The effects of pre-emergence variation in willow cuttings on the development of size and weight hierarchies in willow short rotation coppice

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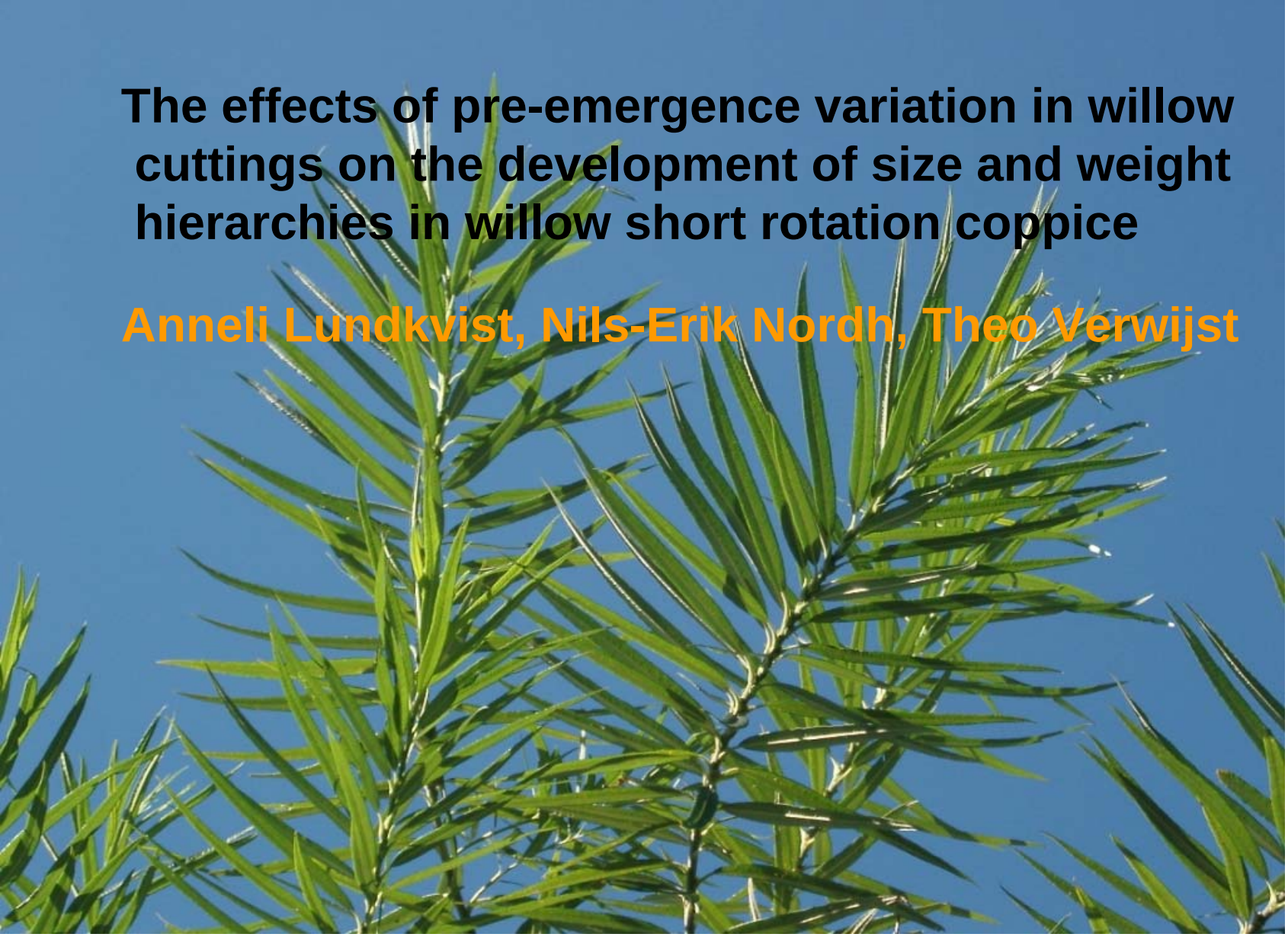

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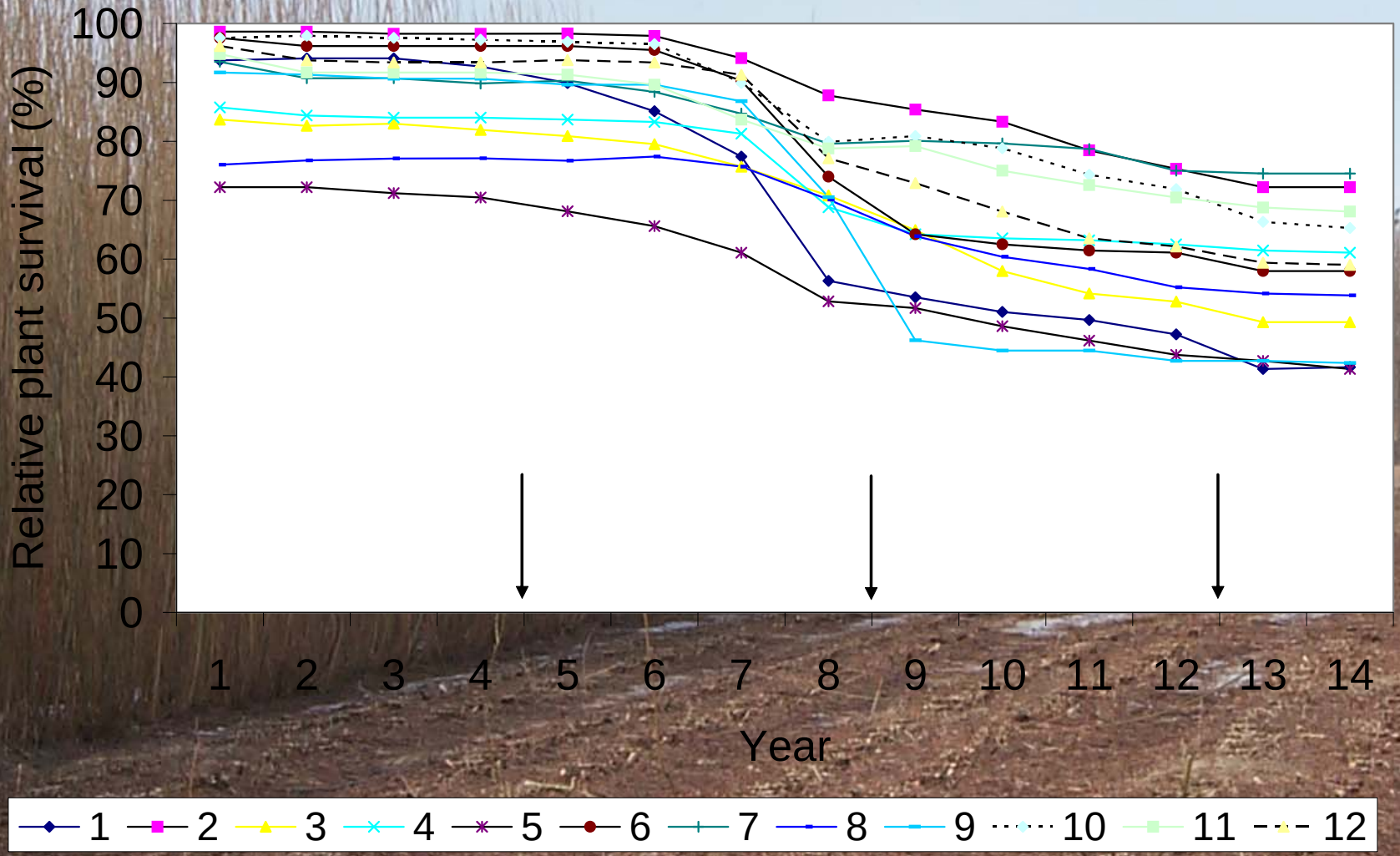
Background (1)

- **Variation in size and weight of established plants in Willow Short Rotation Coppice Systems increases over time.**
- **We know that competition is involved in this process, and that the competitive hierarchy between plants is maintained over harvest.**
- **This process goes along with stool mortality and leads to production losses during later cutting cycles.**

Management for sustained production



Background (2)

- **On the larger within-field scale, variation in establishment performance has been attributed to weed pressure-, soil fertility- and soil moisture gradients.**

- **Causes of variation in early performance on spatially small scales have been attributed to differences in abiotic and biotic conditions on microsite-scale.**

Central Question

- **Are quality differences between individual cuttings contributing to the development of size and weight variations under early establishment of willow stands?**

Salix – pre-emergence variation

Aim: to assess the effects of (variation in) cutting size, weight and origin (position along long shoot) on the consecutive shoot population, in terms of sprouting ability, numbers and size.

Material: *Willow* cuttings of 12, 18 and 24 cm length, from 5 commercial clones

Salix – pre-emergence variation

Experimental design: 5 clones, 3 cutting lengths, 8 (4) long-shoots (64 cuttings) per plot, 2 replicates = 1920 cuttings. Additional plots (9 x 64 cuttings) were used to test the effects of delayed planting.

Measurements: On long shoots; basal diameter and fresh weight. On cuttings; fresh weight and diameter (dry weight determination on sub-sets).

Sprouting is recorded on a 5-point scale, and followed up by height measurements. Final harvest involved measurement on shoot number, size, and cummulative weight of all shoots for each cutting.

Salix – pre-emergence variation

Our hypotheses are that:

- **Cuttings from basal origin will emerge earlier than cutting closer to the apex.**
- **Cuttings from basal origin, for a fixed growth period after emergence, will give rise to shoots with a higher growth rate than cuttings closer to the apex.**
- **Longer cuttings will produce more and larger shoots than shorter cuttings.**
- **Thicker cuttings (given the same length and relative position along the original shoot) will produce more and larger shoots than thin cuttings.**
- **The performance postulated in the above hypotheses is valid for each of the clones from a set of 5 clones to be tested.**
- **The relative performance (in terms of actual timing, growth and number of sprouts grown) will be clone-dependent.**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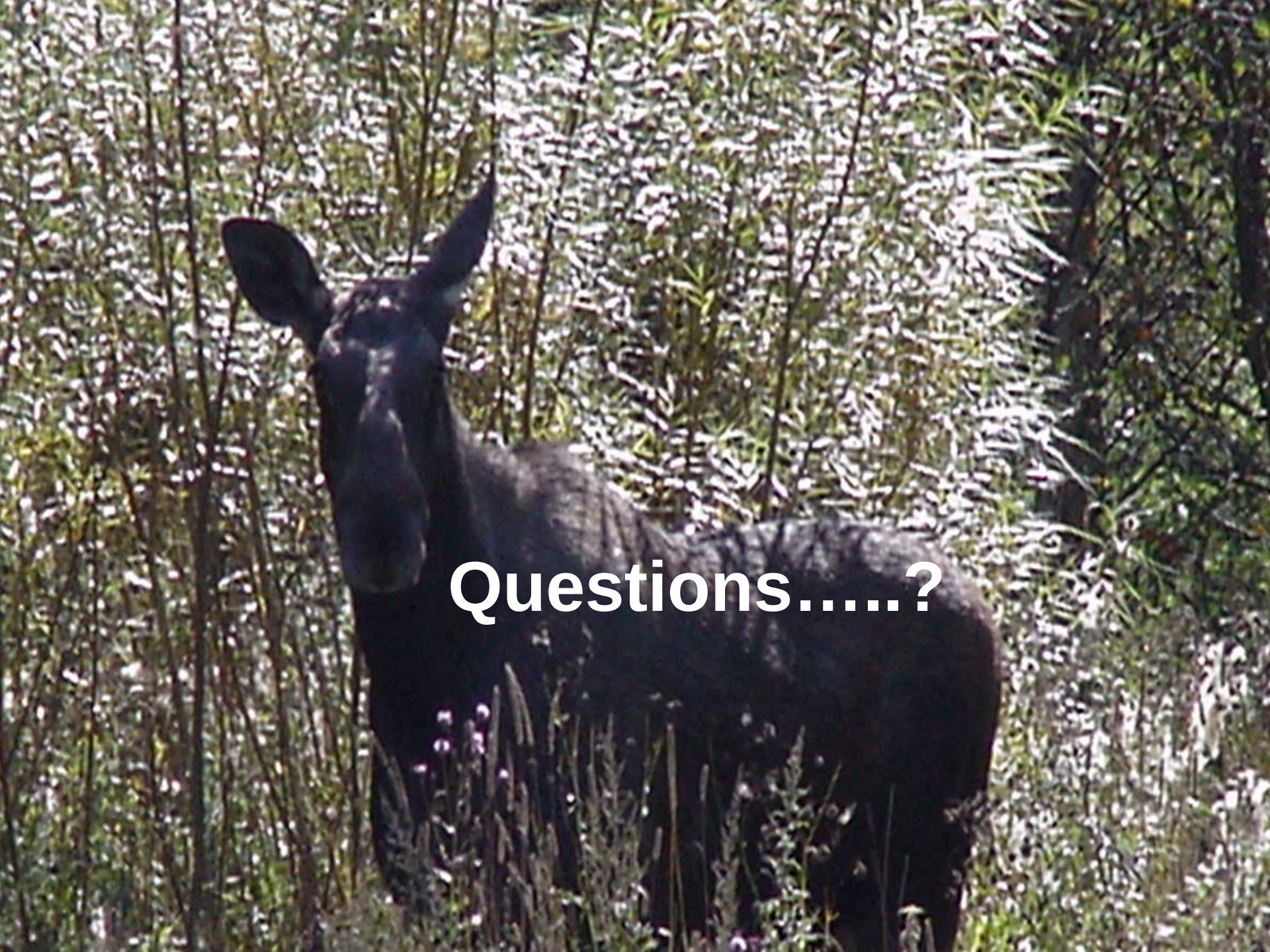
Salix – pre-emergence variation

- Finally, allometric relations will be determined [w = f (height)] to assess if this method can be used in the future for early cutting screening.
- Allometric relations are expected to be clone specific, but not dependent on original cutting length.

Preliminary results

- Early fenology is clone-specific
- Origin (relative position along shoot) has an effect on timing of sprouting
- Positive relation between cutting thickness and height after 6 weeks
- Positive relation between cutting length and performance at 6 weeks


Questions…..?