BS 3936-4:2007

BRITISH STANDARD

Nursery stock

Part 4: Specification for forest trees, poplars and willows

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 25 and a back cover.

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Foreword

Publishing information

This part of BS 3936 is published by BSI and came into effect on 29 June 2007. It was prepared by Technical Committee AW/1, *Nursery stock*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 3936 supersedes BS 3936-4:1984 and BS 3936-5:1985, which are withdrawn.

Information about this document

BS 3936 is published in eight parts:

- Part 1: Specification for trees and shrubs;
- Part 2: Specification for roses;
- Part 3: Specification for fruit plants;
- Part 4: Specification for forest trees, poplars and willows;
- Part 7: Specification for bedding plants;
- Part 9: Specification for bulbs, corms and tubers;
- Part 10: Specification for ground cover plants;
- Part 11: Specification for container-grown culinary herbs.

BS 3936-4 was originally published at the request of the Horticultural Trades Association and the National Farmers Union. This revision has been prepared following a periodic review.

The market for wood from fast-grown poplars available when BS 3936-5 was first prepared has largely disappeared. Poplar and willow varieties are currently planted for amenity and biomass. Poplars are also included in the provisions of the Forest Reproductive Material Regulations [1]. As the former parts 4 and 5 had increasingly much in common, they are now combined.

The species listed in the tables in Annex A include all those named in recent publications describing forestry and woodland planting schemes. Details of sources are given in Annex A.

Attention is drawn to the Forest Reproductive Material Regulations 2002 [1] and the Plant Health (Great Britain) Order 1993 [2]. See Annex B.

This document conforms closely to standards set by the *National Plant Specification* published by the Horticultural Trades Association [3] and guidance from the Joint Council for Landscape Industries [4] and is consistent with best contemporary forestry nursery practice.

Plants marketed and supplied to this specification as forest nursery stock meet the requirements for Forestry Commission-funded grant schemes and, if suited to the site, meet the requirements of the UK Forestry Standard [5][1)].

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1) Advice on current regulations and woodland grant schemes can be obtained from the Forestry Commission, 231 Corstorphine Road, Edinburgh, EH12 7AT. www forestry.gov.uk

It is a characteristic of crop husbandry that periodically, pests or diseases unexpectedly become more virulent than previously, and invalidate earlier recommendations based on many years of experience and practice. Regrettably, varieties of willow and poplar grown widely for biomass have recently suffered seriously from attacks of rusts and other fungal diseases. As a consequence, all lists of willow and poplar cultivars recommended as forest nursery stock are being revised. As it is uncertain when definitive lists will finally be available, recommended willow and poplar cultivar lists are not included in this edition of this British Standard.

Many of the tree species and varieties listed in Annex A are also grown onto larger sizes for amenity planting. BS 3936-1 specifies requirements for such stock.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 3936 specifies requirements for forest nursery stock of a size suitable for planting or replanting of woodlands, woodland landscapes and land required for other purposes involving trees such as production of Christmas trees and production of biomass.

It also specifies requirements for planting stock of poplars and willows.

BS 3936-4 is relevant to the supply of the young trees and shrubs for planting in woodland that falls within the scope of the Forest Reproductive Material (FRM) Regulations [1]. It is not limited to such uses and can be applied to similar plants supplied for any woodland or landscape project.

It includes specifications for plant description, plant dimensions, health and condition, labelling, and packaging and storage, both for field-grown and for cell-grown plants.

Requirements specified for plants being grown for sale or for transfer through market processes include: naming their origin and provenance or variety and/or cultivar; age and the cultural system under which they are raised; dimensions, including height or length, diameter at a specified point or in relation to a given height; condition (health); and care when supplying stock to the planter.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this British Standard.

ALDHOUS, J.R. and MASON, W.L., eds., *Forest Nursery Practice*, Bulletin 111. Edinburgh: Forestry Commission, 1994.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 forest nursery stock
plants of tree and shrub species and varieties, marketed as suitable for any planting that results in the creation, improvement, renewal or other development of woodland, forest or wooded amenity landscape or conservation area

3.2 naming plants

3.2.1 commercial name
current botanical genus, species and where necessary, sub-species, variety or cultivar names of plants

NOTE These names are used in current statutory regulations and in commerce. They are shortened forms of the full botanical name. See Table A.1, Table A.2, Table A.3 and Table A.4 for names in current commerce.

3.2.2 botanical name
name consisting of genus and species, sub-species, variety, cultivar, clone or hybrid name where appropriate, and the authority who assigned the name

3.2.3 common name
name used in plants lists and current literature as a non-definitive aid to plant identity

3.2.4 cultivar
internationally agreed name for a cultivated variety

NOTE 1 The complete name of a cultivar consists of the botanical name of its taxonomic group (genus and possibly species), followed by the cultivar "epithet", e.g. Populus nigra "Italica".

NOTE 2 The cultivar is the basic taxon for cultivated plants [6].

NOTE 3 Many cultivar names are registered. The International Poplar Commission, for example, acts as international registration authority for all Populus L. cultivars [7]. See www.fao.org/forestry

3.2.5 clone
genetically identical group of plants originating from a single plant by vegetative propagation

NOTE Clones can be given cultivar names.

3.2.6 hybrid
plant that results from the cross-fertilization of two different species, sub-species or varieties

3.2.7 origin of seed
location of indigenous stand from which seed was collected, or to which a previous generation of seed collection and plantation can be traced

NOTE A stand of trees is indigenous if it can reasonably be considered to have descended from trees which occurred naturally in the same locality.

3.2.8 origin of cuttings
for forestry species propagated vegetatively and not assigned a cultivar or varietal name, the location from which indigenous propagation material was first taken or to which a previous generation of cuttings can be traced

*NOTE See **B.3.3**.*

3.2.9 provenance of seed
geographical location where seed was collected

3.3 form and treatment of nursery plants

3.3.1 seedling
plant grown from seed in open ground or cells, and not transplanted since sowing or pricking out

NOTE See Table 1.

3.3.2 transplant
plant which has been transplanted one or more times into open ground

NOTE 1 This term usually applies to bare-rooted stock transplanted at the end of the first or second growing season but might include four-year-old transplants (see Table 1).

NOTE 2 Cell-grown trees may also occasionally be transplanted into open ground.

3.3.3 undercut
<verb> sever roots of seedlings at a regulated depth with a sharp horizontal blade drawn through the seedbed

3.3.4 cutting
<noun> short length of stem or root selected from a plant for its potential to develop new shoots and roots when inserted into soil or other rooting medium

3.3.5 rooted cutting
plant grown from a cutting and bearing one or more years' roots and shoots

3.3.6 root collar
location where the base of the aerial part of a plant meets the top of the root system

3.3.7 set
unrooted stem or branch, usually more than 1 m long and used for field planting

NOTE This definition applies only to poplars and willows.

3.3.8 stool
rootstock maintained to produce cuttings and/or sets

NOTE This definition applies to poplars and willows and other coppicing species.

3.3.9 stump
<verb> cut back the stem of a plant or stool to a point slightly above the root collar

NOTE This definition applies mostly to poplars and willows.

3.4 cultural system

3.4.1 field-grown
grown in open nursery ground, as seedlings, undercut plants or transplants

NOTE Field-grown is also known as open grown.

3.4.2 cell
structure filled with growing medium into which seeds are placed individually or individual unrooted cuttings inserted

NOTE The seeds may be dormant, or partly or fully pre-germinated, including pricked out newly germinated seedlings; cell walls may have vertical ridges or grooves to guide root growth, or may be biodegradable; cells may be arranged in multi-cell trays or other modular structures.

3.4.3 cell-grown plant
plant grown in a cell under partially or fully controlled temperature and moisture regimes

NOTE Roots may be air-pruned.

3.4.4 container
structure filled with growing medium into which an established rooted plant is transplanted

NOTE The plant may be bare-rooted or have been raised in a smaller container or cell.

3.4.5 container-grown plant
plant grown in a container under partially or fully controlled moisture and temperature regimes until of marketable size or moved to a larger container

NOTE Such plants are normally considered too large and expensive for use as forestry planting stock.

3.5 plant dimensions

3.5.1 height of rooted plants
distance from the root collar to the tip of the bud of the leading shoot

NOTE 1 Heights are recorded in centimetres.

NOTE 2 Where plants are sold in bulk and not individually, the height of the bulk supply is expressed as a range defining the maximum and minimum height of the lot of plants under consideration. See Table 2.

3.5.2 height of unrooted sets
distance from the base of the set to its tip

3.5.3 stem diameter
<general> point of measurement depending on the plant material being measured

NOTE Stem diameters are measured in millimetres.

3.5.4 stem diameter
<rooted poplars and willows> diameter of the main stem measured at 0.5 m or 1.0 m above the root collar

3.5.5 stem diameter
<unrooted poplar and willow cuttings> diameter at the top of the cutting

3.5.6 stem diameter
<poplar and willow sets> diameter of set at mid length

3.5.7 root collar diameter (rcd)
diameter of the main stem at the root collar

3.5.8 sturdiness
<general> relationship between root collar diameter, measured in millimetres, and stem height, measured in centimetres

3.5.9 sturdiness
<bare-root plants> minimum root collar diameter for a given height range

3.5.10 sturdiness
<cell-grown plants> minimum root collar diameter for a maximum height

3.6 Age and treatment of plants

3.6.1 plant age and type
statement of a plant's history in the nursery, commonly abbreviated using symbols and digits

NOTE *See Table 1 and **4.2**.*

3.7 cultural terms

3.7.1 pruning wound
area on stem exposed by removing a branch

3.7.2 root membrane permeability
rate of leakage of ions across root cell membranes into distilled water under standard test conditions

NOTE *See **5.3.3**.*

4 Plant description

4.1 Naming of plants

4.1.1 General

Conifers, broadleaves, poplars and willows shall be named using the commercial names listed in Annex A, Table A.1, Table A.2, Table A.3 and Table A.4.

4.1.2 Origin and provenance

Available details of the origin of seed and provenance of seed shall be given on request to any interested parties whenever stock raised from seed is marketed.

Available details of origin shall be given on request when marketing species, whether conifer or broadleaved, that have been propagated vegetatively and have not been assigned a variety or cultivar name.

4.1.3 Variety or cultivar

If not already part of the plant name, details of variety or cultivar shall be given on request to any interested parties whenever such stock is marketed.

4.2 Age and type of plants

4.2.1 General

For each lot of plants marketed, the age and type of plants at the time of expected supply shall be stated.

NOTE 1 *See also **3.6.1**.*

NOTE 2 *Table 1 gives examples of current usage.*

Table 1 **Plant age and type or condition of typical forest nursery stock**

Abbreviated description	Full description
1+0 or 1/0	One-year-old seedling that has neither been undercut nor otherwise disturbed in the seedbed
1+0= or 1/0= or ½u½	One-year-old seedling that has been undercut in the first year
1u1	Two-year-old seedling that has been undercut but not transplanted from the seedbed
1+1 or 1/1	Two-year-old plant that has spent one year as a seedling and one year as a transplant
2+0 or 2/0	Two-year-old seedling that has not been undercut or otherwise disturbed in the seedbed
2+1 or 2/1	Three-year-old plant that has spent two years as a seedling and one year as a transplant
1+1+1 or 1/1/1	Three-year-old plant that has spent one year as a seedling and has been twice transplanted
0/1+0 or 0/1	One-year-old plant raised from a cutting
0/2+0 or 0/2	Two-year-old plant raised from a cutting and not disturbed in the cutting bed
0/1+1 or 0/1/1	Two-year-old plant having spent one year in a cutting bed and one year as a transplant
CG1 or C1+0 or C/0	Cell-grown plants in their first growing season and not transplanted
CG2 or C2+0 or C/2	Cell-grown plants in their second growing season and not transplanted
C0/1+0	Cell-grown one-year-old plant raised from a cutting
S+0	For poplars, a one year rooted cutting stumped back and transplanted
S+1	A stumped cutting with a one year shoot

NOTE 1 Symbols "+" or "/" signify transplanting in open ground; "u" or "=" signify undercutting;"0/" signifies plants raised from cuttings; "C" signifies plants raised in cells; digits give the number of growing seasons since sowing, transplanting or undercutting as appropriate.

NOTE 2 The term plant age and condition has the same meaning as plant age and type.

4.2.2 Age of rooted cuttings and sets

The age of rooted plants shall be determined by the age of the root, and the age of sets by the age of wood at the base.

4.3 Plant dimensions

4.3.1 Plant height

For any lot, the height range of plants offered for sale shall be given in centimetres.

Height ranges shall be expressed in 5 cm, 10 cm or 20 cm steps according to the size of plants on offer (see Table 2).

Table 2 **Height classes and ranges for forestry seedlings and transplants other than poplars and willows**

Height class interval cm	Commonly used ranges cm	Application of ranges
5	10–15; 15–20; 20–25; 25–30	Seedlings, undercut seedlings
10	10–20; 20–30; 30–40	Seedlings, transplants, cuttings and cell-grown plants
20	20–40; 40–60; 60–80; 80–100	Seedlings, transplants, cuttings and cell-grown plants

NOTE 1 The height ranges of the more commonly available sizes of planting stock of most forestry species are listed in the HTA NPS [3].

NOTE 2 Specifications of larger size plants can be found in BS 3936-1.

NOTE 3 For unrooted cuttings and sets, the term "length" may be substituted for "height" where appropriate.

4.3.2 Sturdiness of plants

Planting stock shall conform to Table 3 and Table 4.

Table 3 **Species sturdiness for bare-rooted forest nursery stock, based on minimum root collar diameter (rcd) and height** [A], [B]

Species sturdiness group [C]	**Commercial name**	**Plant height range** cm				
		15–30	20–40	30–45	40–60	60–90
		Plant minimum root collar diameter mm				
1 i	Betula pendula Betula pubescens Prunus spinosa Tsuga heterophylla	3	3	4	5	7
1 ii	Salix caprea Salix cinerea	*No data for these spp*				
2 i	Larix decidua Larix marschlinsii (L × eurolepis) Larix kaempferi Picea abies Picea sitchensis Pseudotsuga menziesii	3	4	5	6	—
	Picea omorika	*No data for this spp*				
2 ii	Acer campestre	*No data for this spp*				
	Acer platanoides Acer pseudoplatanus Alnus cordata Alnus glutinosa Alnus incana Carpinus betulus Crataegus monogyna Fagus sylvatica Prunus avium Prunus padus Sorbus aucuparia Sorbus torminalis	3	4	5	6	9
3 i	Pinus nigra Pinus nigra laricio Pinus sylvestris	4	5	6.5	8	—

A) For poplars and willows, see Table 5, Table 6 and Table 7.

B) Bare-rooted stock is specified by minimum root collar diameter for plants of a specified height range.

C) Species are grouped by increasing inherent sturdiness of young plants. Groups are divided for convenience into conifers and broadleaves, and according to whether figures are available for bare-rooted stock. Gaps in this table are due to lack of data for particular heights and species tabulated. In the absence of other guidance, species values may be estimated from other species in the same sturdiness group.

Table 3 **Species sturdiness for bare-rooted forest nursery stock, based on minimum root collar diameter (rcd) and height** [A), B)] (*continued*)

Species sturdiness group [C)]	**Commercial name**	**Plant height range** cm				
		15–30	20–40	30–45	40–60	60–90
		Plant minimum root collar diameter mm				
3 ii	Castanea sativa Corylus avellana Fraxinus excelsior Quercus petraea Quercus robur Tilia cordata Tilia platyphllos	4	5	6.5	8	11
4 i	Abies grandis Abies procera	4	6	8	10	13
	Abies nordmanniana	*No data for this spp*				
4 ii	Aesculus hippocastanum Ilex aquifolium	4	6	8	10	13

A) For poplars and willows, see Table 5, Table 6 and Table 7.
B) Bare-rooted stock is specified by minimum root collar diameter for plants of a specified height range.
C) Species are grouped by increasing inherent sturdiness of young plants. Groups are divided for convenience into conifers and broadleaves, and according to whether figures are available for bare-rooted stock. Gaps in this table are due to lack of data for particular heights and species tabulated. In the absence of other guidance, species values may be estimated from other species in the same sturdiness group.

Table 4 **Species sturdiness for cell-grown forest nursery stock, based on minimum root collar diameter (rcd) and height** [A), B)]

Species sturdiness group [C)]	**Commercial name**	**Plant height range** cm					
		15–30	20–40	30–50	40–60	60–90	Over 90
		Plant minimum root collar diameter mm					
1 i	Betula pendula Betula pubescens Prunus spinosa Tsuga heterophylla	3	4	—	4	6	—
1 ii	Salix caprea Salix cinerea	3	4	5	5	6	—

A) For poplars and willows, see Table 5, Table 6 and Table 7.
B) Cell-grown stock is specified by species of a specified height range.
C) Species are grouped by increasing inherent sturdiness of young plants. Groups are divided for convenience into conifers and broadleaves.

Table 4 **Species sturdiness for cell-grown forest nursery stock, based on minimum root collar diameter (rcd) and height** [A), B)] (*continued*)

Species sturdiness group [C)]	**Commercial name**	**Plant height range** cm					
		15–30	20–40	30–50	40–60	60–90	Over 90
		Plant minimum root collar diameter mm					
2 i	Larix decidua Larix marschlinsii (L × eurolepis) Larix kaempferi Picea abies Picea sitchensis Pseudotsuga menziesii Picea omorika	4	4	5	5	6	—
2 ii	Acer campestre Acer platanoides Acer pseudoplatanus Alnus cordata Alnus glutinosa Alnus incana Carpinus betulus Crataegus monogyna Fagus sylvatica Prunus avium Prunus padus Sorbus aucuparia Sorbus torminalis	4	4	—	5	7	—
3 i	Pinus nigra Pinus nigra laricio Pinus sylvestris	3	4	—	6	8	—
3 ii	Castanea sativa Corylus avellana Fraxinus excelsior Quercus petraea Quercus robur Tilia cordata Tilia platyphllos	—	5	—	6	8	10
4 i	Abies grandis Abies procera Abies nordmanniana	5	7	—	9	—	—
4 ii	Aesculus hippocastanum Ilex aquifolium	5	7	—	9	—	—

A) For poplars and willows, see Table 5, Table 6 and Table 7.
B) Cell-grown stock is specified by species of a specified height range.
C) Species are grouped by increasing inherent sturdiness of young plants. Groups are divided for convenience into conifers and broadleaves.

Table 5 **Heights and diameters for rooted and unrooted poplar and willow sets other than cricket-bat willow**

Unrooted plants		**Rooted plants**	
Height or length range	**Minimum stem diameter at mid-point**	**Height range**	**Minimum root collar diameter**
m	mm	m	mm
<1.25	10	0.3–0.5	5
1.25–1.5	12	0.4–0.6	6
1.5–1.75	12	0.6–0.9	9
1.75–2.0	17	0.9–1.2	12
2.0–2.25	19	1.2–1.5	15
2.25–2.5	22	1.5–2.0	18

4.4 Changes to plant description

4.4.1 General

If the quantity of plants agreed has to be changed, or additional species listed, or any other change made to plant specification or description, the other party shall be advised in writing in good time, seeking agreement for the change and ensuring that amending documents and relevant changed information affecting specification are exchanged expeditiously.

4.4.2 Substitution

Alternatives shall not be supplied without the prior agreement of the purchaser.

5 Plant condition

5.1 Marketable quality

Plants offered for sale shall not exhibit any of the following defects:

- necroses or damage by harmful organisms;
- signs of desiccation, overheating, mould or decay;
- injuries to stem or branches, other than pruning wounds;
- multiple stems where a species or variety normally develops a single dominant leader;
- excessive stem curvature as described in Forestry Commission (FC) Bulletin 111, *Forest Nursery Practice,* Section 6.7.1, (see also FC Bulletin 121, *Forest tree seedlings. Best practice in supply, treatment and planting,* Plates 4–16 [8]);
- symptoms of mineral deficiency as described in FC Bulletin 111, *Forest Nursery Practice*, Section 4.3; or
- damage by atmospheric pollutants or by severe cold.

5.2 Shoots

5.2.1 General

Plants shall only be offered for sale if they have a vigorous leading shoot, furnished with lateral shoots appropriate to species, age, plant type and height.

Plants shall only be offered for sale if they have a well-developed terminal bud appropriate for the species.

Deciduous species, apart from oak and beech transplants, supplied as dormant plants shall only be offered for sale if they are leafless.

NOTE Oak and beech transplants often retain dead leaves in winter.

5.2.2 Cricket-bat willow

Rooted shoots and sets of cricket-bat willow shall be pruned so as to conform to height or length norms as described in Table 6 and Table 7.

Table 6 **Heights and diameters for unrooted cricket-bat willow sets**

Two-year-old plants			**Three-year-old plants**		
Height range	**Minimum length of clear stem**	**Stem diameter range at 1 m from base**	**Height range**	**Minimum length of clear stem**	**Stem diameter range at 1 m from base**
m	m	mm	m	m	mm
3.25–4.0	3.0	25–30	3.5–4.0	3.25	25–35
3.5–4.0	3.25	30–35	3.75–4.5	3.5	30–37
—	—	—	4.0–5.0	3.75	35–40

Table 7 **Heights and diameters for rooted plants of cricket-bat willow: two-year-old plants (C/2+0)**

Height range	**Minimum length of clear stem**	**Stem diameter range at 1 m from base**
m	m	mm
2.75–3.0	2.25	12–25
3.0–3.5	2.5	15–27
3.5–4.0	3.0	>20

5.3 Roots

5.3.1 General

Root systems of plants offered for sale shall have fibrous roots, according to species and shall be proportional to the age, size and type of plant.

NOTE The success of plants when subsequently planted out is strongly influenced by the structure and amount of fibrous root retrieved at the time of lifting. This depends on the skill of the grower in his choice, timing and execution of cultural operations. See FC Bulletin 121 [8].

5.3.2 Root health

Measures shall be taken at all times to prevent damage to plant roots from insects, fungi and other living organisms, and from waterlogging, disturbance and other physical agencies as described in FC Bulletin 111, *Forest Nursery Practice*, Chapter 13.

5.3.3 Root membrane permeability

When a root membrane permeability assessment is required, the figures in Table 8 shall apply.

NOTE 1 The physiological condition of lifted plants can be determined by measuring root membrane permeability. Figures so derived enable suppliers to assess the probability of forestry stock surviving planting out. Favourable figures can provide reassurance to suppliers that their stock was in good condition at the time of the test.

NOTE 2 Relevant root membrane permeability (rmp) figures are given in Table 8.

NOTE 3 Root membrane permeability (rmp) was formerly known as electrolyte leakage.

Table 8 **Root membrane permeability (rmp) for well-rooted forestry planting stock**

Species	**Norms for healthy, fully dormant plan**	**Maximum acceptable rmp**	
		Bare-rooted stock	**Cell-grown stock**
Pinus nigra P. nigra laricio P. sylvestris Picea abies P. sitchensis QSS and VPSS (QSS means from seed of Queen Charlotte Isles origin, VPSS means propagated vegetatively)	10–15	25	30
Picea sitchensis RSS and WSS (RSS means from seed of Oregon origin, WSS means from seed of Washington origin) Pseudotsuga menziesii	15–20	30	35
Larix decidua L. × marschlinsii (= L. eurolepis) L. kaempferi	10–15	30	35
Abies grandis A. procera	15–20	30	35
Fraxinus excelsior	5–10	25	30
Fagus sylvatica Quercus robur Q. petrea Sorbus aucuparia Tilia cordata T. platyphyllos	10–20	30	35
Acer platanoides Acer pseudoplatanus Betula pendula B. pubescens Prunus avium P. padus	20–30	35	40

NOTE rmp increases might be caused by loss of dormancy, desiccation, rough handling, or other damage. The maxima given indicate the highest value that plants can tolerate before survival rates fall. Properly handled, 90% of spruce plants and 80% of all other species, with rmp not exceeding the values in the table, should survive planting.

5.3.4 Root shape and condition

Transplants with severely unbalanced or J-shaped root systems shall be discarded.

Cell-grown plants shall only be offered for sale if they have a coherent plug without spiralling roots.

When a root membrane assessment is required, the figures in Table 7 shall apply.

5.4 Plant dormancy

Plants shall be supplied fully dormant unless there is prior agreement otherwise.

*NOTE See also **6.1.2**.*

6 Supply to planters

6.1 General

6.1.1 Maintenance of plant condition

During supply operations, plants shall at all times be kept such that:

a) their initial moisture content is maintained (i.e. plants do not dry out);

b) they remain cool at all times (i.e. they do not overheat or break bud prematurely);

c) foliage is not waterlogged (to avoid death of tissues and colonization by fungi);

d) plants are handled gently (to maintain cell condition and avoid increased root membrane permeability, see Table 7);

e) insects and other pests cannot multiply.

NOTE 1 See FC Bulletin 121 [8].

NOTE 2 Supply commences when plants are first removed from their growing area for supply, until they are received by the planter. During this period, plants may be subject to lifting, grading, storage, pesticide treatment, packing and conveyance by vehicle.

NOTE 3 No more grading of plants should be done than is essential to cull out small or defective plants and to divide plants into lots best matching market demand; excessive handling raises plants' rmp values.

6.1.2 Cold storage

Plants shall be kept in cold storage whenever it appears that their physiological condition and dormancy will be best maintained under those conditions.

NOTE See FC Bulletin 121, Chapters 6 to 8 and Figures 6.1 to 6.4 [8].

6.2 Wrapping and packing

6.2.1 Packing materials

Unless otherwise agreed between supplier and recipient, the moisture content of forest nursery stock shall be maintained in transit by wrapping or packing plants in polythene film or bags or equivalent materials.

NOTE See FC Bulletin 121 [8].

6.2.2 Packing and bundling

Plants shall be individually separated, packed with their shoots all in the same direction and handled so as to minimize the amount of soil lodging on foliage.

NOTE Whether or not plants are bundled depends on subsequent storage arrangements.

6.2.3 External packaging

Additional external packing material shall be used to protect bags or boxes of plants, as required by the circumstances of despatch.

NOTE See FC Bulletin 121 [8].

6.2.4 Contents of labelling on packages

Each individual package or bag shall be labelled with the following information:

- the species name;
- the number of plants unless this is totally standard throughout the consignment;
- an identity number to enable the bag to be identified within the order/consignment of which it is part;
- a relevant warning, if the contents have recently been treated with pesticide.

6.2.5 Labelling on external wrappings packages

Each species and each provenance or origin in any consignment shall be provided with two or more labels, depending on the size of the consignment, containing the following information:

- name of supplier;
- supplier's order or consignment identity number;
- customer name, customer's order number and delivery address;
- any health and safety warnings related to use of pesticides on contents;
- details of each lot of plants in the consignment – number, size, and age and type;
- commercial botanical name;
- National Register Identity number;
- an EC plant passport number, if required.

Annex A (informative) Species lists

A.1 Introduction

Table A.1, Table A.2, Table A.3 and Table A.4 list all tree and shrub species named in recent publications which describe or give recommendations for planting to create or restore forests, woodlands and wooded landscapes, including plantations for biomass. The annotations to the list of names in the first column of each table indicate the source publications. Explanations of these and other annotations are set out in the note following these tables.

A.2 Names

The names in column 1 of each of the tables are those most widely used in commerce. They are based on current botanical (Latin) names, given in column 2. The names given in column 3 are believed to be the most widely used common names. Several species are known by more than one common name.

A.3 Plant health

Column 4 of Table A.1, Table A.2, and Table A.3 identify those species for which a plant passport is required. For details of the passport requirement see *Plant health guide to plant passporting and marketing requirements* [9], [10]. These guides do not list any passport requirement for willows.

A.4 National Register Identities

Column 6 of Table A.1 and Table A.2 list recently introduced abbreviations for species names; the Forestry Commission will use these abbreviations in all future National Register Identities [11], [12].

A.5 Willow reference collections

The National Willow Collection [13] and associated lists were formerly maintained by Long Ashton Research Station (LARS). Willows were given LARS reference numbers. The collection was transferred to Rothamsted Research in 2002 and new reference numbers allocated. Relevant old and new reference numbers are listed in columns 6 to 8 of Table A.4.

Table A.1 **Species list: conifers**

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Full botanical name** [A]	**Common name**	**Passport needs** [B]	**Short name (FRMR** [C] **or FC)**
Abies alba [D], [E]	Abies alba MILL.	European silver fir	Pg ZPb	aal
Abies balsamea [E]	Abies balsamea (L.) MILL.	Balsam fir	Pg ZPb	aba [F]
Abies concolor [E]	Abies concolor (GORD.) LINDL. EX HILDEBR.	Colorado white fir	Pg ZPb	aco [F]
Abies fraseri [E]	Abies fraseri (PURSH) POIR.	Fraser fir	Pg ZPb	afr [F]
Abies grandis	Abies grandis (DOUGLAS EX D.DON) LINDL.	Grand fir	Pg ZPb	agr
Abies nordmanniana [E], [G]	Abies nordmanniana (STEVEN) SPACH	Caucasian fir	Pg ZPb	ano [F]
Abies procera *syn.* A. nobilis [E]	Abies procera REHDER	Noble fir	Pg ZPb	apr [F]
Chamaecyparis lawsoniana [G]	Chamaecyparis lawsoniana (A.MURRAY BIS) PARL.	Lawson's cypress		cla [F]
Juniperus communis [E], [I], [J]	Juniperus communis L.	Juniper [K]		jco [F]
Larix decidua [D], [E], [G]	Larix decidua MILL.	European larch	Pg ZPb	lde
Larix × eurolepis [D], [E] *syn.* Larix × marschlinsii [G]	Larix × marschlinsii COAZ *syn.* Larix × eurolepis HENRY	Hybrid larch	Pg ZPb	leu
Larix kaempferi [D], [E], [G]	Larix kaempferi (LAMB.) CARRIÈRE	Japanese larch	Pg ZPb	lka
Picea abies [D], [E], [G]	Picea abies (L.) H.KARST.	Norway spruce	Pg ZPb	pab
Picea omorika [E]	Picea omorika (PANČIĆ) PURK.	Omorika spruce	Pg ZPb	pom [F]
Picea pungens [E]	Picea pungens ENGELM.	Blue spruce	Pg ZPb	ppu
Picea sitchensis [D], [E], [G]	Picea sitchensis (BONG.) CARRIÈRE	Sitka spruce	Pg ZPb	psi
Pinus contorta [D], [E]	Pinus contorta DOUGLAS EX LOUDON	Lodgepole pine	Pg ZPb	pco
Pinus mugo pumilio [G]	Pinus mugo *ssp.* mugo TURRA	Mountain pine	Pg ZPb	pmu [F]
Pinus muricata [E]	Pinus muricata D.DON	Bishop pine	Pg ZPb	pmr [F]
Pinus nigra [D], [E], [G]	Pinus nigra *ssp.* nigra J.F.ARNOLD	Austrian pine	Pg ZPb	pni
Pinus nigra laricio [D], [E], [G]	Pinus nigra *ssp.* laricio (POIR.) MAIRE	Corsican pine	Pg ZPb	pni
syn. P. nigra maritima	P nigra *var.* maritima AUCT. NON (AITON) MELVILLE			
Pinus peuce [E]	Pinus peuce GRISEB.	Macedonian pine	Pg ZPb	ppe [F]
Pinus pinaster [D], [E], [G]	Pinus pinaster AITON	Maritime pine	Pg ZPb	ppa
Pinus radiata [D], [E], [G]	Pinus radiata D.DON	Monterey pine	Pg ZPb	pra

NOTE Details of the footnotes A to G to this table are included at the end of this annex.

Table A.1 **Species list: conifers** (*continued*)

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Full botanical name** [A]	**Common name**	**Passport needs** [B]	**Short name (FRMR** [C] **or FC)**
Pinus sylvestris [D, E, G] P. sylvestris scotica	Pinus sylvestris L. *ssp.* scotica (P.K.SCHOTT) E.F.WARB.	Scots pine Caledonian pine	Pg ZPb	psy
Pseudotsuga menziesii [D, E, G]	Pseudotsuga menziesii (MIRB.) FRANCO	Douglas-fir	Pg	pme
Sequoia sempervirens [G]	Sequoia sempervirens (D.DON) ENDL.	Coast redwood		sse [F]
Sequoiadendron giganteum [G]	Sequoiadendron giganteum (LINDL.) BUCHHOLZ	Wellingtonia		sgi [F]
Taxus baccata [E, G]	Taxus baccata L.	Yew		tba [F]
Thuja plicata [E, G]	Thuja plicata DONN EX D.DON	Western red-cedar		tpt [F]
Tsuga heterophylla [E, G]	Tsuga heterophylla (RAF.) SARG.	Western hemlock	Pg	the [F]

NOTE Details of the footnotes A to G to this table are included at the end of this annex.

Table A.2 **Species list: broadleaves other than poplars and willows**

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Full botanical name** [A]	**Common name**	**Passport needs** [B]	**Short name (FRMR** [C] **or FC)**
Acer campestre [E, L]	Acer campestre L.	Field maple		aca [F]
Acer platanoides [D, L]	Acer platanoides L.	Norway maple		apl
Acer pseudoplatanus [D, L]	Acer pseudoplatanus L.	Sycamore		aps
Aesculus hippocastanum [L]	Aesculus hippocastanum L.	Horse-chestnut		ahi [F]
Alnus cordata [L]	Alnus cordata (LOISEL.) DUBY	Italian alder		aco [F]
Alnus glutinosa [D, E, L]	Alnus glutinosa (L.) GAERTN.	Black alder, Common alder		agl
Alnus incana [D, L]	Alnus incana (L.) MOENCH	Grey alder		ain
Alnus rubra [E]	Alnus rubra BONG.	Red alder		aru [F]
Alnus viridis	Alnus viridis (CHAIX) DC.	Green alder		avi [F]
Betula pendula [D, E, L]	Betula pendula ROTH	Silver birch		bpe
Betula pubescens [D, E, L]	Betula pubescens EHRH.	Downy birch		bpu
Buxus sempervirens [E, H]	Buxus sempervirens L.	Box		bse [F]
Carpinus betulus [D, E, L]	Carpinus betulus L.	Hornbeam [K]		cbe
Castanea sativa [D, E, L]	Castanea sativa MILL.	Sweet chestnut	Pg	csa
Cornus sanguinea [E, H]	Cornus sanguinea L.	Dogwood		csg [F]
Corylus avellana [E, H]	Corylus avellana L.	Hazel		cav [F]

NOTE Details of the footnotes A to L to this table are included at the end of this annex.

Table A.2 **Species list: broadleaves other than poplars and willows** (*continued*)

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Full botanical name** [A)]	**Common name**	**Passport needs** [B)]	**Short name (FRMR** [C)] **or FC)**
Crataegus laevigata [E), I)]	Crataegus laevigata (POIR.) DC.	Midland hawthorn	Pw	clv [F)]
Crataegus monogyna [E), L)]	Crataegus monogyna JACQ.	Hawthorn	Pw	cmo [F)]
Cytisus scoparius [E), H)]	Cytisus scoparius (L.) LINK	Broom		csc [F)]
Daphne laureola [E), I)]	Daphne laureola L.	Spurge-laurel		dla [F)]
Euonymus europaeus [E), H)]	Euonymus europaeus L.	Spindle		eeu [F)]
Fagus sylvatica [D), E), L)]	Fagus sylvatica L.	Beech [K)]		fsy
Frangula alnus [E), I)] (*syn.* Rhamnus frangula) [H)]	Frangula alnus MILL. (*syn.* Rhamnus frangula L.)	Alder buckthorn		fal [F)]
Fraxinus excelsior [D), E), L)]	Fraxinus excelsior L.	Ash [K)]		fex
Hippophäe rhamnoides [E), H)]	Hippophäe rhamnoides L.	Sea-buckthorn		hrh [F)]
Ilex aquifolium [E), H)]	Ilex aquifolium L.	Holly		iaq [F)]
Ligustrum vulgare [E), H)]	Ligustrum vulgare L.	Wild privet		lvu [F)]
Malus sylvestris [E), L)]	Malus sylvestris (L.) MILL	Crab apple	Pw ZPa	msy [F)]
Nothofagus nervosa *syn*. N. procera	Nothofagus alpina (POEPP. & ENDL.) OERST. *synonyms* N. nervosa (PHIL.) KRASSER; N. procera OERST.	Rauli		nne
Nothofagus obliqua [E)]	Nothofagus obliqua (MIRB.) BLUME	Roble, Southern beech		nob [F)]
Populus spp, hybrids and clones *see* Table A.3 [D), E), L)]	Populus spp, hybrids and clones *see* Table A.3	Poplar varieties *see* Table A.3	Pg ZPc	pop *see* Table A.3
Prunus avium [D), E), I)]	Prunus avium (L.) L.	Wild cherry, gean	Pw	pav
Prunus padus [E), L)]	Prunus padus L.	Bird cherry	Pw	ppd [F)]
Prunus spinosa [E), H)]	Prunus spinosa L.	Blackthorn, sloe	Pw	psp [F)]
Quercus cerris [L)]	Quercus cerris L.	Turkey oak	Pg +oak	qce
Quercus ilex [L)]	Quercus ilex L.	Holm oak	Pg +oak	qil
Quercus petraea [D), E), L)]	Quercus petraea (MATT.) LIEBL.	Sessile oak	Pg +oak	qpe
Quercus robur [D), E), L)]	Quercus robur L.	Pedunculate oak, English oak	Pg +oak	qro
Quercus rubra [D), L)]	Quercus rubra L.	Red oak	Pg +oak	qru
Rhamnus cathartica [E), H)]	Rhamnus cathartica L.	Buckthorn		rca [F)]
Rosa arvensis [E), H)]	Rosa arvensis HUDS.	Field rose		rar [F)]
Rosa canina [E), H)]	Rosa canina L.	Dog rose		rcn [F)]
Ruscus aculeatus [E), H)]	Ruscus aculeatus L.	Butcher's-broom		rac [F)]
Salix spp, hybrids and clones *see* Table A.4	Salix spp, hybrids and clones *see* Table A.4	Willow varieties *see* Table A.4		sal [F)]
Sambucus nigra [E), H)]	Sambucus nigra L.	Elder		sni [F)]

NOTE Details of the footnotes A to L to this table are included at the end of this annex.

Table A.2 **Species list: broadleaves other than poplars and willows** (*continued*)

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Full botanical name** [A]	**Common name**	**Passport needs** [B]	**Short name (FRMR** [C] **or FC)**
Sorbus aria [E), L)]	Sorbus aria (L.) CRANTZ	Common whitebeam	Pw Zpa	sar [F)]
Sorbus aucuparia [E), L)]	Sorbus aucuparia L.	Mountain ash, rowan	Pw Zpa	sac[F)]
Sorbus intermedia [E), L)]	Sorbus intermedia (EHRH.) PERS.	Swedish whitebeam		sin[F)]
Sorbus torminalis [E), L)]	Sorbus torminalis (L.) CRANTZ	Wild service-tree	Pw Zpa	sto[F)]
Tilia cordata [D), E), L)]	Tilia cordata MILL.	Small-leaved lime		tco
Tilia platyphyllos [D), E), L)]	Tilia platyphyllos SCOP.	Large-leaved lime		tpl
Ulex europaeus [E), H)]	Ulex europaeus L.	Gorse		ueu[F)]
Ulmus glabra [E), L)]	Ulmus glabra HUDS.	Wych elm		ugl[F)]
Viburnum lantana [E), H)]	Viburnum lantana L.	Wayfaring-tree		vla[F)]
Viburnum opulus [E), H)]	Viburnum opulus L.	Guelder-rose		vop[F)]

NOTE Details of the footnotes A to L to this table are included at the end of this annex.

Table A.3 **List of poplar species**

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Full botanical name** [A]	**Common name**	**Passport needs** [B]	**Native status**
Populus alba [L)]	Populus alba L.	White poplar, Abele	Pg ZPc	
Populus balsamifera	P. balsamifera L. *syn.* P. tacamahacca MILL.	Eastern balsam-poplar	Pg ZPc	
Populus candicans [L)]	P. × jackii SARG.	Balm-of-Gilead	Pg ZPc	
Populus canescens [E), L), M)]	P. × canescens (AIT.) SMITH *syn.* P. alba × P. tremula	Grey poplar		UK native
Populus deltoids	P. deltoides MARSH.	Eastern cottonwood	Pg ZPc	
Populus × euramericana	P. × canadensis MOENCH	Hybrid black-poplar		
Populus × interamericana	P. generosa A. HENRY	Generous poplar		
Populus nigra	P. nigra L.	Black poplar	Pg ZPc	
Populus nigra betulifolia [E), I)]	P. nigra *ssp.* Betulifolia (PURSH) DIPPEL	Native black poplar Manchester poplar	Pg ZPc	UK native
Populus tremula [E), L)]	P. tremula L.	Aspen	Pg ZPc	
Populus tremuloides	P. tremuloides MICHX.	American aspen, quaking aspen	Pg ZPc	
Populus trichocarpa	P. trichocarpa HOOK.	Black cottonwood, western balsam-poplar	Pg ZPc	

NOTE Details of the footnotes A to N to this table are included at the end of this annex.

Table A.4 **List of willow species**

Commercial name as in HTA National Plant Specification and/or FRM Regulations and/or FC source	**Species and/or hybrid botanical name as listed for the UK National Willow Collection**[N)]	**Common name as in the UK National Willow Collection**	**Native status**	**Short name**	**LARS No. for clones in collection**	**Rothamsted Research consecutive list No.**	**Rothamsted Research No. for clones in collection**
Salix acutifolia	S. daphnoides Vill. *var.* acutifolia *syn.* S. acutifolia Willd.	Violet w			054/01 - 04	437 - 440	054/001 - 004
Salix alba [E), L)]	S. alba L.	White w	UK native	sab	004/10 - 70 005/04 - 46	127 - 209	017/001 - 083
Salix aurita [E), I)]	S. aurita L.	Eared w	UK native	sau	023/01 - 04	453 - 456	061/001 - 004
Salix caprea [E), H)]	S. caprea L.	Goat w; Great Sallow	UK native	sca	037/03 - 13	458 - 465	063/001 - 008
Salix cinerea [E), H)]	S. cinerea L.	Grey w	UK native	sci	045/02 - 08	469 - 473	064/001 - 005
Salix daphnoides [L)]	S. daphnoides Vill.	Violet w			053/01 - 19	419 - 436	053/001 - 018
Salix elaeagnos [H)]	S. elaeagnos Scop. *syn.* S. rosmarinifolia L.	Olive w			069/01	1037	197/001
Salix exigua [H)]	S exigua Nutt	Coyote w			056/2 - 3	1090 - 1091	207/001 - 002
Salix fragilis	S. fragilis L.	Crack w	UK native	sfr	057/01 - 14	383 - 396	042/001 - 014
Salix irrorata	S. irrorata Andeross.	Blue-stemmed w			074/01	948	165/001
Salix lanata	S. lanata L.	Woolly w	UK native		not listed	Not listed	not listed
Salix myrsinifolia	S. nigricans Sm. *syn.* S. myrsinifolia Salisb.	Dark-leaved w	UK native		091/01 - 14	997 - 1008	185/001 - 012
Salix pentandra	S. pentandoa L.	Bay w	UK native	spe	093/01 - 05	12 - 16	008/001 - 005
Salix phylicifolia	S. phylicifolia L.	Tea-leaved w	UK native		095/01 - 05	1013 - 1017	188/001 - 005
Salix purpurea	S. purpurea L.	Purple w	UK native	spu	097/01 - 53	838 - 884	143/001 - 047
Salix smithiana	S. viminalis L. × cinerea L. = S. × smithiana Willd.	Silky-leaved osier	UK native		not listed	530	077/01
Salix triandra	S. triandra L.	Almond-leaved w	UK native	str	112/01 - 78	24 - 101	013/001 - 078
Salix viminalis [E), H)]	S. viminalis L.	Common osier	UK native	svi	115/01 - 109	642 - 726	109/001 - 085

NOTE The following footnotes apply to Table A.1, Table A.2, Table A.3 and Table A.4.

A) Conifer names as listed in *World checklist and bibliography of conifers* [14]; native species as in *'New flora of the British Isles* [15]; willows as in the *UK National Willow Collection* [13]; poplar cultivars as in *Poplars for wood production and amenity* [7].

B) UK Plant Passport requirements as at 1 April 2004 [9], [10].

The letters "Pw" apply to the *Plant health guide to plant passporting and marketing requirements* [9], [10], Appendix A species, that is those for which a passport is required when sold or moved to commercial producers for growing on and to retail outlets.

The letters "Pg" apply to the *Plant health guide* [9], [10], Appendix B species, that is those for which a passport is required when sold or moved to commercial growers for growing on.

For plants with "+oak" in their row growers need to be aware of current requirements to prevent transfer of "sudden death of oak" disease on carrier species.

Protected zone requirements apply to the species indicated:

- ZPa See the *Plant health guide* [9], [10] for "fireblight" *Erwinia amylovora*;
- ZPb UK (N. Ireland, Isle of Man, Jersey), Ireland for "*Pissodes*" weevils;
- ZPc UK (N. Ireland), Ireland for "poplar canker" *Hypoxylon mammatum.*

C) Abbreviated names used in National Register Identities [11], [12].

D) Name listed in FRM Regulations [11], [12].

E) Name listed in Forestry Commission Practice Note 7 and/or 8, FC Information Note 17 and/or 21, and/or the Forestry Commission Seed catalogue for 2006/07 [16], [17], [18], [19].

F) Not listed in EC Regulation No. 1597/2002 but based on the same rules for selecting shortened forms.

G) Name listed in the HTA NPS [3], section 5.3: conifers.

H) Name listed in the HTA NPS [3], section 2.3: shrubs.

I) Name listed in the HTA NPS [3], section 9.2, species of native origin in the UK.

J) The HTA NPS [3] only lists cultivars of this species.

K) Name may be prefixed by "common" to avoid confusion with other species of the same genus.

L) Name listed in the HTA NPS [3]) section 1.3: trees.

M) Reference identity of tested commercial poplar clones approved for planting schemes that fall within the scope of FRM Regulations [12].

N) The National Willow Collection, formerly maintained at Long Ashton Research Station, Bristol, is now in the care of Rothamsted Research, Harpenden, Herts AL5 2JQ [13].

Annex B (informative) Brief notes on the forest reproductive material and plant health legislation

B.1 Introduction

Attention is drawn to the following legislation on the day-to-control of seed and plant material.

Forest Reproductive Material (Great Britain) Regulations [1]

Plant Health (Great Britain) Order [2]

These notes identify objectives and usage of terms that might otherwise cause confusion.

B.2 Objectives

B.2.1 General

The objectives of the legislation in **B.1** are to promote the best use of tree seed, to support tree improvement programmes in the EU and to minimize risks of loss of trees through spread of fungal and insect pests on plants moving in trade. An outline of the essentials entailed is given in *Recent changes to the control of forest reproductive material* [11].

The system in use over the last 30 years to identify individual lots of seed has been replaced by a system combining the year of collection with National Register Identities recorded in the National Register. It applies equally to any seed passing through the Forestry Commission's records, whether or not the species is covered by the FRM Regulations [1].

From the time the FRM Regulations came into force, new batches of seed have been given an identity number incorporating the National Register Reference for that seed source.

Examples of the new identity numbers incorporating national seed register numbers are given in [11].

B.2.2 Voluntary extension of systems

The species listed in legislation form only a proportion of the species and varieties used as forestry plant stock in commerce. The Forestry Commission encourage voluntary application of standards to species not listed in legislation. Private groups and trade associations have also set up broadly based standards for commercial practice, e.g. the voluntary Nursery Certification Scheme promoted by the Horticultural Trades Association [3].

B.3 Records and traceability

B.3.1 General

Under the FRM Regulations [1], provisions are made to ensure the traceability of stock. Relevant material has to be traceable back to a seed source or cutting source. Under the Plant Health Order [2] also, relevant material has to be traceable from the grower through the marketing process, the detailed provisions depending on the species and type of material being marketed.

B.3.2 Supplier's documents

B.3.2.1 General

Both sets of regulations call for supplier's documents. These differ to some degree in their requirements and content.

B.3.2.2 Forest reproductive material

The Forestry Commission have available on their website (www.forestry.gov.uk), templates for the supplier's document which, when completed, accompanies each lot of forest productive material which is marketed. These seek to ensure that the planter receives the best available information on the origin, provenance and genetic quality of the planting stock supplied. See also *Guidance on the implementation of the FRM Regulations* [12].

B.3.2.3 Plant health

Details of plant passports and supplier document for material are given in *Plant health guide to plant passporting and marketing requirements* [9], [10]. When issued, the plant health supplier document provides documentary evidence that the plant material being marketed is, to the best of the supplier's knowledge substantially free from quality-affecting pests and diseases. See also comments on country of origin in **B.3.3**.

B.3.3 Country of origin

The FRM regulations place great significance on proper identification of seed origin, particularly in relation to native species. This interest derives from the influence seed origin can have on responses of healthy trees to the site into which they have been planted.

The Plant Health Order places emphasis on country of origin as the beginning of the marketing chain, in relation to risk of disease introduction. However, the definitions of origin under the two sets of regulations do not coincide. It is essential that growers remain aware of the different interests.

B.4 Type

The FRM Regulations refer to six **types** of basic material: seed sources, stands, seed orchards, parents of families, clones and clonal mixtures [12]. This usage should be noted in the context of **3.6.1** and Table 1.

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