“Crowd breeding” of Danish apples

by Maren Korsgaard,
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Section for Crop Sciences

The project was funded in 2013 by
The Foundation for Organic Agriculture
I work as a researcher, advisor and fruit grower

www.pometet.dk  www.laerkehoejfrugt.dk  www.ecoadvice.dk
The Pometum at the University of Copenhagen

The national genebank of fruit and berries with app. 2000 cultivars of fruit and berries. App. 800 apple-cultivars. A part of NordGen.

And a workshop for fruit-research and –teaching

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In 2013:  
Why should only Kazakhstan have apple-forests?

Why not apple-forests in Denmark?

(Discussed by Torben Bo Toldam-Andersen, Lisbet Dahl Larsen and Maren Korsgaard)

Goal nr. 1: More biodiversity in Danish landscapes

Goal nr. 2: New robust and tasty Danish Apple Cultivars. New cultivars are important, while the fungus diseases quickly develop new virulent strains, but the tree is left with the same genes.
Apple seeds are easy to grow - even for non professionals

Seeds in the left-overs from apple-juice emerge naturally
The project “Apple-oases” was developed by the Pometum and supported in 2013 by the Danish Foundation for Organic Agriculture. We:

- Selected the 53 most robust and tasty cultivars of the Pometum collection of 300 old Danish cultivars
- Took out the seeds of the selected mother-cultivars
- Dryed the seeds
- Invited people to participate (open-house event, articles in organic magazines)
- Held evening courses for the participants
- Distributed the seeds. (bags of 10 seeds of each cultivar)
- Divided the participants in local groups
- Made a Face-book-group with the participants.
- After 6 years (now) hopefully we find time (money) for evaluation of the new apple cultivars
We selected the mother-plants

Criterias for selection of mother cultivars:

Robustness towards scab, cancer and mildew. This was evaluated earlier during 4 years in an unsprayed collection.

Good taste
App. 150 persons wanted to participate. We held 3 eveningcourses and one sattelite –course.
This was what we asked the participants to do:

• **First winter:** Sow the dry seeds in pots with humid soil. Put them in a sheltered place outdoor. Remember to mark them with the name of the mother.

• **First Spring:** Plant only the healthy seedlings in a nursery or in pots. 10-20 cm´s distance. Note which plants are chosen and which are not.

• **First Fall:** Pick the most healthy plants and replant them in a nursery at ½ m distance. Note which plants you choose.

• **Year 2-5:** A lot of patience. Keep discharging bad trees.

• **Fall 6-:** The trees carry fruit, and you shall taste them. Select the good cultivars, note it down and tell us.
Keep an eye on the health status of the plants. Remove the sick seedlings.

Elsinoe leaf and fruit spot ("Topaz-spot")

Apple scab
Remove the sick seedlings - look for:

Apple mildew

Apple cancer
For a couple of varieties the seeds were taken out by the participants themselves
Approximately 10,000 seeds were distributed to the app. 150 participants.

10 seeds in a bag of each mother-cultivar
Tekst starter uden punktopstilling

For at få punktopstilling på teksten, brug forøg indrykning

For at få venstre-stillet tekst uden punktopstilling, brug formindsk indrykning

Overskrift her

For at ændre "Enhedens navn" og "Sted og dato":
Klik i menulinjen, vælg "Indsæt" > "Sidehoved / Sidefod".
Indføj "Sted og dato" i feltet for dato og "Enhedens navn" i Sidefod.

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My own seedlings in spring 2014, sown in December 2013
The pots were placed in a netted cave, where also the seedlings were planted.
For at ændre "Enhedens navn" og "Sted og dato":
Klik i menulinjen, vælg "Indsæt" > "Sidehoved / Sidefod". Indføj "Sted og dato" i feltet for dato og "Enhedens navn" i Sidefod.
The roots develop fast in the pot and need to be transplanted in time.
This apple-oasis is from one of the more professional participants, fall 2014
The main part of the participants are private gardeners
Seedlings like this was removed
We selected these 53 robust and tasty old Danish cultivars as mother-cultivars:

<table>
<thead>
<tr>
<th>Danish Name</th>
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<th>Danish Name</th>
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</thead>
<tbody>
<tr>
<td>Annas æble</td>
<td>Guldæble</td>
<td>Nørregaards æble</td>
</tr>
<tr>
<td>Barritskov madæble</td>
<td>Hans Mathiesen</td>
<td>Ondrup Sommeræble</td>
</tr>
<tr>
<td>Blangstedgård 157</td>
<td>Harreslev</td>
<td>Ormslev æble</td>
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<tr>
<td>Bredsted æble</td>
<td>Henrik Jensens æble</td>
<td>Oudrupgaards høstæble</td>
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<tr>
<td>Brøndæble</td>
<td>Herman</td>
<td>Pigeon Maribo</td>
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<tr>
<td>C.J.H. 7-27</td>
<td>Hvidkilde voksæble</td>
<td>Rasmus Hansen</td>
</tr>
<tr>
<td>C.J. Hansen 603</td>
<td>Hyltofte æble</td>
<td>Ringkloster kammerjunker</td>
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<tr>
<td>Dansk Rosenhæger</td>
<td>Højbjerg kalvil</td>
<td>Rødbyæble</td>
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<tr>
<td>Degneæble</td>
<td>Ildrød Eilstrup</td>
<td>Sildig Sandholt</td>
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<tr>
<td>Edle Wendelborg</td>
<td>Kyholm reinette</td>
<td>Skarridsø</td>
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<tr>
<td>Elmelund</td>
<td>Langeland hvid pigeon</td>
<td>Spilmose</td>
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<tr>
<td>Fejøæble</td>
<td>Lise Legind</td>
<td>Spiseæble fra Vejle</td>
</tr>
<tr>
<td>Filippa</td>
<td>(Lundbytorp)</td>
<td>Stjerneæble II samsø</td>
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<tr>
<td>Filippa Anka</td>
<td>Lyngbyæble</td>
<td>Søbjerg æble</td>
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<tr>
<td>Flaskehalser</td>
<td>Maren Nis</td>
<td>Vallekilde</td>
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<tr>
<td>Flintinge</td>
<td>Marieæblet fra Hjortholm</td>
<td>Vallekilde sommeræble</td>
</tr>
<tr>
<td>Fynsk udvalg II</td>
<td>Mikkel Peders æble</td>
<td>Ydunsæble</td>
</tr>
<tr>
<td>Grænseæble</td>
<td>Nonnetit Bastard</td>
<td>+ Dronning Louise and Guldborg</td>
</tr>
</tbody>
</table>
Mother cultivars, tasty and robust

Annas æble
Blangstedgård156
Brøndæble
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C. J. H. 7-27
Mother cultivars, tasty and robust

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Mother cultivars, tasty and robust

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Hans Mathiesen

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Mother cultivars, tasty and robust

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Marieæble fra Hjortholm

Nonnetit Bastard

Maren Nis

Mikkel Peders æble

Nørregårds æble
Mother cultivars, tasty and robust

Ondrup sommeræble

Oudrupgaards høstæble

Rasmus Hansen

Ormslev æble

Pigeon Maribo

Ringkloster kammerjunker

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Mother cultivars, tasty and robust

- Rødby æble
- Skarridsø
- Stjerneæble II fra Samsø
- Sildig Sandholt
- Spilmoseæble
- Søbjergæble
Mother cultivars, tasty and robust

Vallekilde æble
Yduns æble
Dronning Louise
Vallekilde sommeræble
Guldborg
Vi know the family-relations and ancestors of many of the Danish mother cultivars.

Main sources are:

‘Cox Orange’

‘Pigeonnet blanc’, and

‘Nonnetit’

Applemap made by Carsten Pedersen, cpr@plen.ku.dk

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And the fathers?

The father-cultivars are not known, while the seeds are free pollinated.

The possible 800 father-cultivars in the Pometum are:

• Wild apples from Kazachstan
• Ornamental apples (crab-apples)
• Columnar apples
• International cultivars, well known and commercially grown through history since app. year 1600 till now.
• Danish local cultivars.
Status 2019: From 10.000 seeds to 1467 trees

In 2019 we contacted all of the participants again.

• 40 have responded,
• 10 persons had lost their trees to mice, voles, new owners, hens, dogs and drougth (2018)
• 30 persons have in total 1467 trees. The largest collection consists of 470 trees.
• 55 of these trees had fruit in 2018 (5th season)
The trees have shown great differences in growth. 50 of 55 fruiting trees in 2018 looked like crap apples. Pictures are from the one member with 470 trees.
This is one of the many crap apples. The owner named it “The Christmas tree”.

Photo: Knud Warming
Another crap apple

Photo: Knud Warming
New daughter 2018:

Mother: ‘Dronning Louise’

‘Filippa’ x ‘Nonnetit’

Photo: Knud Warming
2018: Daughter

Mother: Fynsk udvalg II

Quite promising!

Photo: Knud Warming

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Section for Crop Sciences
Thank you for your attention!