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# Suitability of Some Fig (*Ficus carica*) Cultivars for Organic Production in Austria

**Reinhard Jank* and Andreas Spornberger**

*University of Natural Resources and Life Sciences Vienna, Institute of Viticulture and Pomology, Austria*

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***Corresponding author:** Reinhard Jank, University of Natural Resources and Life Sciences vienna, Institute of Viticulture and Pomology, Austria

**Abstract**

In 2021, in a ten-year-old organically managed fig orchard in Vienna (Austria), six fig cultivars commonly recommended for temperate climates were compared for their suitability to commercial production. The results show that 'Bornholmfigen' produced the most fruits in the first crop, 'Pastilière' and 'Ronde de Bordeaux' in the second crop, 'Longue d'Août' performed best in the second crop regarding weight in the calculated total yield, but with insufficient quality. 'Ronde de Bordeaux', 'Dalmatie', and 'Pastilière' produced sweet, tasty fruits until the end of October.

**Keywords:** Ronde de Bordeaux, Bornholmfigen, Madeleine des deux Saisons, Longue d'Août, Dalmatie, Pastilière

## Introduction

Figs are one of the oldest cultivated crops, they were spread by the Phoenicians, the Greeks, and the Romans over the Mediterranean region, some were even planted in England [1]. In some milder regions of Austria, Germany, and Switzerland, figs have been cultivated for centuries. Since then, people have been looking for cultivars which are suitable for cooler climates [2]. Growing figs was popular among Central and Northern Europe's elite in the early modern period. However, they were usually protected from severe winter frosts by straw or soil [3]. The last years, due to climatic change, the outdoor cultivation of Mediterranean fruits has become an emerging topic also in some milder regions of Central Europe. Especially for organic growers, there is a strong interest to offer regional products to consumers. So far there are not so many experiences in the practical production of figs (*Ficus carica*). In this study, we were concentrating on the question which fig cultivars could be successfully grown outdoors in Austria.

## Material and Methods

In 2010, one year old rooted cuttings of the fig cultivars 'Ronde de Bordeaux', 'Bornholmfigen', 'Madeleine des deux Saisons', 'Longue d'Août', 'Dalmatie', and 'Pastilière' have been planted outdoors on a 3000 $m^2$ site in Vienna, with a planting distance of 2.5 x 5 m. The first considerable harvest was produced in 2014. Older branches from the center and flat branches were pruned yearly in spring. The yearly fertilization consisted of a 2 cm thick layer of composted vegetable plant residues; in 2021, additionally 100 g / $m^2$ of an organic fertilizer with medium N-, P- and K-content were applied (StyriaFert NPK, 8/6/7). In some years, Bacillus thuringiensis has been used against the fig-tree *skeletonizer* (*Choreutis nemorana*). The first four years, the plants were protected with fleece and straw bales during winter. In 2021, between July 24$^{th}$ and October 7$^{th}$, once a week the fruits of five observed trees per cultivar which were ripe at that time were counted and the weight was measured. The total yield was calculated based on the mean number of ripe fruits, the estimated mean fruit weight, and the assumption that there were 2.5 harvests per week on average. The growth length of five annual shoots per plant was measured on October 24$^{th}$. The leaves were assessed every three weeks for the overall impression of health and symptoms of fig mosaic virus (FMV).

## Results and Discussion

Pests and diseases were not a main concern. The fig leaf roller or fig-tree *skeletonizer* (*Choreutis nemorana*) was observed mostly on 'Dalmatie' and 'Pastilière'. Occasionally, fruit flies (*Drosophila spp.*), wasps (*Vespula spp.*), hornets (*Vespa crabro*), bees (*Apis mellifera*), and birds were feeding on ripe fruits. Some cultivars e.g., 'Longue d'Août' showed a sour taste after some raining periods. Due to the unusual cold weather in spring (the average temperatures in April and May were 1.6°C and 1.9°C below the long-term average (1981-2010) of the respective months [4], bud burst, and

harvest time were delayed for about two weeks compared to previous years. This was especially detrimental for cultivars with a relatively late second crop like 'Dalmatie', 'Madeleine des deux Saisons', and 'Longue d'Août', from which a lot of fruits could not ripen anymore. The low number of fruits of the first crop of the cultivars 'Dalmatie' and 'Madeleine des deux Saisons' might have been also due to frost damages. The yield, the number of fruits, and the duration of the harvest of the first crop are usually lower than of the second crop, but the fruit size is usually larger [5]. On July 24th, first fruits were harvested from the cultivars 'Dalmatie' and 'Longue d'Août'. On August 26th, the harvest started for the cultivar 'Ronde de Bordeaux', which usually produces almost exclusively second crop fruits [5]. On September 17th, the leaves showed first signs of autumn coloring with differences among cultivars. 'Madeleine des deux Saisons' was the first cultivar with a beginning leaf coloring, 'Longue d'Août' and 'Bornholmfigen' followed, then 'Dalmatie' and 'Pastilière', and at last 'Ronde de Bordeaux'. This was also the order of the harvest end. 'Madeleine des deux Saisons', 'Bornholmfigen', and 'Longue d'Août' provided ripe fruits until mid of October, while 'Dalmatie', 'Pastilière', and 'Ronde de Bordeaux' were producing until beginning of November.

**Table 1**: Results (mean values) of the assessments of 2021 of overall leaf health, FMV symptoms, yield (ripe fruits, fruit weight, calculated total yield), growth, and harvest period.

| Cultivar | Overall leaf health (7+8 / 9 / 10)[1)2)] rating | FMV (7+8 / 9 / 10)[1)2)] rating | Ripe fruits/plant in total (weekly)[3)] | Fruit weight range (g/fruit)[4)] | Growth (cm/shoot) | Harvest period[5)] | Calculated total yield (kg/plant)[3)] |
|---|---|---|---|---|---|---|---|
| Ronde de Bordeaux | 2/3/2005 | 2.2 / 3 / 3 | 267.6 (38.2) | 15-40 | 99.4 | E8-B11 | 20.1 |
| Bornholmfigen | 1.7 / 5 / 7 | 2/3/2003 | 54.2+123.6=177.8 (10.8+24.7=35.5) | 60-120 15-35 | 66.4 | E7-M10 | 12.2+9.3=21.5 |
| Madeleine des deux Saisons | 2.1 / 5 / 8 | 2/3/2003 | 8.2+26.6=34.8 (2.7+5.3=8) | 90-120 25-50 | 121.2 | E7-M10 | 2.1+2.7=4.8 |
| Longue d'Août | 1.9 / 4 / 7 | 2.3 / 3 / 3 | 8.2+162.6=170.8 (2.7+27.1=129.8) | 90-180 30-90 | 128.6 | E7-M10 | 2.7+20.3=23 |
| Dalmatie | 2.1 / 5 / 7 | 2.3 / 3 / 3 | 5.6+60.2=65.8 (1.9+20.1=22) | 80-170 30-90 | 41 | M7-M10 | 12+10,5=12.5 |
| Pastilière | 2.7 / 4 / 5 | 2.1 / 3 / 3 | 178.8 (29.8) | 20-50 | 63.8 | B9-M10 | 15.6 |

1) Scores for overall leaf health and for FMV show means for the observations in July and August (7+8), September (9) and October (10).
2) Scale from 0 (free from leaf discoloration, no FMV symptoms) to 9 (dead leaf, severe FMV symptoms)
3) Number of ripe fruits calculated total yield: first crop + second crop =total
The average number of ripe fruits per weekly observation is shown in brackets.
4) Fruit weight: the first crop in the first row, the second crop in the second row
5) Harvest period: B for beginning, M for middle, and E for end of the month (7=July, …)

They also showed different reactions to the colder, windier autumn weather. While some cultivars ('Ronde de Bordeaux') still produced fruits with a soft, fragile, and thin skin, the skin of other cultivars ('Dalmatie') was becoming thicker and tougher each day. 'Pastilière' was in between these extremes. Cultivars reacted differently to sinking temperatures at the end of the harvesting season in autumn regarding fruit size. While the fruits of 'Ronde de Bordeaux' shrank to miniscule sizes like cherries, 'Dalmatie' still produced large fruits. As the temperatures kept sinking, the sweetness was also decreasing in some cultivars. Only 'Ronde de Bordeaux', 'Dalmatie', and 'Pastilière' were tasting still good and sweet until the end of October. Although 'Dalmatie' started losing


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the leaves relatively early, it was able to produce very sweet fruits in this period. The mean annual shoot length differed between cultivars from 41 cm ('Dalmatie') to 128.6 cm ('Longue d'Août'). While cultivars with low to medium growth rates are appropriate for the cultivation with the chosen distance, those with higher growth rates like 'Longue d'Août' need more space to avoid shadow and to simplify the harvest work.

## Conclusion

The conclusions are based on the observations in the year 2001 with unusually low temperatures in spring.

'Ronde de Bordeaux' is very hardy, has medium to strong vigor and is very productive; it produces mainly autumn figs with purple skin and a very good taste. 'Bornholmfigen' is also hardy and productive but has a medium vigor and produces summer and autumn figs with green skin with a purple / brown cheek and a good taste. 'Madeleine des deux Saisons' very hardy and has a strong vigor and produces summer and autumn figs with green skin with a purple / brown cheek and a good taste. 'Longue d'Août' is very hardy and has a very strong vigor and produces summer and autumn figs with green skin with a purple / brown cheek and a good taste. 'Dalmatie' is hardy and has a restricted growth and produces summer and autumn figs with green skin and a very good taste. 'Pastilière' is hardy and has a medium vigor and produces only autumn figs with purple skin and a very good taste. 'Bornholmfigen' showed the best performance in the first crop with many relatively large fruits of good flavor. 'Pastilière' and 'Ronde de Bordeaux' performed best in the second crop, with a very high number of smaller fruits of exquisite taste. 'Longue d'Août' was showing the highest yield in the second crop, but the quality of the fruits was insufficient, they turned sour due to wet weather conditions. The Bavarian State Institute for Viticulture and Horticulture (LWG) in Veitshöchheim tested several fig varieties. Plants from 6 cultivars were planted: 'Longue d'Août', 'Ronde de Bordeaux', 'Pastilière', 'Dalmatie', 'Doree', and 'Brown Turkey Type Sweet George'. The first four were also part of our observation, and 'Brown Turkey Type Sweet George' is similar to 'Bornholmfigen'. Due to less favorable climatic conditions for figs in Bavaria, the first crop starts at the beginning of August and the second crop at the beginning of October. They didn't have any problems with pests except ants which were entering the fruit through the ostiole.

**They recorded the harvest of the different cultivars:**

- 'Longue d'Août': 9.3 kg / plant; 71.1 g / fruit
- 'Ronde de Bordeaux': 6.5 kg / plant; 22.9 g / fruit
- 'Pastilière': 2.0 kg / plant; 39 g / fruit
- 'Dalmatie': 1.5 kg / plant; 47.3 g / fruit [6]

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