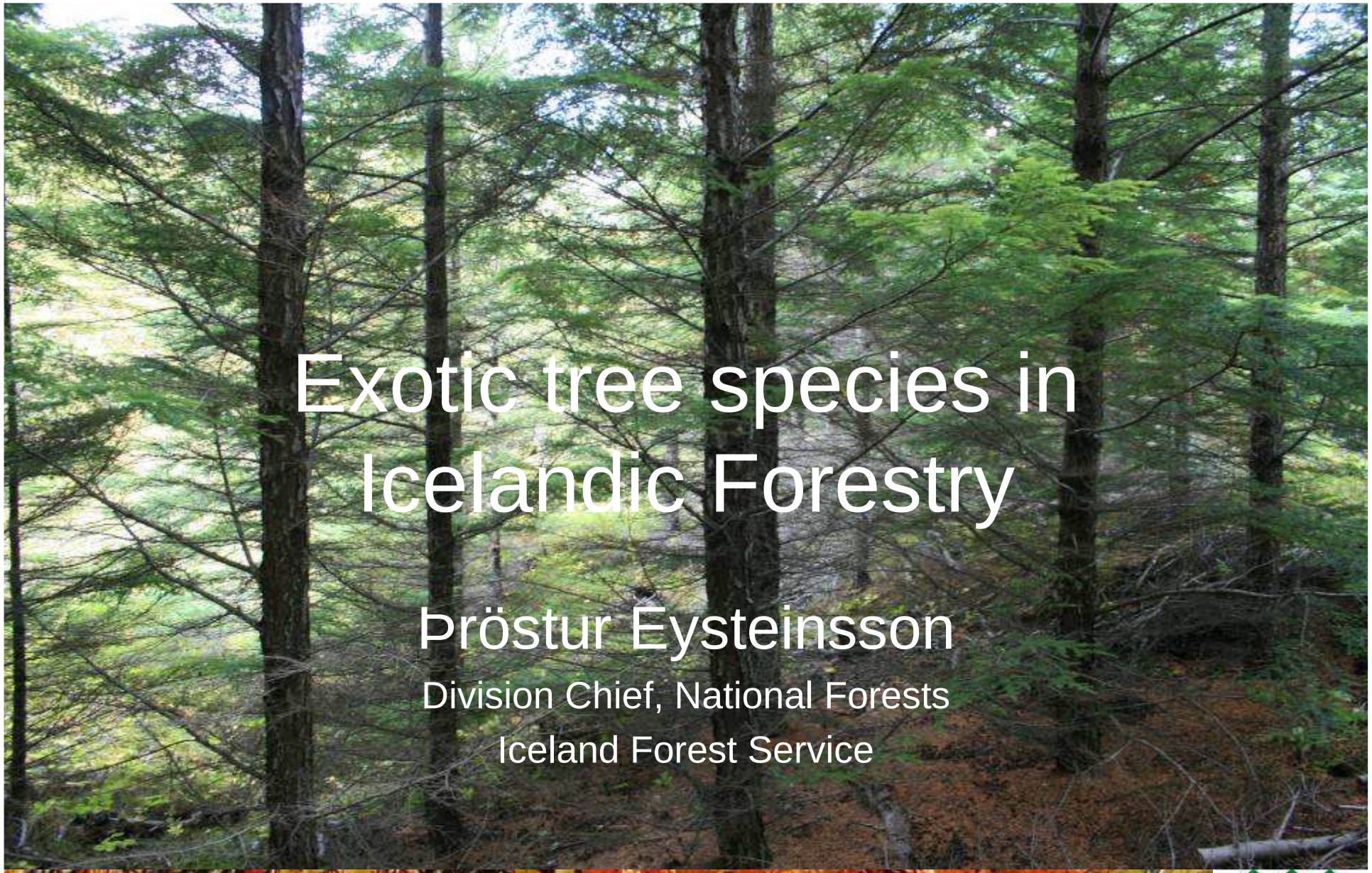

# Exotic tree species in Icelandic Forestry


Þröstur Eysteinsson

Division Chief, National Forests

Iceland Forest Service


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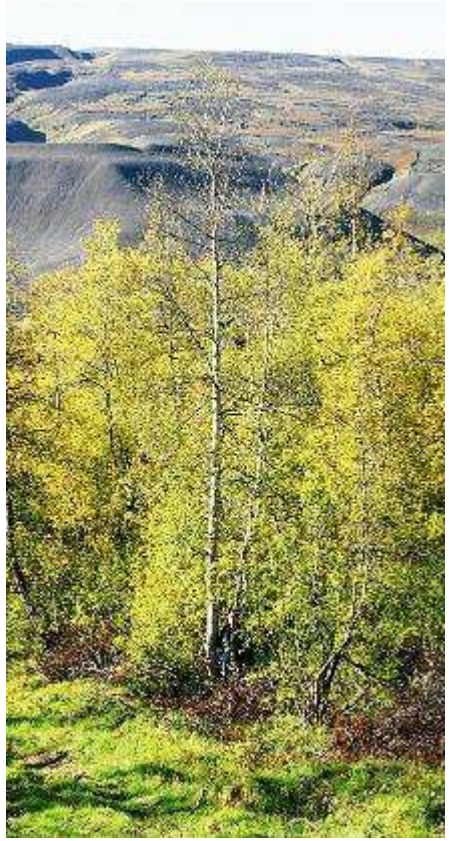
# Only three native tree species



*B. pubescens* 99.9%

*S. aucuparia* < 0.1%

*P. tremula* < 0.0001%

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B. pubescens

+

B. nana

=

Introgressed
Icelandic birch

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# Sustainable forestry with native birch?

- The three pillars of sustainability:
  - Ecological – yes
  - Social – not really
  - Economic - no

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# Icelandic forestry depends on exotic tree species

- If we want to have production forestry
- If we want fast growing trees
- If we want diversity for added security against climate change
- If we want diversity for amenity
- If we want forests that tolerate the pressures that we place on them.

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# Strong connections between gardening and forestry

- Forestry ⇨ gardens
  - *Betula pubescens*
  - *Picea spp.*
  - *Pinus mugo*
- Gardens ⇨ forestry
  - *Populus trichocarpa*
  - *Salix spp.*
  - *Sorbus aucuparia*

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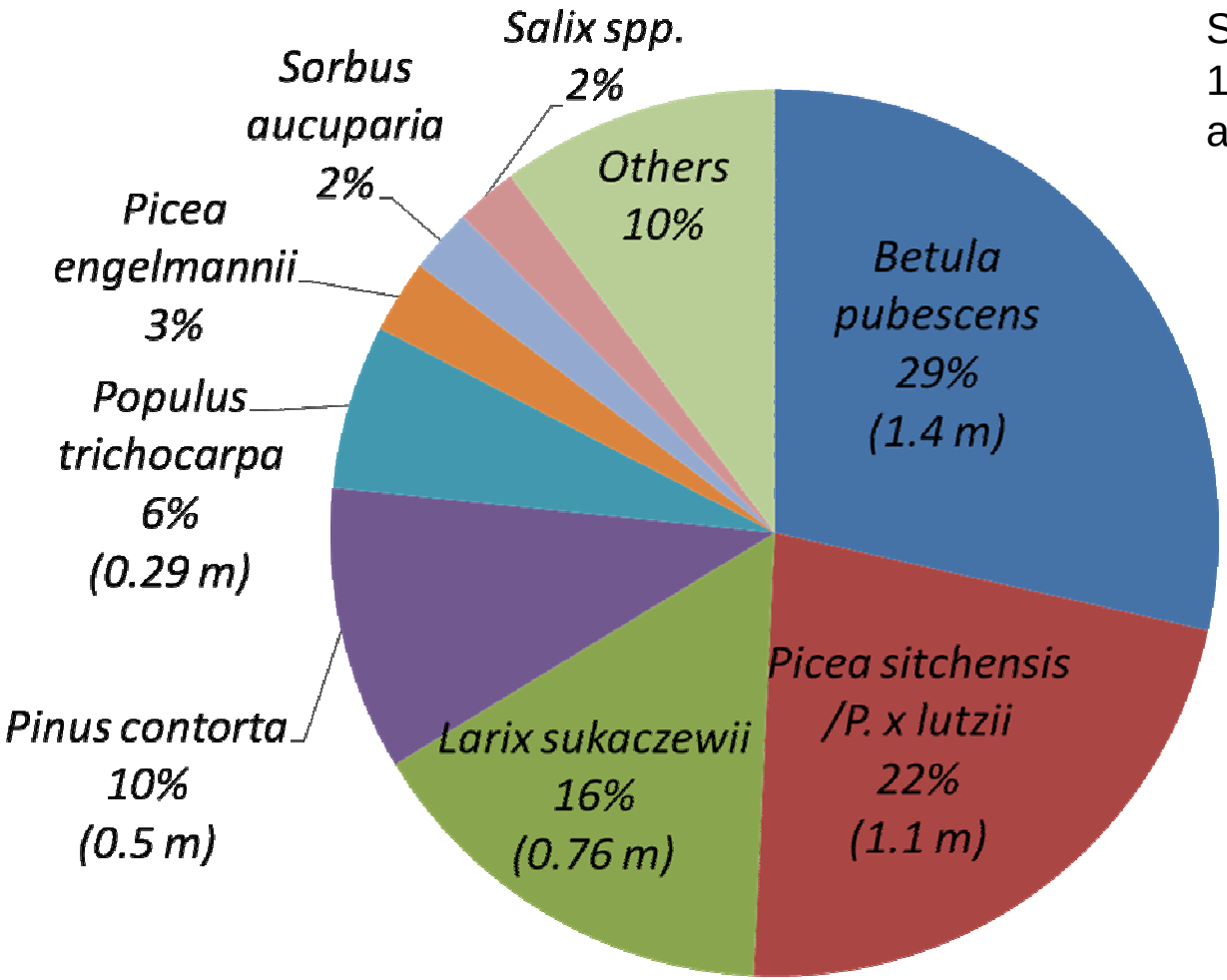
Planting in Icelandic forestry 2009 – Total seedlings planted: 4.9 million




Species with more than 100 000 seedlings planted annually

After: Einar Gunnarsson 2010

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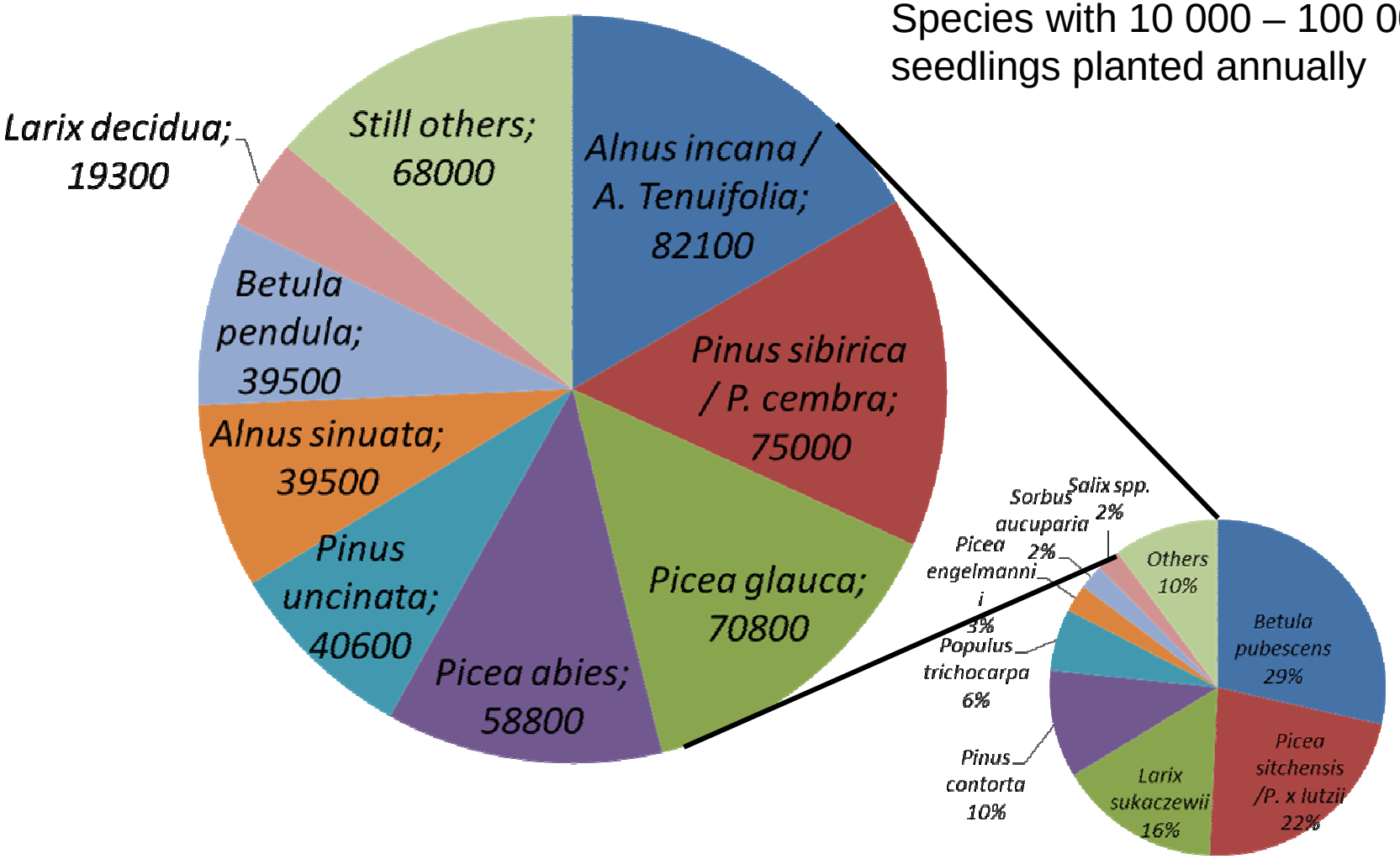
Species with 10 000 – 100 000 seedlings planted annually

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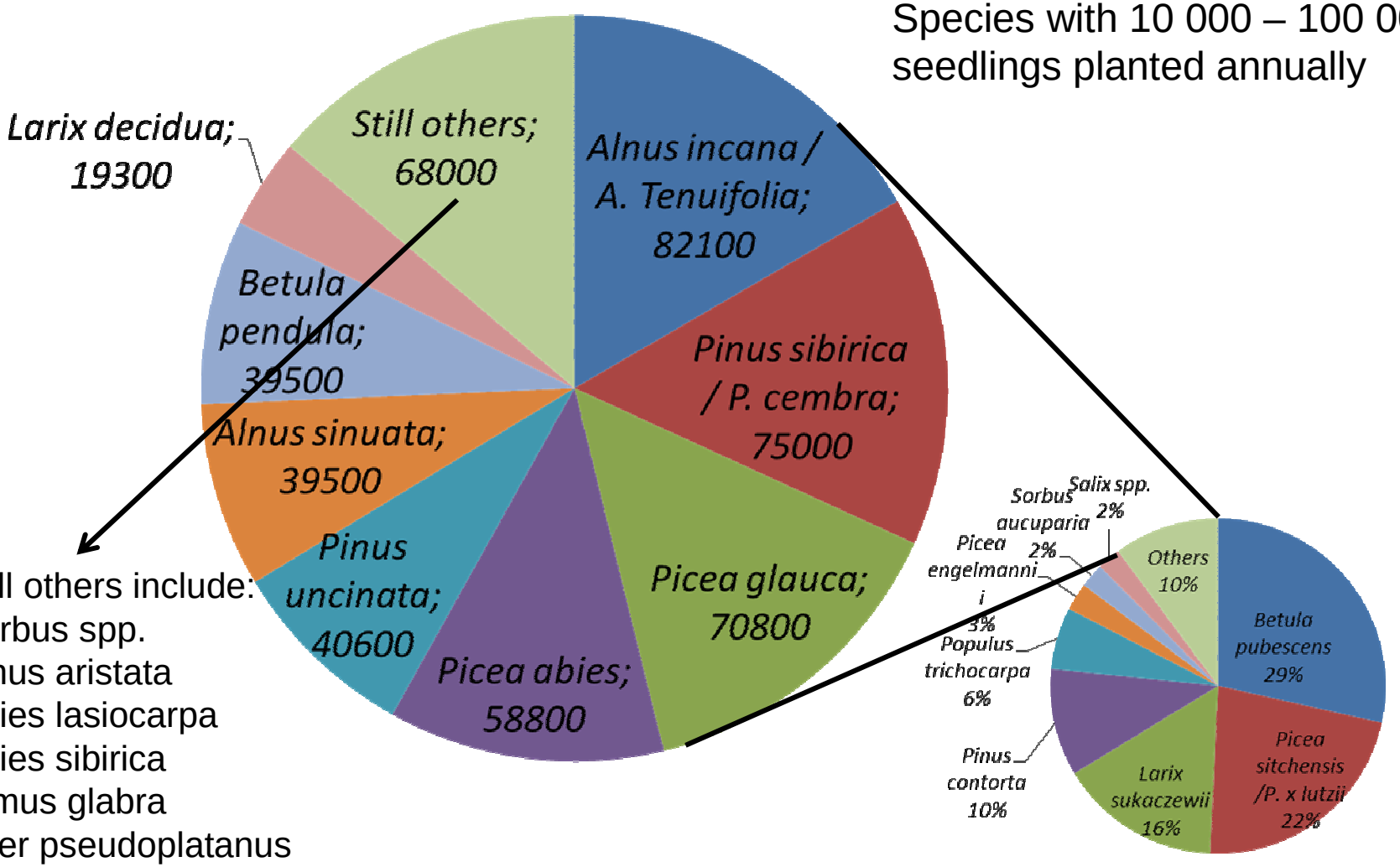
Species with 10 000 – 100 000 seedlings planted annually




Still others include:
Sorbus spp.
Pinus aristata
Abies lasiocarpa
Abies sibirica
Ulmus glabra
Acer pseudoplatanus
Various shrubbs

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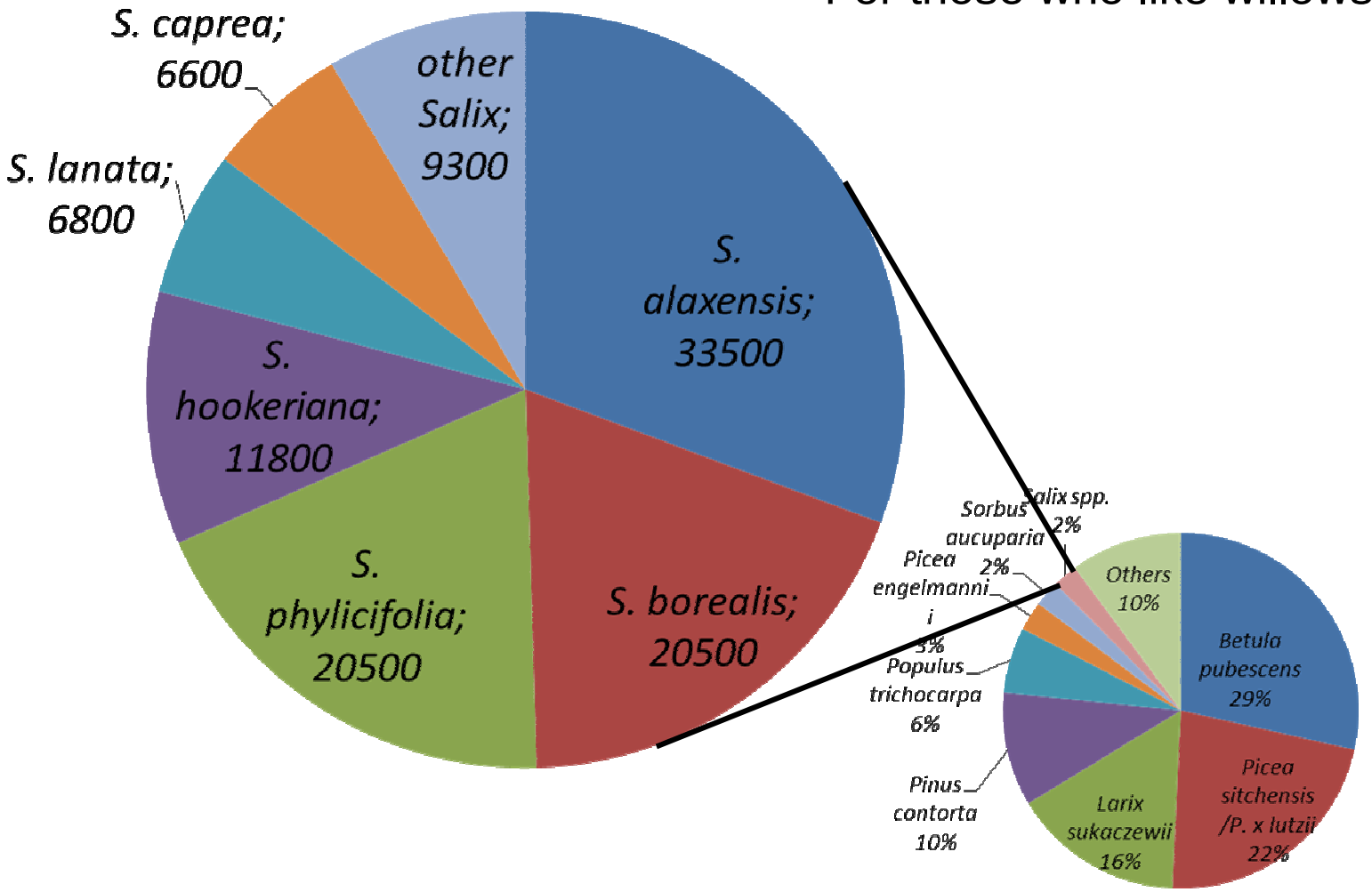
# For those who like willows

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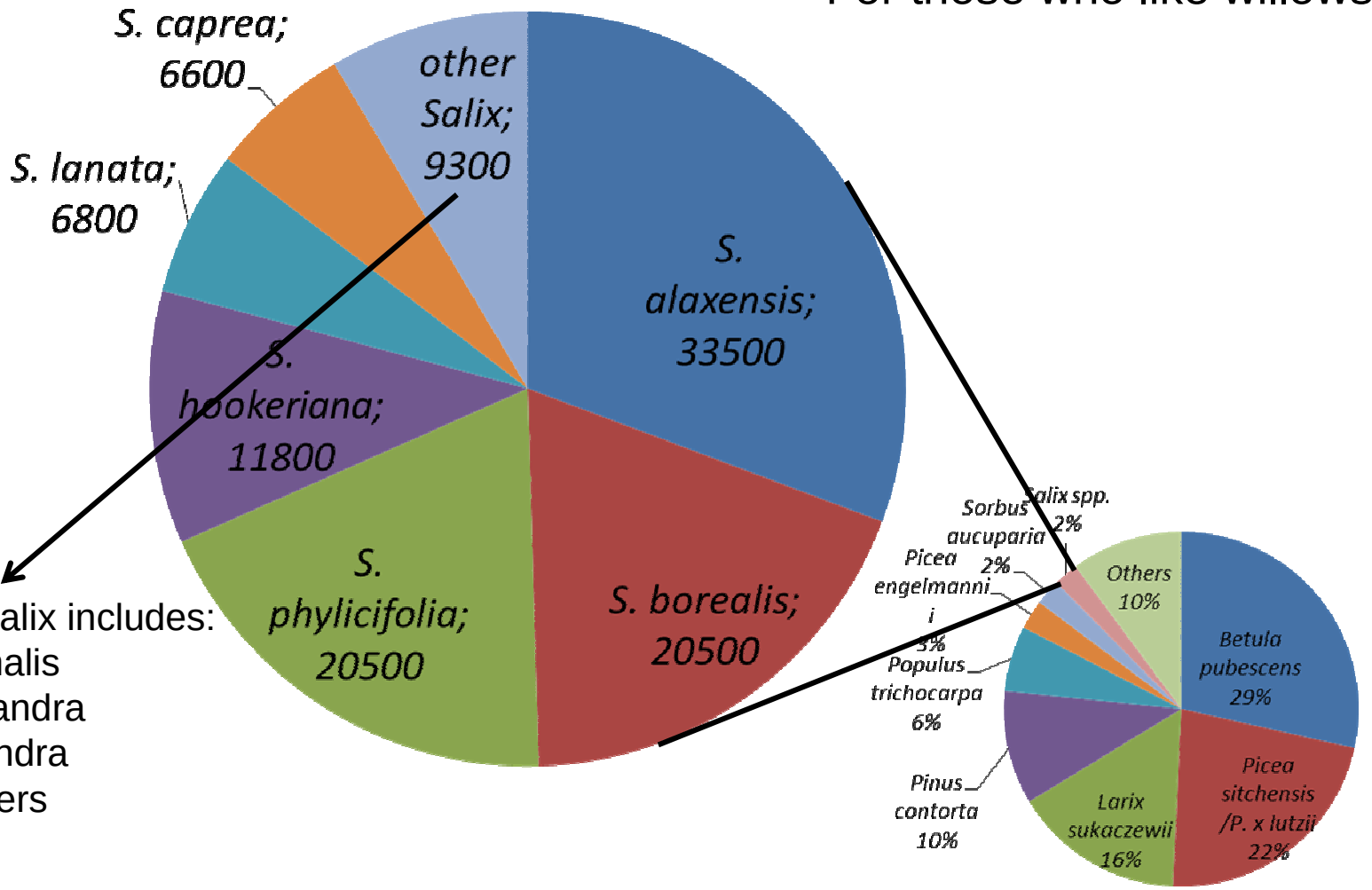
# For those who like willows




Other Salix includes:
S. viminalis
S. pentandra
S. lasiandra
and others

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# Sitka spruce

(*Picea sitchensis and P. x lutzii*)

- We use only provenances of Alaskan origin
- Mostly self sufficient in seed
- Breeding programme

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# Sitka spruce

(*Picea sitchensis and P. x lutzii*)

- Mostly planted with production goals in mind
  - Lumber
  - Biomass

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# Sitka spruce

(*Picea sitchensis and P. x lutzii*)

- Amenity

SKÓGRÆKT RÍKISINS

# Sitka spruce

(*Picea sitchensis and P. x lutzii*)

- Shelter

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# Russian larch

*(Larix sukaczewii)*

- Have tried many provenances
- We use mostly material from Finnish seed orchards
- Breeding programme

SKÓGRÆKT RÍKISINS

# Russian larch

*(Larix sukaczewii)*

- Mostly planted with production goals in mind
  - Lumber
  - Biomass

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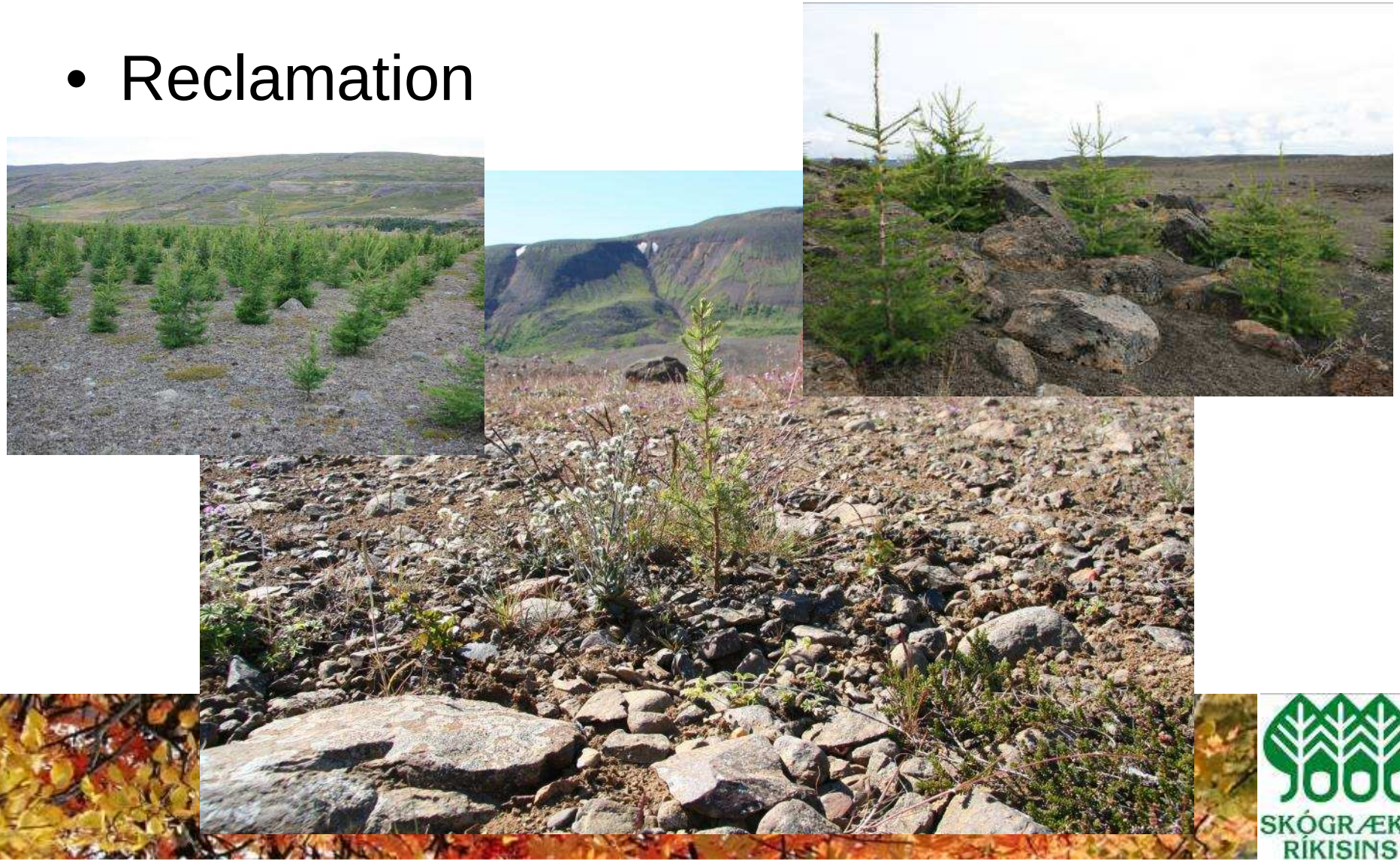
# Russian larch

*(Larix sukaczewii)*

- Reclamation



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# Russian larch

*(Larix sukaczewii)*

- Amenity

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# Lodgepole pine

*(Pinus contorta)*

- Have tried many provenances
- Skagway is best in S and W Iceland
- Rocky Mtn. provenances also good
- Mostly self sufficient in seed

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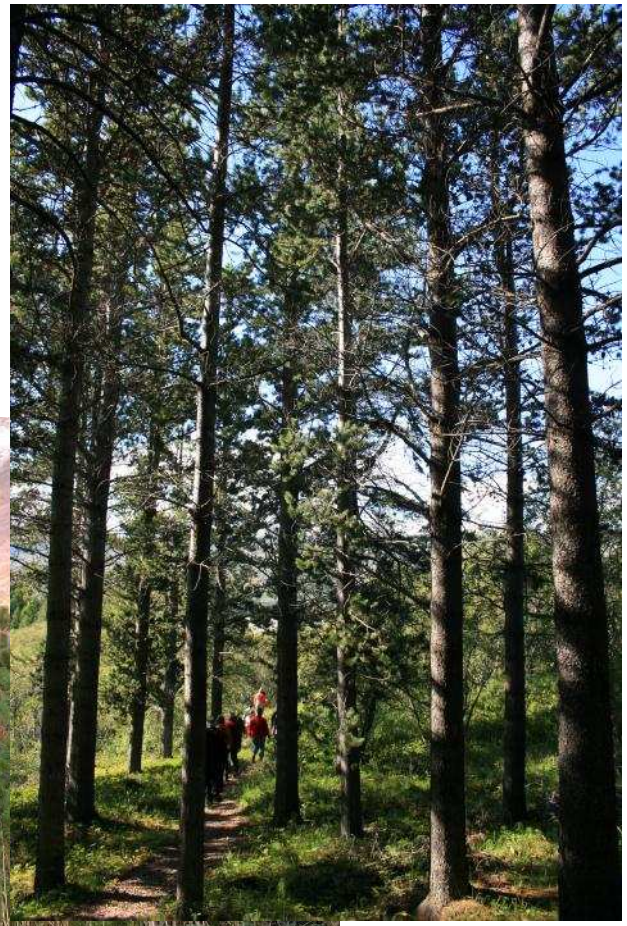
# Lodgepole pine

*(Pinus contorta)*

- Nurse species in production forestry
- Production
  - Biomass
  - Christmas trees



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# Lodgepole pine

*(Pinus contorta)*

- $CO_2$ sequestration

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# Black cottonwood

*(Populus balsamea ssp. trichocarpa)*

- Tallest trees in Iceland
- Fastest growing
- We use only Alaskan origins
- Breeding programme
- Trying hybrids

SKÓGRÆKT RÍKISINS

# Black cottonwood

*(Populus balsamea ssp. trichocarpa)*

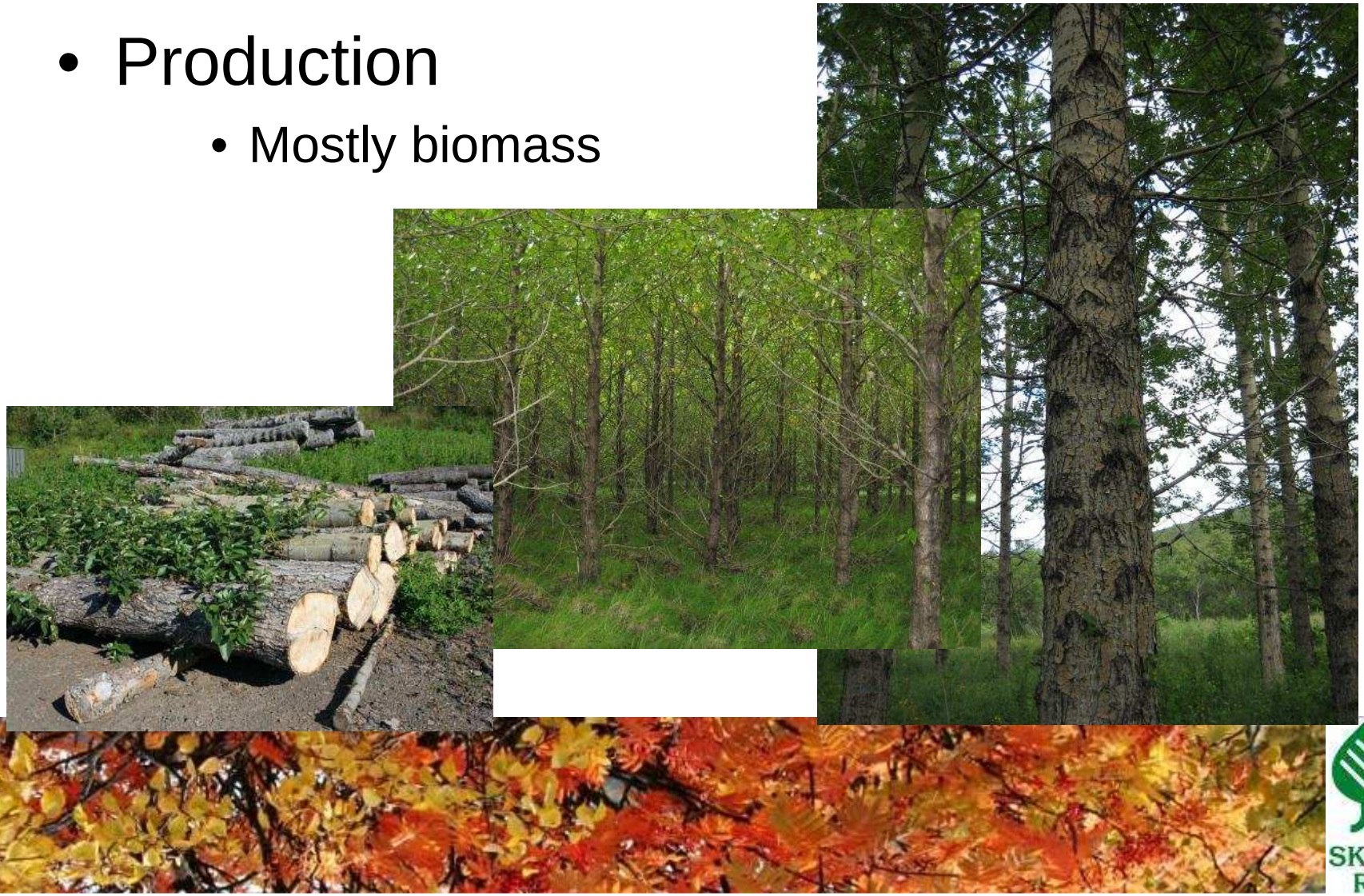
- Amenity
- Shelter

SKÓGRÆKT RÍKISINS

# Black cottonwood

*(Populus balsamea ssp. trichocarpa)*

- Production
  - Mostly biomass



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# Engelmann spruce

*(Picea engelmannii)*

- Consistantly no. 5 among exotics
  - Christmas tree
  - Amenity

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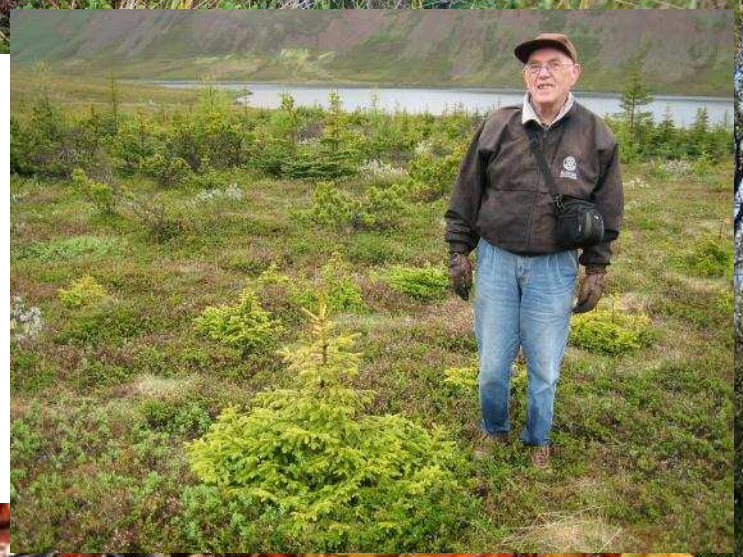
# Why not more Norway spruce and Scots pine?



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Species selection is based on our emphasis in forerstry:

# Afforestation of treeless land

- Usually infertile
- Often exposed
- Sometimes eroded

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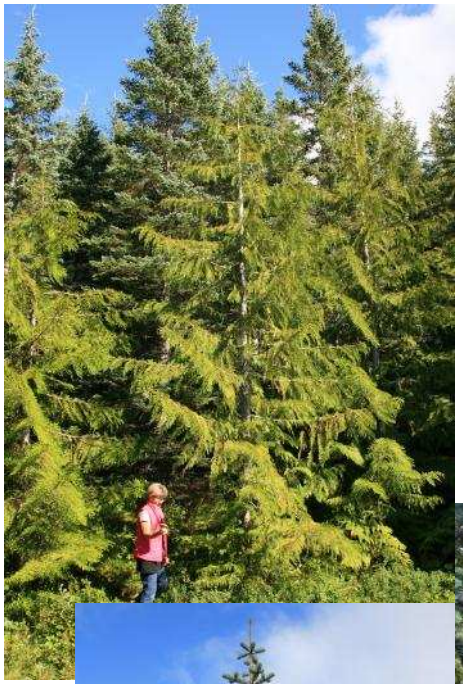
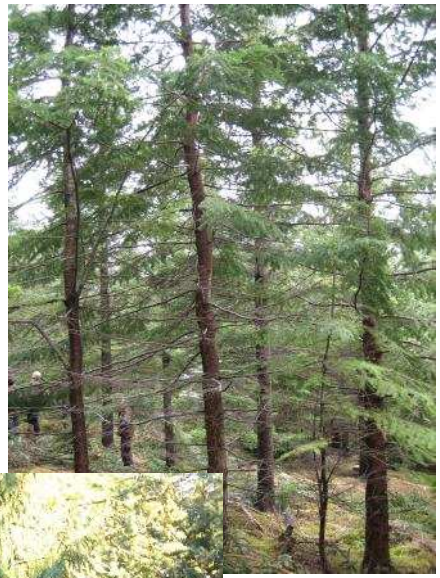
Many more species can be used if provided with shelter when young

- *Picea abies*
- *Pseudotsuga menziesii*
- Several *Abies sp.*
- *Tsuga mertensiana*
- *Tsuga heterophylla*
- *Thuja plicata*
- *Thuja koreana*
- *Cupressus nootkatensis*
- *Prunus spp.*
- *Malus spp.*





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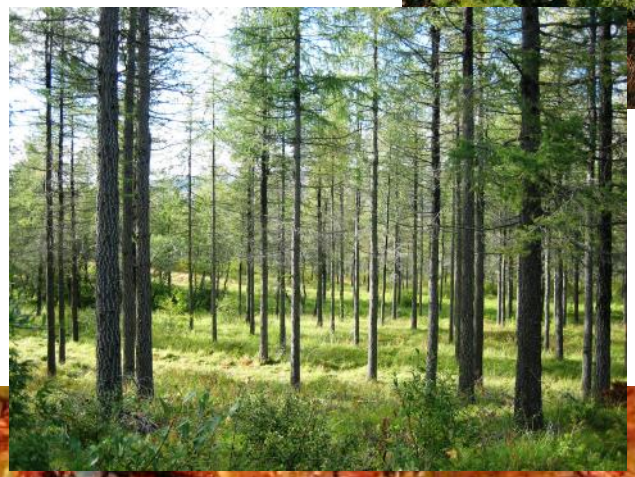
# Recent trends

- Increasing
  - *Picea sitchensis*
  - *Betula pubescens*
  - *Sorbus aucuparia*
  - *Pinus cembra / sibirica*
- Stable
  - *Pinus contorta*
  - *Populus trichocarpa*
  - *Picea engelmannii*
- Decreasing
  - *Larix sukaczewii*
  - *Salix spp.*
  - *Alnus sinuata*



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# If warming continues

- Next 20 years
  - Continued importance of same species as now
  - Increase
    - Betula pendula
    - Pinus sylvestris
    - Poplar hybrids
  - Decrease
    - Salix
    - Picea glauca
    - Sorbus aucuparia

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# If warming continues

- Mid century
  - Continued importance
    - Picea sitchensis
    - Pinus contorta
    - Hybrid poplars
    - Betula pubescens (reclamation)
    - Larix sukaczewii (higher elevations)
  - Increase
    - Larix decidua
  - Decrease
    - Populus trichocarpa

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# If warming continues

- Late century (large scale regeneration starts)
  - Continued importance
    - Picea sitchensis (natural regeneration)
    - Pinus contorta (natural regeneration)
    - Hybrid poplars
    - Betula pubescens (reclamation at high elevations)
  - Increase
    - Picea abies
    - Pseudotsuga menziesii
    - Thuja plicata
    - Quercus robur and other broadleaves
  - Decrease
    - Larix
    - Betula (lowlands)

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# Conclusions

- We will continue to base Icelandic forestry largely on exotic species:
  - Because they provide many more opportunities than the native species
  - Because most people are in favor of them
  - Because without them, sustainable forestry is not possible in Iceland

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Thank you!
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