Organic fruit breeding

apfel:gut e.V.
Förderverein zur Entwicklung und Durchführung ökologischer Obstzüchtung

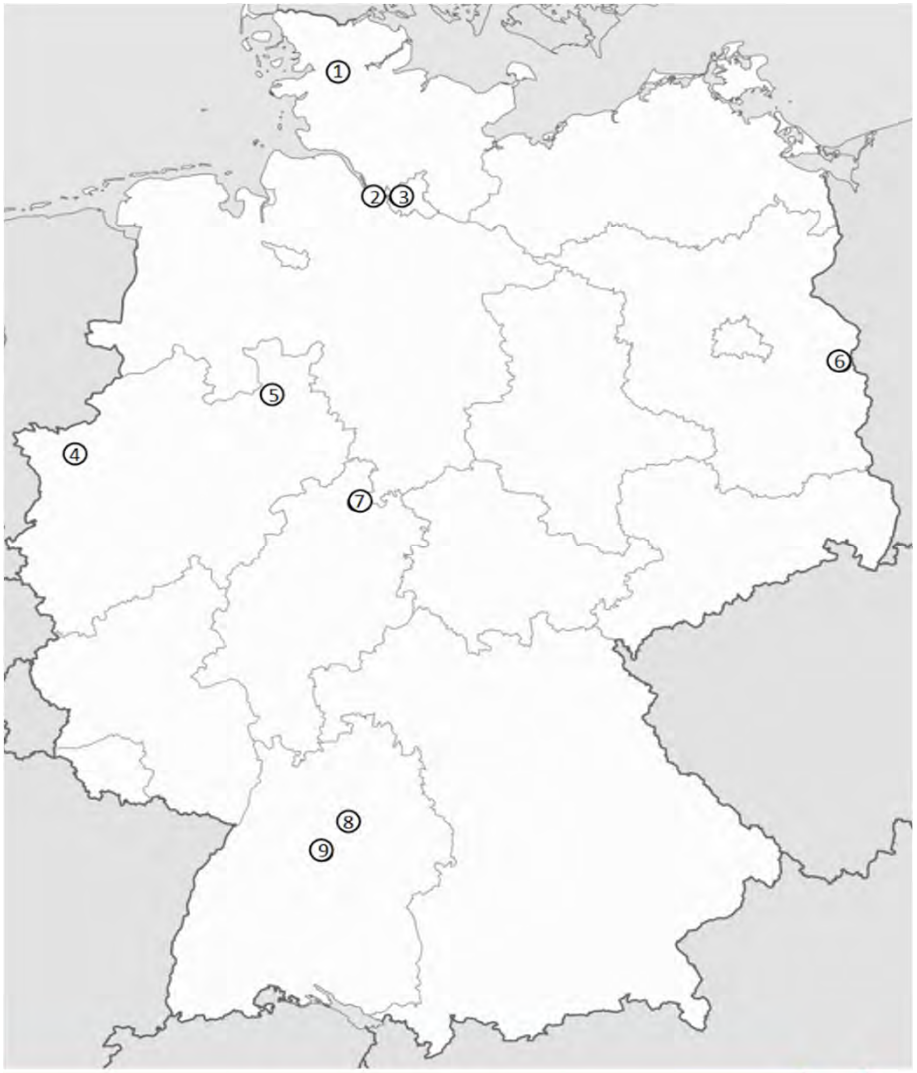
Outline

1. apfel:gut structure
2. apfel:gut concept
3. Breeding process
4. Timeline
5. Which genetics are necessary for a copper free fruit cultivation?
6. Prospects

1. apfel:gut structure

- Participatory, organic apple and pear breeding since 2011
- Crosses, cultivation and selection outdoor on Bioland and Demeter fruit farms
- Cooperation partners at the Lake Constance and in Oldenburg
- Breeding for adaptation of the the organic growing conditions, diverse climates and soils

1. apfel:gut structure



1 = Inde Sattler und Bernd Hagge-Nissen, Hollingstedt

2 = Matthias Ristel, ÖON e.V., ESTEBURG, Jork;

3 = Jörg Quast, Peter Heyne und Maren Bornemann, Finkenwerder

4 = Rolf Clostermann, Wesel-Bislich

5 = Hans-Joachim Bannier, Bielefeld

6 = Heidrun Hauke, Frankfurt (Oder)

7 = Thomas Mauer, Kassel

8 = Lukas & Georg Adrion, Backnang

At all sides: Christoph Kümmerer, Matthias Ristel

Wikimedia 2017, adapted by Maren Bornemann

1. apfel:gut structure

– Farmers take care of seedling orchards, participate with their knowledge in choice of breeding parents and selection decisions

- apfel:gut e.V. is charitable
- Aims to green the breeding process itself: E. g. minimize input of external ressources like copper

2. apfel:gut concept

- Extend the narrow and disease susceptible genetic base of modern fruit varieties
- Focus on polygenic resistances and minimization of susceptibility
- Breeding on the whole plant level (no manipulation of the cell core or DNA)
- Use of genotype x environment interaction through decentralised on-farm breeding
- Use of special traits of heirloom varieties
- 0-spray selection in the first Selection level

3. Breeding process

- Combination of robustness (usually heirloom) x quality (usually modern) > **goal to keep a broad genetic basis, new aromatics and field tolerance**
- Early ripening time: Early x early
- Storage varieties: At least one parent should be good storeable

3. Breeding process

- Seedling get planted in the second half of May
- 400-2000 Seedlings/year

3. Breeding process

Selection for scab, mildew, canker, Elsinoe leaf spot, sooty blotch, powdery mildew and Marssonina robustness

4. Timeline

- 1. – 3. year: 1. selection step
- 4. – 9. year: 2. selection step, Fruit selection
- About the 6. year, grafting, variety testing
- After minimum 6 years of testing: Registration possible
- After minimum 4 years: Potential market release

4. Timeline for first selections

- About the 6th year, grafting, variety testing

- **2020**: First pear and apple selections get planted in the variety testing
- **2026** registration possible
- **2030** Potential market release

5. Which genetics do we need?

E. g. Storage varieties

Seestermüher Zitronenapfel x Allurel

- Partly very good texture
- Some russeting
- Good Fruit sizes
- Good scab robustness
- Good robustness against other diseases
- Very vital
- Storage conditions?

5. Which genetics do we need?

E. g. Early ripening time

Pristine x Discovery

- Good texture
- Nice aroma
- Very good scab robustness
- Not suitable for regions with high pressure for canker
- Ripe before Delbarestival
- Rather weak concerning colour and fruit size

6. Prospects for Future

- apfel:gut e. V., more than 7000 seedlings out of about 370 crosses, of these more than 1500 in the 2nd selection step
- Continous funding difficult
- In relation to apple breeding pear breeding in Europe is rather neglected

Thank you!

Niedersächsisches Ministerium für Wissenschaft und Kultur

Gerd Godt-Grell Stiftung

GLS Treuhand
Zukunftsstiftung Landwirtschaft

SOFTWARE AG-Stiftung