## HYBRID ASPEN PLANTATIONS IN ESTONIA

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## Why has cultivation of hybrid aspen (*Populus x wettsteinii* Hämet-Ahti) started in Estonia?

- There are over 400 000 ha of abandoned agricultural lands in Estonia due to political and social changes in the beginning of 1990ies
- One way to reemploy abandoned agricultural lands is afforestation with deciduous tree species
- The need for pulp and paper oriented biomass production is increasing in the area and 60-years experience with hybrid aspen in Finland and Sweden has confirmed its suitability for that purpose.
- Establishment of hybrid aspen plantations on abandoned agricultural lands started in 1999
- Since then hybrid aspen has been cultivated on ca 700 ha

## •Micropropagated plants are used

•On average 15 different clones have been used in one plantation

List of hybrid aspen clones in Estonia (according to Finnish Plant Production Inspection Centre):

C05-99-8; C05-99-9; C05-99-10; C05-99-11; C05-99-12; C05-99-13; C05-99-14; C05-99-15; C05-99-16; C05-99-17; C05-99-18; C05-99-19; C05-99-20; C05-99-21; C05-99-22; C05-99-23; C05-99-24; C05-99-25; C05-99-26; C05-99-27; C05-99-28; C05-99-29; C05-99-30; C05-99-31; C05-99-32; C05-99-33; C05-99-34;

•Planting density 1000 – 1400 plants per ha

•Usually site preparation (ploughing) is necessary

•Biodegradable plastic tubes and net-like shelters are used to prevent damage by voles, hares and roe deer

#### **Research work, experimental areas**

•In 2002 evaluation of environmental interactions of hybrid aspen planting was carried out

•From 2003-2004 a long-term network of 50 experimental plots was created in five-year-old hybrid aspen plantations in order to study the growth of the trees, nutrient cycling, soil preference and environmental interactions of hybrid aspen plantations.

•Dendrometric characteristics (height, diameter at breast height, current annual height increment and canopy dimensions) have been measured.

•Soil type according to WRB-FAO/UNESCO has been determined. Chemical and mechanical analyses of soil

•Leaf samples have been taken for chemical analyses

•Analyses of wood properties (fiber properties, cellulose/lignin concentration) are planned

## Locations of 50 long-term experimental plots in Estonia



### Results

- On the basis of the evaluation of environmental interactions the potential risk of the influence of hybrid aspen plantations on the local environment is considered to be low
- Growth of hybrid aspen varied greatly among the studied 5year-old plantations

	Average of all plantations	The best plantation	The best tree
Height (m)	2.7	4.7	8.0
Height increment (m)	0.7	1.4	2.5
Diameter at breast height (cm)	1.9	3.9	7.0

The distribution of 5-year-old hybrid aspens by height resembles to a typical distribution of a young stand



Growth intensity of hybrid aspen on different soils according to the matrix of postlithogenic mineral soils

High
Medium
Low



# Mean height of 5-years-old hybrid aspen plantations on different fieldsoils



## Regression between the average height of the trees and foliar concentration of nitrogen of 5-year-old hybrid aspens



### **Conclusions about hybrid aspen in Estonia**

- The dimensions of the best plantations and the best trees show the high growth potential of hybrid aspen in Estonian soil and climate conditions
- More information is needed about interactions between soil conditions and growth rate of hybrid aspen
- The establishment of a new pulp and paper mill for the production of CTMP from aspen wood in northern Estonia ensures the demand for hybrid aspen wood in the future

•Influences of hybrid aspen on native ecosystem need further investigation. Possible threats include gene flow towards our native aspen (*P. tremula*), emergence of new pests and diseases, plantations on our landscape.

•The legislation for managing forest-plantations (maximum area of a palntation, number of clones, rotation period, fertilization...) is incomplete



Hybrid aspen plantation after the fifth growing season in Estonia.

Mean height of the plantation 4.2 m (max height 8.0 m)





Thank You!