Weigi®, a new German generation of rootstocks for cherrytrees

P. Stoppel e H. Siegler
Kressbronn
Bavarian State Institute for Viticulture and Horticulture, Veitshöchheim, Germany

General informations
Weigi®-rootstocks (licensee: Peter Stoppel) result from crossings of GiSelA- and Weiroot-selections. After 15 years of testing in a common trial, they can be classified in slightly dwarfing (Weigi 3) referring to P. avium F12/1, semi-dwarfing, similar to GiselA5 (Weigi 2) and similar between them (Weigi1). First trials with Regina and Skeena started in 2004 in 4 German locations in Badenia, Franconia, Thuringia (each trained as spindle with drip-irrigation) and in La Tapy/South of France (“open Vase”; Micro-sprinklers) with promising results. Suitable towards climate-change, they can become alternatives for moderate as well as for warm-climate regions like the Mediterranean. Rootstocks of Weigi-clones are propagated by Vitroplant and Schramma (Netherlands). Nursery Gräb (Germany) and Fleuren (Netherlands) are actually nursing cherry trees of chosen varieties on Weigi, which induce well branched and uniform trees. Fruit set is very early, getting soon high yield in good quality. 4th leaf, 'Regina' on Weigi 1 and 2 yielded 24 to 30kg marketable fruits per tree (extrapolation: 22-27 tons with 900 trees/0.9 hectare). Plant distances were 4-4.5 m x 2.5 m. Results are shown in figure 1. See also detailed descriptions, figures and photos under: www.weigi.com.

Vegetative Growth in Franconia
Weigi 2, the weakest among the 5 Weigi-clones, grows rather similar to Gisela 5 with 'Regina' in Veitshöchheim / Franconia. Weigi 1 generates there a 25 to 35% bigger tree in comparison to Weigi 2 and Gisela 5. Gisela 6 was not involved in this trial. By experience, however, it can be estimated that Weigi 1 may grow similar to Gisela 6. Weigi 3, Weigi 4 and Weigi 5 induce more vigorous growth. Both trunk diameter and tree-volume of Weigi 3 and Weigi 4 are 35% (Weigi 5: 90 %) higher than Weigi 2. As Weigi 3 shows favorable, advantageous growth with 'Skeena', it is preferred among the other stronger clones like Weigi 4 and Weigi 5.

Figure 1: Vegetative growth at the 11th year of different Weigi rootstocks at location Veitshöchheim, Franconia. Diameter of trunk, measured 20 cm above grafting-point.
Accumulated yield and average fruit-diameter after 11 years in Franconia

The combination of 'Regina' with Weigi 2 yielded 9 to 10 kg per tree more than Weigi 1 resp. Gisela 5. Additionally, average fruit-diameter of Weigi 1 was the best (28.8 mm) and Weigi 2 with 28.2 mm nearly 1 mm better than Gisela 5. Weigi-clones 3 and 4 and 5 also showed bigger fruits, however with significantly less yield. Even if the difference in yield between Weigi 2 and Gisela 5 is only 9.7 kg per tree after 11 years, extrapolation however means an additional yield of 8730 kg per 0.9 hectare. Referring to relative yield as an aspect for fruit set-density, evaluated by parameters “total yield per tree” and “volume of tree”, Weigi 2 is equal to Gisela 5. 'Skeena' should represent compact growing and self-fertile varieties and showed rather similar fruit-diameters on all Weigi-clones, despite very different total yields. In general, Weigi 2 and also Weigi 1 with its very high yield are recommendable.

Because of its weaker growth (see Fig. 1), Weigi 2 shows a noticeable more dense fruit set in relation to Weigi 1 and to Weigi 3, 4 and 5 clones.

![Figure 2: Weigi rootstocks at location Veitshöchheim / Franconia: accumulated yield per tree (total of 2006-2014) and average fruit diameter.](image)

Further results from the Weigi trial in Veitshöchheim

Within 11 years of trial and further 3 years of observation, there were no tree losses and no suckers at all on Weigi-rootstocks (except Weigi 4: very few suckers). Weigi 1, Weigi 3 and Weigi 5 show a smooth and flat grafting point. Weigi 2 and Weigi 4 have an enlarged grafting point, as the rootstock has a smaller diameter than the tree. However, this did not cause any disadvantage and the trees are stable without any trellis or posts. The phenomenon of bare branches due less light intensity in the lower part of the tree is not much expressed by all Weigi-clones. Especially Weigi 1 and Weigi 2 show less bare branches than Gisela 5.

Climatic data in Veitshöchheim: total annual rainfall between 420-650 mm, however dry in summer; sandy loam soil. Cherry orchard Station lays 170 Meter above sea level.
Experience of further German locations
Weigi's were also tested at 3 German regions: Badenia, Thuringia and another Franconian location, each suitable for sweet cherry cultivation. At the Thuringian Research Station “Erfurt”, GiSelA5 showed better overall impression and fruit diameter than Weigi 2, mainly with the variety Regina: Weigi 2 had less trunk-diameter and yield. However with regard to relative yield (as an expression of yield per tree-volume), both rootstocks are similar. At this station, Weigi 2 was a very good combination with Skeena. Due to these positive aspects, Weigi 2 and Weigi1 will be included into future trials.

At South-Badenian Station near Freiburg, which is the warmest and earliest fruit region in Germany, GiSelA 6 induced the best accumulated yield, with Regina (70 kg/tree), Weigi 2 nearly 60 kg/tree and GiSelA5 51 kg/tree. Other WeiGi-clones were significantly worse.

In combination with Skeena, Weigi 2 achieved a higher added yield per tree of almost 20 kg (with GiSela 5) resp. 25 kg (GiSelA 6).

At location “Franconian Switzerland” northeast of Nürnberg (520 Meter above sea level; the yearly rainfall is between 750 mm and 1000 mm; and the location is characterized by better soil and generally more vegetative growth. Plant-distance was 5m x 2,8 m with a density of 640 trees/0,9 ha), Weigi 2 induced a 7 % weaker trunk diameter with Regina, in comparison to GiSelA5. Weigi 1 was not tested there. Weigi 3 (+17%), Weigi 5 (+17%); Weigi 4 (+23%) grew stronger than Gisela 5.

In comparison to Gisela 5, Weigi 2 less yield (-10%) can be well-explained by its 8% less tree volume.

Skeena failed at this location because of cracked fruits by rain, except in 2008 and in 2011. During these 2 years, Weigi 2 convinced as the best Weigi-combination in reference to volume of tree and yield. Combination Skeena/GiSelA5 was not tested.

Suckers did not appear on Weigi 2 and Gisela 5. They were minimal with Weigi 3 and 5 resp. low with Weigi 4. Weigi-combinations and GiSelA5 showed no loss of trees after 10 years.

Weigi-clones under Mediterranean climate
In Southern French Station “La Tapy”, Weigi’s and GiSIA5 were tested with Regina and Skeena, both trained as “open Vase” (5 to 6 long and upright branches without central axe; plant-distance: 7m x 2,5 m). Soil is good there, but with pH of 7,7. Additional irrigation is done by Microsprinklers. By experience, under these conditions the use of GiSelA5 is not recommended, for it showed not sufficient growth, but problems with head and vitality of trees. Growers and researcher are looking for rootstocks similar to GiSelA5 in growth, but better constitution towards heat and pH. Referring vigour after 8 years, Gisela 5 was the weakest. In comparison to it, Weigi 2 induced slightly (on Regina) and noticeable (on Skeena) more growth. Weigi 1 has clearly more growth. Weigi 3, 4 and 5 showed 2.5 to 3 times more growth compared to Gisela 5. The proofed rootstocks showed basically the same effects in reference to yield.

The best fruit weights were achieved by Weigi 1, 3 and 4, with both varieties, and also with Weigi 2 with ‘Skeena’. However Weigi 2 got significantly lower fruit weight with Regina. Gisela 5 with weak growth, problems in vitality and a high fruit set-density led to the lowest fruit weights.

Contrary to German locations, Gisela 5, Weigi 3, Weigi 4 and Weigi 5 grew many suckers; however only some suckers were grown on Weigi 2 and very few on Weigi 1.

Also, under a different training-system and climate than in Germany, the trial in La Tapy confirmed that Weigi 1 and Weigi 2 prove to be better than Gisela 5. Weigi 1 and 2 and above all the more vigorous Weigi 3, 4 and 5 are well or better adapted to "less favourable" locations and environmental conditions. This result emphasizes the good adaptation of the Weigi rootstocks to a higher pH, extreme heat and aridity and may-be to soil fatigue. Furthermore, Weigi-clones can become more important in relation to climate-change and new training systems.
Weigi 2 with Regina, year 12, in Franconia.

Weigi 2 with Regina, year 13, in Franconia.

Weigi 1 with Skeena, at year 12, in Franconia

Weigi 2 with Skeena, at year 12, in Franconia.