

Incidence of virus fungal diseases on three stone fruits cultivars in Hungary

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Summary: In this two-year study, incidence of *Polystigma rubrum* on plum, and *Apiognomonina erytostoma* on apricot were evaluated on several stone fruit cultivars in Hungary. Results showed that most apricot cultivars expressed symptoms caused by *A. erytostoma*, graded between 2 and 3 (10-50%) by the end of the summer in 2005 and 2006. The most tolerant apricot cultivars were Budapest and Mandulakajszai while the most susceptible ones were 'Magyar kajszai' and 'Piroska'. Assessments made on plum showed that most of the plum cultivars were tolerant or lowly susceptible to *P. rubrum* such as 'Ageni', 'Althann ringló', 'Bluefre', 'Cacanska najbolja', 'Silvia', 'Ruth Gerstetter', 'Tuleu gras' and 'Utility'. The most susceptible plum cultivars to *P. rubrum* were 'Besztercei clones' and 'Debreceni Muskotály'.

Key words: *Polystigma rubrum*, plum, *Apiognomonina erytostoma*, apricot

Introduction

Among stone fruit diseases, those fungal pathogens are of great importance which cause early leaf fall and fruit rot. Due to early leaf fall, nutrient accumulation stops from leaves to buds. Consequently, bud formation in summer is delayed and buds cannot develop fully by autumn as well as their susceptibility to frost injury increases during winter and next spring. Fungal pathogens causing early leaf fall include *Polystigma rubrum* on plum and *Apiognomonina erytostoma* on apricot (Holb & Erdős, 2005; Holb, 2005; Holb et al., 2007). Among fruit rot pathogens *Monilinia* spp. (mainly *M. fructigena* and *M. laxa*) the most important stone fruit disease. Since the pathogens are wound parasites, it appears on the fruits at injuries after hail or strong pest damage. Brown rotting of fruits starts and then grey conidiophores appears on their surface. The fruits often mummify and stay on the tree. The primary inoculum sources of the disease are the dead woody parts and the fruit mummies. The disease can also cause significant damages during storage. Its host plants include the stone fruit species (Holb, 2004, 2006).

Some studies evaluated susceptibility of stone fruit cultivars to fungal diseases which cause early leaf fall. On plum, study of Szabó (1997b) and Soltész (1998) showed that 'Ageni', 'Althann ringló', 'Silvia', 'Ruth Gerstetter', and 'Utility' expressed no or little symptoms caused by *P. rubrum*. In this study, 'Debreceni Muskotály' and 'Korai besztercei' cultivars were highly susceptible to *P. rubrum*. In a Bulgarian study, 'Ahatan', 'Sofia-2', 'Gilej', 'Strinava' and 'Stanley' cultivars were partially resistant, while 'Green

gage' and 'Cacanska najbolja' cultivars were highly susceptible to *P. rubrum* (Borovinova, 2002). On apricot, Békési et al. (2000) demonstrated that cultivars 'Mammia', 'Tomis' and 'Nugget' showed less severe symptoms of *A. erytostoma* in the rainy years of 1999 than all other apricot cultivars. Study of Szabó (1997a) revealed that cultivars 'Magyar kajszai' and 'Piroska' were less susceptible to *A. erytostoma* compared to commonly grown cultivars in Hungary.

Szabó (1997a) classified several apricot cultivars into brown rot susceptibility groups. He evaluated cvs. 'Budapest' and 'Mandulakajszai' as highly, 'Ceglédi óriás', 'Liget óriás' and 'Polonais' as moderately and 'Borsi-féle kései rózsa', 'Piroska', 'Pannónia', 'Ceglédi bíborkajszai', 'Magyar kajszai' and 'Rakovszky' as lowly susceptible to blossom and twig blights caused by *M. laxa*. In the case of plum, fruit rot is the most important damage but flower infection can also occur. Such features as vulnerable fruit peeling, long, wet weather periods during fruit maturity and clustering of fruits, are the main factors responsible for susceptibility to brown rot infection (Soltész, 1997). Szabó (1997b) classified several European plum cultivars into brown rot susceptibility groups. He found that 'Bluefre', 'President' and 'Stanley' are highly, 'Cacanska najbolja' and 'President' are moderately, and 'Besztercei', 'Silvia' and 'Tuleu gras' are lowly susceptible to fruit rot caused by *M. laxa*.

These pathogens are causing severe infections in Hungarian stone fruit orchards if the summer is rainy. The amount of precipitation was higher in summers of 2008 and 2009 which allowed detailed investigation on early leaf fall

pathogens on sour cherry cultivars. Similar study was performed in the summers of 2005 and 2006.

Materials and methods

Orchard site and disease assessments

The study was performed at Kecskemét in the experimental orchards of the Fruit Research Station. At Kecskemét, 13 apricot and 17 plum cultivars were evaluated for infections caused by *A. erytostoma* and *P. rubrum*, respectively. Assessments were made in late summers of 2005 and 2006. All assessments were made on all the available trees or at least four trees per cultivar. In each tree, 200 leaves were evaluated for symptoms. Assessed leaves were classified into six groups according to their infection degree. Categories were defined on the basis of the area of the infected surface. On the 0–5 scale, the bigger numbers mean stronger infection. Leaves in grade 0 were without symptoms. Leaves in grade 1 were healthy on most part of the leaf-surface, the infected area did not exceed 10% of the total surface. Leaves in grade 2 were still healthy on most part of the leaf-surface, the infected area was between 10 and 25% of the total surface. In grade 3, 25–50% of the leaf-surface was covered with leaf spots. Leaves of grade 4 had an infected area between 50–75%. In grade 5, the infected area was over 75%. Similar grade (1–5) was used for evaluating fruit rot on 50 fruit/tree on four trees / cultivar. Data for each disease and cultivar were averaged and then analysed by using one-way analyses of variance using Excel PC programme.

Results and discussion

A. erytostoma

Assessment made in apricot in 2008 showed that most cultivars expressed symptoms caused by *A. erytostoma* grading between 2 and 3 (10–50%) by the end of the summer

Table 1. Susceptibility of apricot cultivars to *Apiognomonina erytostoma* (Kecskemét, 2008–2009)

Cultivars	Disease grade (0–5)	
	2008	2009
Bergeron	3	3
Borsi-féle korai rózsa	2	3
Budapest	1	1
Ceglédi bíbor	2	3
Ceglédi óriás	3	3
Korai piros	3	2
Magyar kajszai	5	4
Mandulakajszai	1	1
Pannónia	4	2
Piroska	3	3
Rakovszky	4	3
Rózsakajszai	3	2

in 2005. The most tolerant cultivars were 'Budapest' and 'Mandulakajszai' while the most susceptible ones were 'Magyar kajszai', 'Pannónia' and 'Rakovszky' (Table 1). In 2009, apricot cultivars showed similar susceptibility to *A. erytostoma* as in 2008. Again, the most tolerant cultivars were 'Budapest' and 'Mandulakajszai' while the most susceptible one was 'Magyar kajszai' (Table 1).

P. rubrum

Assessments made on plum in 2008 and 2009 showed that most of the plum cultivars were tolerant or lowly susceptible to *P. rubrum* such as 'Ageni', 'Althann ringló', 'Bluefre', 'Cacanska najbolja', 'Silvia', 'Tuleu gras' and 'Utility'. The most susceptible cultivars were 'Besztercei clones' and 'Debreceni Muskotály' (Table 2).

Table 2. Susceptibility of plum cultivars to *Polystigma rubrum* (Kecskemét, 2008–2009)

Cultivars	Disease grade (0–5)	
	2008	2009
Ageni	1	0
Althann ringló	0	0
Besztercei szilva	4	5
Bluefre	0	0
Cacanska lepotica	2	3
C. najbolja	0	0
C. rodna	3	4
Centenar	2	2
Debreceni muskotály	4	4
Korai besztercei	5	5
Olaszkék	3	2
President	2	3
Silvia	0	0
Stanley	3	2
Tuleu gras	0	1
Utility	0	0

Table 3 Susceptibility of fruit of apricot cultivars to *Monilinia* spp. (Kecskemét, 2008–2009)

Cultivars	Disease grade (0–5)	
	2008	2009
Bergeron	4	4
Borsi-féle korai rózsa	1	1
Budapest	4	4
Ceglédi bíbor	2	3
Ceglédi óriás	4	4
Korai piros	3	3
Magyar kajszai	3	2
Mandulakajszai	5	5
Pannónia	1	2
Piroska	1	2
Rakovszky	1	2
Rózsakajszai	2	3

***Monilinia* spp.**

Assessment made in apricot showed that most cultivars expressed symptoms caused by *Monilinia* spp. grading between 2 and 4 (10–75%) by the end of the summer in 2008. The most tolerant cultivars were ‘Borsi-féle kései róza’, ‘Piroska’, ‘Pannónia’, ‘Magyar kajszí’ and ‘Rakovszky’ while the most susceptible ones were cvs. ‘Budapest’ and ‘Mandulakajszí’ (Table 3). Assessments on plum showed that only cultivars ‘Besztercei’, ‘Silvia’ and ‘Tuleu gras’ were tolerant to *Monilinia* spp., while the most susceptible cultivars were ‘Bluefre’ and ‘Stanley’ (Table 4).

Table 4 Susceptibility of fruit of plum cultivars to *Monilinia* spp. (Kecskemét, 2008–2009)

Cultivars	Disease grade (0–5)	
	2008	2009
Ageni	3	2
Althann ringló	2	3
Besztercei szilva	2	1
Bluefre	4	5
Cacanska leptotica	3	2
C. najbolja	3	3
C. rodna	3	3
Centenar	3	3
Debreceni muskotály	3	3
Korai besztercei	1	2
Olaszkék	3	3
President	3	3
Silvia	1	1
Stanley	4	4
Tuleu gras	2	2
Utility	1	3

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References

- Békési, P. Gergely, L., Jakab, L-né., Augusztá, Gy-né., Bartus, E., Birtáné Vas, Zs. Hertelendy, P., Orlócziné Debreceni, A. & Viola, J-né. (2000): Országos Mezőgazdasági Intézet Növénykórtani Osztály 1999. évi munkája. I. kötet. OMMI, Budapest, 156 pp.
- Borovinova, M. (2002): Susceptibility of plum cultivars to red leaf spot *Polystigma rubrum* (Persoon) De Candolle. ISHS Acta Horticulturae 577: VII. International Symposium on Plum and Prune Genetics, Breeding and Pomology
- Holb, I. J. (2004): The brown rot fungi of fruit crops (*Monilinia* spp.) III. Important features of their disease control (Review). International Journal of Horticultural Science, 10 (4): 31–48.
- Holb, I. (2005): A szilva jelentősebb kórokozói. pp. 193–195. In: Holb, I. (szerk.) A gyümölcsösök és a szőlő ökológiai növényvédelme. Mezőgazda Kiadó, Budapest
- Holb, I. J. (2006): Possibilities of brown rot management in organic stone fruit production in Hungary. International Journal of Horticultural Science, 12 (3): 87–92.
- Holb, I. & Erdős, F. (2005): A kajszí jelentősebb kórokozói. pp. 172–175. In: Holb, I. (szerk.) A gyümölcsösök és a szőlő ökológiai növényvédelme. Mezőgazda Kiadó, Budapest
- Holb, I.J., Drén, G., Thurzó, S., Erdős, Z., Soltész, M. & Szabó, Z. (2007): Incidence of virus and fungal diseases on apricot, cherry and plum cultivars in Hungary. Int J. Hort. Sci., 13 (1): 29–32.
- Soltész, M. (1997): Kórokozókkal és kártevőkkel szembeni ellenállóság. 71–84. In: Soltész M. (ed.) Integrált gyümölcsstermesztés. Mezőgazda Kiadó, Budapest
- Szabó, Z. (1997a): Kajszí. 587–599. In: Soltész, M. (ed.): Integrált gyümölcsstermesztés. Mezőgazda Kiadó, Budapest
- Szabó, Z. (1997b): Szilva. 600–619. In: Soltész, M. (ed.): Integrált gyümölcsstermesztés. Mezőgazda Kiadó, Budapest
- Soltész, M. (1998): A fajták megválasztása. p. 119–154. In: Soltész M. (eds.): Gyümölcsfajtaismeret és -használat. Mezőgazda, Budapest.