

Commercial considerations using pioneers in reforestation

Enerwoods International Conference

Stockholm, 27th of August 2015

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Scenario

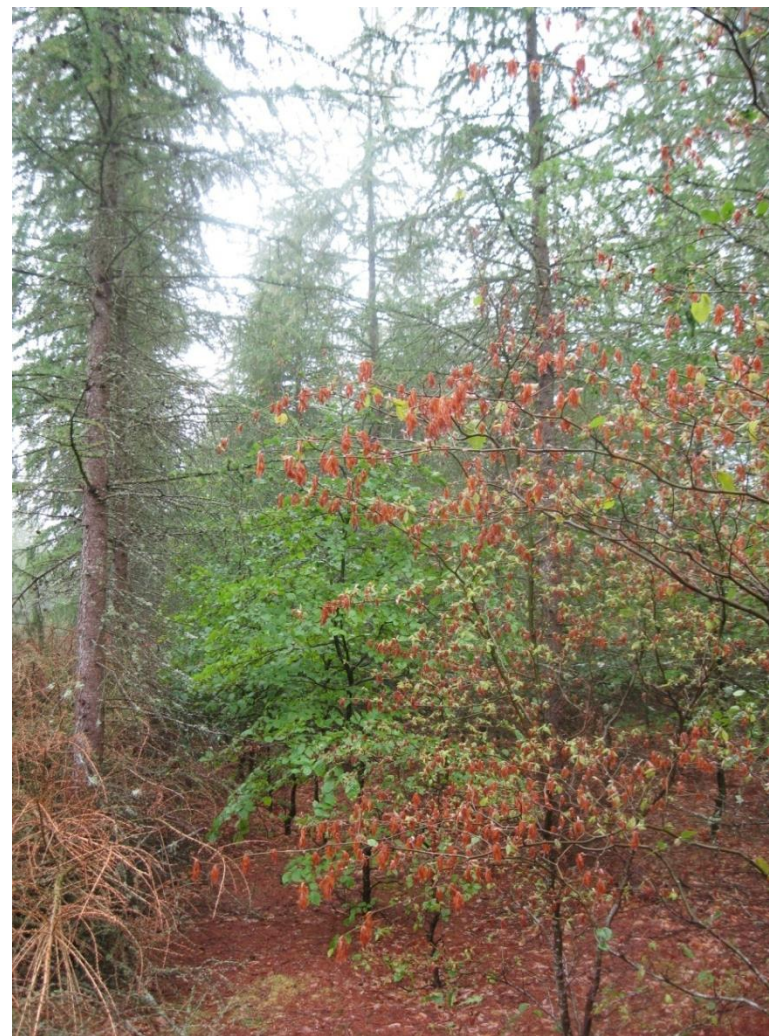
How can the potential for biomass production in young stand be increased when making reforestation with conifer?

The recommendations are based on findings primarily on poor to intermediate soils in Jutland

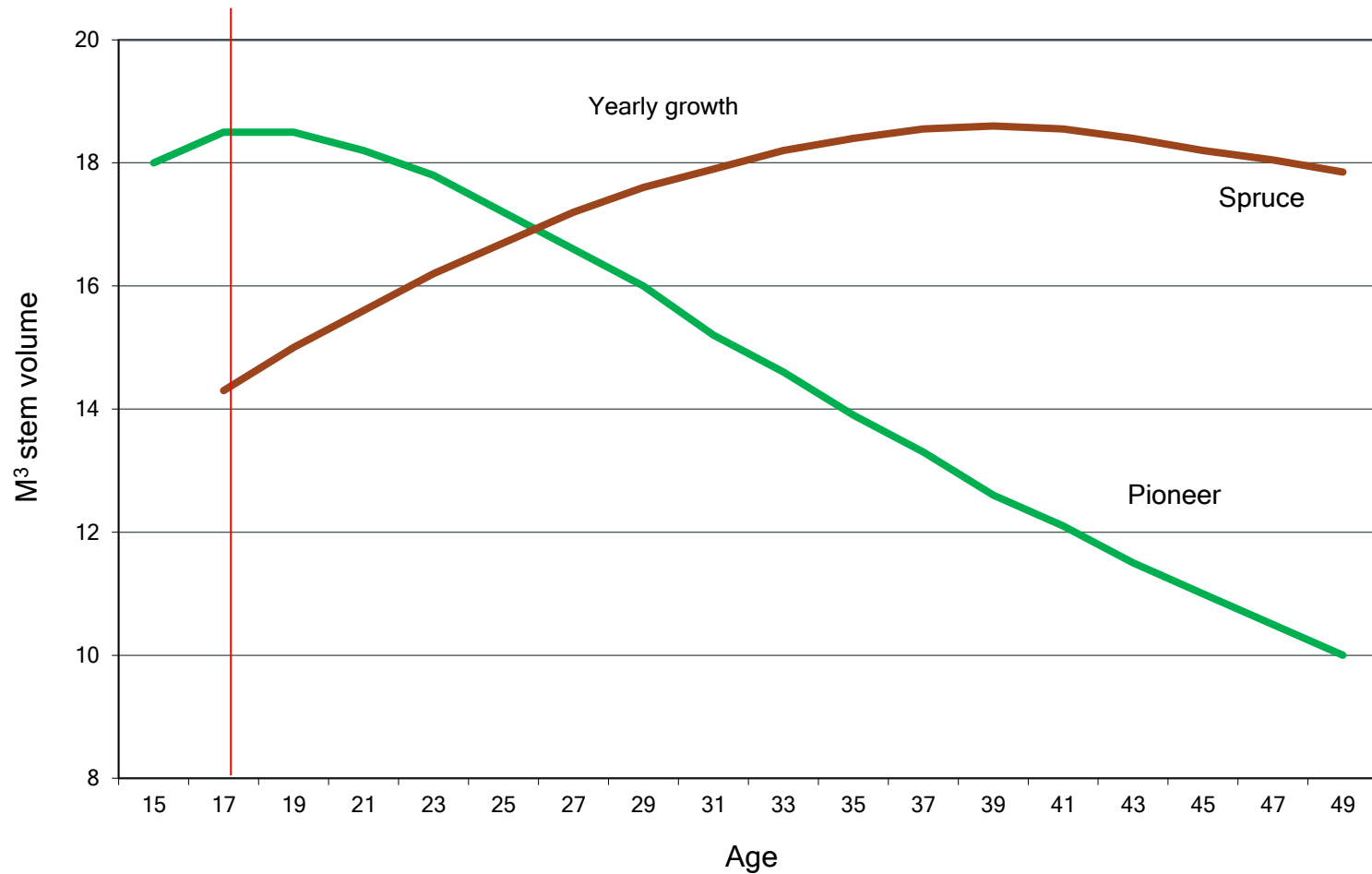


Contents

1. The outcome by the first thinning
2. Some points of importance when marketing the biomass
3. Pioneers in rows or randomly mixed
4. Larch as the preferred pioneer
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6. HD recommendations



Philosophy: To use the differences in growth between main specie and pioneer



Wood chip production – beech with and without pioneers

Production of wood chips and energy in young stands until 15 years

Denmark, east.

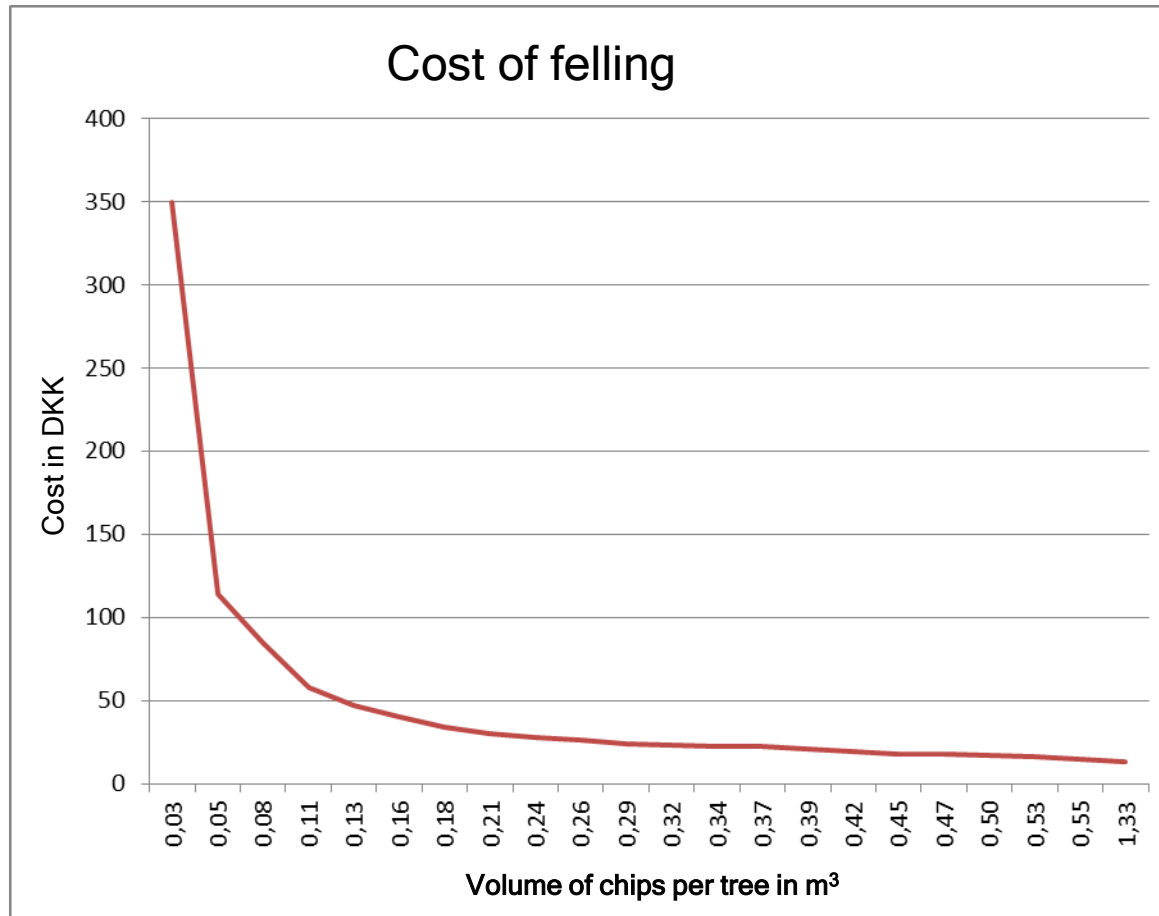
Model	Beech	Nurse crop	Wood chip production	Energy	Energy
	Stand density	Stand density	m ³ /ha	GJ/m ³	GJ/ha
Beech	6.400	0	58	3,7	217
Beech+larch	5.000	1.430	184	2,5	461

Christian Gamborg, Forskningscenteret for Skov & Landskab, 1996

Net income at first thinning (Establishing skidding tracks)

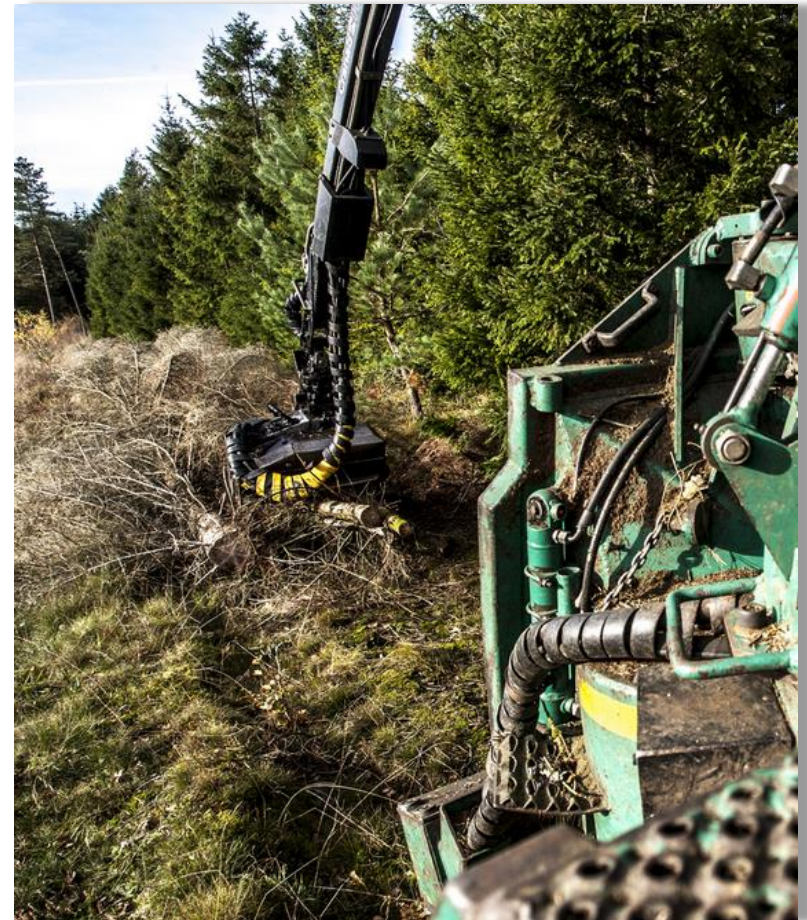
		Larch (hybrid) 17 years	Norway spruce 25 years	Norway spruce 17 years
Reforestation costs	DKK/plant	9	7	7
Ref. costs incl. 3 % capital costs	DKK/plant	15	15	12
Volumen pr. tree when felled	m ³ of chips	0,5	0,2	0,12
Net income, sales - harvest	DKK/m ³	34	18	-5,5
Net income before reforestation costs	DKK/tree	17	3,5	-0,65
Net income after reforestation costs	DKK/tree	3	-11,5	-13
Net income/ha	DKK/ha	2.100	-7.000	-9.700

The size of the tree felled is critical to the cost



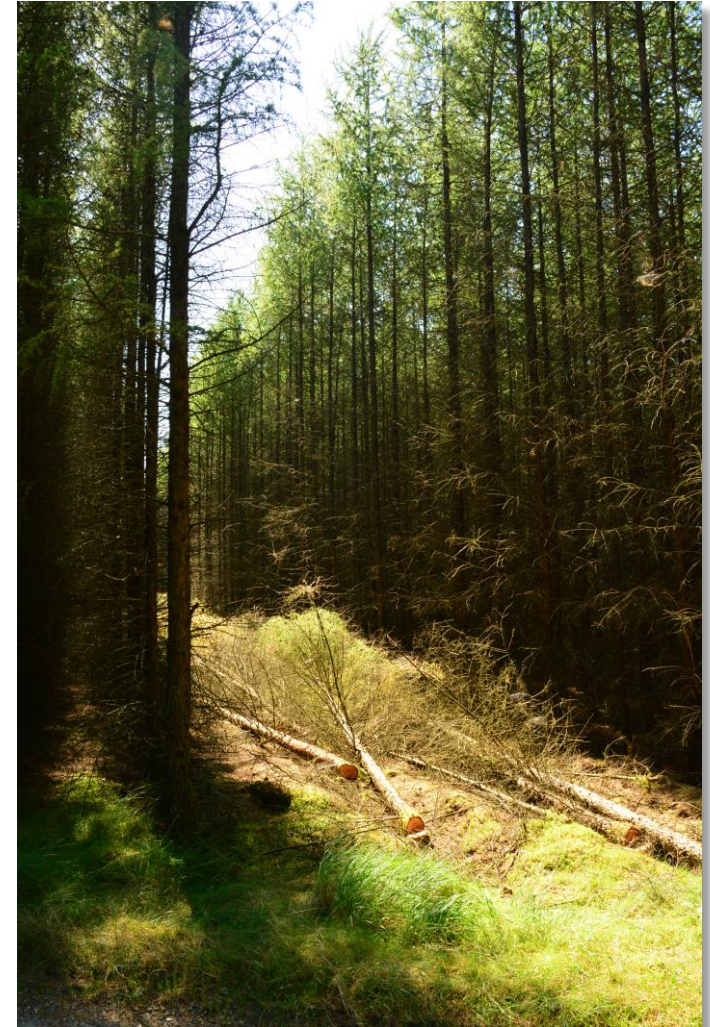
Some points of importance when marketing the biomass

- It should be burnable
 - water content less than 50 %
- The costumers needs delivery all year
 - but with a clear peak during winter.
- It should be stable for storage
 - low water content
- The more flexibility - the lower costs
- The fewer operations - the lower costs



Using pioneer trees in rows instead of randomly mixed

- Helps avoid having to fell too small trees, when making your skidding tracks
- The trees in a row compete, which to a certain extent prevent them from harming the main species in the next row
- Reduces cost both when establishing AND harvesting
- Helps stabilizing the stand



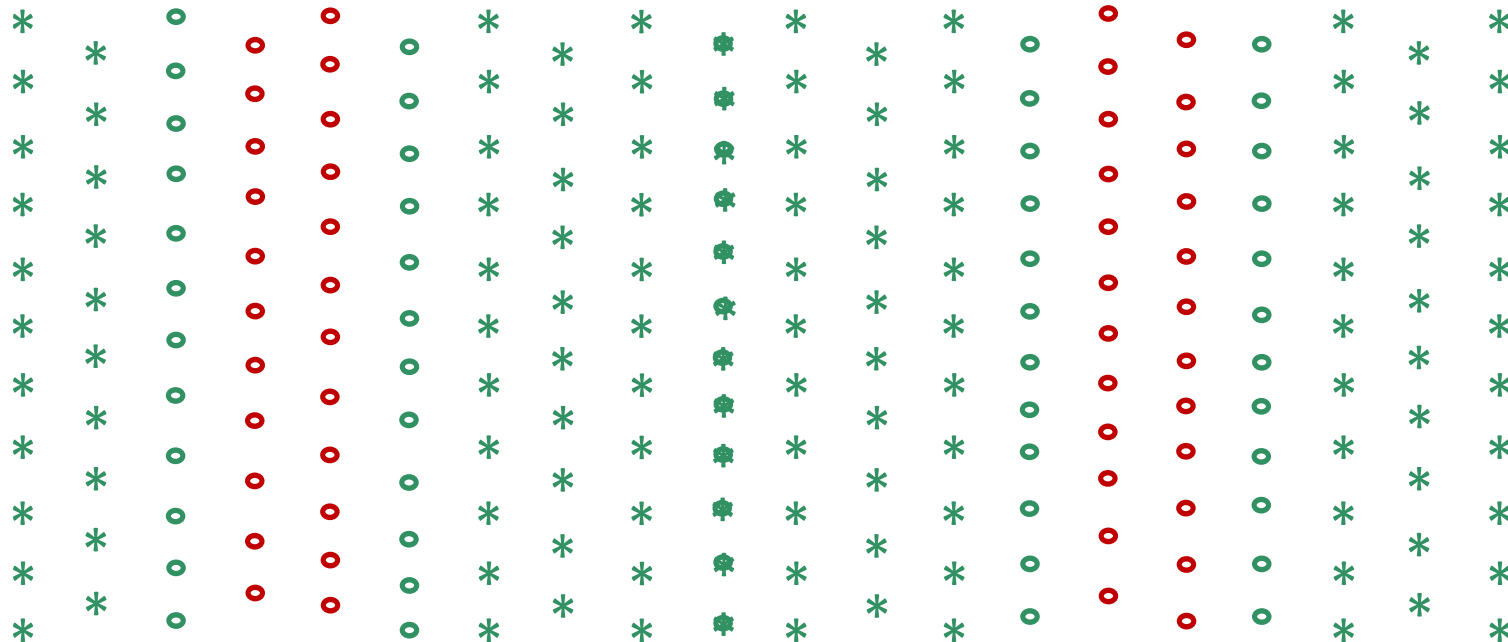
Larch - the preferable pioneer specie in HD

- High content of energy per volume
- Low content of water
- Can be felled and delivered to plant at once during winter (low water content)
- Produces wood chips of very high quality (few stickers - low litter and dust)
- Easy and with low risk to establish in Denmark - also on very poor soils
- Game do not harm it
- Does not produce shoots from roots or stump
- Which larch ?

Conclusion

1. There is a net income in planting extra trees using pioneer species for early biomass production.
2. At the same time, it gives you the opportunity to use more sensitive species for the main stand
3. It is critical to the costs that the pioneer trees reach a dbh of no less than 15 cm and a height of around 15 m without harming the main species
4. Use the preplanned skidding tracks for pioneers
5. Good quality of the wood chips is important to the marketing
6. Low cost and low risk in the establishing of the pioneers is critical

HD's recommendations with reforestation in conifers



← 16 - 18 m →

- Skidding track, larch, temporary
- Neighbouring row with larch, permanent
- ⊕ Middle row larch or main specie, permanent
- * Main specie, permanent, e.g spruce

HD's recommendations with reforestation in conifers

Example 4 years after planting



Sitka spruce with Larch (hybrid) as pioneer

Age: 15 years

Larch

Height: 11 m

Diam: 12 cm

Spruce

Height: 4,5 m

Diam: 5,5 cm



Beech with larch (japanese) as pioneer



- How to do it in deciduous stands?
- Populos, Larch, Prunus avium?