

First successful steps of german fruitgrowers towards a more resilient system of organic apple growing

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Abstract

The potential of scab „resistant“ varieties (Vf-gene) for more resilience in the German system of organic fruit growing is shown using data from a survey on organic farms in the year 2014. The number of applications and the amounts of copper, sulphur and lime sulphur used was reduced whether more orchards had no fruit damage by scab.

Keywords: scab resistant variety, resilient system, copper reduction

Introduction

Few data are available about the practice of plant health care in organic fruit growing in Germany. Data were collected by Foeko e.V. since 2011. First, they were used for the internal discussion and for a benchmarking of strategies for copper minimization. With the publication of first data of 2014, Foeko wants to start the discussion also with interested third parties. Less susceptible varieties are a very important part of the strategy for disease control in organic apple growing. The introduction of scab „resistant“ apple varieties (“resistance” mainly based on the Vf-gene) was a milestone in the development of more resilient systems for organic apple growing.

However, the “resistance” failed in the last years in whole Germany. Remains the question if these varieties still have the potential for a more resilient production system in organic apple growing or if the potential reduction of input is already insignificant. First data from the survey in organic fruit farms in the year 2014 give indications about the actual situation in Germany.

Material and methods

Thirty organic fruit farms in whole Germany with a total of 899 single plots corresponding to 425,6 ha participated in the survey. This area covers more than 10 % of the whole organic apple growing area in Germany (about 3.300 ha). Basic unit is always the farm unit. The data were collected by fruit growers themselves using a field record system (www.proflura.de). For the elaboration of the data, the software system POSEIDON (Kienzle *et al.*, 2012) was used. Fruitgrowers also made an estimation of the success of their strategy in their orchards. Fruit infestation of scab, sooty blotch and russeting was estimated shortly before harvest. Fruit growers assessed 50 fruits at several trees for scab or sooty blotch infestation and for russeting (1,5 cm²). The orchards were classified as not infested when fruit infestation was lower than 5 %.

These estimations even if not really precise give a good idea of the damage. For the calculation of the variety effect only data from farm units that have orchards with scab „resistant“ and not „resistant“ varieties were used (23 farm units).

Results

In the regions Lake Constance and Neckar Baden the percentage of „resistant“ varieties is already very high (43 % and 52,5 %). In Saxonia the percentage is 55,6 % and in the area

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Altes Land it is 7,9 %. In the western region it is rather low (15,7 %) since the climate is less favourable for fungal diseases.

The input of copper for the „resistant“ varieties was 69 % of the amount of copper used for the other varieties (1,36 kg pure copper per ha). The total number of applications in the orchards with „resistant“ varieties was 79 % of the number of applications in the orchards with other varieties. The difference in the use of lime sulphur was very high since actually only few curative treatments are applied on the „resistant“ varieties. The use of potassium hydrogen carbonate, however, is increased in the „resistant“ varieties whether the use of sulphur is also reduced (fig. 1). Looking at the output, the number of orchards without fruit damage by scab is much higher for the „resistant“ varieties and there is also less fruit russetting. The percentage of orchards without sooty blotch, however, is lower for the „resistant“ varieties due to the more extensive treatments with fungicides (fig. 1).

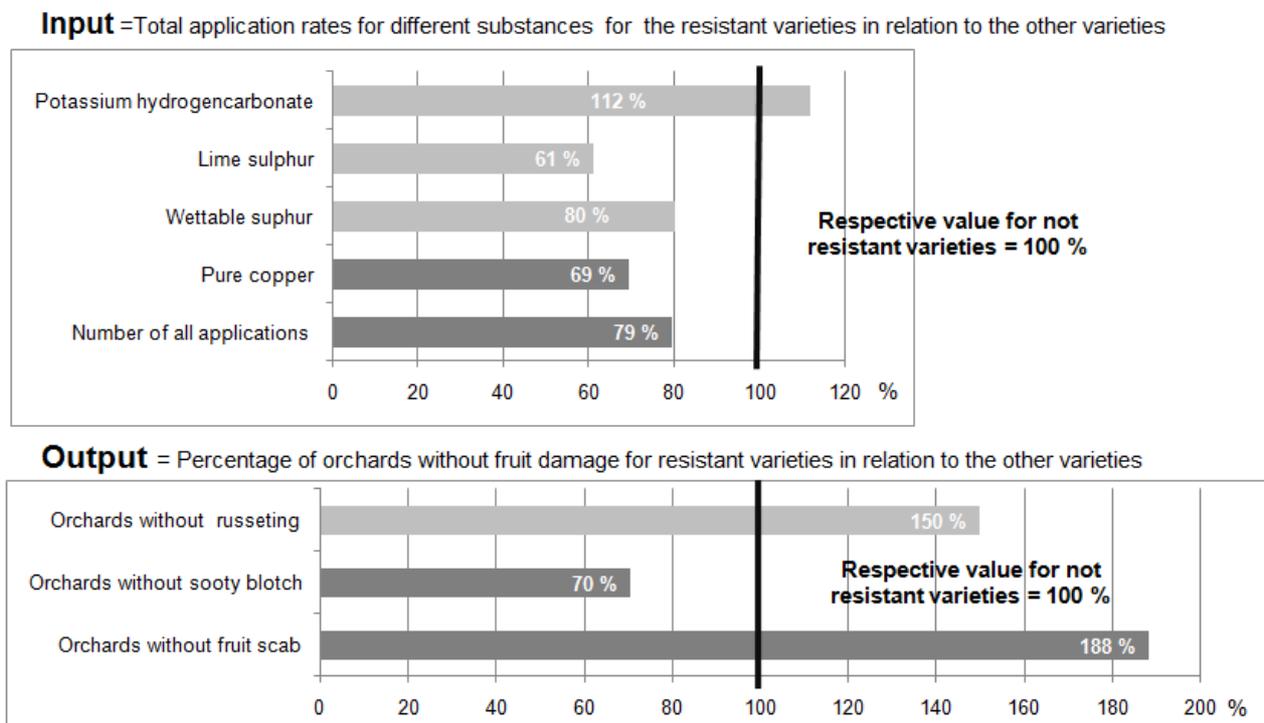


Figure 1: Relation of the input and the output of the scab „resistant“ varieties in comparison to the not scab „resistant“ varieties

Even if the “resistance” is overcome in all German regions, the scab „resistant“ varieties still produce a higher output with a lower input. The limiting factor in regions with high pressure of sooty blotch is the control of this disease. With an intelligent resistance management strategy the use of Vf-“resistant“ varieties can contribute at medium term to a general input reduction and an improvement of the resilience of the growing system.

Fruitgrowers believe this as the data show: In the survey the percentage of „resistant“ varieties in new plantations (from 2010 to 2014) was observed. In the region Lake Constance 77,2 % of the area of new plantations were planted with „resistant“ varieties. In the region Neckar valley/Baden it was 47,4 %, in the West it was 46,8 %, in the area Altes Land 53,2 % and in Saxony 80,9 %.

Actually, there is a concerted initiative of fruit growers from whole Germany to launch new „resistant“ varieties on the market. The first variety ‘Natyra’ is introduced in 2016. At long term, however, scab resistance or tolerance must be based on different concepts than the “resistance” based on the Vf-gene.

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References

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