

# On-farm apple breeding: Interview with Niklaus Bolliger, founder of Poma Culta

As a Swiss biodynamic fruit farmer, Niklaus Bolliger was looking for new possibilities to create high performing varieties, which did not require high inputs for pest control. In other words, he was selecting and crossbreeding for cultivars which could meet the high quality standards of the market, while also being robust and healthy.



Photo: Felix Heiber

## Could you please describe your work with organic plant reproductive material (PRM)? What makes your approach unique?

I do on-farm apple breeding only, since my opinion is that selection and breeding should take place within the plants' actual growth environment. I also believe that seedlings should not be treated with pesticides. This helps to identify the seedlings that will prove themselves in practice. After two years of cultivation, you can already appreciate, in a holistic perspective, how suitable an apple variety is. After that, I start with minimal pesticide treatment (Mycosin and bicarbonate without any sulphur I do not use copper or sulphur because of personal and political conviction). This is also when I begin the second selection stage:

2-20% of the seedlings will come to fruit. I can judge the fruits and their storability. Only 5% will reach the third selection stage, where I assess many agronomic parameters such as tree growth, yield, robustness of the variety, etc.

## Why are you producing organic PRM?

The quantity of pesticides that was necessary to produce fruit for the market simply felt wrong, and led me to believe that this could not be the ecologically correct way to produce food. Hence, we needed to develop robust varieties to reduce the burden on the environment.

## When did you start?

My wife Regula Bolliger-Flury and I have managed the biodynamic vegetable and fruit farm Rigi since 1985. In the late 90s, I started selecting and cross-breeding. The non-profit organisation Poma Culta was founded in 2004 to support my efforts to breed new apple varieties and in general, to promote research into biodynamic fruit breeding. In 2017 I was able to plant 20 trees of 6 varieties in different locations for further testing. I would describe two of these varieties as excellent and two as average. The remaining two have been replaced with other varieties, as I was not happy with their performance.

Location	Hessigkofen (Switzerland)
Area	15 ha organic vegetable/fruit farm with livestock (1 ha is reserved for breeding & 0.5 ha for fruit production)
Turnover	€ 400 k
Crops	Fruit and vegetable crops
Staff	5 full-time employees (2 of them family members)
Website	<a href="https://pomaculta.org/en/pomaculta/">https://pomaculta.org/en/pomaculta/</a>

## Is it economically viable? Or which other benefits do you see in producing organic PRM?

I am financing the apple breeding with around 20% revenue from my own farm and around 80% with funding from Poma Culta. In the first year, when Poma Culta was established, it provided around €20k and today, 15 years later, it is around €200k. However, Poma Culta was not only helpful with funding my breeding work; it also brought together many people sharing a similar interest, who helped me in many other ways.

## What are the main success factors? What would your advice be for someone who wishes to become a fruit tree breeder/producer?

It is very important to do the breeding in the crops' natural growth environments. I am trying to reduce the time the seedlings are grown OUT of their natural environment (e.g. in the greenhouse), as much as possible. I conduct all selection phases outdoors. Another advice I would give is to start out with as many seedlings as possible. I grow 4,000 seedlings per year and think that 10,000 seedlings are the maximum. Everyone needs to find their own balance. However, one must be aware that only 2-20% of these seedlings will come to fruit and only 5% of them will reach the second phase of selection. That's the reason why I prefer to start with many seedlings.

## What are you most proud of?

I am proud of my breeding lines: they all have really good pulp quality and are also robust and genetically diverse.

## What are your plans for the future?

We have recently applied for public funding for a pear breeding project. It will be nice to expand our work on a different fruit species, while of course continuing our apple breeding programme.

*Katharina Meyer, FiBL Deutschland*

*This interview is extracted from 'Success stories on organic seed production & breeding - Experiences from LIVESEED cross-visits (July 2020).'*

*[https://www.liveseed.eu/wp-content/uploads/2020/08/LIVESEED\\_Booklet3\\_web.pdf](https://www.liveseed.eu/wp-content/uploads/2020/08/LIVESEED_Booklet3_web.pdf)*

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230 and by the Swiss State Secretariat for Education, Research and Innovation under contract number 17.00090.*