



**Reference genotypes  
As support for breeding and  
genetic & ecological studies (WP2)**

**Alterra-NL, CREA-IT, FCBA-FR, FR-UK, IBL-PL,  
ICAS-RO, INBO-BE, INRA-FR, LUKE-FI, vTI-DE**

## Reference genotypes

### As support for breeding and genetic & ecological studies (WP2)

Status Feb.2016 (*compiled by L.E.Pâques*)

#### Context:

In several forestry research studies, access to different kinds of reference genotypes would be beneficial. In our understanding, reference genotypes are genotypes which could be easily shared among several partners to be used either as standards and/or as common basis for observation across many sites.

We identified 3 main categories of them:

- **Genetic control:** breeders are used to compare performances of newly created material towards some standards, which allow them measuring genetic gains. Usually, these genotypes are represented either by some wild material or by the best genotypes available from their breeding programme;
- **Benchmark for traits:** some traits such as stem architecture, phenology, disease resistance, etc. cannot be measured but only evaluated using subjective scoring systems; for some traits, scores are developed within the limits of a given population /site variability and do not cover the whole species range. Benchmark genotypes represent then the scores (at least the extremes) of a given scale (e.g. crooked stem → straight stem; early flushing → late flushing).
- **Network standard:** for some studies (e.g. phenology, plasticity, pest & disease epidemiology), the possibility to monitor the same (set of) genotypes over many sites or at various ages would be profitable to separate genetic from environmental effects.

According to the category and within the limits of each species possibility (state of progress in the breeding programme), reference genotypes should be genetically stable and easily accessible (propagated).

- For genetic control, besides some wild (unimproved) material, references could be either clones (e.g. for poplars, wild cherry), full-sib families (e.g. Sitka spruce, hybrid larch) or seed orchard progenies (for most other species where available); at last, selected seed stands (for species without seed orchards, as beech, oaks, etc.).
- For benchmarks, clonal material (cutting, grafting, etc.) would be best;
- For network standards, probably material with the narrowest genetic basis available should be preferred (clones > FS progenies > ... seed orchard progenies).

The use of these references would be restricted to a single species in genetic trials (genetic controls and benchmarks). They would be particularly useful in international trials but also in regional ones. Network standards could be installed at low cost (they concern few individuals) whenever and wherever a new experimental plantation is established across Europe: references from several species could be side-planted to the main plantation.

Benefits are obvious in particular

- to refer to up-dated genetic progress (genetic controls),

- to make results more comparable (benchmarks): it is one major drawback in compiling and actualising genetic parameters for many traits in genetics and breeding studies,
- to settle down a pan-European observatory of forest trees disentangling genetic and environmental effects.

### Objective:

The objective of this task within WP2 is

- firstly to inventory proposals from the partners (open to any species and traits),
- to agree on a limited list of standards for each species,
- to think about the logistic organisation of distribution of plant material: from production of material (seed, cutting, grafting, etc.), storage or breeding, to distribution to partners.

### Results:

#### 1. The inventory

Answers received

- from 9 partners: Alterra-NL (J.Buiteveld, S.de Vries), CREA-IT (F.Ducci), FCBA-FR (L.Harvengt), FR-UK (S.J.Lee), IBL-PL (J.Kowalkzyk), ICAS-RO (E.Chesnoiu), INBO-BE (B.de Cuyper), INRA-FR (C.Bastien, JC Bastien, L.E.Pâques, F.Santi), LUKE-FI (E.Beuker), vTI-DE (M.Lieseback)

no information from T4F partners: INIA-SP

- for 16 species (or group of species: *Populus*)
- mostly for Genetic control category; very little information provided for other reference categories
- nearly no clonal material excepted for *Populus* and wild cherry.

Detailed information can be provided on request.

A summary of proposals follows.

A) <i>Prunus avium</i> Wild cherry	p. 4
B) <i>Populus sp.</i> Poplar	p. 9
C) <i>Larix</i> Larch	p.18
D) <i>Pseudotsuga</i> Douglas fir	p.22
E) <i>Picea abies</i> Norway spruce	p.24
F) <i>Picea sitchensis</i> Sitka spruce	p.27
G) <i>Pinus sylvestris</i> Scots pine	p.29
H) <i>Pinus pinaster</i> Maritime pine	p.32
I) <i>Fagus sylvatica</i> Beech	p.34
J) <i>Fraxinus excelsior</i> ash	p.37
K) <i>Quercus sp.</i> Oak	p.40

## Proposal for Standards genotypes

### A) Wild cherry: *Prunus avium*

#### Category 1: genetic control

According to traits, the following best clones are proposed combining vigour and one of the following traits:

Traits	Clones
Stem straightness	IT- ML11, FR-254, BE- GEN/PAV-051, NL-KQ.8.3.01-01(Landscape Bloom), RO- PS-CI-VL85; RO- PS-CI-VL89;RO- PS-CI-VS85
Flat branching angle	IT- ML11, FR-294, BE- GEN/PAV-030, RO- PS-CI-VL85; RO- PS-CI-VL89;RO- PS-CI-VS85
Thin branching	IT- ML11, FR- 254, FR- 294, RO- PS-CI-VL85; RO- PS-CI-VL89;RO- PS-CI-VS85
Leaf spot disease resistance	IT- AP08, FR- 253, FR- 254, FR- 294, BE- PB/PAV-10,

The following seed stands are also proposed

FRM	Origin	Proposed by	Type
Forstamt <b>Weilburg</b> , comp. 114 a1; 23a1, (Hessen)	unknown	THÜNEN-DE	Selected stand
LRA <b>Reutlingen</b> , Distr. VI, comp. 8, (Baden-Württemberg)	unknown	THÜNEN-DE	Selected stand

#### Category 2: benchmarks for traits

##### *Phenology*

Budflush phenology	Standard clones
Early budflush	IT- BF06, FR-253, BE- AN060
Late budflush	IT- VF01, FR-171, BE- SSG014

##### *Stem straightness*

Stem straightness	Standard clones
Straight	IT- ML11, FR-254, BE- GEN/PAV-051, RO- PS-CI-VL85; RO- PS-CI-VL89;RO- PS-CI-VS85
Crooked	IT- ML12, FR-358, BE- GEN/PAV-080

### *Branching*

<b>Branch angle</b>	<b>Standard clones</b>
Flat	IT- ML11, FR-294, BE- GEN/PAV-030, RO- PS-CI-VL85; RO- PS-CI-VL89;RO- PS-CI-VS85
Sharp	IT- ML12, FR-328, FR- 171, BE- PB/PAV-01
<b>Branch thickness</b>	<b>Standard clones</b>
Thin	IT- ML11, FR- 254, FR- 294, RO- PS-CI-VL85; RO- PS-CI-VL89;RO- PS-CI-VS85
Coarse	IT- ML12, FR- 328, BE- PB/PAV-01

### *Leaf spot disease resistance*

<b>Leaf spot resistance</b>	<b>Standard clones</b>
Resistant	IT- AP08, FR- 253, FR- 254, FR- 294, BE- PB/PAV-10
Susceptible	FR- 358, BE- PB/PAV-35

### Category 3: network standards

#### *NL-Landscape Bloom*

See list category 1

## Dissemination

The easiest way to propagate these clones is probably through grafting; grafted plant can be planted in a delay of 2 yrs, which supposes some earlier planification (and contract).

For dissemination, it would probably be best if stocks are produced at one place: this would suppose that each Institute accepts to provide scions, from which on, further grafting could be produced. Plantlets could be sold to partners.

An alternative could be vegetative propagation by in vitro culture followed by nursery cultivation.

Clones	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
IT- AP08	CRA-SEL	Italy	fulvio.ducci @entecra.it	Qualified potentially, but we are waiting for the official Register establishment	(not yet registered)		Veneto Agricoltura and ERSAF	Micropropagated, graft only for keeping them in collection
IT-BF06	CRA-SEL	Italy		id	id		Veneto Agricoltura and ERSAF	id
IT-VF01	CRA-SEL	Italy		id	id		Veneto Agricoltura and ERSAF	id
IT-ML11	CRA-SEL	Italy		id	id		Veneto Agricoltura and ERSAF	id
IT-ML12	CRA-SEL	Italy		id	id		Veneto Agricoltura and ERSAF	id
FR-171	INRA-AGPF	France	frederique.santi @orleans.inra.fr					graft

FR-253	INRA-AGPF	France						graft
FR-254	INRA-AGPF	France						graft
FR-294	INRA-AGPF	France						graft
FR-328	INRA-AGPF	France						graft
FR-358	INRA-AGPF	France						graft
BE-AN060	INBO	Belgium	bart.decuiper@inbo.be					graft
BE-SSG014	INBO	Belgium						graft
BE- PB/PAV-01	INBO	Belgium						graft
BE- PB/PAV-10	INBO	Belgium						graft
BE- PB/PAV-35	INBO	Belgium						graft
NL.KQ.8.3.01-01 (Landscape Bloom)	ALTERRA	Netherlands	Joukje.Buiteveld@wur.nl	Y	Y	Y	<a href="http://www.vermeerderingstuinen.nl/">www.vermeerderingstuinen.nl/</a> + list of licence holders available with <a href="mailto:sven.devries@wur.nl">sven.devries@wur.nl</a>	Graft
Weilburg		Germany	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Y 06 3 814 04 003 2	N	Y	Samendarre Wolfgang	Seed
Reutlingen		Germany	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 08 4 814 04 501 2	N	Y	Staatsdarre Nagold	Seed
RNP-ROMSILVA. OS HOREZU, UPII HOREZU, u.a. 27P, CIOCALTEA-PS-CI-VL85	INCDS (ICAS)	Romania	cathyches@yahoo.com	Qualified	y	y	RNP-ROMSILVA office@rnp.rosilva.ro	graft

RNP-ROMSILVA. OS BABENI, PEPINIERA IONESTI, IONESTI PS-CI- VL89	INCDS (ICAS)	Romania	cathyches@yahoo.com	Qualified	y	y	RNP-ROMSILVA office@rnp.rosilva.ro	graft
RNP-ROMSILVA. OS HUSI, UP V STANILESTI, u.a. 41P, VOLOSESTI; PS-CI-VS85	INCDS (ICAS)	Romania	cathyches@yahoo.com	Qualified	Y	Y	RNP-ROMSILVA office@rnp.rosilva.ro	graft
RNP-ROMSILVA. OS VASLUI, UP I CRASNA, u.a. 2P, ROSIESTI; PS-CI- VS85	INCDS (ICAS)	Romania	cathyches@yahoo.com	Qualified	y	y	RNP-ROMSILVA office@rnp.rosilva.ro	graft



## B) Poplars (*Populus sp.*) (revised by C.Bastien)

### Category 1: genetic control

According to traits, the following best commercial clones are proposed as genetic control:

Traits	Taxa	Clones
<i>Melampsora larici-populina</i> (low susceptibility under natural infection)	<i>P. deltoides</i>	Alcinde, Lena
	<i>P. trichocarpa</i>	-
	<i>P. nigra</i>	-
	<i>P. x canadensis</i>	Triplo, Soligo, Koster, Degrosso, Turcoaia
	<i>P. x generosa</i>	-
	Other interspecific hybrids	Bakan, Skado
<i>Marssonina brunnea</i> (low susceptibility under natural infection)	<i>P. deltoides</i>	Alcinde, Dvina, Lux
	<i>P. trichocarpa</i>	Trichobel
	<i>P. nigra</i>	Jean Pourtet
	<i>P. x canadensis</i>	Dorskamp, Polargo
	<i>P. x generosa</i>	-
	Other interspecific hybrids	Rochester, Taro
<i>Xanthomonas populi</i> (low susceptibility to race 1)	<i>P. deltoides</i>	-
	<i>P. trichocarpa</i>	Fritzi Pauley, Trichobel
	<i>P. nigra</i>	Vereecken
	<i>P. x canadensis</i>	I-214, Koster, Vesten, Robusta, Turcoaia
	<i>P. x generosa</i>	Boelare, Raspalje, Beaupré
	Other interspecific hybrids	Bakan, Skado
	<i>P. deltoides</i>	Alcinde, Dvina
Growth potential in large-spacing plantation	<i>P. trichocarpa</i>	Scott Pauley, Fritzi Pauley, Trichobel
	<i>P. nigra</i>	Vereecken
	<i>P. alba</i>	Villafranca
	<i>P. tremula</i>	Tapiau 8
	<i>P. x canadensis</i>	I-214, Dorskamp, Koster, Triplo, Soligo, Vesten
	<i>P. x generosa</i>	Raspalje, Beaupré <sup>1</sup>
	<i>P. x canescens</i>	Ingolstadt 3 a, Schlewig 1
	Other interspecific hybrids	Bakan, Skado, Max4, Rochester
Growth potential under short rotation coppice (SRC)	<i>P. trichocarpa</i>	Muhle Larsen
	<i>P. x canadensis</i>	AF2, Baldo, Orion

<sup>1</sup> Only in areas where virulences 7 and 8 of *Melampsora larici-populina* are not present

	<i>Other interspecific hybrids</i>	Androscoggin, Max 1, Hybride 275, Bakan Skado, Monviso
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Category 2: benchmarks for traits

Bud Phenology

<b>Budflush phenology</b>	<b>Standard clones</b>
Early budflush	Flevo, I-214, Soligo , Rochester, Fritzi Pauley, Turcoaia
Medium budflush	Alcinde, I45-51, Dorskamp, Polargo, Sanosol
Late budflush	Koster, Blanc du Poitou, Triplo, Serotina

<b>Budset phenology</b>	<b>Standard clones</b>
Early budset	Flevo, Koster, Lena, Vereecken
Medium budset	I-214, Dorskamp, Blanc du Poitou
Late budset	Soligo, Triplo, Alcinde

Susceptibility to *Melampsora larici-populina*

<b>Determination of rust pathotypes present in Mlp populations Virulence detected</b>	<b>Discriminant clone</b>
1	Ogy, Isières
2	Luisa Avanzo, 'Aurora', Grimminge
3	Brabantica
4	Unal
5	Rap
6	84B09, 87B12
7	Beaupré, Ghoy
8	Hoogvorst, Hazendans

<b>Susceptibility level to Mlp in field experiments in presence of all virulences</b>	<b>Standard clones</b>
Very low susceptibility	Alcinde, Lena, Bakan, Skado, Soligo, Triplo, Degrosso,
Low susceptibility	Dvina, I-214, Flevo, Dorskamp, Koster, Fritzi Pauley, Trichobel, Grimminge, Vesten, Hees, Turcoaia
Susceptible	Robusta, Unal, Blanc du Poitou, I-45/51, Lambro, Raspalje, Vereecken
Very susceptible	Rap, Beaupré, Boelare, Hoogvorst, Marilandica, Serotina

### Susceptibility to *Marssonina brunnea*

Taxa	Very susceptible reference clones	Susceptible reference clones	Resistant/Tolerant reference clones
<i>P. deltoides</i>	Lena	Lux	Dvina
<i>P. x canadensis</i>	Magister géant, I-45/51, Tardif de Champagne	I-214, Robusta, Triplo, Lambro, Soligo, Blanc du Poitou, Brenta, Mella	Dorskamp, Polargo, Lux
<i>P. trichocarpa</i>		Fritzi Pauley	
<i>P. x generosa</i>	Hazendans, Grimminge, Raspalje		
Other interspecific hybrids			Taro

### Susceptibility to *Xanthomonas populi*

Taxa	Very susceptible to race1	Susceptible to race1	Resistant to race1
<i>P. x generosa</i>	S.6-2		Boelare, Raspalje, Beaupré
<i>P. trichocarpa</i>		S.3-31	Fritzi Pauley, Trichobel
<i>P. x canadensis</i>	Donk, I-45/51	Blanc du Poitou, Dorskamp	I-214, Koster, Vesten

### Susceptibility to *Phloeomyzus passerinii*

Susceptibility level to woolly poplar aphid in field	Reference clones
Very low susceptibility	Koster, Brenta, Polargo, Alcinde
Intermediate susceptibility	I45-51
Very susceptible	I-214

### Wood specific gravity

Wood specific gravity	Reference clones
Very low	I-214
Low	Trichobel, Polargo
Medium	Koster, Dvina
High	Alcinde, Flevo
Very high	Robusta, Soligo

Category 3: network standards

<b>Taxa</b>	<b>Clones</b>
<i>P. deltoids</i>	Alcinde
<i>P. trichocarpa</i>	Trichobel
<i>P. x canadensis</i>	I-214, Dorskamp, Koster, Soligo, Vesten
<i>P. x generosa</i>	Raspalje, Beaupré
<i>Other interspecific hybrids</i>	Bakan, Skado, Max4

*Comment:* Koster, I-214 and Max4 have been selected as common standard in the recent trial network coordinated by ASP (Germany)

## Dissemination

All clones are available as cuttings

Clones	Taxa	Selection	Country	Contact	Certified	Protected	Available in commercial nursery	Disseminated by
84B09	<i>P. x generosa</i>	INRA-AGPF	France	catherine.bastien@orleans.inra.fr	no	no	no	INRA-AGPF
87B12	<i>P. deltoides</i>	INRA-AGPF	France	catherine.bastien@orleans.inra.fr	no	no	no	INRA-AGPF
AF2	<i>P. × canadensis</i>	Alasia	France	info@alasianewclones.com	yes	yes	yes	Alasia New Clones
Alcinde	<i>P. deltoides</i>	Cemagref	France	-	yes	no	yes	ONF-PNRGF-Guémené
Androscoggin	<i>P. maximowiczii x P. trichocarpa</i>	USA	USA	waldgenressourcen@nw-fva.de	yes	no	yes	NW-FVA
Aurora	<i>P. xcandicans</i>	?	?	?	no	no	ornamental	ONF-PNRGF-Guémené
Bakan	<i>P.trichocarpa x P.maximowiczii</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	yes	yes	INBO
Baldo	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Beaupré	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	no	?	INBO
Blanc du Poitou	<i>P. × canadensis</i>	Cemagref	France	-	yes	no	yes	ONF-PNRGF-Guémené
Boelare	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	no	?	INBO
Brabantica	<i>P. × canadensis</i>	?	Netherlands	?	yes	no	no	ONF-PNRGF-Guémené
Brenta	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Degrosso	<i>P. x canadensis</i>	ALTERRA 3C2A	Netherlands France	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a> <a href="mailto:louispoloni3c2a@yahoo.fr">louispoloni3c2a@yahoo.fr</a>	Yes	Yes	yes	<a href="mailto:louispoloni3c2a@yahoo.fr">louispoloni3c2a@yahoo.fr</a>

Donk	<i>P. x canadensis</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	Yes	no	yes	<a href="http://www.vermeerderingstuinen.nl">www.vermeerderingstuinen.nl</a> , INBO
Dorskamp	<i>P. x canadensis</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	Yes	no	yes	www.vermeerderingstuinen.nl Possibility at ONF-PNRGF- Guémené
Dvina	<i>P. deltoides</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Flevo	<i>P. x canadensis</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	Yes	no	yes	www.vermeerderingstuinen.nl, ONF-PNRGF- Guémené
Fritzi Pauley	<i>P. trichocarpa</i>	Cemagref	France	-	yes	no	yes	ONF-PNRGF- Guémené
Ghoy	<i>P. x canadensis</i>	INBO	Belgium	Marijke.STEENACKERS @inbo.be	yes	no	yes	INBO
Grimminge	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS @inbo.be	yes	yes	yes	INBO
Hazendans	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS @inbo.be	yes	yes	yes	INBO
Hees	<i>P. x canadensis</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	Yes	yes	yes	<a href="http://www.vermeerderingstuinen.nl">www.vermeerderingstuinen.nl</a>
Hoogvorst	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS @inbo.be	yes	yes	yes	INBO
Hybride 275	<i>P. maximowiczii x P. trichocarpa</i>	unknown	unknown	waldgenressourcen@nw-fva.de	yes	no	yes	NW-FVA
I-45/51	<i>P. x canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF- Guémené
I-214	<i>P. x canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF- Guémené
Ingolstadt 3 a	<i>P. x canescens</i>	unknown	Germany	waldgenressourcen@nw-	yes	no	no	NW-FVA

				fva.de				
Isières	<i>P. × canadensis</i>	INBO	Belgium	Marijke.STEENACKERS @inbo.be	yes	no	yes	INBO
Jean Pourtet	<i>P. nigra</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF- Guémené
Koster	<i>P. x canadensis</i>	ALTERRA	Netherlands- France	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a> louispoloni3c2a@yahoo.fr	yes	yes	yes	<a href="http://www.vermeerderingstuinen.nl">www.vermeerderi ngstuinen.nl</a>  <a href="mailto:louispoloni3c2a@&lt;br/&gt;yahoo.fr">louispoloni3c2a@ yahoo.fr</a>
Lambro	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Lena	<i>P. deltoides</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Luisa Avanzo	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF- Guémené
Lux	<i>P. deltoides</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF- Guémené
Magister géant	<i>P. × canadensis</i>	?	?	?	?	no	no	ONF-PNRGF- Guémené
Marilandica	<i>P. × canadensis</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	yes	no	yes	<a href="http://www.vermeerderingstuinen.nl">www.vermeerderi ngstuinen.nl</a>
Max1	<i>P. maximowiczii x P. nigra</i>	unknown	unknown	waldgenressourcen@nw- fva.de	yes	no	yes	NW-FVA
Max4	<i>P. maximowiczii x P. nigra</i>	unknown	unknown	waldgenressourcen@nw- fva.de	yes	no	yes	NW-FVA
Mella	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF- Guémené

Monviso	<i>P. xgenerosa</i> × <i>P. nigra</i>	Alasia	France	info@alasianewclones.com	yes	yes	yes	Alasia New Clones
Muhle Larsen	<i>P. trichocarpa</i>	unknown	unknown	waldgenressourcen@nw-fva.de	yes	no	yes	NW-FVA
Ogy	<i>P. × canadensis</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	no	yes	INBO
Orion	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Polargo	<i>P. × canadensis</i>	ALTERRA 3C2A	Netherlands France	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a> louispoloni3c2a@yahoo.fr	yes	yes	yes	<a href="mailto:louispoloni3c2a@yahoo.fr">louispoloni3c2a@yahoo.fr</a>
Rap	<i>P. × generosa</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	no	no	no	ONF-PNRGF-Guémené
Raspalje	<i>P. × generosa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	no	yes	INBO
Robusta	<i>P. × canadensis</i>	Cemagref ALTERRA	France Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	yes	no	yes	www.vermeerderingstuinen.nl ONF-PNRGF-Guémené
Rochester	<i>P. nigra</i> × <i>P. maximowiczii</i>	Oxford Paper Cie	USA	-	yes	no	?	ONF-PNRGF-Guémené
S3-31	<i>P. trichocarpa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	no	no	no	INBO
S.6-2	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	no	no	no	INBO
Sanosol	<i>P. × canadensis</i>	ALTERRA 3C2A	Netherlands France	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a> louispoloni3c2a@yahoo.fr	yes	yes	yes	<a href="mailto:louispoloni3c2a@yahoo.fr">louispoloni3c2a@yahoo.fr</a>
Schleswig 1	<i>P. × canescens</i>	unknown	Germany	waldgenressourcen@nw-fva.de	yes	no	no	NW-FVA
Scott Pauley	<i>P. trichocarpa</i>	unknown	unknown	waldgenressourcen@nw-fva.de	yes	no	yes	NW-FVA
Serotina	<i>P. × canadensis</i>	ALTERRA	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	yes	no	yes	<a href="http://www.vermeerderingstuinen.nl">www.vermeerderingstuinen.nl</a>



Skado	<i>P.trichocarpa x P.maximowiczii</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	yes	yes	INBO
Soligo	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Tapiau 8 <sup>2</sup>	<i>P.tremula</i>	NW-FVA	Germany	waldgenressourcen@nw-fva.de	yes	no	no	NW-FVA
Tardif de Champagne	<i>P. × canadensis</i>	Cemagref	France	-	yes	no	yes	ONF-PNRGF-Guémené
Taro	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	yes	yes	CRA-PLF
Turcoaia	<i>P. × canadensis</i>	INCDS (ICAS)	Romania	Cathyches@yahoo.com	yes	no	yes	INCDS (ICAS)
Trichobel	<i>P. trichocarpa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	no	yes	INBO
Triplo	<i>P. × canadensis</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF ONF-PNRGF-Guémené
Unal	<i>P. x generosa</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	no	yes	INBO
Vereecken	<i>P. nigra</i>	Alterra	Netherlands	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	yes	no	yes	<a href="http://www.vermeerderingstuinen.nl">www.vermeerderingstuinen.nl</a> ONF-PNRGF-Guémené
Vesten	<i>P. × canadensis</i>	INBO	Belgium	Marijke.STEENACKERS@inbo.be	yes	yes	yes	INBO
Villafranca	<i>P. alba</i>	CRA-PLF	Italy	gianni.facciotto@entecra.it	yes	no	yes	CRA-PLF

<sup>2</sup> Type of plants disseminated: from tissue culture, not cutting

### C) Larch (*Larix* sp) :

#### Category 1: genetic control

#### European larch

For European larch, only synthetic varieties from selected seed stands or better from seed orchards are proposed:

FRM	Origin	Proposed by	Type
SS- Suchedniów Forest District; MP/2/31854/05, MP/2/31850/05, MP/2/31852/05	<i>polonica</i>	IBL-PL	Seed stand
VG Theil : LDE-VG-001	<i>sudetica</i>	INRA-FR	Seed orchard
Forstamt <b>Burghaun</b> , comp. 4408 A 11, 4408 A21, 4409 – 1, (Hessen), recommended as standard: below 600 m asl	probably <i>sudetica</i>	THÜNEN-DE	Selected stand
Stiftungsförsterei <b>Elm</b> , comp. 3203e1, (Niedersachsen), recommended as standard: below 600 m asl	probably <i>sudetica</i>	THÜNEN-DE	Selected stand
BaySF; FB Berchtesgaden, AELF Traunstein; Distr. 58 comp. 7, <b>Käferschlag</b> , (Bayern), recommended as standard: above 600 m asl	Alpine	THÜNEN-DE	Selected stand
BaySF FB Ruhpolding, AELF Traunstein; Distr. 61 comp. 6, <b>Grisselberg Schneid</b> (Bayern), recommended as standard: above 600 m asl	Alpine	THÜNEN-DE	Selected stand
RNP-Romsilva, OS Garcina, U.P. IV, u.a. 28,29,31, PS-LA-NT82	Carpathians	INCDS (ICAS)	Seed orchard
INCDS, Hemeiusi, PS-LA-BC67	Carpathians	INCDS (ICAS)	Seed orchard
RNP-Romsilva, OS Voineasa, U.P. II Latorita, u.a. 4,5, RG-LA/MO,BR,FA-C21D-1	Carpathians	INCDS (ICAS)	Seed stand

#### Japanese larch

FRM	Origin	Proposed by	Type
Forstamt <b>Sellhorn</b> , comp. 1050 a1, b, e, (Niedersachsen)	Artificial	THÜNEN-DE	Selected stand
SHLF Revier <b>Kummerfeld</b> , comp. 1111B, (Schleswig-Holstein)	Artificial	THÜNEN-DE	Selected stand

NB. Some Danish seed orchard (eg Flensburg) could be worth

#### Hybrid larch

FRM	Origin	Proposed by	Type
Vaals-01	hybrids	Alterra-NL	Seed orchard
LEU-VG-001 Lavercantière-PF	Hybrids (over 95%)	INRA-FR	Seed orchard
RNP-Romsilva, OS Tg Mures, U.P. IX, u.a. 2P, PS-LA-MS77	Hybrids (with Carpathians)	INCDS (ICAS)	Seed orchard

NB. Some Danish seed orchard (eg FP201, FP626, etc) could be worth

## Category 2: benchmarks for traits

### Phenology

Budflush phenology	Species	Type	Standard clones
Early budflush			? <sup>1)</sup>
Late budflush	EL	Clone	FR-3001.C.00035
Early bud set/senescence			?
Late budset/senescence	HL F2	Clone	FR-3021.C. Pey-F2

1) INRA can come up with some proposal later on (must get through its collections)

### Canker (*Lachnellula willkommii*) susceptibility

Susceptibility	Species	Type	Standard
High susceptibility	EL	Seed stand	FR-Briançon (LDE-502) (alpine)
Low susceptibility	EL	Seed orchard	FR-VG Theil (LDE-VG-001) ( <i>sudetica</i> )
	EL	Seed orchard	RO, Hemeiusi, PS-LA-BC67 ( <i>carpathians</i> )

### Meria laricis

Susceptibility	Species	Type	Standard
High susceptibility	EL	Seed orchard	FR-VG Theil (LDE-VG-001) ( <i>sudetica</i> )
Medium susceptibility	HL F1	Seed orchard	FR-LEU-VG-001 Lavercantière-PF
Low susceptibility	JL	Seed orchard	DK-FP Flensburg

### Stem form

Straightness	Species	Type	Standard
Straight	HL F1	Seed orchard	FR-LEU-VG-001 Lavercantière-PF
Crooked (highly)			?

## Category 3: network standards

Species	Type	Standard
HL F1	Seed orchard-PF	FR-LEU-VG-001 Lavercantière-PF
EL	Seed orchard	FR-VG Theil (LDE-VG-001) ( <i>sudetica</i> )
EL	FS progenies	RO-Full sib trials (Carpathians)
EL	Seed orchards progenies	RO-Half sib trials (Carpathians)

## Dissemination

Material	Species	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
3001.C.00035	EL	clone	INRA	FR		N		N		graft
Burghaun	EL	Stand		DE	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Yes 063 837 03 013 2	No	Yes	Samendarre Wolfgang	seed
Elm	EL	Stand		DE	<a href="mailto:Poststelle@nfa-oorrel.niedersachsen.de">Poststelle@nfa-oorrel.niedersachsen.de</a>	Yes 034 837 02 674 2	No	Yes	fsb Oerrel	seed
Grisselberg Schneid	EL	Stand		DE	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 837 05 002 2	No	Yes	BaySF Samenklenge Laufen	seed
Käferschlag	EL	Stand		DE	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 837 05 028 2	no	Yes	BaySF Samenklenge Laufen	seed
SS-Suchedniów Forest District	EL- <i>polonica</i>	Seed stand	IBL	PL		N	N	Y	Polish State Forest, available after ordering	seed, seedlings
VG Theil : LDE-VG-001	EL- <i>sudetica</i>	Seed orchard	INRA	FR		Y		Y	GIE 'graines forestières'	seed
FP Flensburg	JL	Seed orchard		DK		Y		Y		seed

Revier Kummerfeld	JL	Stand		DE	<a href="mailto:Poststelle@nfa-oerrel.niedersachsen.de">Poststelle@nfa-oerrel.niedersachsen.de</a>	Yes 011 839 01 002 2	no	Yes	Fsb Oerrel	seed
Sellhorn	JL	Stand		DE	<a href="mailto:Poststelle@nfa-oerrel.niedersachsen.de">Poststelle@nfa-oerrel.niedersachsen.de</a>	Yes 033 83901 263 2	no	yes	fsb Oerrel	seed
3021.C. Pey-F2	HL F2	clone	INRA	FR		N		N		graft
LEU-VG-001 Lavercantière-PF	HL F1	Seed orchard-PF	INRA	FR		Y		Y	GIE 'graines forestières'	Seed
Vaals-01	HL F1	Seed orchard	Alterra	NL	Sven.devries@wur.nl	Y, NL.ZT.3.6. 04-01	no	Y	B.os@staatsbosbeheer.nl	seed
RNP-Romsilva, OS Garcina, U.P. IV, u.a. 28,29,31, PS-LA-NT82	EL	Seed orchard	INCDS (ICAS)	RO	gmihai_2008@yahoo.com	Y		Y	RNP-ROMSILVA office@rnp.rosilva.ro	seed
INCDS, Hemeiusi, PS-LA-BC67	EL	Seed orchard	INCDS (ICAS)	RO	gmihai_2008@yahoo.com	Y		Y	INCDS icas@icas.ro	seed

## D) Douglas-fir

### Category 1: genetic control

FRM	Origin	Proposed by	Type
Darrington-VG : PME-VG-001	Washington	INRA-FR	Seed orchard
La Luzette-VG : PME-VG-002	?	INRA-FR	Seed orchard
Californie-VG : PME-VG-006, Californie-VG	California	INRA-FR	Seed orchard
SHLF <b>Heidmühlen</b> , comp. 2221 C (Schleswig-Holstein) recommended as standard: below 300 m asl	Artificial	THÜNEN-DE	Selected stand
LW Oberförsterei Steinförde, Revier <b>Zechlinerhütte</b> , comp. 6076a2, (Brandenburg) recommended as standard: below 300 m asl	Artificial	THÜNEN-DE	Selected stand
Forstamt <b>Königstein</b> , comp. 412 A 0 (Hessen) recommended as standard: 300-600 m asl	Artificial	THÜNEN-DE	Selected stand
Forstamt Daun, comp. 39 a (Rheinland-Pfalz) " <b>Heuweg</b> " recommended as standard: 300-600 m asl	Artificial	THÜNEN-DE	Selected stand
SS- Bystrzyca Kłodzka Forest District; MP/2/31666/05	?	IBL-PL	Seed stand
SS- Kamienna Góra Forest District; MP/2/31691/05	?	IBL-PL	Seed stand

### Category 2: benchmarks for traits

*No proposal*

### Category 3: network standards

*No proposal*

## Dissemination

Material	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
Californie-VG : PME-VG-006	Seed orchard	INRA	FR		Y	?	Y	GIE 'graines forestières'	seed
Darrington-VG : PME-VG-001	Seed orchard	INRA	FR		Y	?	Y	GIE 'graines forestières'	seed
Heidmühlen	stand		DE	<a href="mailto:Poststelle@nfa-oerrel.niedersachsen.de">Poststelle@nfa-oerrel.niedersachsen.de</a>	Yes 01 1 853 01 009 2	no	yes	fsb Oerrel	Seed
Heuweg	stand		DE	<a href="mailto:FoGz@wald-rlp.de">FoGz@wald-rlp.de</a>	Yes 073 853 05 084 2	no	yes	Forstliches Genressourcenzentrum Rheinland-Pfalz	Seed
Königstein	stand		DE	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Yes 061 853 04 008 2	no	yes	Samendarre Wolfgang	Seed
La Luzette-VG : PME-VG-002	Seed orchard	INRA	FR		Y	?	Y	GIE 'graines forestières'	seed
SS- Bystrzyca Kł. Forest District	Seed stand	IBL	PL		N	N	Y	Polish State Forest, available after ordering	Seed, seedlings
SS- Kamienna Góra Forest District	Seed stand	IBL	PL		N	N	Y	Polish State Forest, available after ordering	Seed, seedlings
Zechlinerhütte	stand		DE	<a href="mailto:Dagmar.schneck@lfb.brandenburg.de">Dagmar.schneck@lfb.brandenburg.de</a>	Yes 123 853 02 018 2	no	yes	LFB, Landesstelle für forstliches Vermehrungsgut	Seed

## E) Norway spruce

### Category 1: genetic control

FRM	Origin	Proposed by	Type
Seed orchard 403 "Suhola 1"	Southern Finland	LUKE-FI	Seed orchard
SS- Wisła Forest District (Istebna)- Wyrchzadeczka Forest Range;	Istebna	IBL-PL	Seed stand
SO- Złoty Potok Forest District;	Istebna	IBL-PL	Seed orchard
LRA <b>Biberach</b> , Distr. XXXV comp. 5-8, (Baden- Württemberg) recommended as standard: below 600 m asl	Unknown	THÜNEN- DE	Selected stand
Forstamt <b>Abtsgmünd</b> , Distr. XIV comp. 3, (Baden- Württemberg) recommended as standard: below 600 m asl	unknown	THÜNEN- DE	Selected stand
Forstbezirk <b>Neustadt</b> , comp. D286a2, (Sachsen) recommended as standard: below 600 m asl	unknown	THÜNEN- DE	Selected stand
LRA <b>Freudenstadt</b> , Distr. XII comp. 126, (Baden- Württemberg) recommended as standard: 600-900 m asl	Probably autochthonous	THÜNEN- DE	Selected stand
BaySF FB Bodenmais, AELF Regen; Distr. 16 comp. 6, <b>Grandl</b> , (Bayern) recommended as standard: 600-900 m asl	Probably autochthonous	THÜNEN- DE	Selected stand
Bay SF FB Neureichenau, AELF Regen; Distr. 27 comp. 1, <b>Lichtauwald</b> , (Bayern) recommended as standard: above 900 m asl	autochthonous	THÜNEN- DE	Selected stand
BaySF Forstbetrieb Bad Tölz, AELF, Miesbach; Distr. 56 comp. 5, <b>Breitörterer Sparben</b> , (Bayern) recommended as standard: above 900 m asl	autochthonous	THÜNEN- DE	Selected stand
RNP-Romsilva, Sighisoara, UP III, ua 134P, PS-MO-MS80	RO-Northern Carpathians	INCDS (ICAS)	Seed orchard
RNP-Romsilva, Gura Humorului, UP V, ua 20P, PS-MO-SV70	RO-Northern Carpathians	INCDS (ICAS)	Seed orchard
INCDS, Tomnatec, UP VI, ua 62, MO, BR, PAM-A220-41	RO-Northern Carpathians	INCDS (ICAS)	Seed stand

### Category 2: benchmarks for traits

Traits	Type	Standard
Stem form, wood quality	Straight, Resonance wood	Seedling seed orchard RO - PS-MO-MS80

### Category 3: network standards

Species	Type	Standard
Norway spruce	Breeding seedling orchard (HS progenies)	RO - PS-MO-MS80



## Dissemination

Material	Type	Selection	Country	Contact	certified	Protected	Available in commercial nursery	Disseminated by	Type of propagation
Seed Orchard 403 "Suhola 1"	Seed orchard	LUKE-FI	FI		Y		Y	Available under order through Siemen Forelia	seed
SS- Wisła Forest District (Istebna)- Wyrchczadeczka Forest Range;	Seed stand	IBL-PL	PL		N	N	N	Polish State Forest, available after ordering	seed, seedlings
SO- Złoty Potok Forest District;	Seed orchard	IBL-PL	PL		N	N	Y	Polish State Forest, available after ordering	
Biberach	stand		DE	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 084 840 27 650 2	no	yes	Staatsdarre Nagold	seed
Abtsgmünd	stand		DE	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 081 840 25 013 1	no	yes	Staatsdarre Nagold	seed
Neustadt	stand		DE	<a href="mailto:Poststelle.sbs@smul.sachsen.de">Poststelle.sbs@smul.sachsen.de</a>	Yes 141 840 14 042 2	no	yes	Darre Flöha	seed
Freudenstadt	stand		DE	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 082 840 23 666 2	no	yes	Staatsdarre Nagold	seed
Grandl	stand		DE	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 840 20 006 2	no	yes	BaySF Samenklenge Laufen	seed

Lichtauwald	stand		DE	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 840 21 043 2	no	yes	BaySF Samenklenge Laufen	seed
Breitörterer Sparben	stand		DE	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 840 29 040 2	no	yes	BaySF Samenklenge Laufen	Seed
RNP- Romsilva, Sighisoara, UP III, ua 134P, PS-MO-MS80	Seed orchard	INCDS (ICAS)	RO	gmihai_2008@yahoo.com	Y		Y	RNP-ROMSILVA office@mp.rosilva.ro	seed
RNP- Romsilva, Gura Humorului, UP V, ua 20P, PS-MO-SV70	Seed orchard	INCDS (ICAS)	RO	gmihai_2008@yahoo.com	Y		Y	RNP-ROMSILVA office@mp.rosilva.ro	seed
INCDS, Tomnatec, UP VI, ua 62, MO,BR, PAM- A220-41	Seed stand	INCDS (ICAS)	RO	gmihai_2008@yahoo.com	Y		Y	INCDS icas@icas.ro	seed

## F) Sitka spruce

### Category 1: genetic control

FRM	Origin	Proposed by	Type
Unimproved wild collection from Canada	Queen Charlotte Island (QCI), BC, Canada	UK-FC	Wild stands
Tested Seed orchard - psiOR12TE <a href="http://www.forestry.gov.uk/pdf/psiOR12TE.pdf/\$FILE/psiOR12TE.pdf">http://www.forestry.gov.uk/pdf/psiOR12TE.pdf/\$FILE/psiOR12TE.pdf</a>	QCI; UK landrace	UK-FC	Seed Orchard
Tested Seed orchard - psiOR13TE <a href="http://www.forestry.gov.uk/pdf/psiOR13TE.pdf/\$FILE/psiOR13TE.pdf">http://www.forestry.gov.uk/pdf/psiOR13TE.pdf/\$FILE/psiOR13TE.pdf</a>	QCI; UK landrace	UK-FC	Seed Orchard
Tested full-sibling family used in vegetative propagation <a href="http://www.forestry.gov.uk/pdf/psiPF93TE.pdf/\$FILE/psiPF83TE.pdf">http://www.forestry.gov.uk/pdf/psiPF93TE.pdf/\$FILE/psiPF83TE.pdf</a>	QCI; UK landrace. Controlled pollination	UK-FC	FS Family
Tested full-sibling family used in vegetative propagation <a href="http://www.forestry.gov.uk/pdf/psiPF112TE.pdf/\$FILE/psiPF112TE.pdf">http://www.forestry.gov.uk/pdf/psiPF112TE.pdf/\$FILE/psiPF112TE.pdf</a>	QCI; UK landrace. Controlled pollination	UK-FC	FS Family

### Category 2: benchmarks for traits

#### Stem Form and Branching Quality

Straightness	Type	Standard
Improved Straightness	Seed orchard	Tested Seed Orchard – psiOR12TE
Best straightness	FS Family	Tested full-sibling family – psiPF112TE
Crooked	Wild Stands	Unimproved collection from Canada

### Category 3: network standards

Type	Standard
Seed orchard	Tested Seed Orchard – psiOR12TE
FS Family	FS Family – psiPF112TE

## Dissemination

Material	Type	Selection	Country	certified	Protected	Available in commercial nursery	Disseminated by	Type of propagation
Tested Seed orchard - psiOR12TE <a href="http://www.forestry.gov.uk/pdf/psiOR12TE.pdf/\$FILE/psiOR12TE.pdf">http://www.forestry.gov.uk/pdf/psiOR12TE.pdf/\$FILE/psiOR12TE.pdf</a>	Seed Orchard	UK-FC	UK	Y	N	Y	Forestry Commission (England)	seed
Tested Seed orchard - psiOR13TE <a href="http://www.forestry.gov.uk/pdf/psiOR13TE.pdf/\$FILE/psiOR13TE.pdf">http://www.forestry.gov.uk/pdf/psiOR13TE.pdf/\$FILE/psiOR13TE.pdf</a>	Seed Orchard	UK-FC	UK	Y	N	Y	Forestry Commission (England)	seed
Tested full-sibling family used in vegetative propagation <a href="http://www.forestry.gov.uk/pdf/psiPF83TE.pdf/\$FILE/psiPF93TE.pdf">http://www.forestry.gov.uk/pdf/psiPF83TE.pdf/\$FILE/psiPF93TE.pdf</a>	FS Family	UK-FC	UK	Y	N	Y	Sitka spruce Breeding Co-operative. Northern Research Station, Roslin, EH25 9SY, Scotland	Cuttings
Tested full-sibling family used in vegetative propagation <a href="http://www.forestry.gov.uk/pdf/psiPF112TE.pdf/\$FILE/psiPF112TE.pdf">http://www.forestry.gov.uk/pdf/psiPF112TE.pdf/\$FILE/psiPF112TE.pdf</a>	FS Family	UK-FC	UK	Y	N	Y	Sitka spruce Breeding Co-operative. Northern Research Station, Roslin, EH25 9SY, Scotland	Cuttings

## G) Scots pine

### Category 1: genetic control

FRM	Origin	Proposed by	Type
Seed Orchard 404 "Suhola 2"	Southern Finland	LUKE-FI	Seed orchard
Seed Orchard 407 "Ruhala"	Southern Finland	LUKE-FI	Seed Orchard
SS: Syców Forest District; MP/2/44273/05, MP/2/44272/05, MP/2/31462/05	Rychtal	IBL-PL	Seed stand
SO (clonal): Oleśnica Śląska Forest District; MP/3/41185/05	Rychtal	IBL-PL	Seed orchard
Forstamt <b>Oerrel</b> , comp. 2134 C ,(Niedersachsen), recommended as standard: below 300 m asl	unknown	THÜNEN-DE	Selected stand
Forstamt <b>Romrod</b> , comp. 1171 A 2; 1197-1; 1198-1; 1199 A 1; 1190 B 0; 1192 A 2; 1193 A 0; 1193 B 0; 1195 A 0; (Hessen) recommended as standard: 300-600 m asl	Unknown	THÜNEN-DE	Selected stand
BaySF Forstbetrieb Selb, AELF Münchberg; Distr. 16 comp. 6; <b>Schwarzhüll</b> , (Bayern) recommended as standard: 300-600 m asl	Unknown	THÜNEN-DE	Selected stand
BaySF Forstbetrieb Selb, AELF Münchberg; Distr. 22, Abt. 8, <b>Hopfenschlag</b> , (Bayern) recommended as standard: above 600 m asl	unknown	THÜNEN-DE	Selected stand
psyOR71TE <a href="http://www.forestry.gov.uk/pdf/psyOR71TE.pdf/\$FILE/psyOR71TE.pdf">http://www.forestry.gov.uk/pdf/psyOR71TE.pdf/\$FILE/psyOR71TE.pdf</a>	Mainly native to UK	UK-FC	Tested clonal seed Orchard

### Category 2: benchmarks for traits

*No proposal*

### Category 3: network standards

*No proposal*

## Dissemination

Material	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
Seed Orchard 404 « Suhola 2 »	Seed orchard	LUKE-FI	Finland	Luke	Y		Y	Available under order through Siemen Forelia	Seed
Seed Orchard 407 « Ruhala	Seed orchard	LUKE-FI	Finland	Luke	Y		Y	Available under order through Siemen Forelia	Seed
SS: Syców Forest District	Seed stand	IBL	Poland	Syców Forest District	N	N	N	Polish State Forest, available after ordering	Seed, seedlings
SO (clonal): Oleśnica Śląska Forest District	Seed orchard	IBL	Poland	Oleśnica Śląska Forest District	N	N	N	Polish State Forest, available after ordering	Seed
Tested clonal seed orchard <a href="http://www.forestry.gov.uk/pdf/psyOR71TE.pdf/\$FILE/psyOR71TE.pdf">http://www.forestry.gov.uk/pdf/psyOR71TE.pdf/\$FILE/psyOR71TE.pdf</a>	Seed Orchard	UK-FC	UK	Forestry Commission (England)	Y	N	Y	Forestry Commission (England)	Seed

								Plant and Seed Supply Branch,	
<b>Oerrel</b>	Stand		Germany	<a href="mailto:Poststelle@nfa-oerrel.niedersachsen.de">Poststelle@nfa-oerrel.niedersachsen.de</a>	Yes 033 851 03 211 2	No	Yes	Fsb Oerrel	Seed
<b>Romrod</b>	Stand		Germany	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Yes 063 851 05 037 2	No	Yes	Samendarre Wolfgang	Seed
<b>Schwarzhüll</b>	Stand		Germany	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 851 12 005 2	No	Yes	BaySF Samenkl enge Laufen	Seed
<b>Hopfenschlag</b>	stand		Germany	<a href="mailto:info-laufen@baysf.de">info-laufen@baysf.de</a>	Yes 091 851 12 007 2	no	Yes	BaySF Samenkl enge Laufen	Seed

## H) Maritime pine

### Category 1: genetic control

FRM	Origin	Proposed by	Type
PPA-VG-015, Saint Sardos-VF3	Landes	FCBA-FR	Seed orchard
PPA-VG-016, Hourtin-VF3	Landes	FCBA-FR	Seed orchard
PPA-VG-011, Beychac-VF3	Landes	INRA-FR	Seed orchard
PPA-VG-013, Saint-Laurent1-VF3	Landes	INRA-FR	Seed orchard
PPA-VG-019, Carcans-VF3	Landes	INRA-FR	Seed orchard
PPA-VG-017, Courlasse-VF3	Landes	INRA-FR	Seed orchard
PPA-VG-014, Saint-Laurent2-VF3	Landes	INRA-FR	Seed orchard
PPA-VG-012, Saint Sardos LC2	Landes x Corsica	FCBA-FR	Seed orchard
PPA-VG-008, Beychac-LC2	Landes x Corsica	INRA-FR	Seed orchard
PPA-VG-°020, Beychac2-LC2	Corsica x Landes	INRA-FR	Seed orchard
PPA-VG-010, Picard-LC2	Landes x Corsica	INRA-FR	Seed orchard
PPA303, Dunes atlantiques	Non improved Landes	INRA-FR	Seed stand

### Category 2: benchmarks for traits

#### Stem form

Straightness	Type	Standard
Straight	Seed stand	PPA800 Corsica
Crooked	Seed stand	PPA303 Dunes atlantiques

#### *Matsucoccus feytaudi*

Susceptibility	Type	Standard
Susceptible	Seed stand	PPA800 Corsica
Resistant	Seed stand	PPA303 Dunes atlantiques

### Category 3: network standards

Type	Standard
Clones	Clones from 35 reference populations (Clonapin in Spain, Portugal and France)



## Dissemination

Material	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
All PPA-VG-xxx VF3 and PPA-VG-xxx LC2	Seed orchards	FCBA-INRA	FR		Y		Y	Seeds available on order through Forelite, ONF, Planfor, SCEA or Vilmorin	Seedlings or seeds
PPA800 Corsica and PPA303 Dunes atlantiques	Seed stands	N	FR		Y		N	Seeds available on order through ONF	seeds

## I) Beech

### Category 1: genetic control

<b>FRM</b>	<b>Origin</b>	<b>Proposed by</b>	<b>Type</b>
Park 't Loo-01	Unknown	Alterra-NL	stand
SS- Kwidzyn Forest District; MP/2/31792/05	Kwidzyn	IBL-PL	Seed stand
Forstamt <b>Nidda</b> , comp. 762 – 0, 763 – 1,(Hessen recommended as standard: below 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Amt für Kreisforsten in <b>Farchau</b> , Kreis Hzgt. Lauenburg, comp. 72 a (Schleswig-Holstein), recommended as standard: below 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
LW Oberförsterei Chorin, Revier Chorin, comp.99 b 3; 100a2; 101a7, „ <b>Brodowin</b> “, (Brandenburg) recommended as standard: below 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Forstamt <b>Schlüchtern</b> , comp. 3411 – 0, (Hessen) recommended as standard: 300-600 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Regionalforstamt Soest-Sauerland, Stadt <b>Warstein</b> comp. 227, 235B, 236B, 238A, 245A, (Nordrhein-Westfalen) recommended as standard: 300-600 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
LRA <b>Heidenheim</b> , Distr. I comp. 16 (Baden-Württemberg) recommended as standard: 300-600 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Forstbezirk <b>Bärenfels</b> , comp. Q604a2, Q605a1 (Sachsen) recommended as standard: 300-600 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
NPV Bayer. Wald, AELF Regen; Staatswald, Distr. 46 comp. 5, <b>Höllbachschlag</b> ,(Bayern) recommended as standard: above 600 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Forstbezirk <b>Marienberg</b> , comp. 18a8, 26a3 (Sachsen) recommended as standard: above 600 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
FA-G340-7, OS FANTANELE, UP6, 42A, 53,54, NAHNISOARA, 340-420m, asl	autochthonous	INCDS (ICAS)	Seed stand

### Category 2: benchmarks for traits

*No proposal*

### Category 3: network standards

*No proposal*

## Dissemination

Material	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
Park 't Loo-01	Seed stand?	Alterra	NL	Sven.devries@wur.nl	Y NL.T.2.2.15-01	No	Y	<a href="http://www.pymbv.com">www.pymbv.com</a>	Seed
SS- Kwidzyn Forest District	Seed stand	IBL	PL	Kwidzyn Forest District	N	N	Y	Polish State Forest, available after ordering	seed, seedlings
Nidda	stand		DE	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Yes 061 810 09 076 2	no	yes	Samendarre Wolfgang	Seed
Farchau	stand		DE	<a href="mailto:Poststelle@nfa-oerrel.niedersachsen.de">Poststelle@nfa-oerrel.niedersachsen.de</a>	Yes 011 810 02 082 2	no	yes	Fsb Oerrel	Seed
Brodowin	stand		DE	<a href="mailto:Dagmar.schneck@lfb.brandenburg.de">Dagmar.schneck@lfb.brandenburg.de</a>	Yes 123 810 04 089 2	no	yes	LFB, Landesstelle für forstliches Vermehrungsgut	Seed
Schlüchtern	stand		DE	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Yes 061 810 09 020 2	no	yes	Samendarre Wolfgang	Seed
Warstein	stand		DE	<a href="mailto:Martin.rogge@wald-und-holz.nrw.de">Martin.rogge@wald-und-holz.nrw.de</a>	Yes 052 810 07 028 2	no	yes	Landesbetrieb Wald und Holz	Seed
Höllbachschlag	stand		DE	<a href="mailto:info-bindlach@baysf.de">info-bindlach@baysf.de</a>	Yes 091 810 19 033 2	no	yes	BaySF Samenklenge Bindlach	Seed
LRA Heidenheim	stand		DE	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 081 810 23 046 2	no	yes	Staatsdarre Nagold	Seed
Forstbezirk Bärenfels	stand		DE	<a href="mailto:Poststelle.sbs@smul.sachsen.de">Poststelle.sbs@smul.sachsen.de</a>	Yes 141 810 13 002 2	no	yes	Darre Flöha	Seed

Forstbezirk Marienberg	stand		DE	<a href="mailto:Poststelle.sbs@smul.sachsen.de">Poststelle.sbs@smul.sachsen.de</a>	Yes 141 810 15 005 2	no	yes	Darre Flöha	Seed
FA-G340-7, OS FANTANELE, UP6, 42A, 53,54, NAHNISOARA	Seed stand	INCDS (ICAS)	RO	cathyches@yahoo.com	no	yes	yes	RNP-ROMSILVA	seed

## J) Ash

### Category 1: genetic control

FRM	Origin	Proposed by	Type
Vaartbos-01/-02	unknown	Alterra-NL	Seed orchard
Hoge Bos (SS)		INBO-BE	Seed stand
Forstamt <b>Münden</b> , comp. 2078a/2079a, (Niedersachsen) recommended as standard: below 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Forstamt Karlsruhe, Distr. II comp. 8 – 11, (Baden-Württemberg) recommended as standard: below 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
Forstamt Schlüchtern, Staatswald, Abt. 238 B 1; 246-0; 250_0; 250 A 0; 252 A 0; 252 A 1; 254 A 1, (Hessen), recommended as standard: above 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand
BaySF FB <b>Rothenburg</b> o.d.T., AELF, Ansbach; Distr.78, comp. 11, (Bayern) recommended as standard: above 300 m asl	Probably autochthonous	THÜNEN-DE	Selected stand

### Category 2: benchmarks for traits

#### Bacterial canker

Material	Type	Standard
Tolerant	Clone	PB/FEX-22
Susceptible	Clone	PB/FEX-07

### Category 3: network standards

*No proposal*

## Dissemination

Material	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
Vaartbos 01/02	Seed orchard	Alterra	NL	Joukje.buiteveld@wur.nl	Yes, NL.ZQ.8.3.02-01/02	no	yes	B.os@staatsbosbeheer.nl	Seed
Hoge Bos (SS)	Seed stand	INBO	BE		?	?	?	?	Seed
Münden	stand		DE	<a href="mailto:Poststelle@nfa-oerrel.niedersachsen.de">Poststelle@nfa-oerrel.niedersachsen.de</a>	Yes 034 811 04 002 2	No	Yes	Fsb Oerrel	Seed
Karlsruhe	stand		DE	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 082 811 05 502 2	No	Yes	Staatsdarre Nagold	Seed
Schlüchtern	stand		DE	<a href="mailto:SamendarreWolfgang@fort.hessen.de">SamendarreWolfgang@fort.hessen.de</a>	Yes 061 811 04 015 2	No	Yes	Samendarre Wolfgang	Seed
Rothenburg	stand		DE	<a href="mailto:info-bindlach@baysf.de">info-bindlach@baysf.de</a>	Yes 091 811 07 004 2	no	yes	BaySF Samenklenge Bindlach	Seed
PB/FEX-22	Clone	INBO	BE		?	?	?	?	Graft
PB/FEX-07	clone	INBO	BE		?	?	?	?	Graft

## K) *Quercus* sp.

### Category 1: genetic control

FRM	Species	Origin	Proposed by	Type
Ede-01	<i>Quercus robur</i>	Non-autochthonous	Alterra-NL	Seed stand (Cat. Tested)
SS- Krotoszyn Forest District; MP/2/31448/05, MP/2/31450/05	<i>Quercus robur</i>	Krotoszyn	IBL-PL	Seed stand
Amt für Kreisforsten in <b>Farchau</b> , Kreis Hzgt. Lauenburg, comp. 132 A, (Schleswig-Holstein) recommended as standard: below 300 m asl	<i>Quercus robur</i>	Probably autochthonous	THÜNEN-DE	Selected stand
LRA <b>Reutlingen</b> , Distr. III, comp. 3, (Baden-Württemberg) recommended as standard: above 300 m asl	<i>Quercus robur</i>	Probably autochthonous	THÜNEN-DE	Selected stand
SS- Smolarz Forest District; MP/2/31518/05	<i>Quercus petraea</i>		IBL-PL	Seed stand
SO- Smolarz Forest District; MP/3/41170/05	<i>Quercus petraea</i>		IBL-PL	Seed orchard
SS- Syców	<i>Quercus petraea</i>		IBL-PL	
Forstamt <b>Wolfgang</b> , comp. 43 B 0, 44 A 0, 47 0, 48 0, (Hessen) recommended as standard: below 300 m asl	<i>Quercus petraea</i>	Probably autochthonous	THÜNEN-DE	Selected stand
Obf. <b>Waldsiedersdorf</b> , comp. 2210°1; 2213°1; 2218°1; (Brandenburg) recommended as standard: below 300 m asl	<i>Quercus petraea</i>	Probably autochthonous	THÜNEN-DE	Selected stand
BaySF FB <b>Rothenbuch</b> , AELF Karlstadt; Distr. 24 Rothsohl, (Bayern) recommended as standard: above 300 m asl	<i>Quercus petraea</i>	Probably autochthonous	THÜNEN-DE	Selected stand
Forstamt <b>Johanniskreuz</b> , Staatswald, Distr. XIV, comp. 2 a1, b2 ,c2, (Rheinland-Pfalz) recommended as standard: above 300 m asl	<i>Quercus petraea</i>	Probably autochthonous	THÜNEN-DE	Selected stand
GO-H150-1, OS GRIVITA, UPIII, 30A, FUNDEANU	<i>Quercus petraea</i>	Autochthonous	INCDS (ICAS)	Seed stand (tested)
ST-J290-2, O.S. CARACAL, UP10, 64A, RESCA	<i>Quercus robur</i>	Autochthonous	INCDS (ICAS)	Seed stand (tested)
RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU	<i>Quercus robur</i> <i>Quercus pedunculiflora</i> <i>Quercus</i>	Autochthonous	INCDS (ICAS)	Seed stand

	<i>petraea</i>			
PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B	<i>Quercus robur</i>	Artificial	INCDS (ICAS)	Seed orchard

### Category 2: benchmarks for traits

#### Phenology

<b>Budflush phenology</b>	<b>Species</b>	<b>Type</b>	<b>Standard</b>
Early budflush	ST/STB/GO	Seed stand	RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU
Late budflush	ST/STB/GO	Seed stand	RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU
Early bud set/senescence	ST/STB/GO	Seed stand	RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU
Late budset/senescence	ST/STB/GO	Seed stand	RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU
Male flowering	ST/STB/GO	Seed stand	RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU

<b>Budflush phenology</b>	<b>Species</b>	<b>Type</b>	<b>Standard</b>
Early budflush	ST	Seed orchard	PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B
Late budflush	ST	Seed orchard	PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B
Early bud set/senescence	ST/	Seed orchard	PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B
Late budset/senescence	ST	Seed orchard	PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B
Male flowering	ST	Seed orchard	PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B

*No proposal*

### Category 3: network standards

*No proposal*



## Dissemination

Material	Species	Type	Selection	Country	Contact	certified	protected	Available in commercial nursery	Disseminated by	Type of propagation
Ede-01	<i>Quercus robur</i>	seed stand	Alterra	NL	<a href="mailto:Sven.devries@wur.nl">Sven.devries@wur.nl</a>	Yes, NL.T.2.3.03-01	no	Yes	<a href="http://www.pymbv.com">www.pymbv.com</a>	seed
SS- Krotoszyn Forest District; MP/2/31448/05 , MP/2/31450/05	<i>Quercus robur</i>	Seed stand	IBL	PL	Krotoszyn Forest District	N	N	Y	Polish State Forest, available after ordering	seed, seedling
Farchau	<i>Quercus robur</i>	stand		DE	<a href="mailto:Poststelle@nfa-oeerrel.niedersachsen.de">Poststelle@nfa-oeerrel.niedersachsen.de</a>	Yes 011 817 02 084 2	no	Yes	Fsb Oerrel	seed
Reutlingen	<i>Quercus robur</i>	stand		DE	<a href="mailto:Staatsklenge.Nagold@rpf.bwl.de">Staatsklenge.Nagold@rpf.bwl.de</a>	Yes 084 816 02 511 2	No	yes	Staatsdarre Nagold	seed
SO- Smolarz Forest District; MP/3/41170/05	<i>Quercus petraea</i>	Seed orchard	IBL	PL	Smolarz Forest District	N	N	Y	Polish State Forest, available after ordering	seed
SS- Smolarz Forest District; MP/2/31518/05	<i>Quercus petraea</i>	Seed stand	IBL	PL	Smolarz Forest District	N	N	Y	Polish State Forest, available after ordering	seed
Wolfgang	<i>Quercus petraea</i>	stand		DE	<a href="mailto:SamendarreWolfgang@forst.hessen.de">SamendarreWolfgang@forst.hessen.de</a>	Yes 061 818 09 006 2	No	Yes	Samendarre Wolfgang	seed
Waldsiefersdorf	<i>Quercus petraea</i>	stand		DE	<a href="mailto:Dagmar.schneck@lfb.brandenburg.de">Dagmar.schneck@lfb.brandenburg.de</a>	Yes 123 818 04 051 2	No	Yes	LFB, Landesstelle für forstliches Vermehrungsgut	seed
Rothenbuch	<i>Quercus</i>	stand		DE	<a href="#">info-</a>	Yes	No	yes	BaySF	seed

	<i>petraea</i>				<a href="mailto:bindlach@baysf.de">bindlach@baysf.de</a>	091 818 10 086 2			Samenklenge Bindlach	
Johanniskreuz	<i>Quercus petraea</i>	stand		DE	<a href="mailto:FoGz@wald-rlp.de">FoGz@wald-rlp.de</a>	Yes 07 2 818 08 031 2	no	yes	Forstliches Genressourcenz entrum Rheinland- Pfalz	Seed
GO-H150-1, OS GRIVITA, UPIII, 30A, FUNDEANU	<i>Quercus petraea</i>	Seed stand (teste d)	INCDS (ICAS)	RO	cathyches@yahoo.com	No	yes	yes	RNP- ROMSILVA,	seed
ST-J290-2, O.S. CARACAL, UP10, 64A, RESCA	<i>Quercus robur</i>	Seed stand (teste d)	INCDS (ICAS)	RO	cathyches@yahoo.com	No	yes	yes	RNP- ROMSILVA,	seed
RG-STB/ULC, PR-H180-1, OS GRIVITA, UPIII, 18A, FUNDEANU	<i>Quercus robur</i>	Seed stand	INCDS (ICAS)	RO	cathyches@yahoo.com	No	yes	yes	RNP- ROMSILVA,	seed
PS-ST-GL85, MANDRESTI, OS TECUCI, UPV, 104A, 104B	<i>Quercus robur</i>	Seed orcha rd	INCDS (ICAS)	RO	cathyches@yahoo.com	No	yes	yes	RNP- ROMSILVA,	seed