

## Synthesis report Performance of new fruit varieties

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**WP:** 2

**IEG thematic area:** Performance of new fruit varieties

**Covered NUTS 3 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) and DK050 (North Jutland); BE221 (arr. Hasselt); FR611 (Dordogne); DE600 (Hamburg), DE932 (Cuxhaven), DE933 (Harburg), DE939 (Stade) and DEF09 (Pinneberg); NL226 (Arnhem/Nijmegen); UKJ42 (Kent); ES511 (Barcelona), ES512 (Gerona), ES513 (Lérida) and ES514 (Tarragona); CH0 (Schweiz/Suisse/Svizzera); ITH10 (Bolzano-Bozen); HU101 (Budapest) and HU102 (Pest); LT002 (Kauno apskritis); DE148 (Ravensburg); ITH55 (Emilia Romagna region – Bologna) and FR512 (Maine et Loire).

**Reporting period:** Y1 report due August 2016

**No. IEG members:** *Total: 30*  
*Male: 23*  
*Female: 7*

### Document history

Version no.	Version date	Description/changes	Author (name and contact details)
1	09/08/2016	First version (meeting 27+28/06/2016)	ir. Jef Vercammen jef.vercammen@pcfruit.be

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<sup>1</sup> If an EUFRUIT project partner, use EUFRUIT partner short name, if a contributing organization designate a partner short name

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## Synthesis findings

On June 27<sup>th</sup> and 28<sup>th</sup> 2016 a meeting of the International Experts Group for EUFRUIT WP2 was organized at the University of Bologna (UNIBO), Via Fanin G. 46, 40127 Bologna (Italy).

### Participants:

EUFRUIT Partners: Jef Vercammen (pcfruit- Partner 2), Sandrine Codarin (CTIFL - Partner 3), Andreas Hahn and Joerg Hilbers (OVA - Partner 4), Felicidad Fernandez (EMR - Partner 6), Ignasi Iglesias (IRTA - partner 7), Sarah Perren (Agroscope - Partner 8), Walter Guerra (Laimburg - Partner 9), Darius Kviklys (replace Audrius Sasnauskas) (LRCAF - Partner 12), Vera Platzgummer (SKST- Partner 14), Uli Mayr (UHOH - Partner 19), Luca Corelli Grappadelli and Stefano Tartarini (UNIBO - Partner 20), Francois Laurens (INRA - Partner 21).

EUFRIN Partners: Tommaso Pantezzi and Roberto Torresani (FEM), Mekjell Meland (NBIO).

### Excused

EUFRUIT Partners: Marianne Bertelsen (AU - Partner 1), Vincent Mathieu and Julien Ruesch (CTIFL - Partner 3), Bujdosó Geza (NARIC - Partner 11), Audrius Sasnauskas (LRCAF - Partner 12), Markus Bradlwarter (SKST - Partner 14).

EUFRIN Partners: Lorenzo Berra and Silvio Pellegrino (Agrion), Nicola Dallabetta (FEM), Thomas Rühmer (Haidegg), Jan Blazek, Frantisek Paprstein and Jiri Sedlak (Holovously), Dorota Kruczynska (INHORT), Gerhard Baab (Klein-Altendorf).

Not present: USAMV (Partner 10), AREFLH (Partner 13).

### Scannings:

After a short presentation of the EUFRUIT-project by J. Vercammen, leader of WP2, each partner has presented its scanning of EUFRUIT WP2. *(It was decided to focus in the first year on variety testing of apples and pears.)* In this synthesis also the scannings of the EUFRUIT WP2 partners that were excused are included, to the extent that they concern variety testing of apple and pear. The scannings of USAMV and AREFLH are missing. *(In the IEG-meeting in Bologna it was decided that in the second year WP2 will focus on stone fruit (peaches, apricots, cherries and plums) and in the third year on strawberries and small fruits.)*

### AU

At AU Aarslev is the main site in Denmark for variety testing of fruit cultivars. In recent years focus has increasingly been on organic production. In recent years 27 new apple cultivars from all over the world have been screened for their suitability to organic production. AU is looking for apple varieties that are robust and suitable for organic production. Fruit quality is a priority and in particular AU is looking for varieties that are sweeter than the existing varieties in order to provide growers with alternatives to imported sweet varieties like 'Pink Lady' - which cannot be grown in Denmark. Suitability to the climate is another important criterion – and the reason why local variety testing is of relevance: A lot of varieties developed in more southern countries require longer growth periods or higher temperatures than can be met in Denmark and several of the recently tested varieties had to be discarded for that reason.

In 2015 10 varieties of the original 27 were chosen for a in a second screening: Your Choise, Sansa/Galak, Maribelle/Lola ®, TellsA931/Galant, Tells47/05, HL783, Fragrance, A987-74, NZ-4 and Poul Sloth. In 2015 two new Norwegian pear varieties have been planted: Kristina and Celina.

### Pcfruit

Pcfruit npo is since the beginning in 1996 involved in the EUFRIN Working Group "Variety testing on apples and pears". Since 2011 pcfruit is also participating in the meetings of the German variety testers and breeders commission "Fachkommission Kernobst im Arbeitskreis Züchtung". For most new apple and pear varieties in test pcfruit use the EUFRIN testing agreement. For the evaluation of the new apple varieties in level 1 the EUFRIN Descriptor list for apples is used. For the evaluation of the new pear varieties the EUFRIN Descriptor list for pears, composed by representatives of Belgium (pcfruit), The Netherlands (DLO) and Italy (UNIBO) is used.

Pcfruit is looking for an apple or a pear which is productive, firm and delicious and which has a good fruit size, a good outlook, a good storability and a good shelf life. If possible it must be able to pick the new apple variety in one time. The new apple or pear variety must be distinguished from the existing varieties and must also be optimally to grow in our climate and it must be preferably less susceptible for pests and diseases and for spring night frost. For a new pear variety it is also very important that fruit set is possible through sprayings with gibberellins.

From the best varieties in the first screening mostly 40 to 120 trees are planted in a second screening (Level 2). The eventual goal is to make a technical guide for the fruit growers. In 2016 pcfruit has 13 apple varieties (Kanzi®/Nicoter, Belgica, Maribelle/Lola®, Wellant®/Fresco, Sweet Surprise®/B3F45, Rockit®/PremA96, Joly Red, Kizuri, Asfari, Ras 95, Isaaq®, Natyra®/SQ159 and Sweetango®) and 7 pear varieties (Corina®, Cepuna/Migo®, Sweet Sensation®, Celina/QTee®, Dicolor, TE-4179, Regal Red® Comice and Red Modoc®) in the second screening: Besides pcfruit has also 5 pear varieties in comparison under a hail net: Xenia®/Oksana, Queen's Forelle®/Thimo, Early Desire®/Gräfin Gepa and Dazzling Gold®/Uta.

### CTIFL

CTIFL is member of EUFRIN Working Group "Variety testing on apples and pears". Testing new apple varieties is organized around a national charter established by industry partners implicated in varieties: growers (FNPF), nurserymen (CEP), INRA (research) and CTIFL (experimentation) since 1997. CTIFL is coordinating the national network of regional stations. The network is organized around 2 levels. Level 1 is implanted in 3 sites (2 trees / variety) located in the main areas of production. Observations are based on the EUFRIN descriptors. Level 2 is implanted in 8 sites (20 trees / variety) located in the main areas of production. At level 2, scab resistant varieties are planted in a plot where fungicides are applied on high risk periods. In some sites, trees are also planted in organic orchards.

Demands for a new apple variety: high pack-out (productive, good quality, long storage), disease-tolerant (polygenic resistance to scab), low susceptibility to canker, mildew, rosy aphid, Gloeosporium (pyramidal resistance) and high resilience to environmental changing conditions. Demands for a new pear variety: productive, easy to grow, long storage period (until march/april) and disease and pest tolerant (scab, fire blight, psylla).

New apple varieties in development: new sports of Gala (Galaval, Galafab), Cripps Pink (Rosy Glow, Sekzie), Golden Delicious (Parsi), Fuji (Aztec, Fubrax) and new monogenic scab-resistant varieties: Story® Inored, Opal® UEB 3264/2, Goldrush® Coop 38, Dalinette and Juliet® Coop 43. New pear varieties in development are Sweet Sensation® and Xenia.

### OVA

The Esteburg (Obstbauversuchsanstalt) is involved in the EUFRIN Working Group "Variety testing on apples and pears". Furthermore the Esteburg ist a founding member of the German variety testers and breeders commission "Fachkommission Kernobst im Arbeitskreis Züchtung". The department of pip fruit variety testing at ESTEBURG is testing new apple and pear varieties. In intensive trials we examine the performance of this new fruit varieties under Northern German conditions of climate and soil. In the first screening they measure the yield with fruit size and fruit weight, colour, russeting, harvest time, maturity and sugar-acid-ratio. Furthermore they collect data of taste and appearance. From the best varieties in the first screening mostly 60 to 120 trees are planted in a second screening. Depending on the variety they do trials on improving the fruit, chemical thinning, fertilization, fruit quality, training and pruning.



### StDLO

The Fruit Research Unit of Wageningen UR is involved in the working group variety testing on apples and pears from the beginning. Wageningen UR is also participating in the yearly meetings of the German variety testers and breeders commission 'Fachkommission Kernobst im Arbeitskreis Züchtung'. A new testing method is used for apple and pear selections since 2014. At that time, a consortium of 16 parties from the whole, mainly Dutch, fruit chain started and funds the current testing work. The consortium is interested in a new apple cultivar which has a really nice smooth and attractive appearance. Besides that, the taste, production, shelf life needs to be excellent. Susceptibility to diseases needs to be low and the variety has to be suitable for growing under Dutch growing circumstances. A new pear selection needs to be special in shape, color and taste and a long storability and shelf life is very important. Of course the productivity needs to be good and the susceptibility to pests and diseases and spring night frost needs to be acceptable.

The parcel can only be visited by the consortium partners and variety owners together with an employee of the Fruit Research Unit. As soon as a market organization has interest in a selection the Fruit Research Unit informs the variety owner about it. The variety owner makes the decision to get in contact with the interested party or not. Additional screening and observations to specific selections depends on the needs of the market organization and the variety characteristics.

New planted club varieties for apple are Kanzi®, Junami®, Wellant® and Lola®. Currently there is an increasing interest in Natyra® for organically growing. For pear Sweet Sensation®, Xenia® and currently also Cepuna-Migo® are club varieties with interest.

### EMR

Currently, UK growers do not commission any cultivar trials for pip fruit through their levy board (AHDB Horticulture) and that has been the case for many years nor do they run other independent tests jointly. It has become industry practice to run their own observational trials on grower farms. Whilst these type of trials are a long way from best practice it appears that UK growers currently favour the introduction of new cultivars on the basis of marketing strategies (e.g. club varieties) and are satisfied to validate larger trials carried in other countries with medium size demonstration orchards in their farms.

Industry priorities for new apple cultivars are reliable high yields, excellent texture and long storage potential. Resistance to pest and diseases are also often mentioned (in particular scab and canker) but often hold less weight than other unique selling points such as a distinct appearance and/or flavour. There is currently great interest from retailers or red/pink fleshed cultivars and growers are looking for competitive cultivars for this and other niches. The pear industry continues a slow but steady decline with few new plantings. New pear varieties are rarely introduced although there is some interest in small fruited or unusual fruit for specific markets. Several organizations have mentioned the need for a 'crunchy' and/or red fleshed pear, but there are no evidence ongoing trials.

### IRTA

IRTA is since 1997 involved in the EUFRIN Working Group "Variety testing on apples and pears". Based on the EUFRIN network a common testing agreement was established and used for most new apple and pear varieties in test. For the evaluation of the new apple varieties in level 1 the EUFRIN Descriptor list for apples is. For the evaluation of the new pear varieties the EUFRIN Descriptor list for pears is used.

IRTA is looking for several apple cultivars providing a constant and good productivity, high packout, with a good colour development, firm with a good fruit size, a good outlook, a good storability and a good shelf life. If possible it must be able to pick the new variety in two times and it must be distinguished from the existing varieties, except in the strains of the common cultivars as Gala', 'Red Delicious' or 'Fuji'. The new variety must also be optimally to grow in our climate and it must have if possible a lower susceptibility for pests and diseases. After the first selection and from the best varieties mostly 50 to 70 trees are planted in a second screening (Level 2 or Level B). In this second screening IRTA has in 2016 13 new apple varieties at

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IRTA Lleida: Opal®, Hooney Moon®, Gala Venus, Gala Decarli, Ultima Gala, Gala Schniga® Schnico, Story ®(Inored), Mandy ® (Inolov), SchnicoRed , FujiCIV-51, Brookfield INFEL®7411, Galafab, Rubin Fuji 811 and Luresweet (Red Love 119/06); and 23 varieties at IRTA Mas Badia: Opal®, Annaglo<sup>cov</sup>a®, Jeromine<sup>cov</sup>, Roat Delicious<sup>cov</sup>, Honeymoon® , Fujiko<sup>cov</sup>, Fujion<sup>cov</sup>, September Wonder®, Crimson Crisp<sup>cov</sup>, Chouquette®, Gala Venus®, Gala Decarli®, Ultima Gala® Banning Gala, Gala Schniga® Schnico, Delicia<sup>cov</sup>, Shinano Gold, Story® Inored<sup>cov</sup>, Galaval<sup>cov</sup>, Mandy® Inolov , Shinano Gold , SchnicoRed, FujiCIV 51, Brookfield INFEL®7411, Galafab, Fengapi, Rubin Fuji 811.

For a new pear cultivar interest lays on its good productivity, excellent eating quality, adequate fruit size and appearance and good storability and shelf life. And of course the essential no introduce as a new cultivar must if possible be distinguishable from the existing varieties. The new variety must also be adapted in our case to warm and hot climates preferably with low susceptibility for pests and diseases (e.g. fire blight, *Psilla pyri*, etc.). From the best varieties in the first screening 50 to 70 trees are planted in a second stage of screening (Level 2). In 2016 IRTA has 3 pear varieties in the second screening: Elliot (Selena), Celina/QTee®, and a new cultivar still under code.

### Agroscope

Agroscope is involved in the European EUFRIN network and it is also participating at the meetings of the German variety testers and breeders commission “Fachkommission Kernobst im Arbeitskreis Züchtung”. The EUFRIN descriptor list is used for the agronomic evaluations and the data are stored in an Agroscope database. For most of the new apple and pear varieties which are currently being tested Agroscope use the EUFRIN testing agreement.

The goal is to select resistant apples which are productive, firm, and tasty with a good fruit size, appearance, storability and shelf life. If possible, it should be distinguishable from the varieties already on the market. In Wädenswil, new scab and/or mildew resistant apple cultivars (currently 30) are planted in a separate orchard (level 1). Half of them are treated with a “normal” fungicide program, and the other half with a Low-Residue fungicide program. Best varieties in the first screening will be planted in Level 3.

For pear Agroscope is screening for a red or a red blushed pear which is productive, tasty and that has a good fruit size, a good appearance, a good storability and a good shelf life. If possible, it must be distinguishable from the existing varieties. This new variety should exhibit optimal growing properties under Swiss climate and being resistant against common pests in this area (e.g. fire blight).

### Laimburg

Through an intense collaboration with most of the important apple breeders, variety managers and license holders around the world Laimburg is trying to get the new hybrids and mutants to test them for their adaptability to the pedoclimatic conditions of our local territory. In most cases Laimburg has a testing agreement directly with the breeder, since several years Laimburg is trying to force them to use the EUFRIN testing agreement which should give a balance between the interests, rights and obligations of both the variety owner and the variety tester. Laimburg is involved from their beginnings in the national network of Liste varietali and in the European EUFRIN network; it is also participating since 2009 to the meetings of the German variety testers and breeders commission “Fachkommission Kernobst im Arbeitskreis Züchtung”.

The testing in so called level 1 is carried out in 2 macroclimatic areas of South Tyrol, in particular at Laimburg 220 m asl and in Latsch at 670 m asl. At Laimburg the monogenic scab resistant hybrids (75 in testing at the moment) are planted in a separate orchard with no fungicide application allowing to evaluate the susceptibility of this material to other fungi like powdery mildew, *Alternaria*, *Marssonina* etc. For the agronomic evaluations the EUFRIN descriptor list is used and the data are stored in an own Oracle database with interfaces with the instruments used for the assessments (Pimprenelle, Aweta sorting machine etc.). The variety owners get an annual report as an output of the database. All the resources used for level 1 testing are coming from internal funding.

Laimburg has an own breeding program in house which gives is a potential risk of a conflict of interest.

### NARIC

At NARIC no apple and pear varieties are tested.

### LRCAF

Plant breeding, such as winter-hardiness, frost tolerance, high productivity, fruit quality, complex resistance to apple scab (*Venturia inaequalis*) and apple blotch (*Phyllosticta mali* Pr.at Del.), canker (*Nectria galligena* Bres.), high storage potential and cultivar evaluation has been an important activity at the IH-LRCAF. The goals of research and breeding of fruit plants include also collection activities and preservation of genetic resources, assessment and improvement of quality of germplasm.

Apple cultivar 'Auksis' became more popular not only in Lithuania, but also between Belarus, Latvia, and Estonia farmers. Our results showed that the Lithuanian apple cultivars 'Auksis', 'Štaris', 'Noris', 'Aldas', 'Skaistis' and 'Rudenis' and pear cultivars such as 'Lukna', 'Gaisra' and 'Liepona' have increased profitability for fruit growers.

### SKST

In South Tyrol, every year around 4 % of the 18,500 ha of apples (700 ha) are renewed with new orchards. The most important question for the grower is which mutant of policlonal cultivars or which new hybrid to plant. With the aim to answer this question in a systematic, knowledge based and market driven way in 2002 the Variety Innovation Consortium SK Suedtirol was funded by VOG and VI.P. It is exclusively funded by these two unions of cooperatives, who have their representatives in the board, which is the body who takes all the final decisions regarding the introduction of new cultivars and mutants. To support and help these decisions, the so called variety commission was funded. It includes representatives of the Extension Service, the Research Center and the marketing organizations VOG and VI.P. The job of the variety commission is to collect independent information and facts on the agronomic performance and the market potential of new varieties of interest, both from abroad but also and mainly through in local evaluation. The evaluation in South Tyrol is a follow up of level 1 testing being carried out exclusively at Laimburg Research Center (see the scanning report of Laimburg). In level 2 and 3 (precommercial) a subset of the cultivars tested in level 1 and proposed by Laimburg and/or the variety owner itself is planted at 3 to 6 microclimatic sites, with at least 50 trees per hybrid and site. The increased number of trees (compared to level 1) allows to be able to start with systematic pruning, thinning, postharvest and marketing trials. This stage is being carried out in collaboration with Laimburg, the Extension Service, the Quality and Marketing Departments of the cooperatives. At present around 30 new hybrids are in the evaluation level 2-3. SKST is looking for a hybrid, which suits for the grower, the marketer as well for the consumer, which is nearly impossible.

### UHOH

KOB is the fruit research station for Hohenheim University (UHOH). KOB is involved in the EUFRIN Working Group "Variety testing on apples and pears". Since 2001 KOB is also participating in the meetings of the German variety testers and breeders commission "Fachkommission Kernobst im Arbeitskreis Züchtung" and since 2006 in the meetings of DOSK (Deutsches Obstsortenkonsortium).

Every year new apple and pear varieties are planted in the first and second screening. We have trials of level 2 in IPM and organic farming conditions. Scab sensible varieties get a normal spraying scheme (IPM, Organic) and scab resistant varieties get only treatments, when there is a high risk on scab in springtime. In most cases KOB used for new apple and pear varieties in test the EUFRIN testing agreement. For the evaluation of new apple and pear varieties German Descriptor list for apples and pears is used, which is comparable to the Euftrin descriptor list. Demands for a new apple or pear variety: productive, good pack-out, good fruit quality, storability and good shelf life, nice appearance and distinguishable to other varieties.

Since 2009 KOB has a cooperation with UEB Prag, noted for a breeding program of resistant apple varieties for more than 40 year. One of the aims of the cooperation is: to combine resistances, taste and appearance of old varieties with the quality of new varieties. KOB has a collection of more than 500 traditional old varieties. In these orchards we do also a small screening of characteristics.

### UNIBO

UNIBO is involved since its beginning of the national network of “Liste varietali” (as project coordinator). The data collected during the variety testing trials were analyzed and the results were disseminated in technical journals in order to inform growers about the performances of these new accessions. UNIBO is also participating to the European EUFRIN network since the beginning of its activity.

At present about 46 not-resistant hybrids, 63 mutants of Gala/Fuji/Red Delicious/Braeburn/Golden Delicious/Pinova/Cripps Pink from different owners and about 150 hybrids from the own apple breeding program are being tested in those trial orchards. The UNIBO collection include also 43 monogenic scab resistant hybrids (20 in testing at the moment). Most of them are carrying the *Vf*-resistance (*Rvi6* gene). For the variety evaluations, the EUFRIN descriptor list is used and the data are stored in an own database. The five best selections from the UNIBO breeding program are currently tested (level 2).

### INRA

INRA is involved in both fruit breeding and fruit variety testing. The testing activity is performed in association with CTIFL and described in CTIFL WP2 scanning report.

INRA is involved in apple and pear breeding programs from the 50s. Some apple cultivars have been released; few have been successfully planted: the first one, released in 1974, Belchard® Chantecler (Golden Delicious x Reinette Clochard) is still a well-known and well paid cultivar in France recognized for its fruit quality. From 1959, INRA started new programs looking for high fruit quality, productive and scab resistant cultivars. So far, all the released cultivars are carrying the *V<sub>f</sub>* gene of scab resistant which can be overcome by new scab strains. It is recommended to spray these *V<sub>f</sub>* cultivars few times in orchard to limit the amount of inoculum and so the risk of overcoming. The most planted cultivars from this program are Ariane®, Antares® Dalinbel, Chouquette® Dalinette and Story® Inored. On pear, Angelys has been released already few years ago. More recently, MIGO® Cepuna, has been released as a first co-obtention between INRA and CEP Innovation.

### Common rootstock trials:

Since 2015 also rootstock research of apples and pears is included in the EUFRIN Working Group “Apple & Pear Variety & Rootstock Testing” some time was spent on rootstock research in the different research stations participating in the IEG-meeting in Bologna. In 2015 it was already decided to start common rootstock trials for apple and pear. During the IEG-meeting a list of observations was discussed.

## Summary for EIP dissemination

**Project title:** EUFRUIT: European Fruit Network

**Keywords:** Variety testing, demands, less susceptible

### Summary:

12 of the 17 partners in EUFRUIT-WP2 are member of the EUFRIN Working Group “Apple & Pear Variety & Rootstock Testing”. From the research institutes only AU, USAMV and NARIC are not a member. Most of the partners of EUFRUIT-WP2 are also participating in other networks (eg Fachkommission Kernobst in Arbeitskreis Züchtung, Liste Varietali, ...). These networks allow an exchange of information between variety testers, which is very useful to enlarge the knowledge around new apple and pear varieties and mutants of existing varieties. All partners, except AREFLH and SKST, are variety testers. Several participants have (Agroscope, LRCAF, Laimburg, UNIBO, INRA) or are working together (IRTA, UHOH-KOB) with a breeding program for apples and/or pears.

Members of the EUFRIN Working Group are mostly using the EUFRIN testing agreement (last version March 4<sup>th</sup> 2009), which should give a balance between the interests, rights and obligations of both the variety owner and the variety tester.. For the evaluation of the new apple varieties in level 1 the EUFRIN Descriptor list for apples (or a derived list) is used (developed during the EUROFRU-project and adapted by the EUFRIN Working Group). For the evaluation of the new pear varieties the EUFRIN Descriptor list for pears (or a derived list), composed by representatives of Belgium (pcfruit), The Netherlands (DLO) and Italy (UNIBO) is used.

Looking at the demands for a new apple or pear variety, besides production, fruit size, appearance, ... also storability and shelf life are very important criteria in the evaluation of new apple and pear varieties. For most of the participants in EUFRUIT-WP2 it is also important that the new apple or pear variety can be distinguished from the existing varieties. Another important demand for a new apple or pear variety is that it is less susceptible to pests and diseases. To determine this a least a part of the trees is less or not treated with fungicides.

Almost all participants are working with 2 levels. In level 1 a limited number of trees (5 to 20) is planted in comparison with a standard apple or pear variety. These varieties differ depending on the location. After a few years a selection is made. The best varieties of level 1 are planted in a larger scale on one or sometimes more locations. In contrary with level 1, the varieties in level 2 can be visited by fruit growers. Depending on the variety and the location trials are done on different topics. It is clear that the selected apple and pear varieties for level 2 are not the same in the different institutes or climate zones. The eventual goal is to make a technical guide line for the fruit growers.

Resume of the challenges:

- How to evaluate resilient varieties (in the frame of public testing)?
- How to aggregate knowledge about varieties at European level?
- Marketing strategies are more/as important as agronomic performance?

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Performance of new fruit varieties – synthesis report

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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) and DK050 (North Jutland); BE221 (arr. Hasselt); FR611 (Dordogne); DE600 (Hamburg), DE932 (Cuxhaven), DE933 (Harburg), DE939 (Stade) and DEF09 (Pinneberg); NL226 (Arnhem/Nijmegen); UKJ42 (Kent); ES511 (Barcelona); ES512 (Gerona); ES513 (Lérida) and ES514 (Tarragona); CH0 (Schweiz/Suisse/Svizzera); ITH10 (Bolzano-Bozen); HU101 (Budapest) and HU102 (Pest); LT002 (Kauno apskritis); DE148 (Ravensburg); ITH55 (Emilia Romagna region – Bologna); FR512 (Maine et Loire); NO51 (Hordaland) and ITH20 (Trento).

Project web page: [www.eufrin.org](http://www.eufrin.org)

## Annex: Scanning reports

Scanning reports from IEG members EUFRUIT WP2