



Spotless apples under roof

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It started as a crazy idea –Is it possible to grow apples without spraying and without getting scabby fruit if you put a roof over the trees? We set out to investigate this in the project 'Fruitgrowth' which aims at optimizing the Danish production of organic apples. The results are very promising and show that a small roof can make a big impact on the occurrence of most of the diseases that attack apples.



Growing apples under roof

After the first year, in the FruitGrowth project, we can conclude that the crazy idea wasn't dumb – and that a small roof can make a big impact on the occurrence of most of the diseases that attack apples.

Cultivars in the experiment

In the experiment the cultivars 'Elshof' and 'Rubens' were grown, both varieties are highly susceptible to apple scab (*Venturia Inaequalis*), which is the most important disease in apples. Under unsprayed conditions 70 % of the 'Elshof' fruit was discarded due to severe scab attack and only 3 % of the remaining fruit were spotless at the end of storage.

Positive effect of the roof

Contrary, under roof only 0-5 % of the fruit were severely affected by scab and a total of 85 % of fruit were free of scab by the end of storage.

The storage period was three month and the fruits were stored in a standard cold storage at 1 C followed by one week shelf-life at 18 C. For 'Rubens', which is extremely susceptible to scab, the outcome was even more clear. Under roof 75 % of the fruits were without scab lesions while 15 % had to be discarded. Without the roof, 95 % of the fruits were

discarded, fruit size was halved and yield only one third of what was achieved under roof.

The occurrence of other diseases was also reduced by the roof, for example sooty blotch which in some years is very frequent under unsprayed conditions, but under roof it was absent.

Fruit were examined for storage diseases and rots were infrequent, whereas 5 % of the fruits developed storage scab, which are tiny black scab lesions. The same amount of storage diseases was found in parts of the experimental field that were intensively sprayed with fungicides allowed for organic production.

Why is the roof effective?

Reduced periods of leaf wetness is the most likely explanation for the success of the roof. Scab spores require prolonged periods of leaf wetness to infect the leaves and fruitlets. At 10 C 28 hours of leaf wetness is required, while 18 hours suffice when the temperature is around 17 C. Field observations clearly showed that the roof could not prevent leaf wetness after steady rain and windy conditions, but drizzle that under normal conditions can maintain leaf wetness was caught by the roofs. After light rain the soil under the roof protected trees



The cultivar Elshof grown under roof



Apple fruit severely attacked by apple scab. Fruits have to be discarded due to the amount of scab on the fruit, but can be used for apple juice production.

was dry.

Fruit quality

Fruit quality was also investigated as we expected the roof to have negative consequences due to shading. However, no negative effects on fruit size or coloration could

be ascribed to the roofing. Neither was there a reduction in soluble solids, but fruit of both cultivars were slightly firmer at the end of storage when grown under roof.

Perspectives

The first year of this experi-

ment raises a lot of questions, first of all if the promising results can be achieved in the following years and if so, is it economical sound to put up roofs in a commercial production.

We hope to investigate that

in the coming years, and the experiment will continue in its present form in the 2013 season.



The roofs in the experimental orchard are 2 m wide and 3 m tall. Other commercial roofing systems exist for the use in sweet cherry production, where temporary covering is done to protect the fruits against cracking. Photo: Conni Damgaard

More information

Read more about the Organic RDD project FruitGrowth at: http://www.icrofs.org/Pages/Research/organicrdd_fruitgrowth.html



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