

The New Zealand Institute for Plant & Food Research Limited

Plant & Food
RESEARCH

RANGAHAU AHUMĀRA KAI



Poplars stabilising soil on slopes

Prepared by:

Ian McIvor

Poplar clones on the horizon 1

Populus maximowiczii x P. nigra

- Fastigiate (narrow) form, high wind resistance
- Rust resistance
- Quick growing
- Few double leaders
- Variation in growth rate
- Four clones
- Straight trunk
- Four clones: NZ3032 – NZ5035



Trialled under testing field conditions

Maxi-nigra



Poplar clones on the horizon 2

Populus deltoides x P.ciliata

- Variable rust resistance
- Variable growth
- Broader branching, wind tolerant
- Three clones: NZ5025-NZ5027
- Straight trunk

Deltoides x ciliata

NZ5027



NZ5026



NZ5025



NZ5027

New clones below ground

We know that these clones add variation to the commercial gene pool in relation to above ground performance

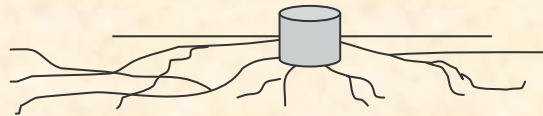
Rooting characteristics are under study at present in a nursery setting

Rooting performance on hill slopes are governed by different rules

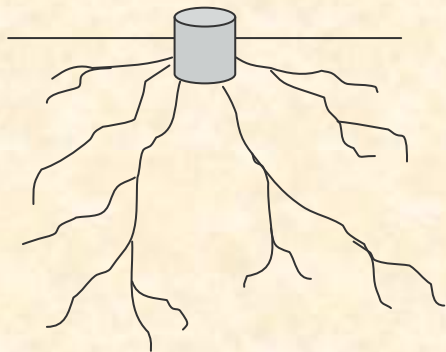
Environmental demands shape root development

Root architecture

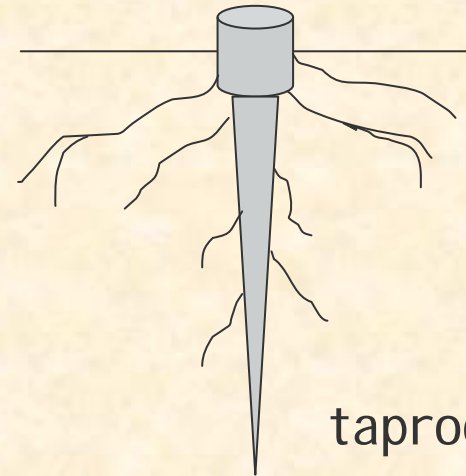
Nature of structure:



plateroot



heartroot

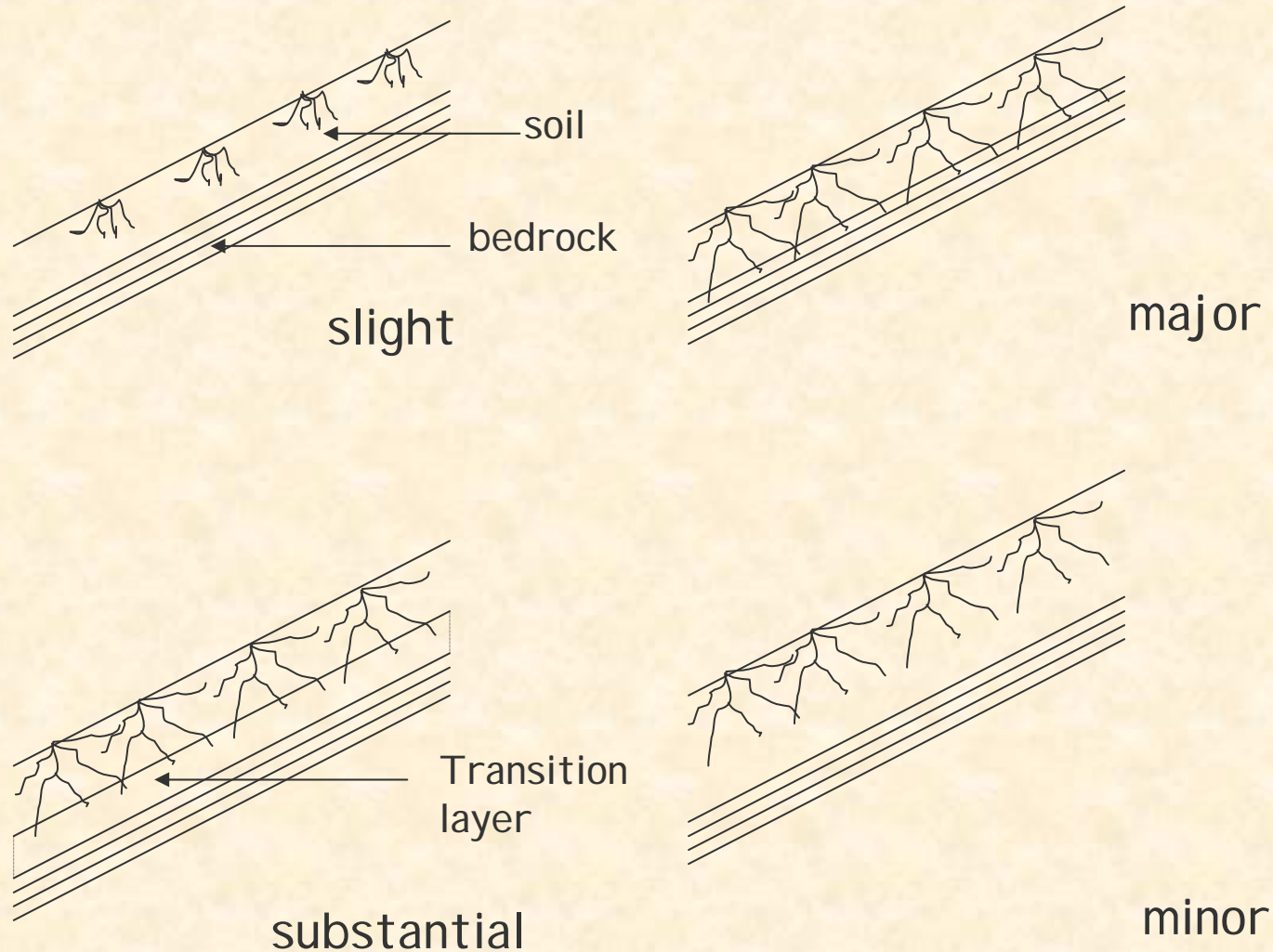


taproot

Types of roots

Lateral, vertical, sinker, coarse,
fine

How slope stratigraphy influences the stabilizing effect of roots against slope failure

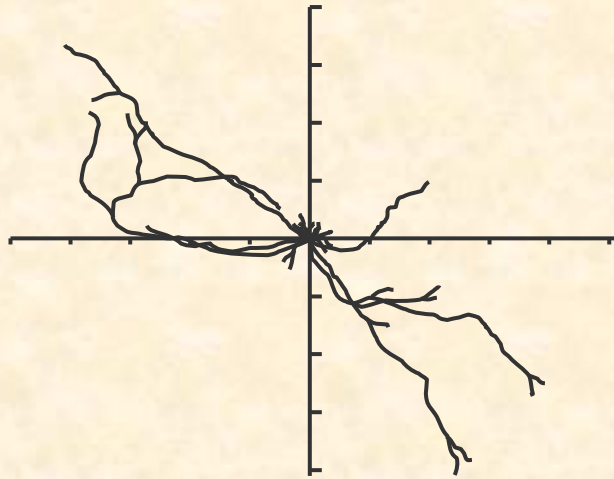


Factors affecting root development

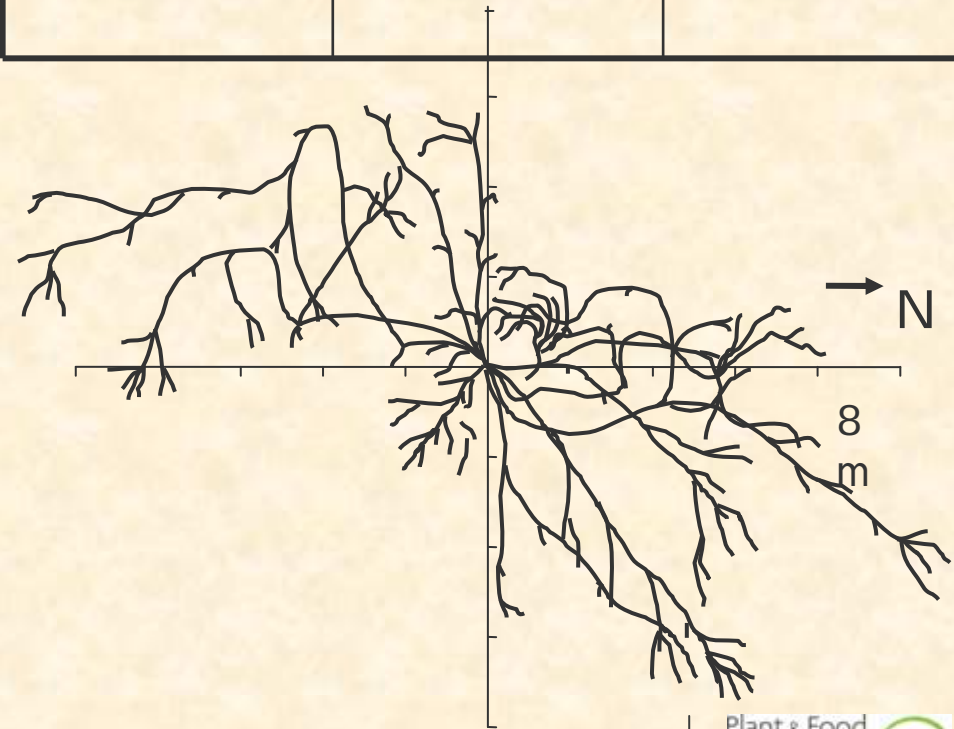
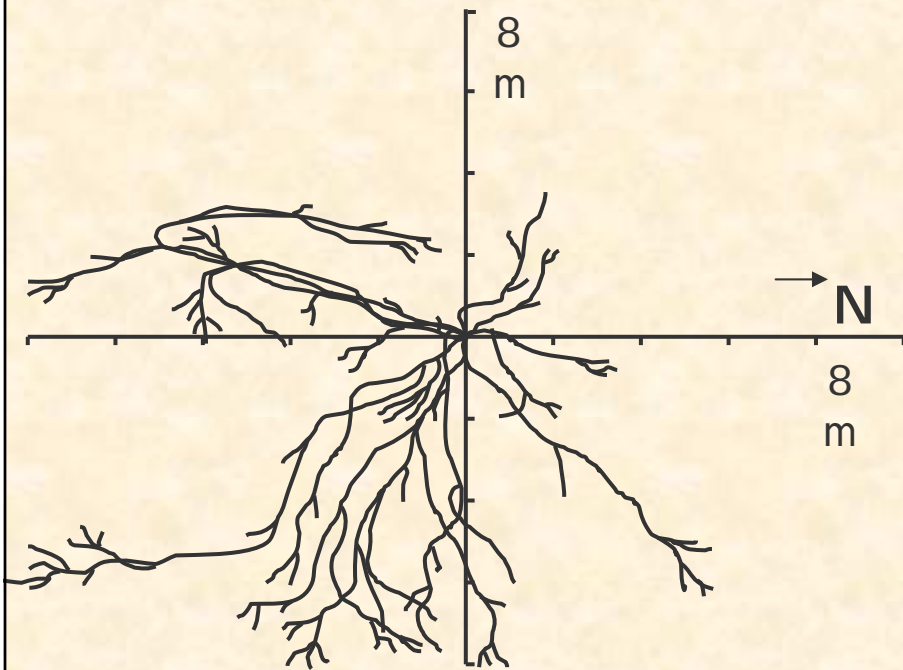
- Plant genetics
- Competition
- Above ground stress

- Soil nutrients
- Water supply

- Soil bulk density
- Slope
- Soil depth
- Nature of the bedrock

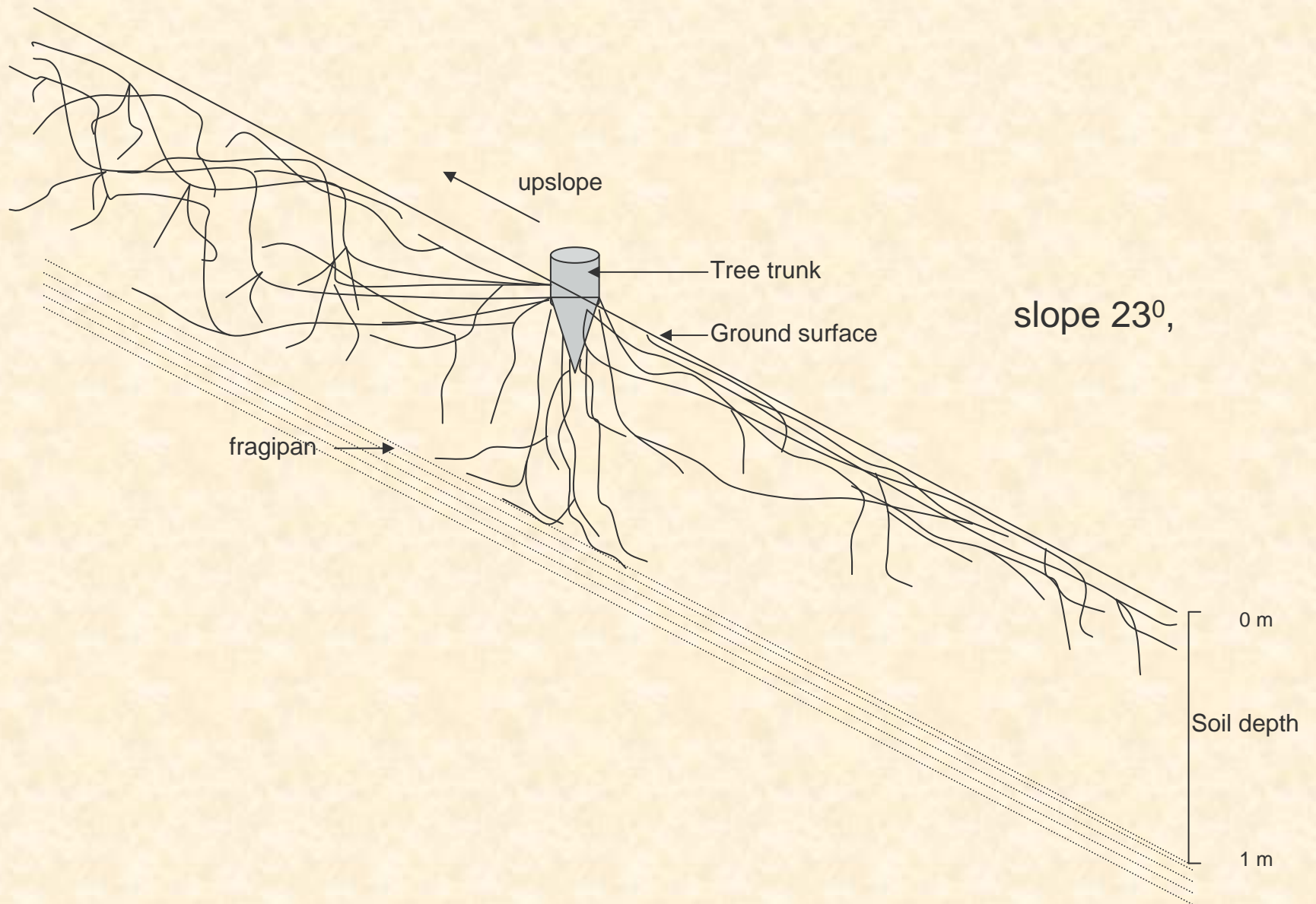


5 yr	0.57 kg	79.4 m
7 yr	7.8 kg	349.3 m
9.5 yr	17.9 kg	663.5 m

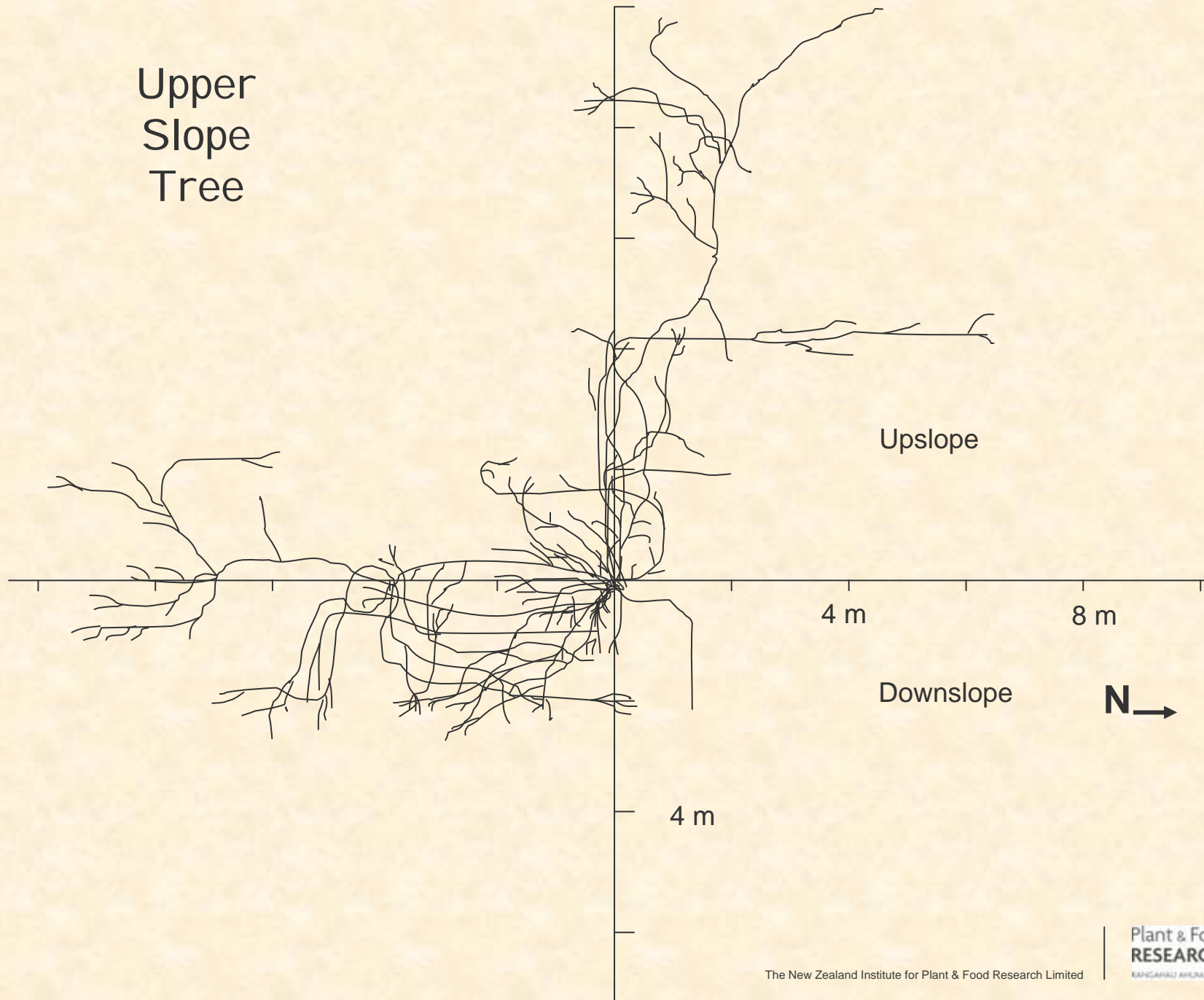


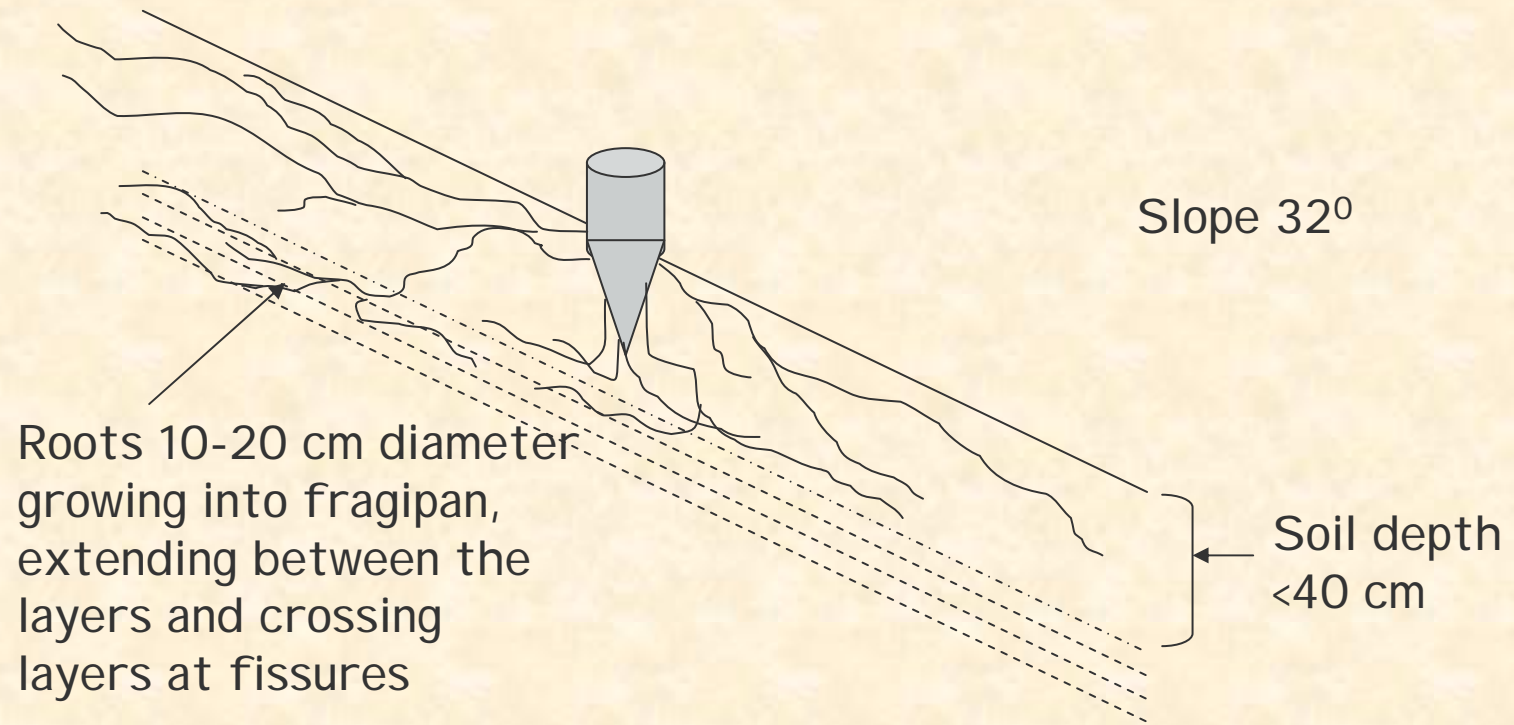
Downslope





Upper
Slope
Tree



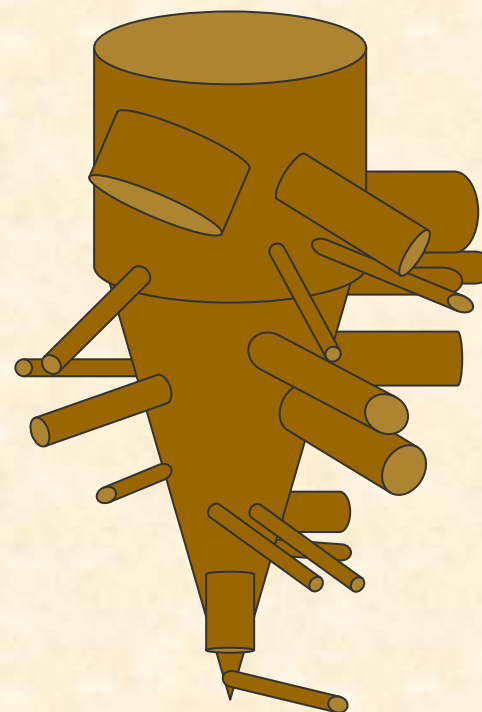
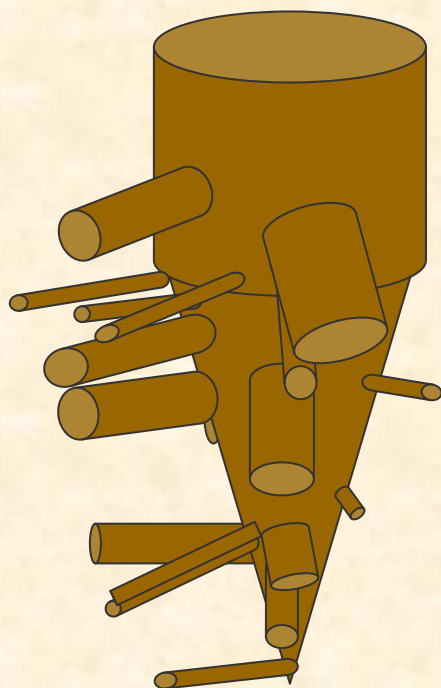




TREE 8 Carter Farm North and East orientation and relative size of roots

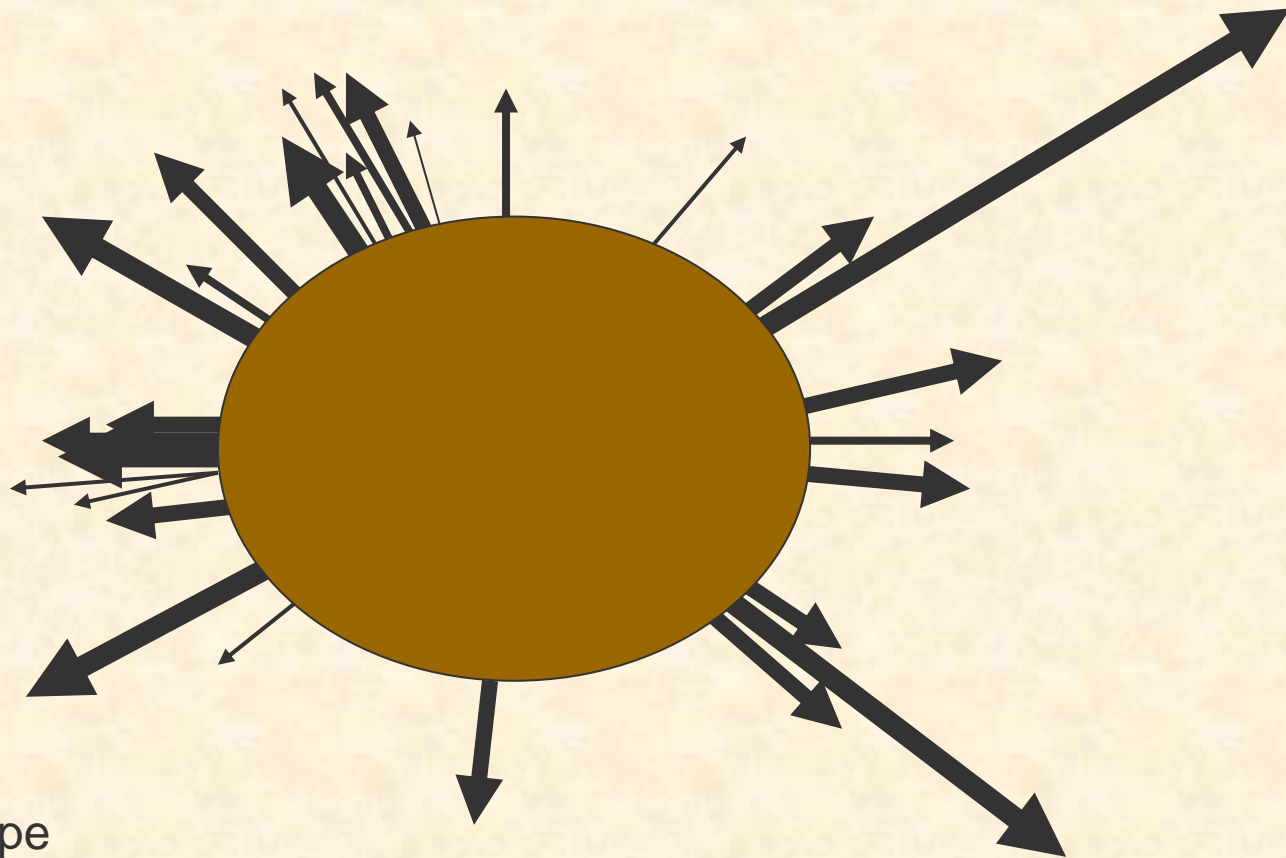
→ N

→ E



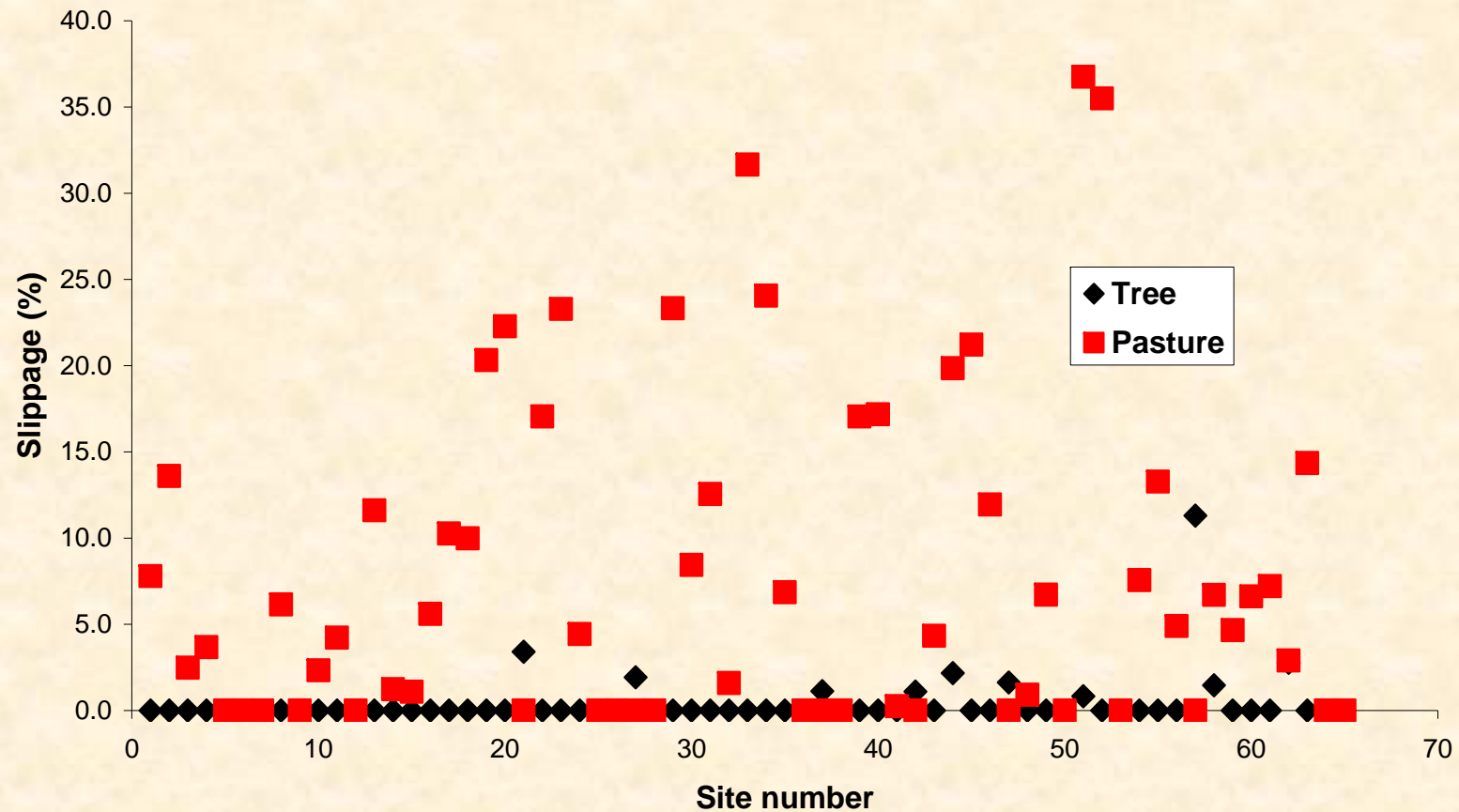
North-facing slope
Prevailing wind is from the west

Tree 8 Root orientation off the crown

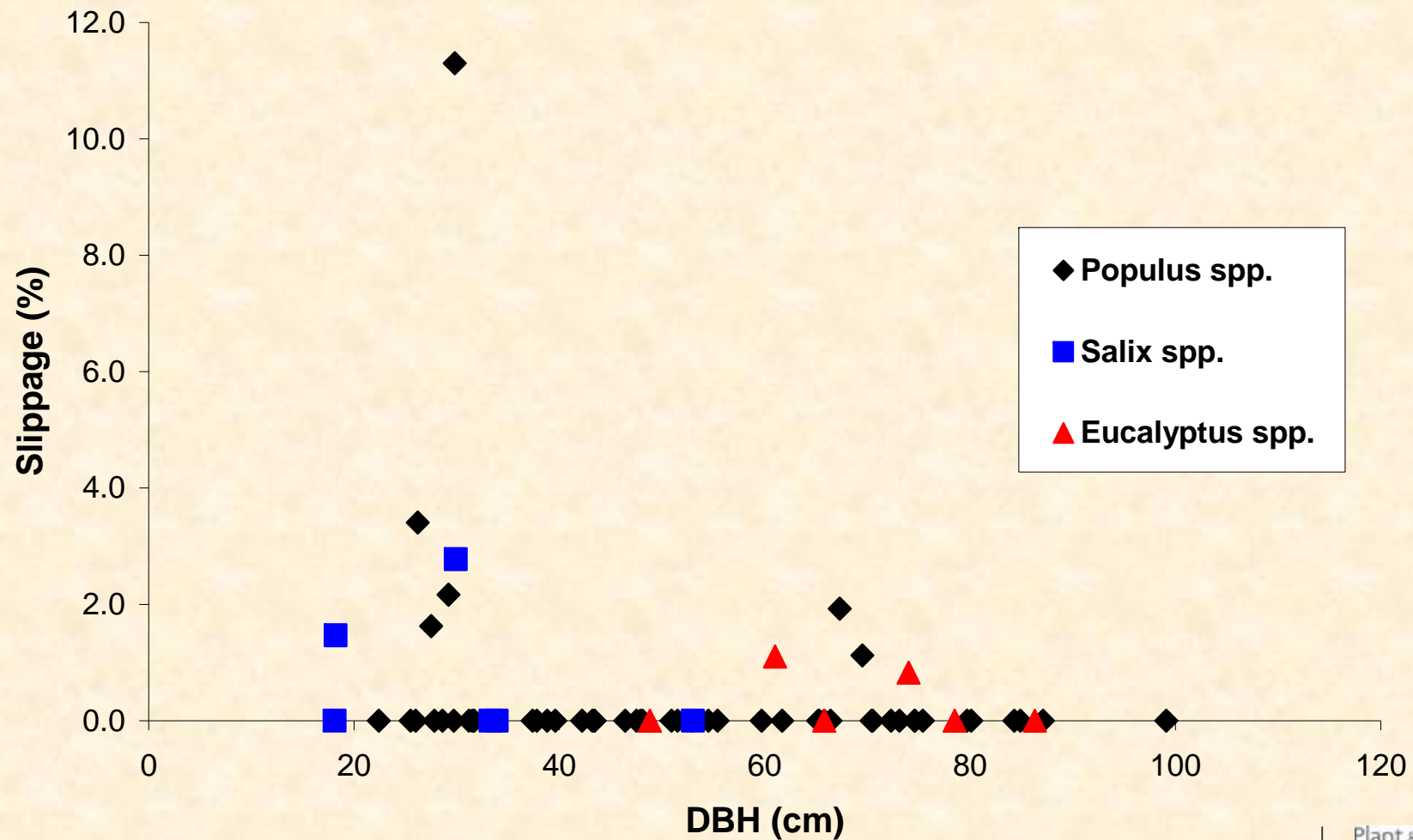


Root CS area ~ arrow font x arrow length

Extent of slippage (%) on tree and pasture sites at 65 sites in Manawatu and Wairarapa in winter 2007



Association between extent of slippage (%) and diameter at breast height (DBH; cm) for spaced trees growing at 65 sites in Manawatu and Wairarapa in winter 2007.





Management Strategies

Choosing

- species
- needs

Spacing

- risk
- cost

Pruning

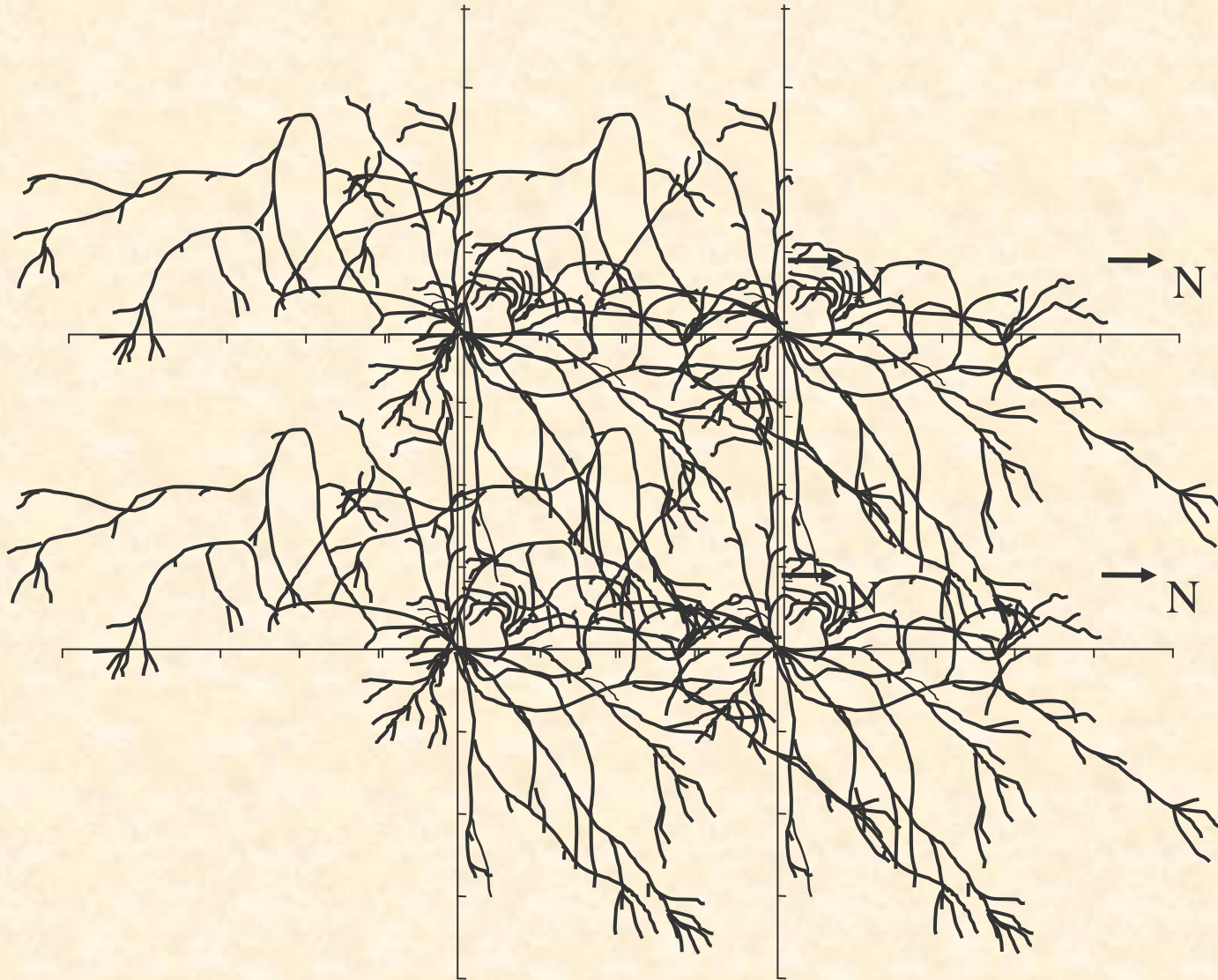
- Growth
- enduse

Pollarding

- Size
- fodder

The New Zealand Institute for Plant & Food Research Limited

8 m x 8 m



10 m x 10 m



15 m x 15 m

