

Scanning report (EIP format for practice abstracts)

***Project title (native language):** EUFRUIT: European Fruit Network, WP2 Potential von neuen Frucht-Sorten

***Project title (English):** EUFRUIT: European Fruit Network, WP2 Performance of new fruit varieties

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Section A. Summary for EIP dissemination

***Keywords:** Variety testing, rootstock testing, breeding, stone fruits, sweet cherries, plums, apricots

***Main geographical location:** CH0

Other geographical locations:

***Summary (native language):**

Die Hauptforschungsthemen von Agroscope im Zusammenhang mit Steinobstsorten sind: Sortenprüfung, Unterlagenprüfung, Anbausysteme und mechanischer Schnitt, Ertragsstabilität, Ernteschätzung bei Süsskirschen, Toleranz und Resistenz gegenüber Pflanzenkrankheiten und Sortenzüchtung von Aprikosen.

Das Ziel der Sortenprüfung ist es ein breites Sortenspektrum zu erhalten das den Erwartungen von Obstproduzenten, des Handels und der Konsumenten entspricht. Die Evaluierung neuer Sorten wird neutral durchgeführt und die gewonnenen Erfahrungen werden mit Produzenten und Branchenvertretern geteilt. Wichtige Anforderungen an eine Sorte sind gute, stabile Erträge und robuste Früchte und Bäume.

In der Sortenprüfung befinden sich im Jahr 2017 rund 120 internationale Kirschen- und 100 Zwetschgensorten am Versuchsbetrieb Breitenhof, sowie rund 170 Aprikosensorten am Versuchsbetrieb Conthey. Die Sorten werden auf die Anbaueignung und Vermarktungsfähigkeit in der Schweiz hin geprüft.

Seit 20 Jahren werden in der Schweiz Kirschen und Zwetschgen auf schwachwachsenden Unterlagen angebaut. Je nach Standort können bei den etablierten Unterlagen Probleme, verursacht durch Staunässe oder durch eine den Bodenbedingungen nicht angepasste Sorten-Unterlagen-Kombination auftreten. Es ist daher wünschenswert, über eine breitere Auswahl an Steinobst-Unterlagen zu verfügen, deren Eigenschaften in Unterlagenversuchen getestet werden.

Ein grosses Risiko für die Schweizer Zwetschgenproduktion ist die Ausbreitung des Sharka-Virus. Um diesem Problem entgegenzuwirken befinden sich Sharka-hypersensible Unterlagen- und Sorten in der Prüfung. 2010 wurden die Sharka-hypersensiblen Unterlagen Docera 5, Docera 6 und Docera 9 des Bayerischen Obstbauzentrums in Kombination mit Sharka-toleranten Unterlagen gepflanzt. 2012 wurden diese Versuche erweitert, unter anderem im Rahmen eines internationalen Unterlagenversuchs. Die ersten Ergebnisse sind sehr vielversprechend.

Das Ziel bei der Aprikosen-Unterlagenprüfung ist es eine Alternative zur Unterlage Myrobalane B zu finden, welche anfällig gegenüber Staunässe ist. Ein weiteres Ziel bei Aprikosen und generell bei Steinobst ist es Unterlagen zu finden welche weniger anfällig gegenüber Bakterien-Krebs und Pseudomonas sind.

Die wichtigsten Kirschenunterlagen welche sich im Moment in der Prüfung finden sind Weigi 1, 2, 3 und Krymsk 5, 6, 7.

Die Ergebnisse der Forschung werden in diversen Zeitschriften publiziert und bei Konferenzen und verschiedensten Veranstaltungen wie der Breitenhoftagung oder der Fête de l'Abricot in Saxon einem breiten Publikum von diversen Branchenvertretern, Produzenten und Interessierten präsentiert.

Summary (english):

The main research topics at Agroscope for **stone-fruits** concerning varieties are: variety testing, rootstock testing, training systems and mechanical pruning, crop-stability, yield estimation of sweet-cherries, tolerance and resistance against diseases and apricot breeding.

The goal of a good variety range is to fulfill the expectations and demands of the producers, the market and the consumers. Variety testing is done to make a neutral evaluation of new emerging varieties in favor of production and consulting. Important requirements for a variety are good and stable yields, sturdy trees and fruits.

In 2017 around 120 international cherry-varieties and around 100 plum-varieties are tested at the Agroscope trial-center Breitenhof, at the Agroscope trial-center Conthey around 170 apricot varieties are tested. The suitability of these international varieties is tested for Swiss growing conditions and the Swiss market.

Since 20 years cherries and plums are cultivated in Switzerland on dwarfing rootstocks. With established rootstocks site-specific problems can occur, e.g. with waterlogging or due to bad soil-rootstock-variety interactions. Therefore the rootstock trials aim to find a bigger selection of suitable rootstocks for Swiss growing conditions. The progressive spread of the plum pox virus is a big risk for the **plum** cultivation. To counter this disease, hyper-sensitive rootstocks and varieties are tested. In 2010 hyper-sensitive rootstocks (Docera 5,6,9) of the Bayerisches Obstbauzentrum were planted in combination with different varieties. In 2012 those trials have been extended, within the scope of an international rootstock-trial. The first results are very promising.

The aim in **apricot** rootstock-testing is to find an alternative to the rootstock Myrobalane B, which is susceptible to waterlogging. Another goal for all stone-fruits is to find rootstocks that are less susceptible to bacterial cancer and pseudomonas.

Related to **cherries** the most important rootstocks that are tested at the moment are Weigi 1, 2, 3 and Krymsk 5, 6, 7.

The outcome of the research is published in different journals and is presented to the Swiss stakeholders of fruit-production at the Breitenhofstagung (conference at the trial center), at Fête de l'Abricot in Saxon and at different meetings and conferences.

Section B. Project information

***Project coordinator:** Michelle H. Williams; Aarhus University, Department of Food, Kirstinebjergvej 10, 5792 Aarslev, Denmark; mw@food.au.dk; +45 25170049

***Project period:** 2016 - 2019

***Project status:** Ongoing

***Funded by:** Horizon 2020

***Total budget:** €1.8m

***Geographical regions:** DK011 Copenhagen, DK012 Copenhagen and its environs, DK013 North Zealand, DK014 Bornholm, DK021 East Zealand, DK022 West- and South Zealand, DK031 Funen, DK032 South Jutland, DK041 West Jutland, DK042 East Jutland, DK050 North Jutland, BE211 (Arrondissement. Antwerpen), BE212 (Mechelen), BE213 (Turnhout), BE221 (Hasselt), BE222 (Arr. Maaseik), BE223 (Tongeren), BE231 (Aalst), BE232 (Dendermonde), BE233 (Eeklo), BE234 (Gent), BE235 (Oudenaarde), BE236 (Sint-Niklaas), BE241 (Halle-Vilvoorde), BE242 (Leuven), BE251 (Brugge), BE253 (Ieper), BE254 (Kortrijk), BE255 (Arr. Oostende), BE256 (Arr. Roeselare), BE257 (Tielt), BE258 (Veurne), BE310 (Nivelles-Nijvel), BE331 (Huy-Hoei), BE332 (Liège- Luik), BE334 (Wareme-Borgworm), BE335 (Verviers), FR8 Méditerranée; FR81 Languedoc-Roussillon, FR6 SUD-OUEST, FR512 Maine et Loire, FR611 Dordogne, FR812 Gard, DE6 (Hamburg), DE8 (Mecklenburg-Vorpommern), DE9 (Niedersachsen), DEF0 (Schleswig-Holstein), DEE0 (Sachsen-Anhalt), DEA (Nordrhein-Westfalen), DE111, DE112, DE113, DE114, DE115, DE116, DE117, DE118, DE119, E11A, DE11B, DE11C, DE11D, DE121, DE122, DE123, DE124, DE125, DE126, DE127, DE 128, DE129, DE12A, DE12B, DE12C, DE131, DE132, DE133, DE134, DE135, DE136, DE137, DE138, DE139, DE13A, DE141, DE142, DE143, DE144, DE145, DE146, DE147, DE148, DE149, DE600 Hamburg, DE932 Cuxhaven, DE933 Harburg, DE939 Stade, DEF09 Pinneberg, NL1-NL4 + NLZ Holland; NL 224 zuidwest Gelderland, NL 226 Arnhem/Nijmegen, NL230 Flevoland, NL310 Utrecht, NL321 Kop van Noord-Holland, NI322 Alkmaar en omgeving, NL338 oost Zuid-Holland, NL33A zuidoost Zuid-Holland, NL341 Zeeuws-Vlaanderen, NL342 overig Zeeland, NI411 west Noord-Brabant, NL413 noordoost Noord-Brabant, NL414 zuidoost Noord-Brabant, NL421 noord Limburg, NL422 Midden-Limburg, NL423 zuid

Limburg, ES620 Murcia, UKG11 Herefordshire, UKG12, Worcestershire, UKH12 Cambridgeshire, UKH16 North and West Norfolk, UKH17 Breckland and South Norfolk, UKJ22 East Sussex, UKJ35 South Hampshire, UKJ36 Central Hampshire, UKJ37 North Hampshire, UKJ41 Medway, UKJ42 Kent, UKJ43 Kent Thames Gateway, UKJ44 East Kent, UKJ45 Mid Kent, UKJ46 West Kent, ES618 Sevilla, ES511 Barcelona, ES512 Gerona, ES513 Lérida, ES514 Tarragona, CH0 Schweiz/Suisse/Svizzera, ITH51-59 Emilia Romagna region, ITH10 Bolzano-Bozen, HU101 Budapest, HU102 Pest, RO111, RO112, RO113, RO114, RO115, RO121, RO122, RO123, RO124, RO125, RO126, RO211, RO212, RO213, RO214, RO215, RO216, RO221, RO222, RO223, RO224, RO225, RO226, RO311, RO312, RO313, RO314, RO315, RO316, RO317, RO321, RO322, RO411, RO412, RO413, RO414, RO415, RO421, RO422, RO423, RO424. HU101, HU102, LT001 Alytaus apskritis, LT002 Kauno apskritis, LT003 Klaipėdos apskritis, LT004 Marijampolės apskritis, LT005 Panevėžio apskritis, LT006 Šiaulių apskritis, LT007 Tauragės apskritis, LT008 Telšių apskritis, LT009 Utenos apskritis, LT00A Vilniaus apskritis.

Project web page: <http://www.eufrin.org/index.php?id=55>

***Project Objectives (native language):**

1. Gründung eines europäischen Netzwerks im Bereich des Fruchtsektors.
2. Entwicklung und Implementierung eines systematischen Ansatzes um bestehendes wissenschaftliches und praktisches Wissen abzufragen und zusammenzufassen.
3. Aufbau eines fortlaufenden Dialogs mit relevanten EU, nationalen und regionalen Interessensvertretern.
4. Identifizierung und Unterstützung neuer Prioritätsbereiche durch kontinuierliches Monitoring und Analysieren bestehender und künftiger Forschungs- und Innovationsaktivitäten.

Project Objectives (English):

1. Establish a European network focused on the fruit sector.
2. Develop and implement a systematic approach for scanning and synthesizing existing scientific and practical knowledge.
3. Establish an ongoing dialogue with relevant EU, national and regional policy bodies.
4. Identify and support new priority areas of research by continually monitoring and analysing existing and upcoming research and innovation activities.

***Project partners:**

1. Aarhus University, Department of Food Science (Denmark) • AU
2. Research Station for Fruit npo (Belgium) • Pcfuit
3. Centre Technique Interprofessionnel des Fruits et Légumes (France) • CTIFL
4. Obstbauversuchsanstalt Jork (Germany) • OVA
5. Stichting Wageningen Research (Netherlands) • WR
6. ~~East Malling Research (United Kingdom) • EMR (terminated 08-02-2016)~~
7. Institut de Recerca i Tecnologia Agroalimentàries (Spain) • IRTA
8. Federal Department of Economic Affairs, Education and Research (EAER), acting through Agroscope Institute of Plant Sciences (Switzerland) • Agroscope
9. Laimburg Research Centre for Agriculture and Forestry (Italy) • Laimburg
10. University of Agronomic Sciences and Veterinary Medicine of Bucharest (Romania) • USAMV
11. National Agricultural Research and Innovation Centre Fruitculture Research Institute (Hungary) • NARIC
12. Lithuanian Research Centre for Agriculture and Forestry (Lithuania) • LRCAF
13. Assemblée des Régions Européennes Fruitières, Légumières et Horticoles (France) • AREFHL
14. Variety Innovation Consortium South Tyrol (Italy) • SKST
15. Freshfel Europe (Belgium) • FRESHFEL
16. Elbe-Obst Erzeugerorganisation r.V. (Germany) • EO
17. Fruitconsult BV (Netherlands) • FC
18. University of Greenwich (United Kingdom) • UoG
19. University of Hohenheim (Germany) • UHOH
20. Università di Bologna (Italy) • UNIBO
21. Institut National de la Recherche Agronomique (France) • INRA

22. NIAB EMR (new 09-02-2016)

Section C. Annex: Scanning report¹

Scanning report [Simon Schweizer, Andreas Riedl; Agroscope]

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Country: Switzerland

NUTS 3 region(s)²: CH0

WP no. and title: WP2 - performance of new fruit varieties

Date: [12-04-2017]

Source materials and methodology

The Research Center Agroscope is a public research center funded mostly by the Swiss government. One of its many activities is the testing of new cherry, plum and apricot varieties. In collaboration with most of the important rootstock and stone-fruit breeders, variety managers and license holders Agroscope is testing new varieties from all over the world. Agroscope evaluates their suitability for Swiss growing conditions, their agronomic potential and marketability. Besides the variety testing, Agroscope Conthey runs a breeding program for Apricots.

The goal of a good variety range is to fulfill the expectations and demands of the producers, the market and the consumers. Variety testing is done to make a neutral evaluation of new emerging varieties in favor of production and consulting. Important requirements for a variety are good and stable yields, sturdy trees and fruits.

One of Agroscope's testing areas for stone fruits is located in North-Western Switzerland, in Wintersingen at an altitude of 550 meters above sea level. The annual mean precipitation is about 1000 mm/year, the annual mean temperature is 8.5 °C. The loamy claysoils have a high clay and lime content, the pH-value is from 7.5 to 8. The testing area has an extension of 13.5 hectares, from which currently 3.5 ha are planted with cherries, 2.5 ha with plums and 1.5 ha with apricots, wild fruits and walnuts.

Another testing area with specialization in Apricot is in Conthey, Valais at an altitude of 500 meters above sea level. The annual mean precipitation is about 560 mm/year, the annual mean temperature is 10.7 °C. The testing area has an extension of 21 hectares, from which currently 4.5 ha are planted with apricots and 2 ha with apples and pears.

Promising varieties are planted at different sites for demonstration reason and to evaluate their properties at different locations.

Agroscope is in regular exchange with different national and international stakeholders along the value chain to define common goals and criteria for variety testing. For example, an exchange of information and results is done with the group Deutscher Arbeitskreis Steinobst, which is a working group focusing on stone-fruits with different institutes of the German spoken area involved. For apricot, information and results exchanges are conducted with different French, Italian and Spanish institutions. Agroscope is member of the EUFRIN working group "Sweet and Sour cherries", a working group that allows an exchange of information and experience between researchers in the cherry sector.

Agroscope is also well connected with different national stakeholders of the fruit and stone-fruit sector like Schweizer Obstverband (SOV), Agridea or governmental consulting institutions.

Best practice findings

The main research topics for **stone-fruits** concerning varieties at Agroscope are: variety testing, rootstock testing, training systems and mechanical pruning, crop-stability, yield estimation of sweet-cherries, tolerance and resistance against diseases and Apricot breeding.

¹ Equivalent to 'final report' in EIP-AGRI format.

² Please see ec.europa.eu/eurostat/ramon/nomenclatures/ for details on NUTS regions, level 3

In 2017 around 120 international cherry-varieties and around 100 plum-varieties are tested at the Agroscope trial-center Breitenhof, and around 170 apricot varieties at Agroscope Conthey. The suitability of these international varieties is tested for the Swiss growing condition and market. The ideal **sweet-cherry** variety for the Swiss market should be adapted to a humid climate, tolerant against frost events, tolerant or resistant against diseases, have a good fruit-quality, a high fruit firmness and should have black to dark-red fruits.

In **plum**-production the market demands for fruits with a high fruit-weight. The right moment for picking is variety related and very important to provide fruits with the best flavour for the consumers.

In Switzerland, Valais is the main **apricot production** area: This strong regional identity is represented by the use of the regional trademark Valais® and by the importance of direct sale, mainly with the traditional variety Luizet. However, this variety corresponds no more to the retailer and consumer requirements. Market demands high price and quality segments, and bicolor fruits. Furthermore, in the last decade, varieties exhibiting disease tolerance or resistance are explored.

Fruit losses caused by **spotted wing drosophila** (SWD) are a major problem for the Swiss summer fruit production. To have varieties with a low attraction or a repellent effect for SWD could be a precious pillar in future control strategies.

The core of the Agroscope stone-fruit variety testing is the plantation of 3 trees per variety, which are observed for at least 3 years of production. As a next step, promising varieties are planted in a larger number at different locations to see their properties under different site conditions and for demonstration purpose.

The varieties are tested against different parameters as flowering time (flowering period, date of full bloom), harvest time, productivity (kg/tree; kg/m²), fruit size and fruit weight, fruit firmness, taste, texture, tree health, growth strength, attractiveness for spotted wing drosophila (planned).

Since 20 years cherries and plums are cultivated in Switzerland on dwarfing rootstocks. With established rootstocks site-specific problems can occur, e.g. with waterlogging or due to bad soil-rootstock-variety interactions. Therefore the rootstock trials aim to find a bigger selection of suitable rootstocks for Swiss growing conditions. The progressive spread of the plum pox virus is a big risk for the **plum** cultivation. To counter this disease, hyper-sensitive rootstocks and varieties are tested. In 2010 hyper-sensitive rootstocks (Docera 5,6,9) of the Bayerisches Obstbauzentrum were planted in combination with different varieties. In 2012 those trials have been extended, within the scope of an international rootstock-trial. The first results are very promising. The aim in **apricot** rootstock-testing is to find an alternative to the rootstock Myrobalane B, which is susceptible to waterlogging. Another goal for all stone-fruits is to find rootstocks that are less susceptible to bacterial cancer and pseudomonas. For apricot, the influence of 21 rootstocks from different *Prunus* origin are evaluated with particular attention to the sensitivity to bacterial canker. Related to cherries the most important rootstocks that are tested at the moment are Weigi 1, 2, 3 and Krymsk 5, 6, 7.

The outcome of the research is published in different journals and is presented to the Swiss stakeholders of fruit-production at the Breitenhoftagung (conference at the testing centre) and at different meetings and conferences.

Challenges and gaps

- The majority of Swiss stone-fruit varieties are imported, but the breeding goals of foreign breeders do not always meet the requirements of the Swiss production system, e.g. Monilia susceptibility of Canadian varieties in the humid climate of Switzerland
- Avoidance of infestations and the spread of the plum pox virus
- High investment costs for orchard canopies and exclusive netting
- *Drosophila suzukii* (SWD) has become a major pest in stone-fruits, especially in sweet-cherry and apricot production. Adequate management of this pest is a big challenge.
- Switzerland is a neutral country and is not a member of the European Union, nevertheless Switzerland aims to have good and strong connections and interactions with neighbouring countries.
- To bring the interests of different stakeholders along the value chain together.
- Collaboration and exchange of experiences is essential for a production focused variety testing. At the same time independent evaluations are needed. Collaboration and independency can conflict with each other.