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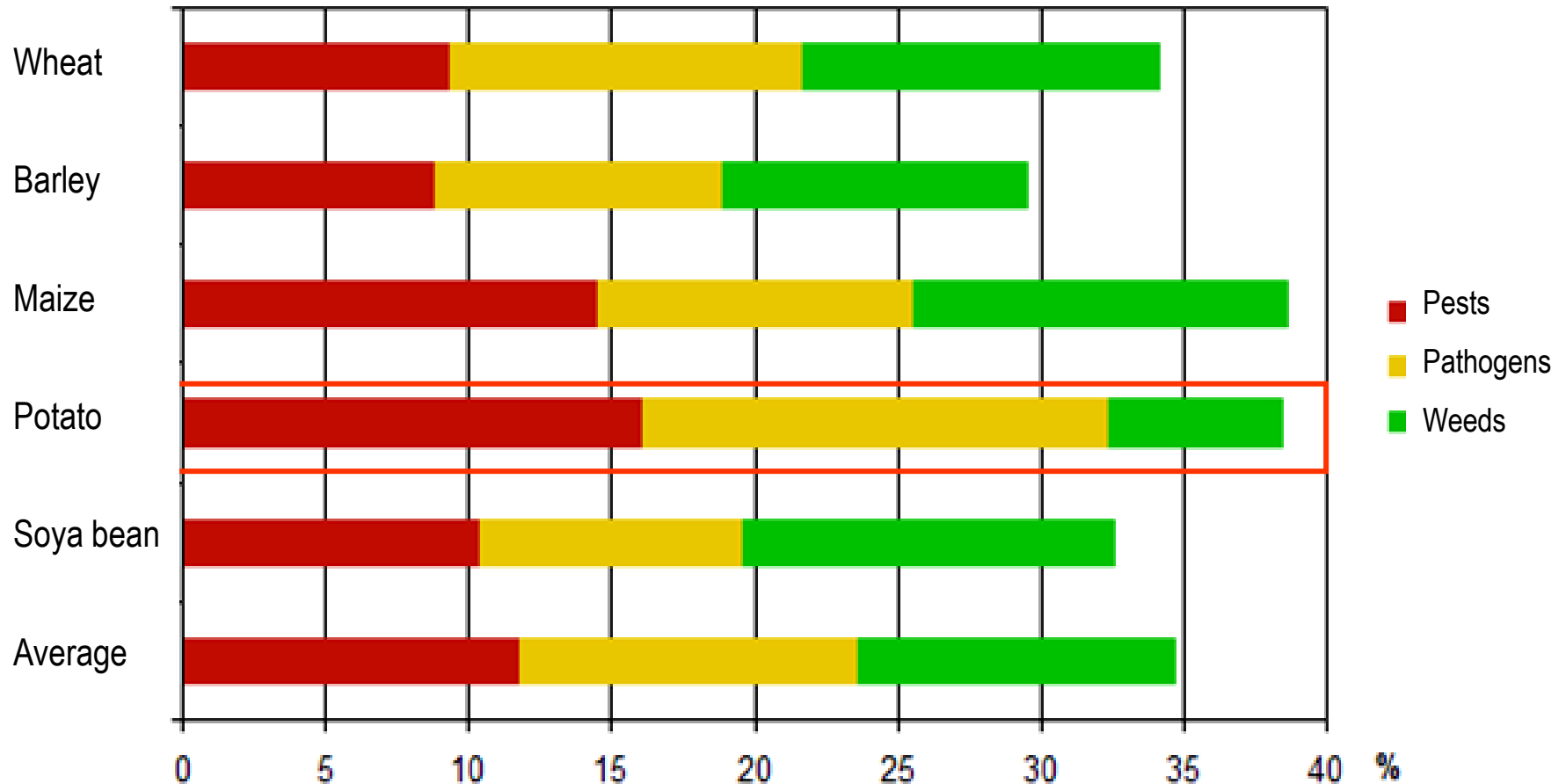
**Host-pathogen interaction  
between *Alternaria*  
species and *S.tuberosum*  
under different conditions**



# Yield losses of important crops in the world scale

(acc. Norris *et al.* 2003)

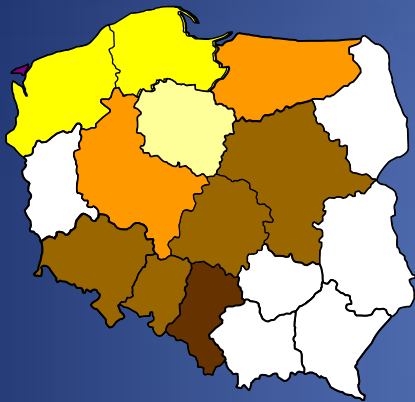
## Yield losses %



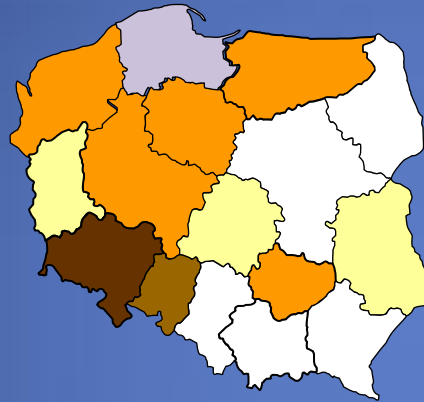
## Dates of the first recorded outbreaks of early and late blight in potato fields in Poland (based on questionnaires)

Disease	Year of observations													
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
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.	12. 06.
Late blight	23. 06.	02. 06.	07. 06.	06. 06.	21. 05.	11. 06.	17. 06.	13. 06.	05. 06.	01. 06.	27. 05.	04. 06.	01. 06.	06. 06.

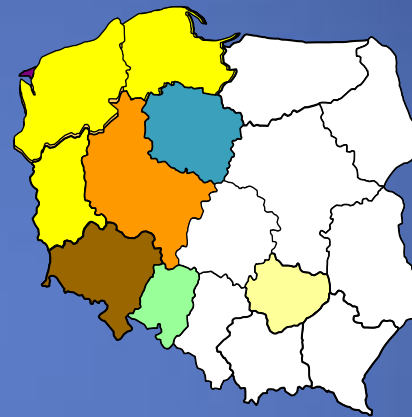
# Risk assessment of EB occurrence in Poland in 2008 – 2011 based on results of pathogens' monitoring net



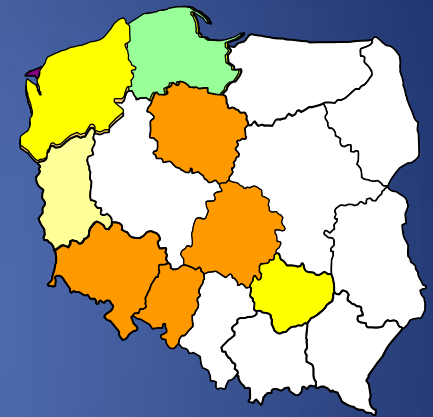
**27.05.2008**



**29.05.2009**



**02.06.2010**

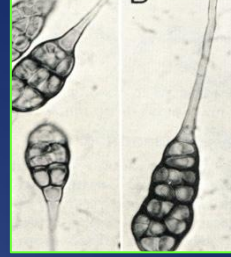


**12.06.2011**

											Lack of EB	Lack of data
<20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31		
MAY		JUNE			JULY			AUGUST				

# Material and methods

**The aim** of the laboratory studies carried out in Bonin in the years 2003-2005 was to estimate the level of susceptibility of potato different cultivars to 2 species of *Alternaria* fungus and the correlation between leaf and tuber resistance of these cultivars.



**Material:** 36 potato cultivars differed in earliness (from very early to late)  
2 pathogens: *Alternaria alternata* and *Alternaria solani*



**Method:** Aggressiveness of the pathogens was assessed using method with artificially inoculated detached leaves and sliced tubers („sandwich method”).

**Inoculum** of *A. alternata* and *A. solani* at concentration 100 spores / 1 mm<sup>3</sup>. One droplet of inoculum was placed by pipette on 10 detached leaves and between 10 pairs of tuber slaces.

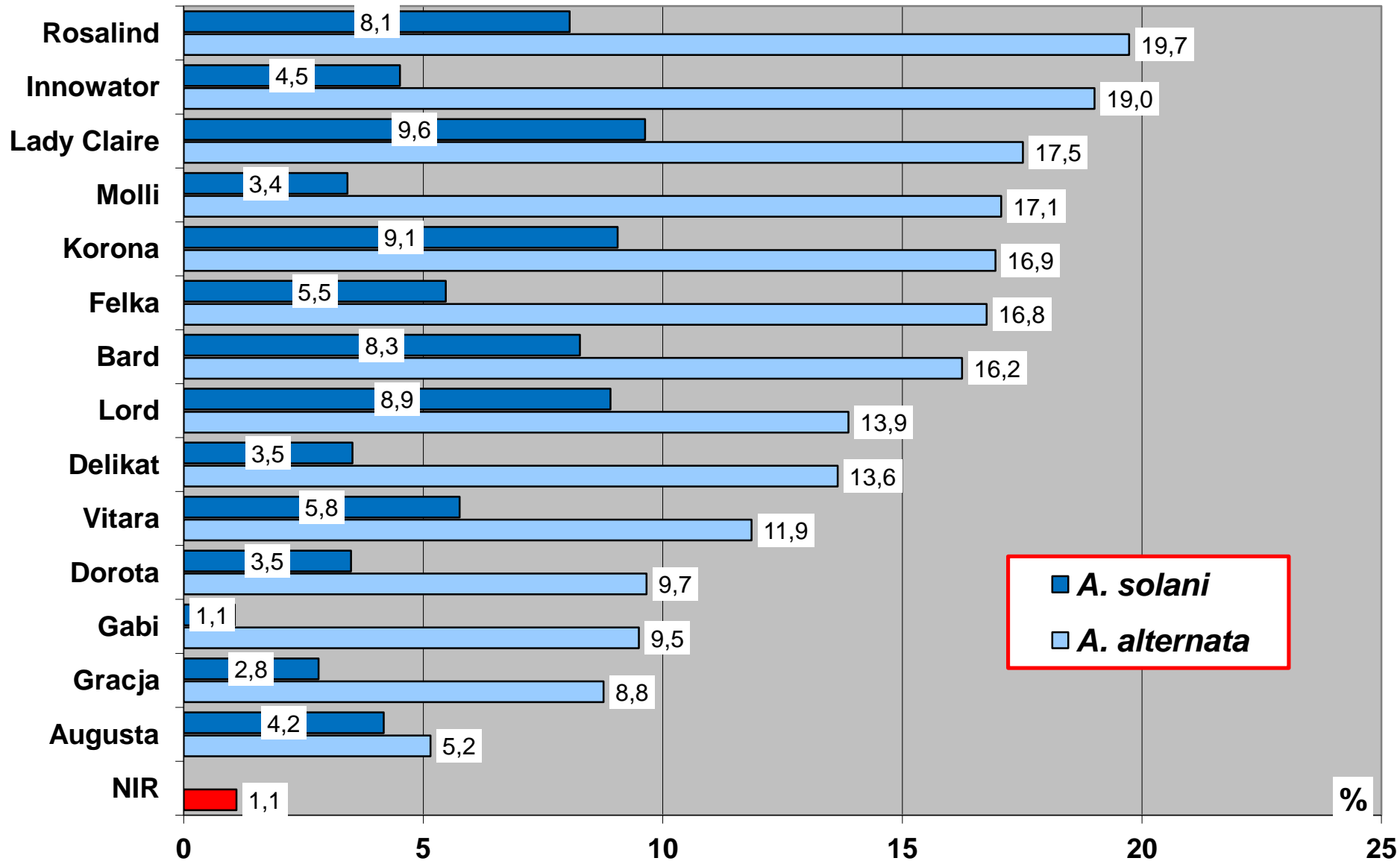
**Incubation conditions:** (7-9 days for leaves and 15-20 days for tubers) at temperature of 18°C, RH 100%, under 16-hour artificial light (2000 luxes).

**The assessment criteria:**

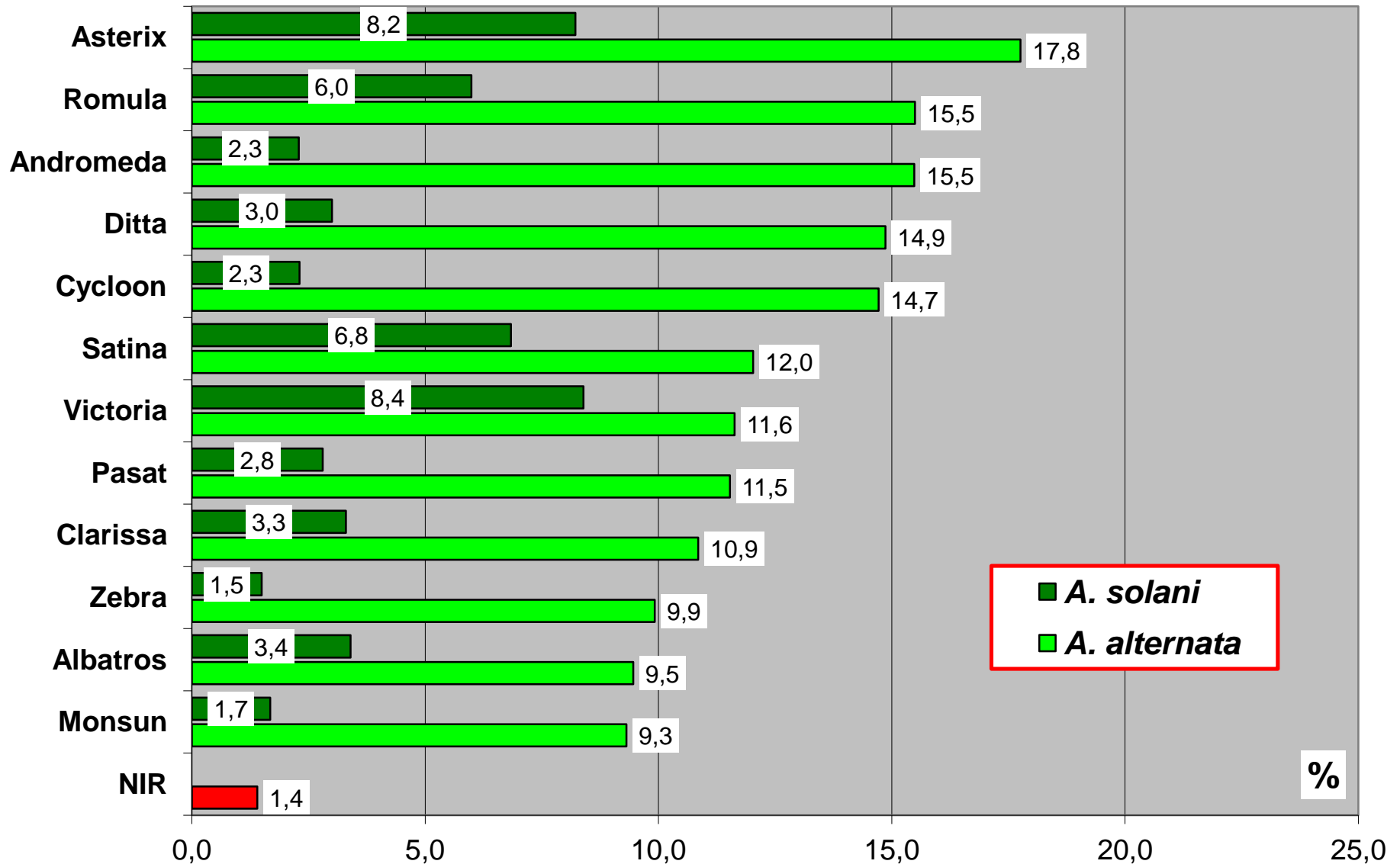
for leaves: percentage of successful infections and size of lesions on leaves  
– percentage of changed leaf surface (yellowing tissue, chlorosis, necrosis),  
for tuber – percentage of upper slice surface covered with mycelium



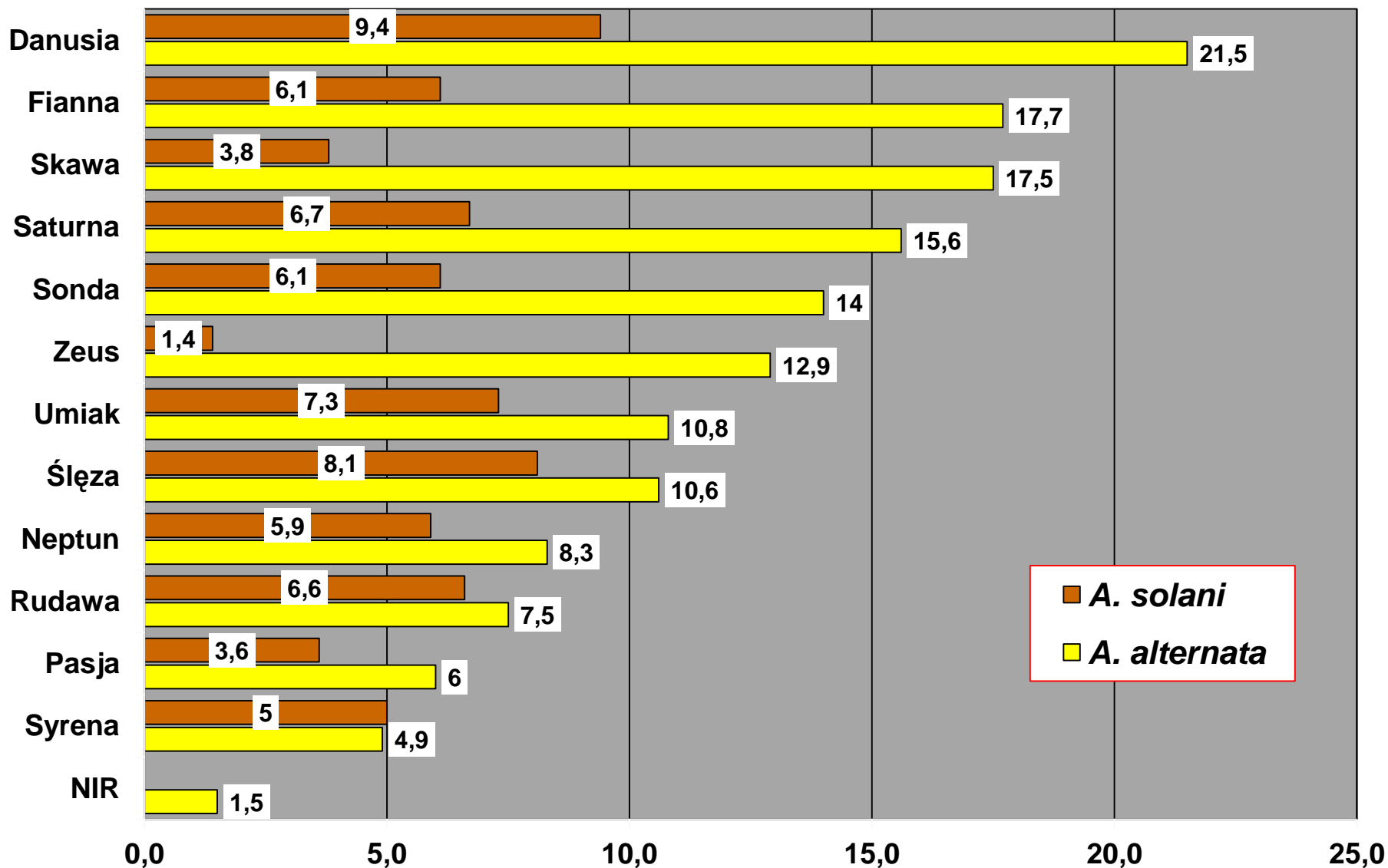
# Differentiation of leaf reaction of *very early* and *early* potato cultivars to *Alternaria* infection



# Differentiation of leaf reaction of **medium early** potato cultivars to *Alternaria* infection



# Differentiation of leaf reaction of **medium late and late** potato cultivars to *Alternaria* infection

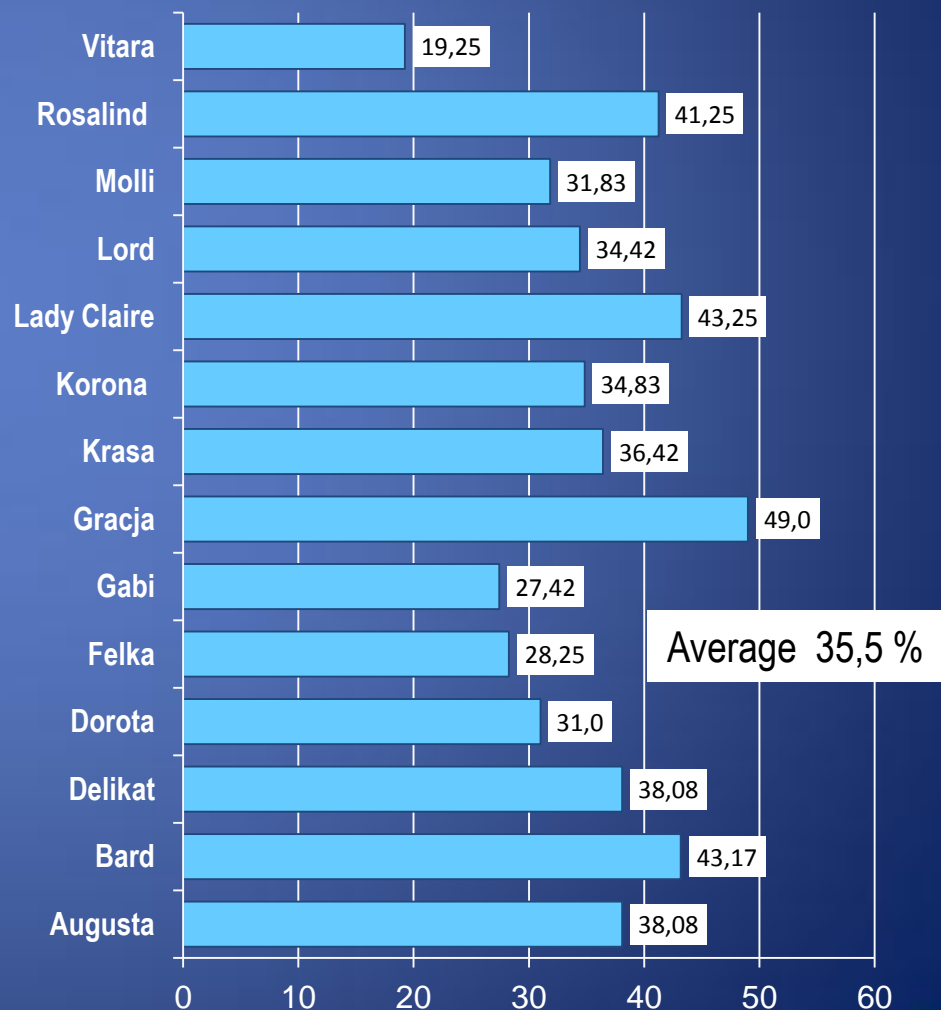
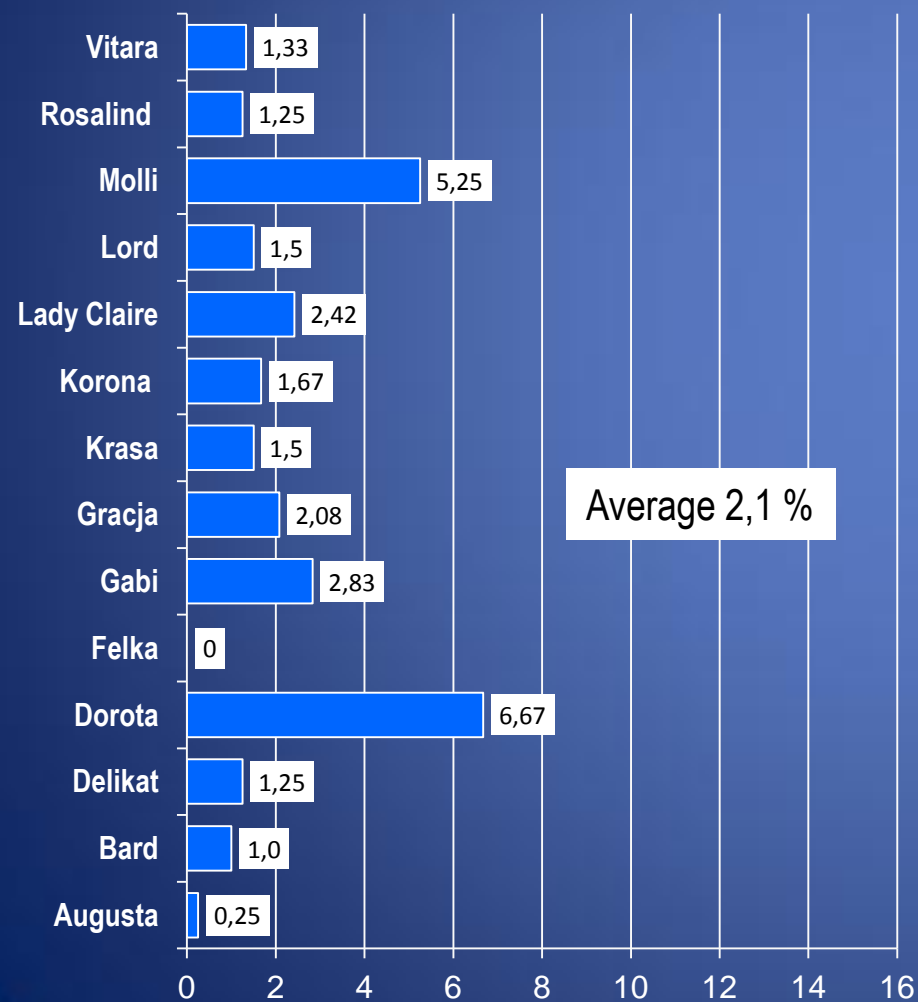




# Differentiation of tuber reaction of potato *very early* and *early* cultivars to *Alternaria* infection

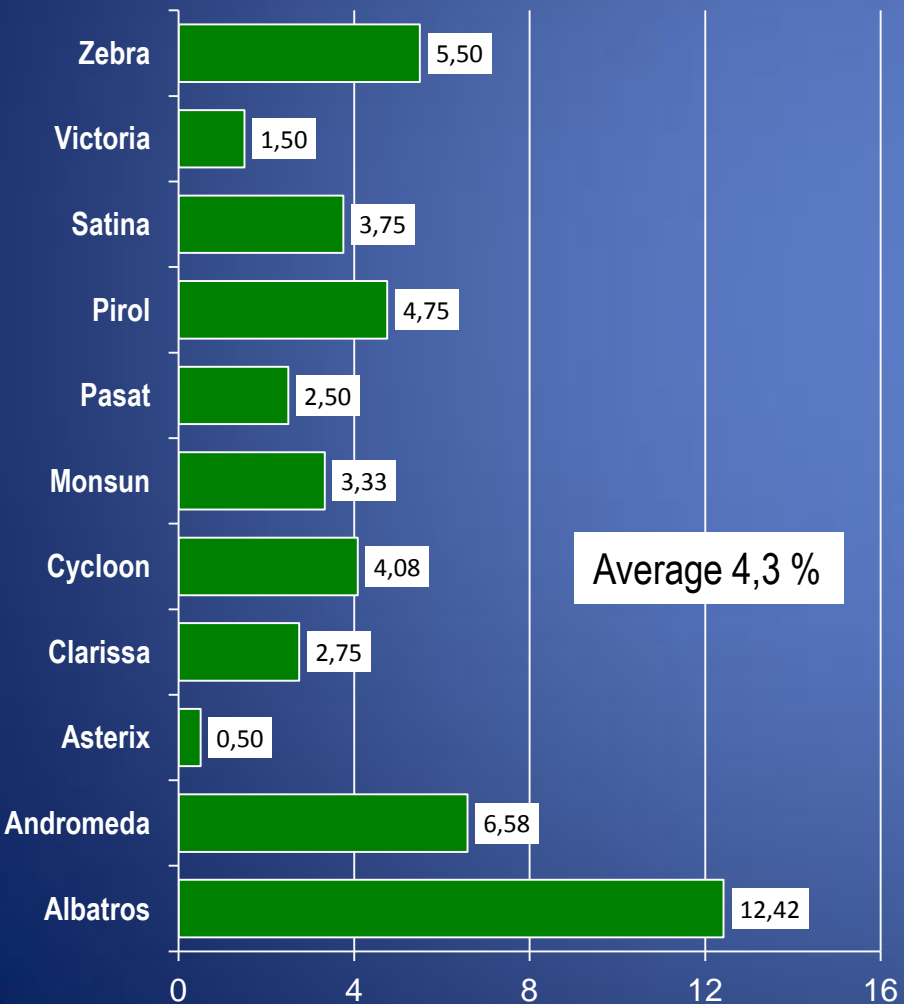
## *Alternaria alternata*

## *Alternaria solani*

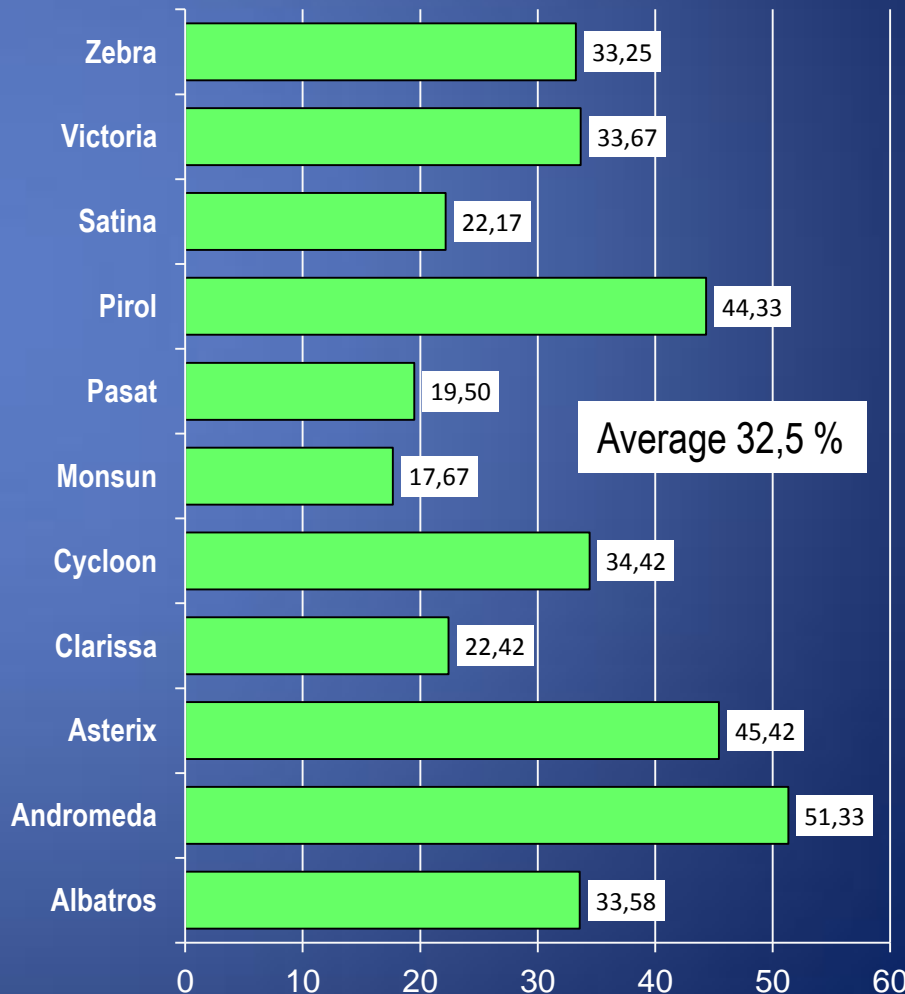


# Differentiation of tuber reaction of potato **medium-early** cultivars to *Alternaria* infection

## *Alternaria alternata*

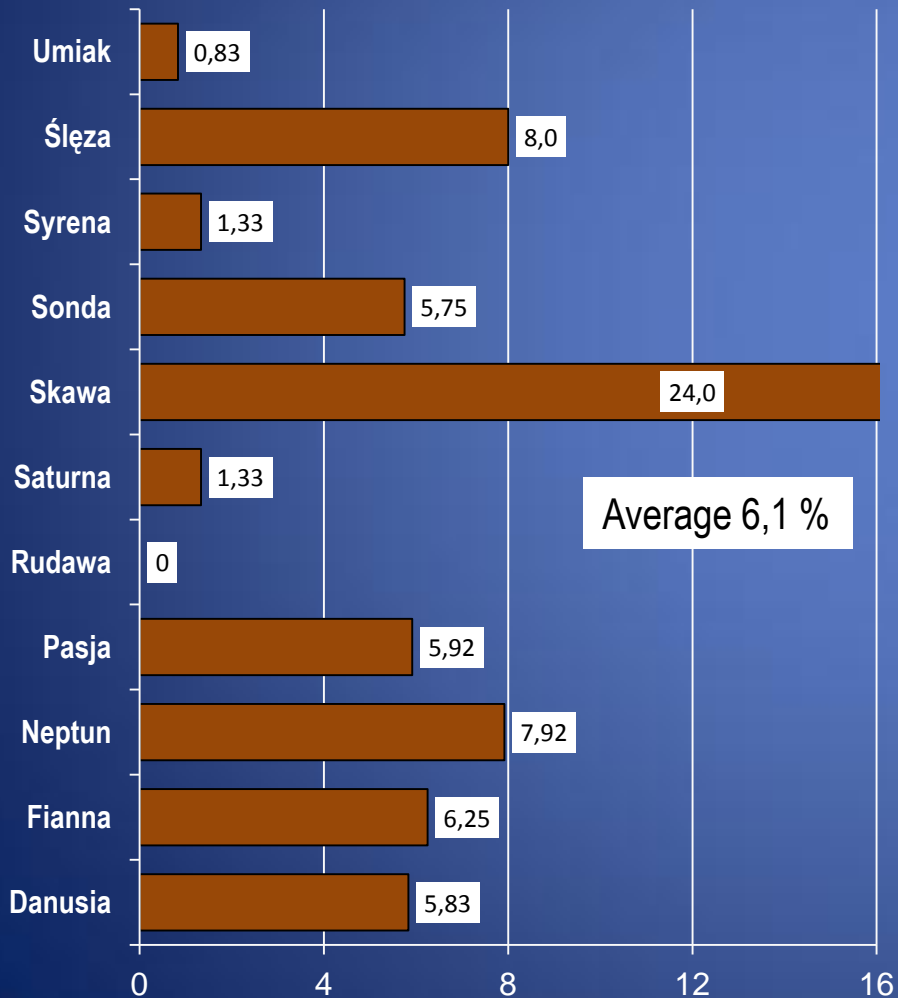


## *Alternaria solani*

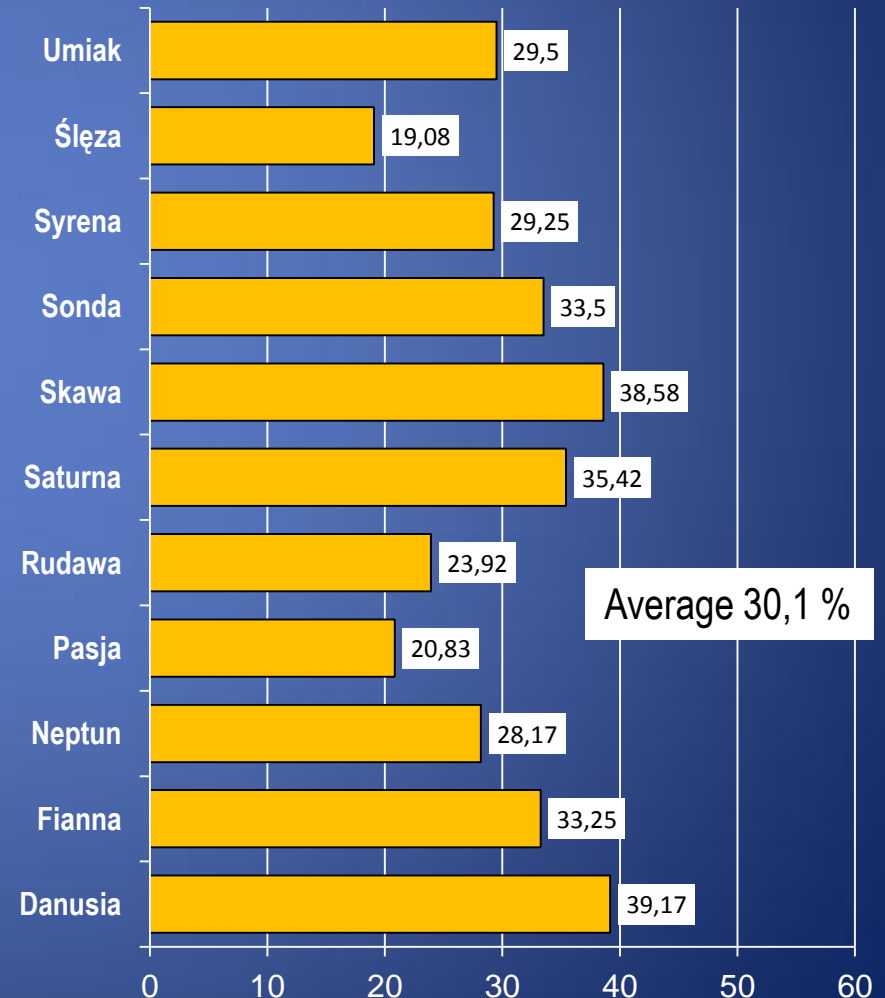


# Differentiation of tuber reaction of potato **medium late** and **late** cultivars to *Alternaria* infection

## *Alternaria alternata*



## *Alternaria solani*



# Average level of infection (%) caused by *Alternaria* spp. under laboratory conditions

a/ on leaves

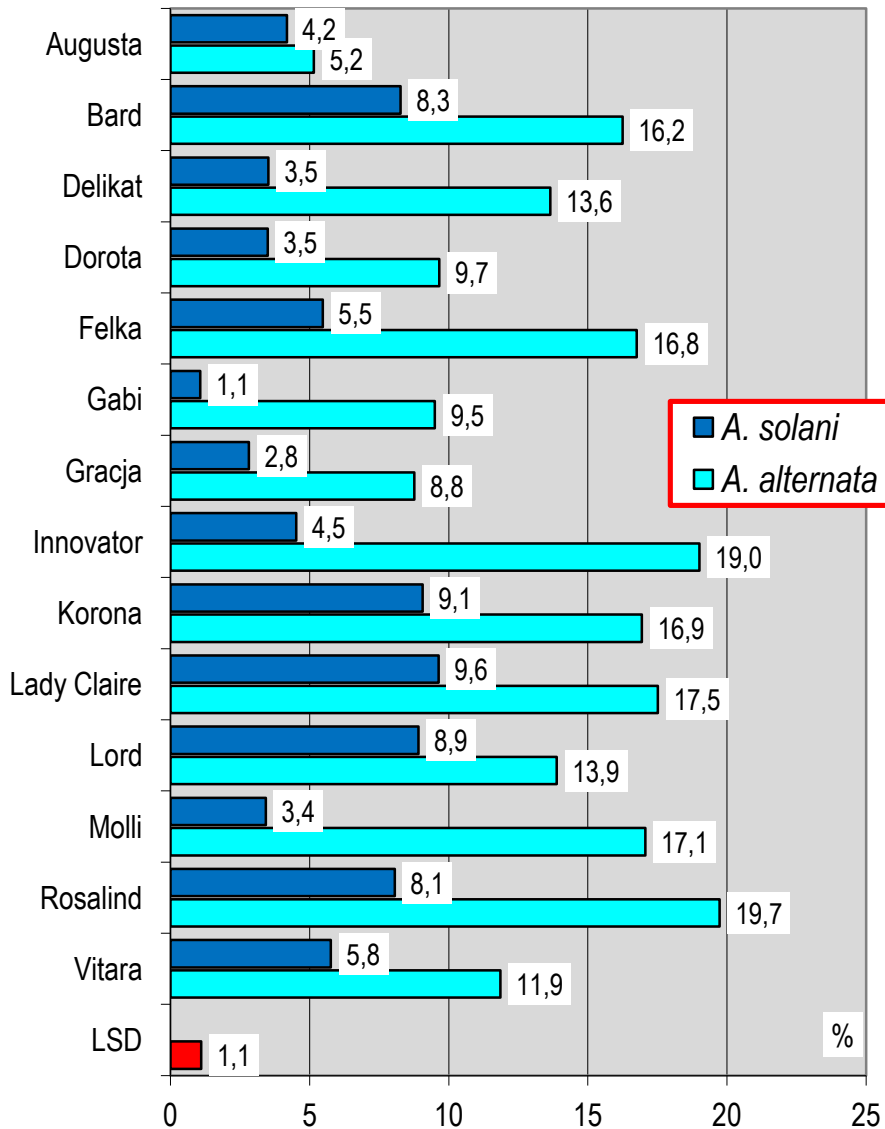
Pathogen	Maturity		
	First early + early (14)	Medium early (11)	Medium late + late (11)
<b><i>A. alternata</i></b>	<b>14,0</b>	<b>12,6</b>	<b>12,2</b>
<b><i>A. solani</i></b>	<b>5,6</b>	<b>4,2</b>	<b>6,2</b>

b/ on tubers

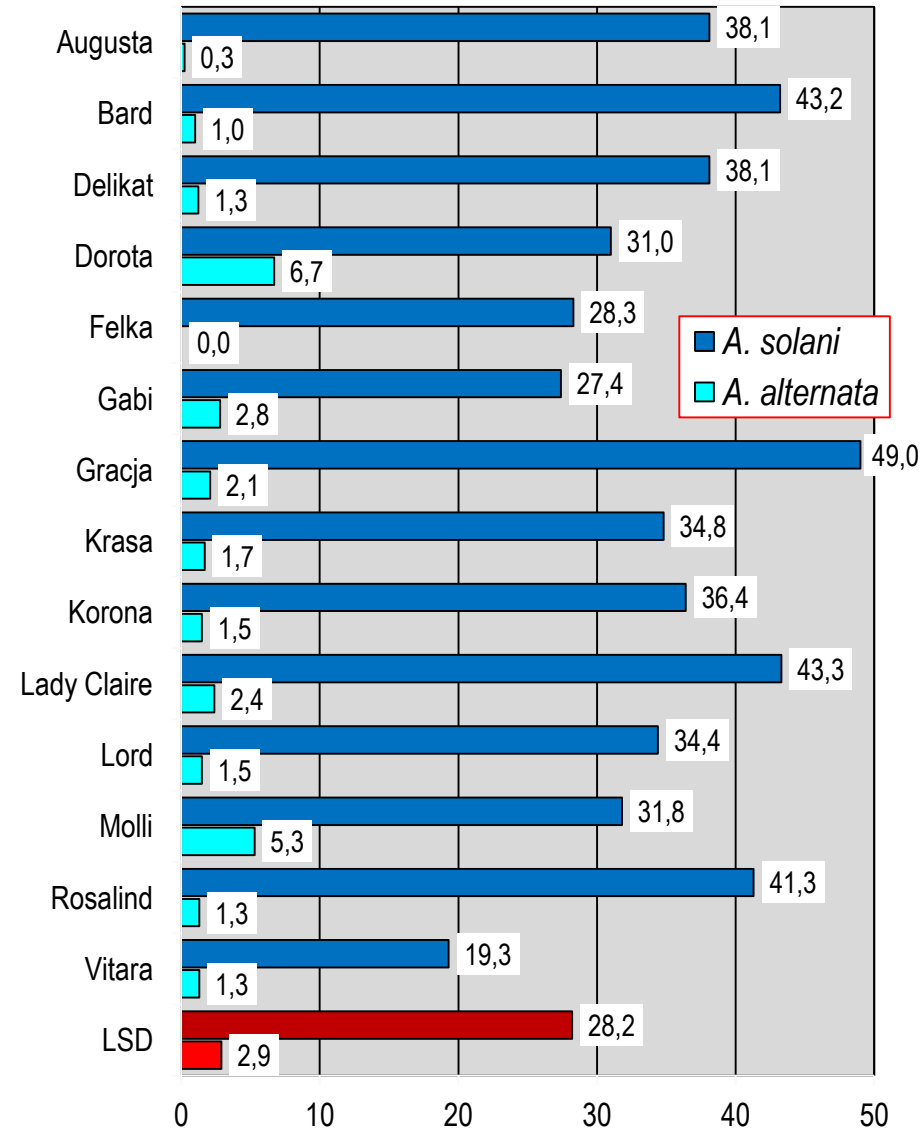
Pathogen	Maturity		
	Very early + early (14)	Medium – early (11)	Medium late + late (11)
<b><i>A. alternata</i></b>	<b>2,1</b>	<b>4,3</b>	<b>6,1</b>
<b><i>A. solani</i></b>	<b>35,5</b>	<b>32,5</b>	<b>30,1</b>

# Comparison of leaf and tuber reactions of very early and early potato cultivars to *Alternaria* infection

## leaf reaction

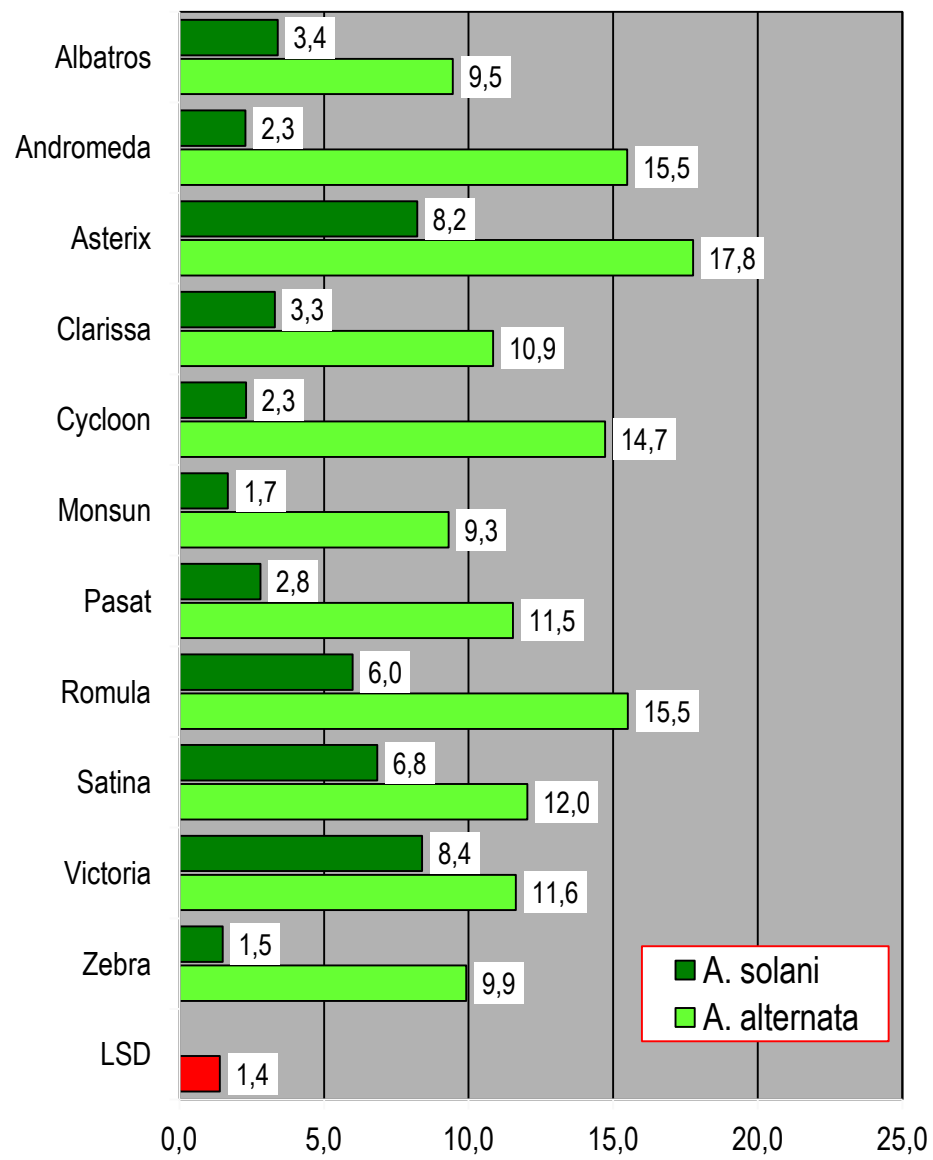


## tuber reaction

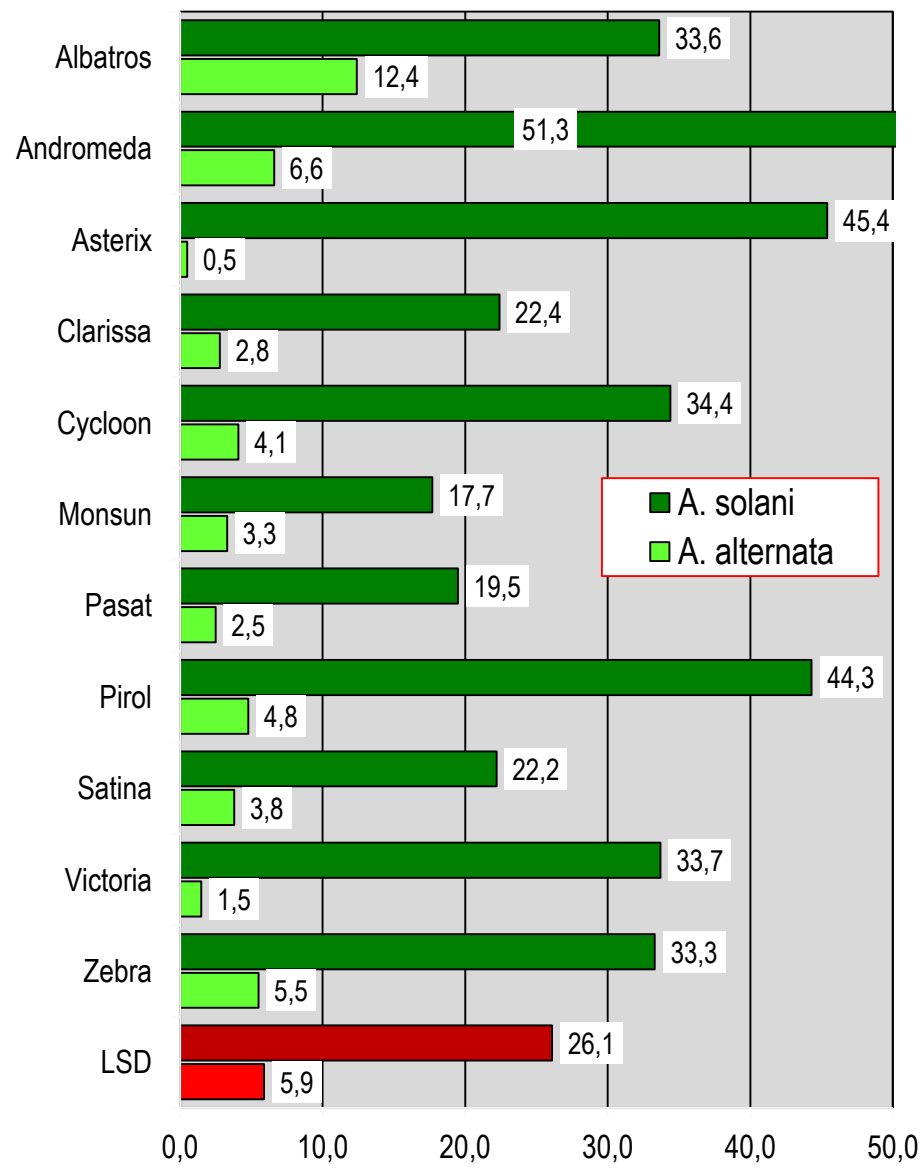


# Comparison of leaf and tuber reactions of medium early potato cultivars to *Alternaria* infection

## leaf reaction

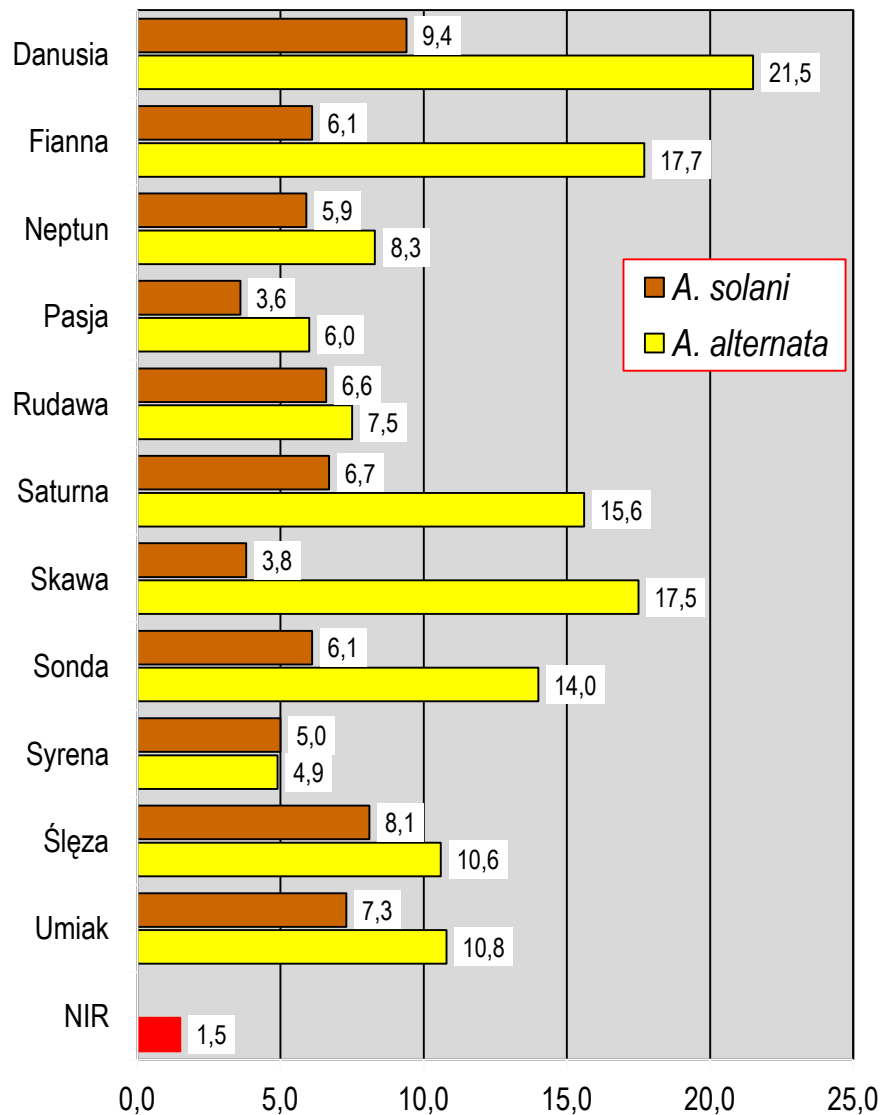


## tuber reaction

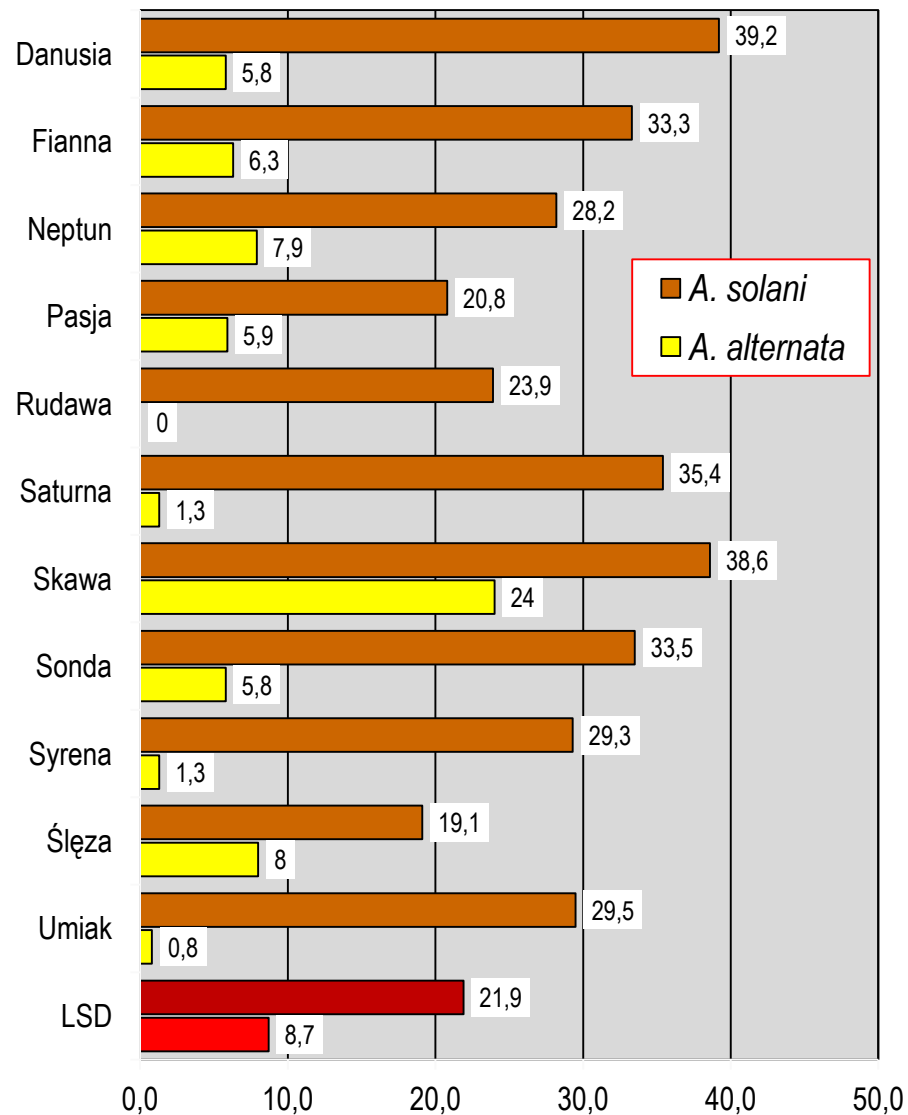


# Comparison of leaf and tuber reactions of medium late and late potato cultivars to *Alternaria* infection

## leaf reaction



## tuber reaction



# Level of susceptibility of potato different cultivars to *A. alternata* and *A. solani* (on the basis of leaf reaction)

Very early + early			Medium early			Medium late + late		
Cultivar	<i>Alternaria</i>		Cultivar	<i>Alternaria</i>		Cultivar	<i>Alternaria</i>	
	<i>alternata</i>	<i>solani</i>		<i>alternata</i>	<i>solani</i>		<i>alternata</i>	<i>solani</i>
Augusta	+++	+++	Albatros	+++	+++	Danusia	+	++
Bard	+	++	Andromeda	+	+++	Fianna	+	++
Delikat	++	+++	Asterix	+	++	Neptun	+++	++
Dorota	+++	+++	Clarissa	+++	+++	Pasja	+++	+++
Felka	+	++	Cycloon	++	+++	Rudawa	+++	++
Gabi	+++	+++	Monsun	+++	+++	Saturna	+	++
Gracja	+++	+++	Pasat	++	+++	Skawa	+	+++
Korona	+	++	Romula	+	++	Sonda	++	++
Innovator	+	+++	Satina	++	++	Syrena	+++	+++
Lady Claire	+	++	Victoria	++	++	Śleza	++	++
Lord	++	++	Zebra	+++	+++	Umiak	++	++
Molli	+	+++						
Rosalind	+	++						
Vitara	++	++						

ratings:	+++	resistant
	++	medium sensitive
	+	sensitive



# CONCLUSIONS

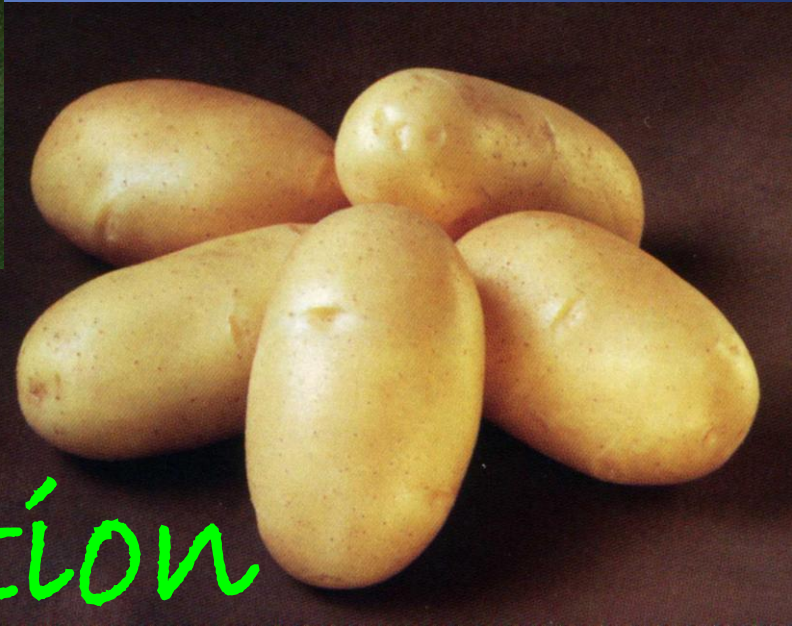


Under favorable conditions for early blight development, the *Alternaria* fungus species (*A. alternata* and *A. solani*) differed in their pathogenicity towards potato leaves and tubers.

*A. alternata* isolates are characterized by the higher aggressiveness especially towards leaves whereas isolates of *A. solani* were more aggressive towards tissue of potato tubers.

On the basis of leaf reaction for *A. alternata* and *A. solani* infection, tested cultivars were divided into 3 groups: resistant, medium sensitive and sensitive. Only a part of them showed clear-cut reaction for both of the *Alternaria* species.

A few of cultivars revealed quite dissimilar reaction for *A. alternata* and *A. solani* species



Thank you  
for your attention