

23 new Danish apple cultivars from "The Apple Oasis"

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Abstract

The "Apple Oasis" project was started in 2013, where we distributed 10,000 apple seeds from "The Pometum", the national Danish Genebanks collection of old Danish apple cultivars. They were sown throughout Denmark by over 100 volunteers in the project. From 2019, we followed up on the 2,000 seedlings in the project "Development of unique Danish apple cultivars" and from 2022 in the project "InnOBreed". By 2025, we have sent 23 new apple cultivars from the project for registration on the EU's apple variety list, e.g. 18 table apples, 4 ornamental apples and 1 cider apple/rootstock. The selected cultivars are shown here and represent great diversity in harvest season, taste and appearance. All of them are selected under organic conditions and have high resilience against diseases. The genes of these apple cultivars differ significantly from other newer cultivars. These 23 cultivars have genes from 88 ancestors (parents + grandparents). Of these, 40 are unknown cultivars, 48 are known, but only 6 of these cultivars are often used in apple breeding. We are thus bringing a wider part of the genetic cultural heritage from The Pometums collections to use. The apple genes have been released from the gene bank!

Keywords: Participatory breeding, Apple cultivar, genetic diversity.

Introduction

The "Apple Oasis" project was started in 2013, where we invited volunteers to sow apple seeds from "The Pometum", the national Danish Genebanks collection of old Danish apple cultivars. The goal was to reach Danish apple cultivars with more diversity and better robustness towards diseases.

Material and Methods

In autumn 2013 we selected 52 robust and tasty old Danish apple cultivars and gathered open pollinated seeds from them. The 10.000 seeds were sown throughout Denmark by more than 100 volunteers, mainly in private unsprayed gardens. From 2019, we followed up on the 2,000 seedlings in the project "Development of unique Danish apple cultivars" and from 2022 in the project "InnOBreed".

We screened the seedling-trees for their robustness towards Apple scab (*Venturia inaequalis*), Apple mildew (*Podosphaera leucotricha*), Apple canker (*Neonectria ditissima*) and Elsinoe fruit and leaf spot (*Elsinoe piri*) and we tested the quality of the fruits, as soon as the trees were fruiting. (Korsgaard and Toldam-Andersen, 2020 and 2024)

We have preselected 105 seedling-trees for their potential. They were grafted on M7 and M9 and continuously planted at The Pometum for further investigations. The preselections were DNA-tested to reveal their parentage.

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Results

Table 1: Parentage of the 23 new Danish apple cultivars

Type of new cultivar	Parents (no. of times present, if more than 1)	Grand parents (no. of times present)
18 Dessert apple cultivars	Brøndæble (5) C.J. Hansen 1017 (3) Unknown parent (3) Dronning Louise (3) Pigeon Maribo Ananas Reinette Aroma Butteræble C.J.Hansen 603 Cox Orange Discovery Ferskenrødt sommeræble Hvid vinter pigeon Hyslop Katja Langeland Hvid Pigeon Oudrupgaards høstæble Pigeon ildrød Dronningmølle Rajka Rasmus Hansen Spilmose æble Venus (Vejløæble)	Unknown grandparent (19) Ildrød Pigeon (6) James Grieve (6) McIntosh (6) Maglemer (5) Margil (4) Flaskeæble (3) Guldborg (3) Mølleskov (3) Hvid Vinter Pigeon (2) Worcester Pearmain (2) Beauty of Bath Butteræble Danziger Kantapfel Elmelund Filippa Golden Harvey Heuapfel Ingrid Marie Katka Passe Pomme Rouge Reinette de Hollande Rosemary Russet Sampion
1 Cider apple /rootstock cultiv.	Harreslev æble Unknown father	Unknown grandparent (3) Reinette de Hollande
4 Ornamental apple cultivars	Unknown parent Freja Hvidkilde voksæble <i>Malus asiatica</i> Maren Nis Pigeon Maribo Rødby æble Scarlett	Unknown grandparent (13) Guldborg Hvid Vinter Pigeon Mølleskov

By 2025, we have sent 19 new apple cultivars from the project for registration on the EU's apple variety list. 18 table apples, 1 cider apple/rootstock and furthermore selected 4 ornamental apples. The selected cultivars represent great diversity in both seasons, taste and appearance. All of them are selected under organic conditions (though not certified) and have high resilience against diseases. The genes of these apple cultivars differ significantly from other newer cultivars.

Our 23 cultivars have genes from 88 ancestors (parents + grandparents). Of these, 40 are unknown cultivars (probably local Danish cultivars), 48 are known, but only 6 of these cultivars have been used in more recent apple breeding. These are Aroma, Cox Orange, Discovery, Ingrid Marie, James Grieve and McIntosh (see table 1).

Discussion

The great genetic diversity in our preselected cultivars shows that we have brought a wider part of the genetic cultural heritage from The Pometums collections to use. The genetic diversity might give the cultivars a longer lasting resilience towards diseases and climate changes. The fruits from which the seeds were collected had been open pollinated, and in the collections at the Pometum this means that there are about 800 potential fathers. We have DNA profiles from almost all, but even so it was in a few cases not possible to identify the identity of the parent. However, in most cases of an unidentified cultivar it was at the level of the grandparent. Many cultivars in the collection are likely to be chance seedlings which may include unknown parental material. (Larsen et al. 2025)

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