

## Testing of different Sour cherry cultivars under organic cultivation

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### Abstract

In an orchard of the LVWO Weinsberg 24 different sour cherry varieties on rootstock Piku 3 were planted in December 2004 and were tested under organic cultivation methods. Data about the phenology (bud breaking, duration and intensity of blossom), yield and loss of fruits were collected. Susceptibilities for infections by *Monilia* sp. and *Blumeriella jaapii* and differences in the occurrence of aphids were assessed. 2007 and 2008 the most important fungus was *Blumeriella jaapii*, 2009 some days with high amounts of rain during blossom caused heavy damages by *Monilia* sp., depending from the variety. The varieties 'Achat', 'Safir', 'Ciganymeggy 7', 'Oblacinska', 'Jade', 'Rubellit' and 'Hartei' had good yields in spite of the difficult weather conditions in 2009. This research work is part of the project "Evaluation and Optimizing of biological control methods of plum moth (*Cydia funebrana*) and *Monilia*-disease in organic stone fruit production", granted by the Bundesprogramm Ökologischer Landbau (FuE 06OE198).

**Keywords:** Sour cherry, cultivars, *Monilia* sp., *Blumeriella jaapii*

### Introduction

Infections by *Monilia* sp. during blossom cause great losses in yield in organic sour cherry orchards, where often still the cultivar 'Schattenmorelle' is grown. Experiments about blossom sprayings to prevent infections by *Monilia* sp. without use of copper showed often non-uniform results. Therefore it is necessary to proof newer cultivars under the conditions of organic fruit growing. Important characteristics are type of growing, susceptibilities for *Monilia* sp. and *Blumeriella jaapii*, flowering behaviour, yield and taste.

### Material and Methods

In an orchard of the LVWO Weinsberg 24 different sour cherry cultivars (see table 1) grafted on rootstock Piku 3 were planted in December 2004 (distance 5 m x 5 m, 3 trees per cultivar) and were tested under organic cultivation methods. The fertilization was done with horn shavings in combination with foliar fertilizer Wuxal Aminoplant and a slight covering of the soil round the trunk with compost. In spring the trees were treated with NeemAzal<sup>®</sup>T/S and a preparation based on *Bacillus thuringiensis*.

Beginning in 2007 only few applications were done with wetting sulphur to prevent extreme infections by leaf spots, but not during the long time of harvest of the different cultivars. Data about the phenology (bud breaking, duration and intensity of blossom), yield and loss of fruits were collected. Susceptibilities for infections by *Monilia laxa* and *Blumeriella jaapii* and differences in the occurrence of aphids at end of June were assessed. Characteristics of growing habit were recorded during winter.

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Table 1: Ripening groups of the tested cultivars (data from Weinsberg)

early	middle	late
last third of June	beginning of July	middle of July
'Ludwigs Frühe' 'Röhrigs Weichsel' 'Ciganymeggy 7' 'Erdi Nagygümölesü' 'Korai Pipacsmeggy' 'Favorit' 'Achat' 'Ciganymeggy 59'	'Debreceni Bötermö' 'Oblacinska' 'Ujfehertoi Fürtös' 'Kantorjanosi' 'Jade' 'Schukowskaja' 'Morina' 'Topas' 'Safir' (*) 'Malike emleke' 'Csengödi'	'Hartei' 'Rubellit' 'Vowi' 'Schattenmorelle'  'Pitic de Jasi' (end of July)

\* planted in April 2006 on rootstock Colt

In spring 2007 'Karneol', 'Morina', 'Vowi', 'Pi-Sa 12,100' and 'Pi-Sa 13,122' were additionally grafted on *Prunus avium*. For these cultivars only the first impressions can be described.

For the occurrence of *Monilia laxa* the following scheme was used: All infected twigs and single infected blossom clusters were counted at end of June and were removed from the trees. The symptoms of *Blumeriella jaapii* were divided in classes from 0 (= no symptoms at all) to 9 (= leaves fell down, tree nearly bare) every year at end of August. As a summary from the years 2007-2009 the cultivars were graded into the groups low / middle / high / extreme high susceptibility for *Blumeriella jaapii*. Similar three groups for susceptibility for *Monilia sp.* were formed (low / middle / high susceptible) mainly based on the results from 2009.

Every year the marketable yield and loss per tree was evaluated. Characteristics of the cultivars like form and colour of the fruits, taste, length of fruit stem and juicing (when stem is removed) were described.

## Results

2007:

After warm winter months most cultivars sprouted about March 7<sup>th</sup>/8<sup>th</sup> 2007, in April the weather conditions were dry and warm, so the stage 'full blossom' was reached on April 15<sup>th</sup>/16<sup>th</sup> except for late flowering cultivars like 'Rubellit', 'Schattenmorelle' or 'Vowi'. Flowering went on very fast, so after blooming period lots of not pollinated flowers and small green fruits fell down. Nearly no symptoms of *Monilia laxa* on twigs were seen in 2007, yield was very low. On the cultivars 'Morina', 'Hartei' and 'Safir' some infections by black cherry aphids were watched at end of May (level 2.7 to 4.0 on a scale from 1-9), but beneficial arthropods like syrphids and ladybirds appeared soon.

2008:

In spring 2008 growing season started very early (about February 25<sup>th</sup> to 27<sup>th</sup>), but went on slowly because of some cold nights. During Easter temperature fell down to -5.6°C, cultivars like 'Röhrigs Weichsel', 'Achat', 'Debreceni Bötermö', 'Ujfehertoi Fürtös', 'Favorit', 'Schukowskaja', 'Topas', 'Safir', 'Csengödi' and 'Schattenmorelle' had still reached BBCH stage 09-10. On April 8<sup>th</sup> the next frost (-2.9 °C) caused probably damages on most

cultivars, which were in stage BBCH 55-56 (green scales slightly open, single flower buds visible, but sepals still closed). Only late flowering cultivars like 'Kantorjanosi', 'Jade', 'Rubellit', 'Vowi', and 'Pitic de Jasi' had worth mentioning yields in 2008 (see also figure 2).

In 2008 infections by *Monilia laxa* were seen only on a low level: Mainly single blossom clusters were damaged ('Korai Pipacsmeggy', 'Topas', Malike emleke', 'Debreceni Bötermö'), 5-10 infected blossom clusters/tree were found at 'Röhrigs Weichsel', 'Rubellit', 'Kantorjanosi', about 10-30 infected blossom clusters were seen at 'Jade' and 'Pitic de Jasi'. Completely infected twigs were seldom. *Blumeriella jaapii* caused not as heavy symptoms as in 2007, but grading between the cultivars was similar.

2009:

In spring 2009 growing season started about March 6<sup>th</sup> during a cold and rainy period, in the last third of March some nights were frosty with minimum temperatures of -4.4°C. In April temperatures increased and weather was warm and dry before April 16<sup>th</sup> (see figure 1). Main blossom of most of the cultivars coincided with the following rainy days, so in 2009 extreme infections by *Monilia laxa* of blossom clusters and twigs could be seen.

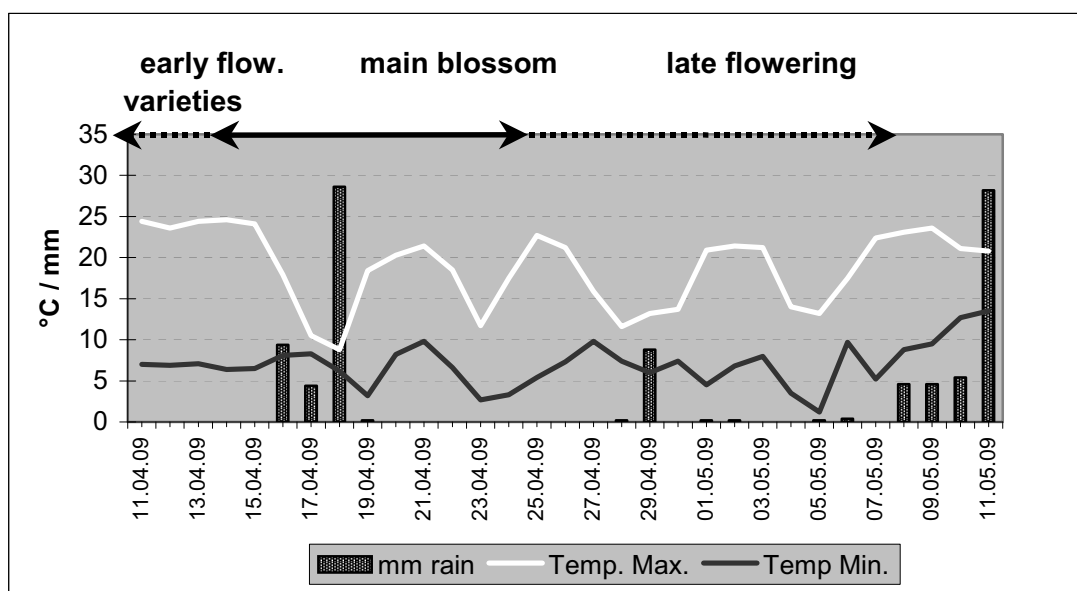


Figure 1: Weather during blossom of sour cherries 2009 at Heuchlingen (Experimental orchard of LVWO Weinsberg, Data from LTZ Augustenberg, 2009).

The infections by *Monilia* influenced the yield in 2009 heavily. During summer it was often rainy, so similar to apple scab in this year the level of infections was very high and some cultivars lost their leaves still at end of July. This is a great difference to testing of sour cherries in comparison to conventional cultivation, there the trees have healthier leaves because of the use of stronger fungicides and leaf fall is later. In figure 2 marketable yield (2008+2009) is described for a selection of cultivars, which showed acceptable yields in spite of bad weather conditions, in comparison to 'Schattenmorelle'. Table 2 summarizes susceptibilities for *Blumeriella jaapii* and *Monilia* species in 2009. Detailed results are described in the annual reports of the research project (2007, 2008).

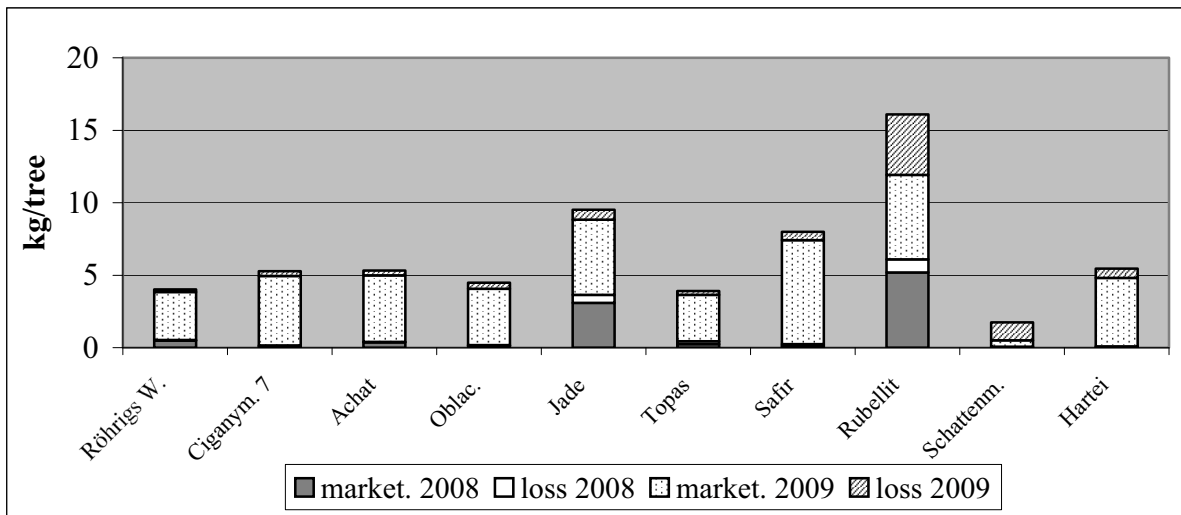


Figure 2: Marketable yield and loss/tree 2008+2009 of some sour cherry cultivars inspite of bad weather conditions during blossom 2009.

Table 2: Susceptibilities for *Monilia laxa* and *Blumeriella jaapii* in 2009

Susceptibility	<i>Monilia sp.</i> weak	<i>Monilia sp.</i> middle	<i>Monilia sp.</i> high
<i>Bl. jaapii</i> weak	'Debreceni Bötermö' 'Csengödi', 'Favorit' 'Hartei', 'Morina', 'Rubellit'		'Erdi Nagygümölesü'
<i>Bl. jaapii</i> middle	'Ludwigs Frühe' 'Röhrigs Weichsel' 'Korai Pipacsmeggy' 'Jade'	'Kantorjanosi'	'Schattenmorelle' 'Ciganymeggy 7' 'Ciganymeggy 59' 'Oblacinska', 'Schukowskaja'
<i>Bl. jaapii</i> high	'Safir'	'Pitic de Jasi'	'Ujfehertoi Fürtös', 'Topas', 'Malike emleke'
<i>Bl. jaapii</i> very high	'Achat'		'Vowi'

## Discussion

Bad weather conditions before and during blossom like frost or a condensed flowering period - but that is not specific for organic production - caused losses. Here the high grade of self-fertility of some cultivars, as it was described in examinations of Schuster (2006), is advantageous for sufficient yields. *Monilia* is another important factor for reduced yields, also for long-term damages on the wood, if twigs near the stem were infected. *Blumeriella jaapii* causes early leaf fall at susceptible cultivars, some results didn't correspond exactly with data published by Schuster (2004). Organic fruit growers should know the level of susceptibility of cultivars to integrate hygienic measurements and to react with applications of wetting sulphur against leaf spot disease. Well-considered selection of sour cherry cultivars will be essential in a future with reduced possibilities to use copper in organic orchards.

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