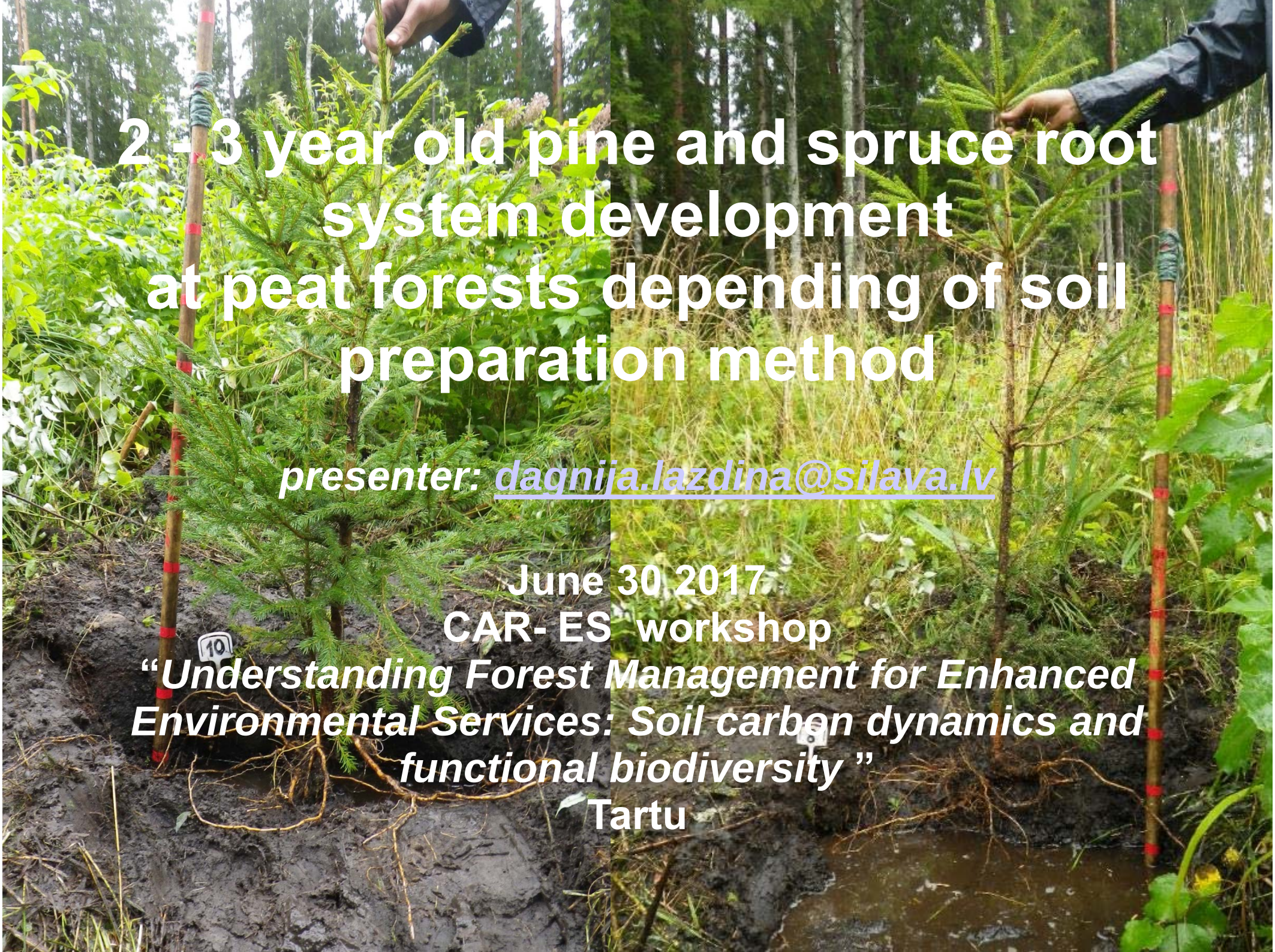


2 - 3 year old pine and spruce root system development at peat forests depending of soil preparation method

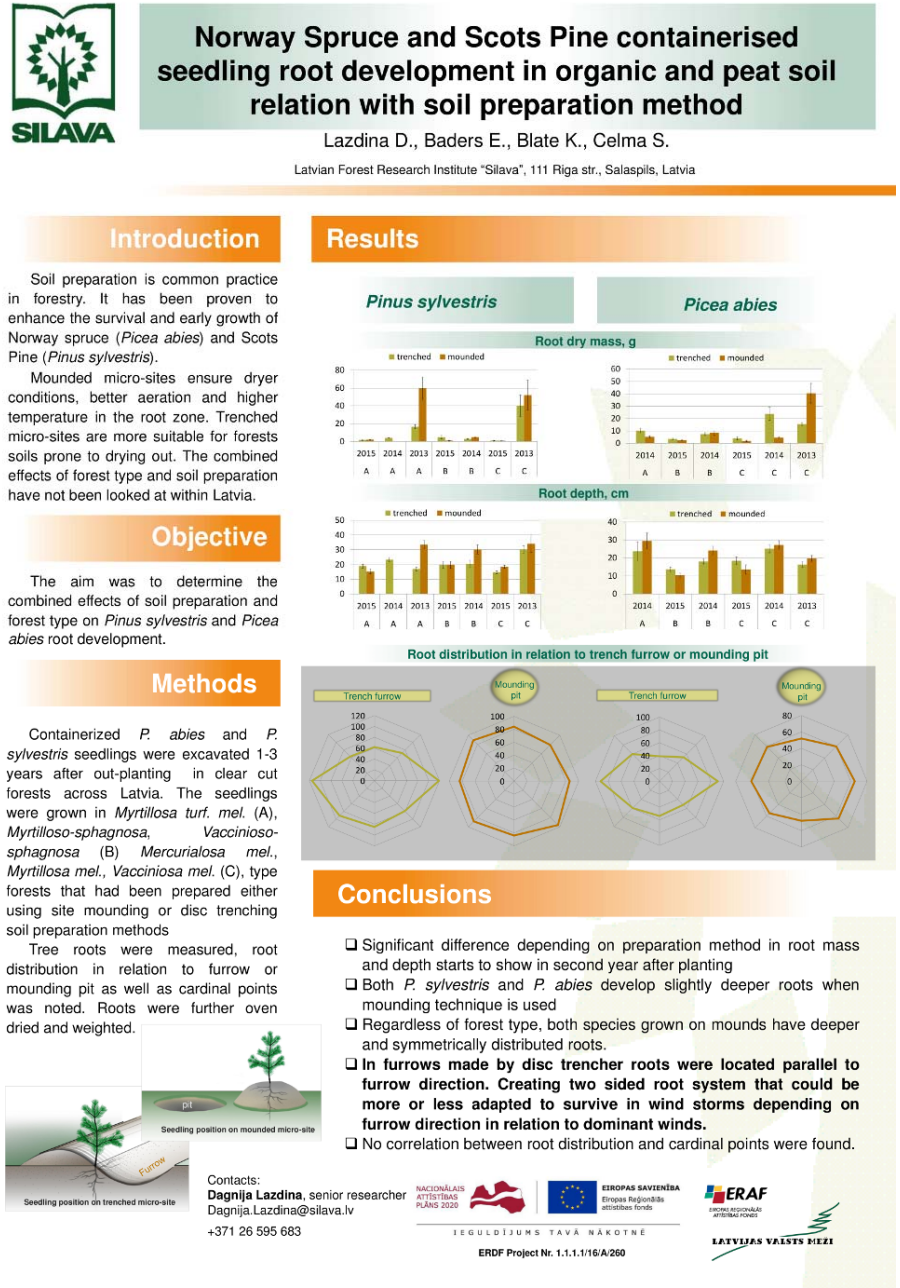
presenter: dagnija.lazdina@silava.lv

June 30 2017

CAR- ES workshop

"*Understanding Forest Management for Enhanced Environmental Services: Soil carbon dynamics and functional biodiversity* "

Tartu



Norway Spruce and Scots Pine containerised seedling root development in organic and peat soil relation with soil preparation method

Lazdina D., Baders E., Blate K., Celma S.

Latvian Forest Research Institute "Silava", 111 Riga str., Salaspils, Latvia

Introduction

Soil preparation is common practice in forestry. It has been proven to enhance the survival and early growth of Norway spruce (*Picea abies*) and Scots Pine (*Pinus sylvestris*).

Mounded micro-sites ensure dryer conditions, better aeration and higher temperature in the root zone. Trenched micro-sites are more suitable for forests soils prone to drying out. The combined effects of forest type and soil preparation have not been looked at within Latvia.

Objective

The aim was to determine the combined effects of soil preparation and forest type on *Pinus sylvestris* and *Picea abies* root development.

Methods

Containerized *P. abies* and *P. sylvestris* seedlings were excavated 1-3 years after out-planting in clear cut forests across Latvia. The seedlings were grown in *Myrtillosa turf. mel.* (A), *Myrtilloso-sphagnosa, Vaccinioso-sphagnosa* (B) *Mercurialosa mel., Myrtillosa mel., Vacciniosa mel.* (C), type forests that had been prepared either using site mounding or disc trenching soil preparation methods

Tree roots were measured, root distribution in relation to furrow or mounding pit as well as cardinal points was noted. Roots were further oven dried and weighted.

Results

Pinus sylvestris | *Picea abies*

Root dry mass, g

Root depth, cm

Root distribution in relation to trench furrow or mounding pit

Conclusions

- Significant difference depending on preparation method in root mass and depth starts to show in second year after planting
- Both *P. sylvestris* and *P. abies* develop slightly deeper roots when mounding technique is used
- Regardless of forest type, both species grown on mounds have deeper and symmetrically distributed roots.
- **In furrows made by disc trencher roots were located parallel to furrow direction. Creating two sided root system that could be more or less adapted to survive in wind storms depending on furrow direction in relation to dominant winds.**
- No correlation between root distribution and cardinal points were found.

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IEGULDĪJUMS TAVĀ NĀKOTNĒ
ERDF Project Nr. 1.1.1.1/16/A/260

7th International Symposium on Physiological Processes in Roots of Woody Plants

Session 4: Roots, global change and ecosystem services

Poster 37

Hypothesis

Roots on mounded sites is very shallow.

If trenching used to prepare soils, one side root system is developing.

Both factors leads to unstabil forest stands in case of windstorms – it is acctual in scope of project

“Audžu uz kūdras augsnēm vētru bojājumu riska novērtēšanas rīka izstrāde

Eiropas Reģionālā attīstības fonda projekts

NACIONĀLAIS ATTĪSTĪBAS PLĀNS 2020

EIROPAS SAVIENĪBA
Eiropas Reģionālās attīstības fonds

IEGULDĪJUMS TAVĀ NĀKOTNĒ

Material

The seedlings grown in

Myrtillosa turf. mel.,

Mercurialosa mel.,

Myrtillosa mel.,

Vacciniosa mel.,

Myrtilloso-sphagnosa,

Vaccinioso-sphagnosa

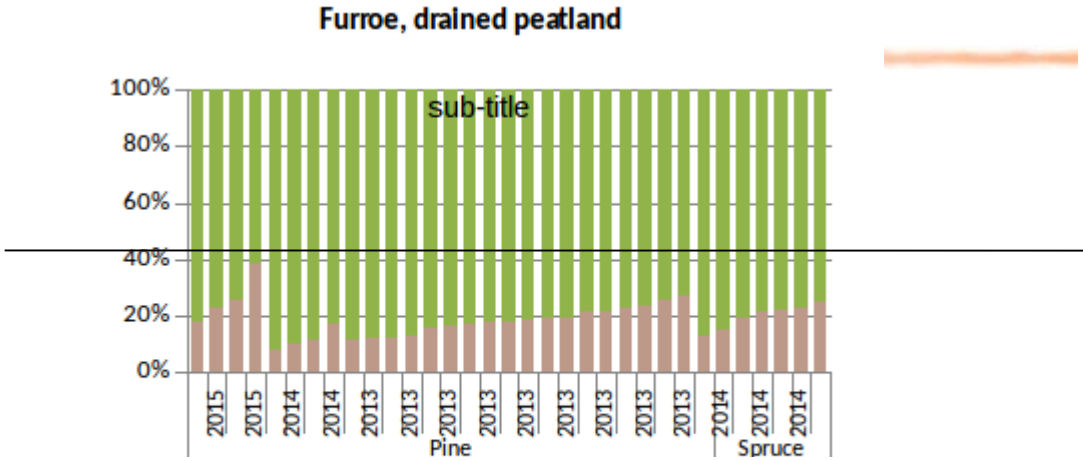
type forests were measured.

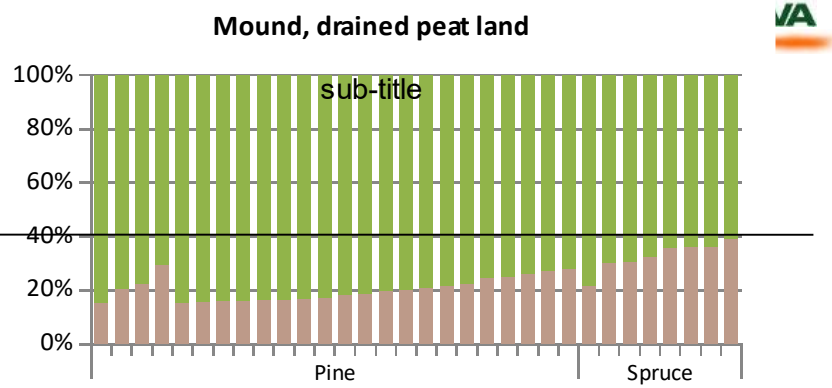
Methods

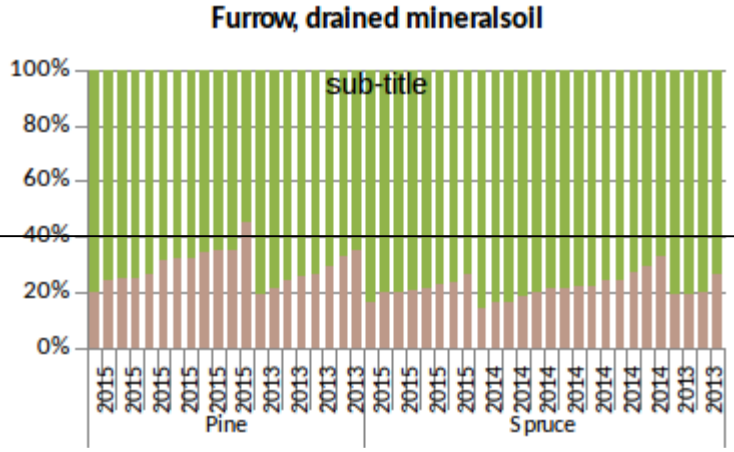
20(wet mineral soil) +20 (drained mineral soil) +20(drained peatsoil)=60 stands X 5 sampling rings (5-8 trees in eache)= ~1800 trees measured of height and annual increments, surviving, projection of vegetation on mound..

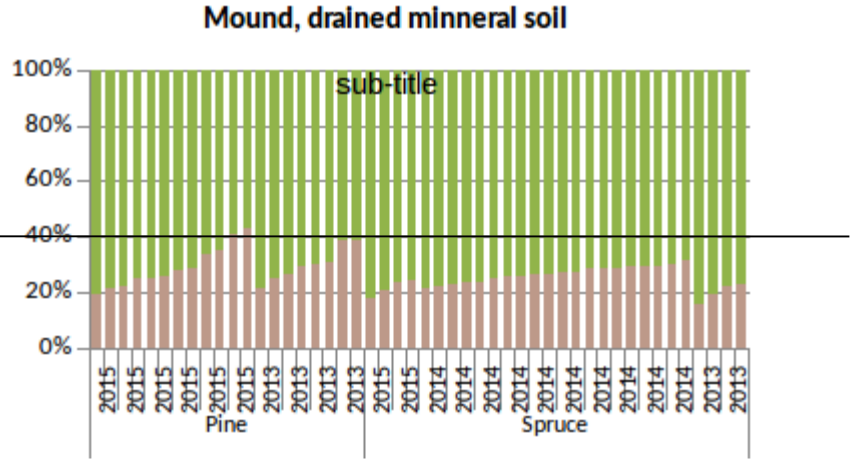
In two from 5 sampling rings 5 trees excavated = 600 trees for measurements of growth and biomass as well main root direction and depth.

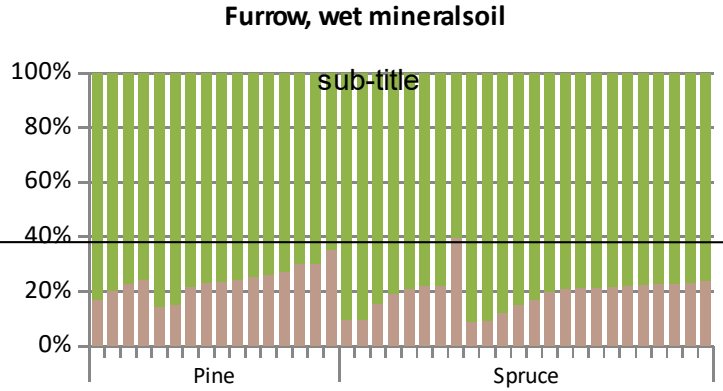
Above / below ground biomass

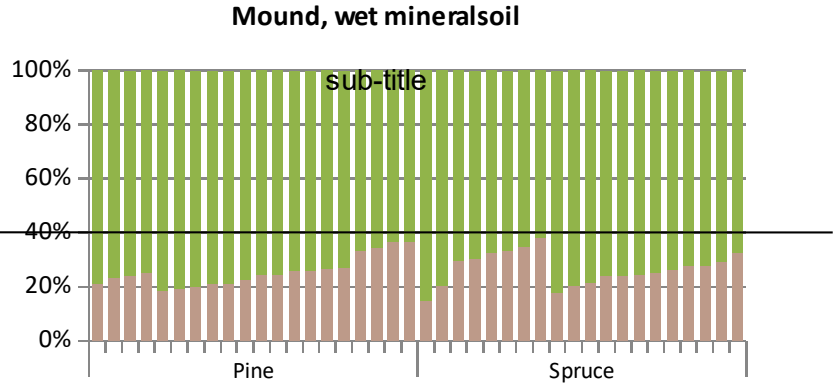








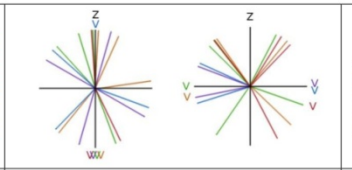
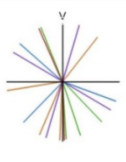
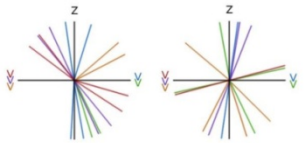
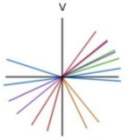
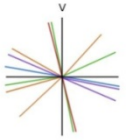
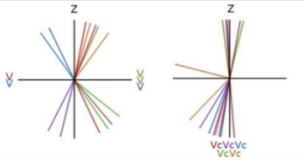
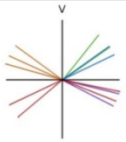
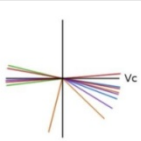
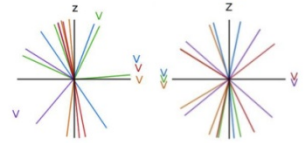
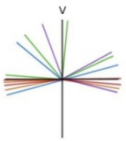
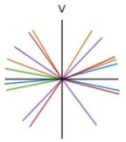
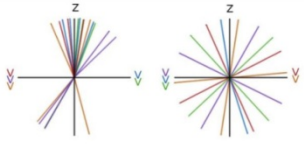
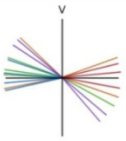
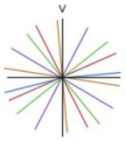
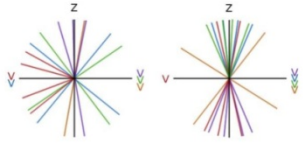
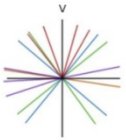
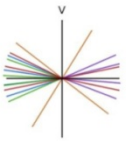




Root direction and depth

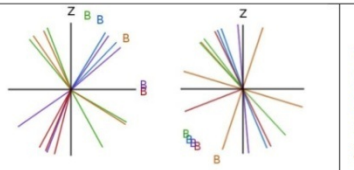
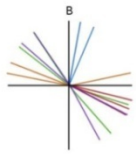
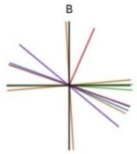
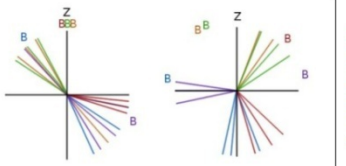
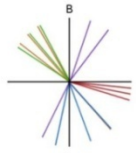
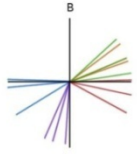
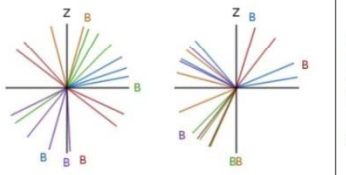
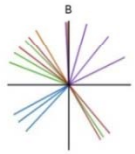
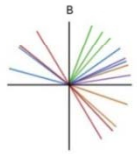
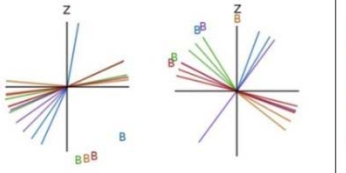
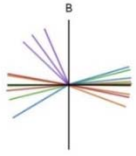
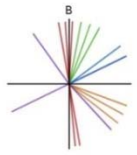
Slapjaiņi, vagas

Egle

Gads	Atslēga	Sakņu virziens attiecībā pret ziemeļiem un sakņu dziļums cm				Sakņu virziens attiecībā pret vagu	
2015	Dienvidkurzeme, Remte 208-176-27	15 11 17 17 14			22 14 15 19		
	Dienvidkurzeme, Remte 208-137-20	21 15 14 9 15			15 12 14 14 10		
	Rietumvidzeme, Rūjiena 403-298-1	35 18 16 20 17			20 18 15 20 21		
	Dienvidkurzeme, Remte 208-122-14	16 20 19 17 15			12 14 14 11 16		
	Dienvidkurzeme, Renda 202-428-33	13 10 12 11 12			22 28 21 32 12		
	Ziemeļkurzeme, Mētras 709-138- 5	15 16 23 12 21			10 15 11 12 14		

Slapjaiņi, pacilas

Egle

Gads	Atslēga	Sakņu virziens attiecībā pret ziemeļiem un sakņu dziļums cm				Sakņu virziens attiecībā pret vagu	
2014	Dienvidkurzeme, Remte 208-176-31	44 26 19 40 21			15 14 13 14 30		
	Dienvidkurzeme, Remte 208-176-38	23 22 20 13 19			18 17 15 19 40		
	Rietumvidzeme, Rūjiena 404-100-5	25 28 20 18 25			13 12 25 18 37		
2015	Dienvidkurzeme, Remte 208-10-7-1	8 13 9 7 6			9 8 13 8 8		
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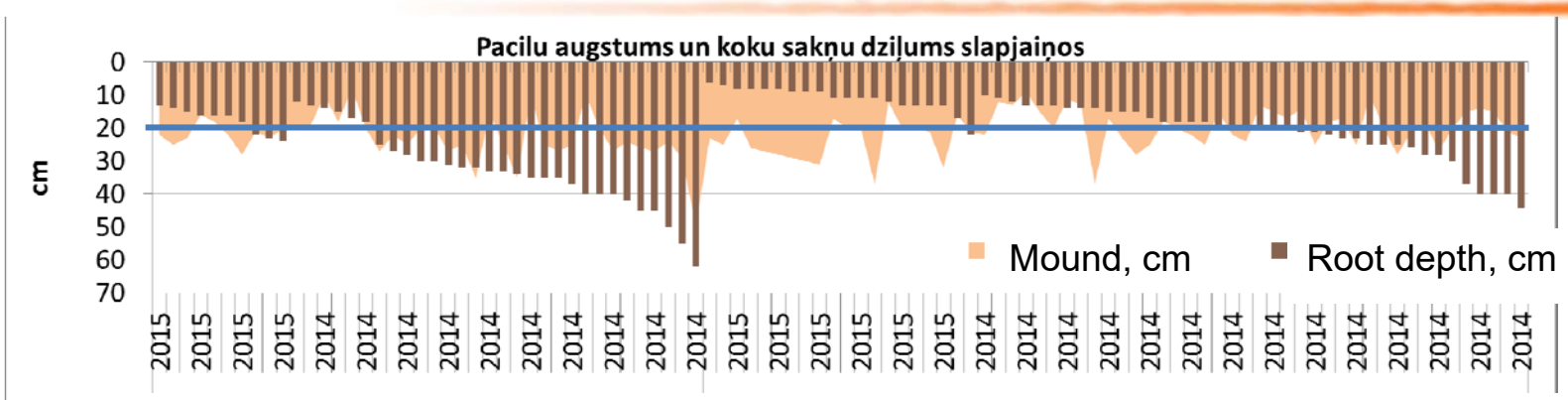
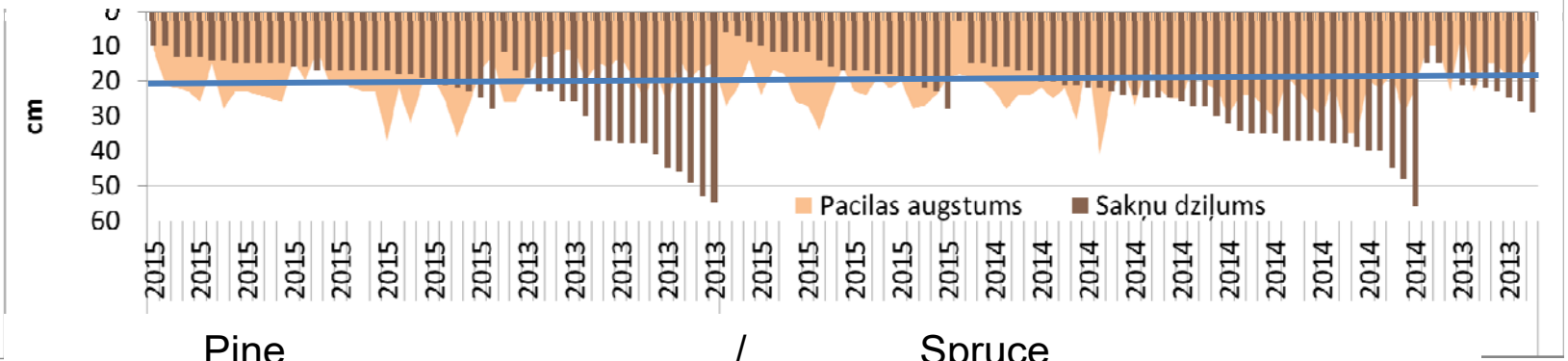
Depth of root system and height of mound



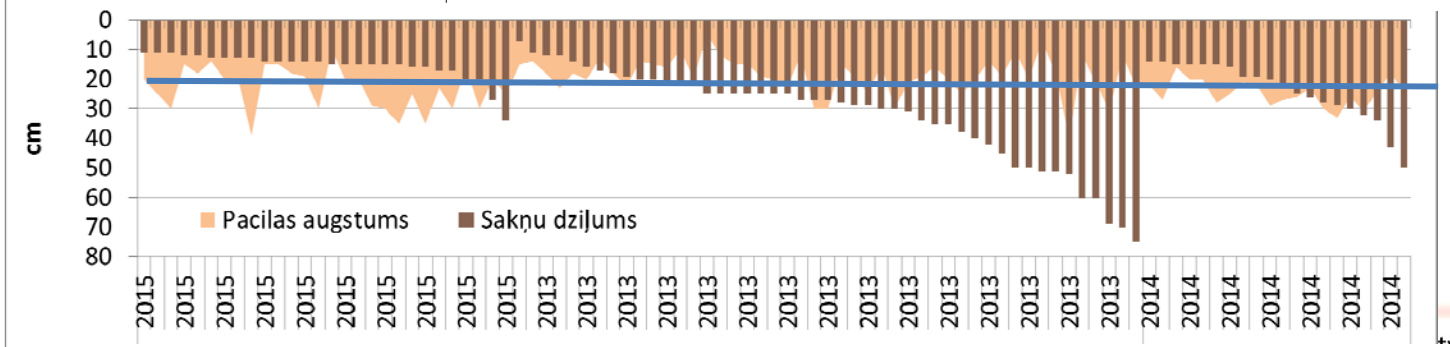
Wet mineral soil

Pine Spruce

Drained mineral soil



Pine / Spruce



Drained peat soil

Pine / Spruce

jas valsts meži" un LVMI Silava
nemoranda
ajā izpētē" ietvaros

LATVIJAS VALSTS MEŽI

Interests for future collaboration

(greetings from andis.lazdins@silava.lv)

- Dinamic Carbon models, like YASSO.
- Impact of aeration on soil mineralization processes, to describe situation and dinamic of C in wet and drained sites.
- Investigations of amount and structure of litter in young to old stands depending of management regime.
- C content and fluxes in different kind of landuse (http://restore.daba.gov.lv/public/eng/).
- Department of genetics have opportunity to do genetics analysis of genetical diversity = 'barcoding of soil microorganisms' vai 'profiling of soli microorganisms with high throughput sequencing'.contact person dainis.rungis@silava.lv
- We are open for different kind of challenges...:)
- Of course talis.gaitnieks@silava.lv and team are doing world level micorizastudies and zane.libiete@silava.lv works with forest ecology and ecosystem services studies!

Pētījums veikts a/s "Latvijas valsts meži" un LVMI Silava
2011. gada 11. oktobra memoranda
"Par sadarbību zinātniskajā izpētē" ietvaros

LATVIJAS VALSTS MEŽI