculated as formula:

$$K = \frac{P}{\sum T_p \times 0,1}$$

where:

K – value of Sielianinov index

P - sum of month rainfall [mm]

$\sum T_p$ – sum of month temperatures [° C]

Aim: Characterization of *Alternaria* changes in „time” and „space”

Observations were carried out in the 2012 ,
in potato fields in 2 localities:

Bonin (voivodship zachodniopomorskie)

Przytoko (voivodship pomorskie)



Since spring of 2012, thanks cooperation with Bayer Company frequency of both *Alternaria* species are evaluated with professional two Burkard spore traps.

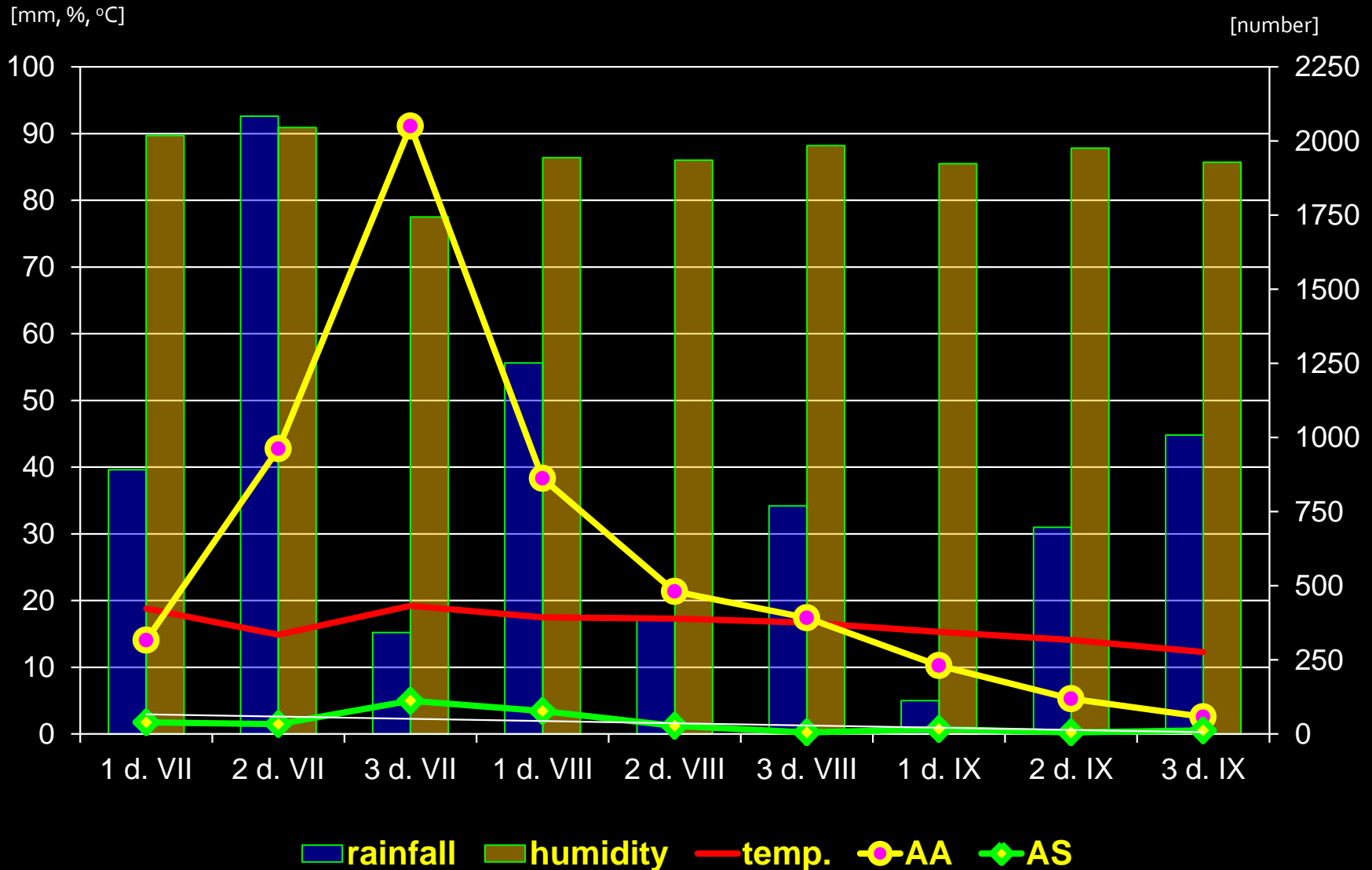
The traps suck in air actively ($10 \text{ m}^3/\text{h}$) together with hovering spores and pollen which are deposited inside the trap on a tape covered with vaseline.

The tape is fixed to a clockwork drum that rotates at 2 mm/h.

The microscopic identification of weekly collected tape cuts allows to define what time and day the spores were presented in the air.



Seasonal changes in quantity of *Alternaria* spores in potato field in Bonin (2012, results of Burkhard spore trap)



Summary:

- Early blight is a very popular disease in potato fields in Poland and its symptoms were observed in 85,4% of observed potato fields,
- During 2011 season more spores of *Alternaria* pathogens were collected compared to season 2012 (in 2011 – 3491 and in 2012 - 2534),.
- During both of years *A. alternata* spores were collected more frequently (percentage ratio *A.a* : *A.s.* in 2011 – 74 : 26 and in 2012 – 89 : 11).
- Top of spore density of both *Alternaria* species was observed at the end of July and at the beginning of August, in most cases at the same time



Thank you
for your attention

