

Hard pruning and long day treatment of stock plants improve rooting and early growth habit of Norway spruce cuttings

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Bulk propagation using rooted cuttings

- **Young stock plants (e.g. starting from seeds)**
- **Reduce problems with ageing and poor quality of rooted cuttings**
- **Genetic quality known prior to propagation (e.g. by using progeny tested seed parents)**

Could rooting and quality of rooted cuttings be enhanced by altering the vigour of stock plants?

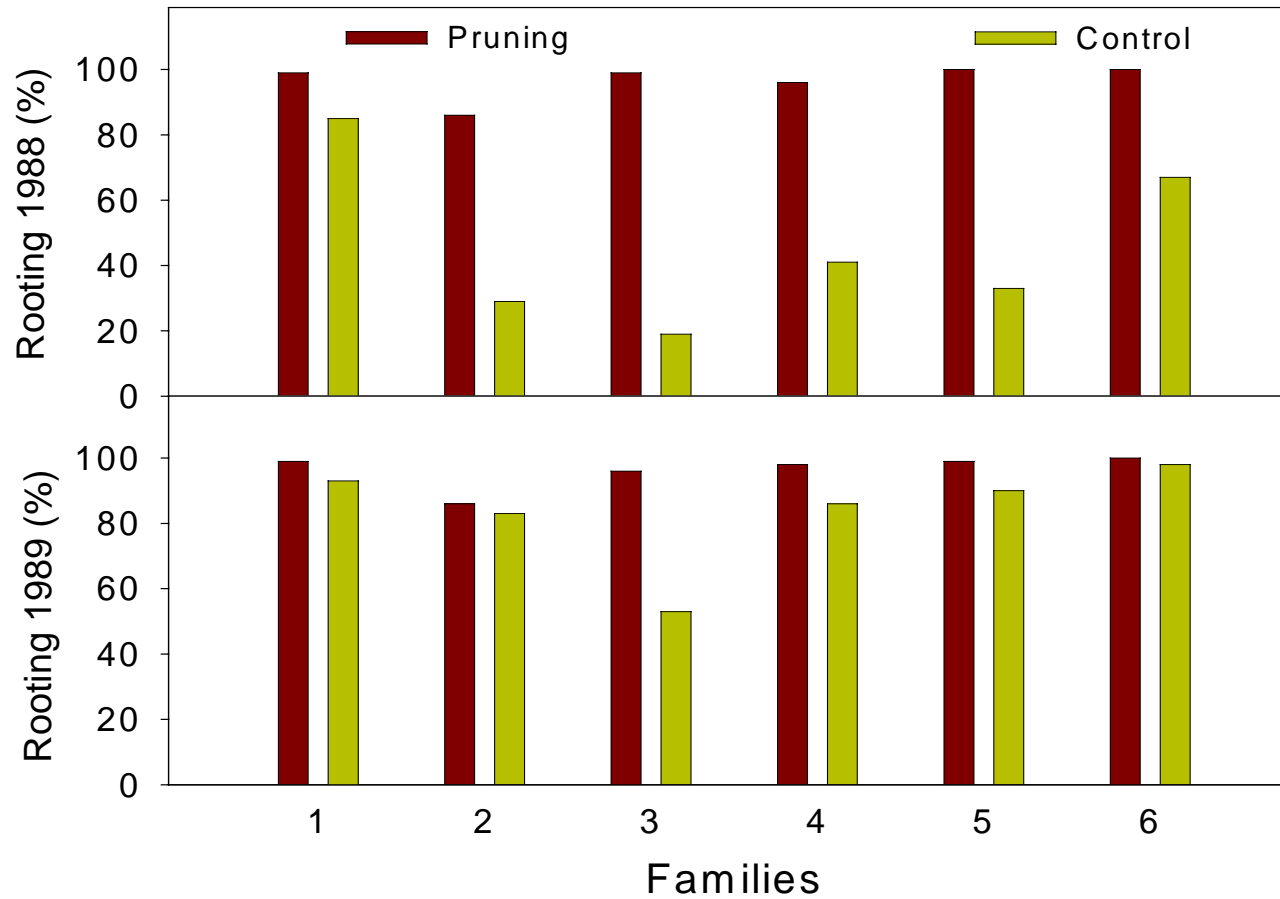
Hard pruning of stock plants



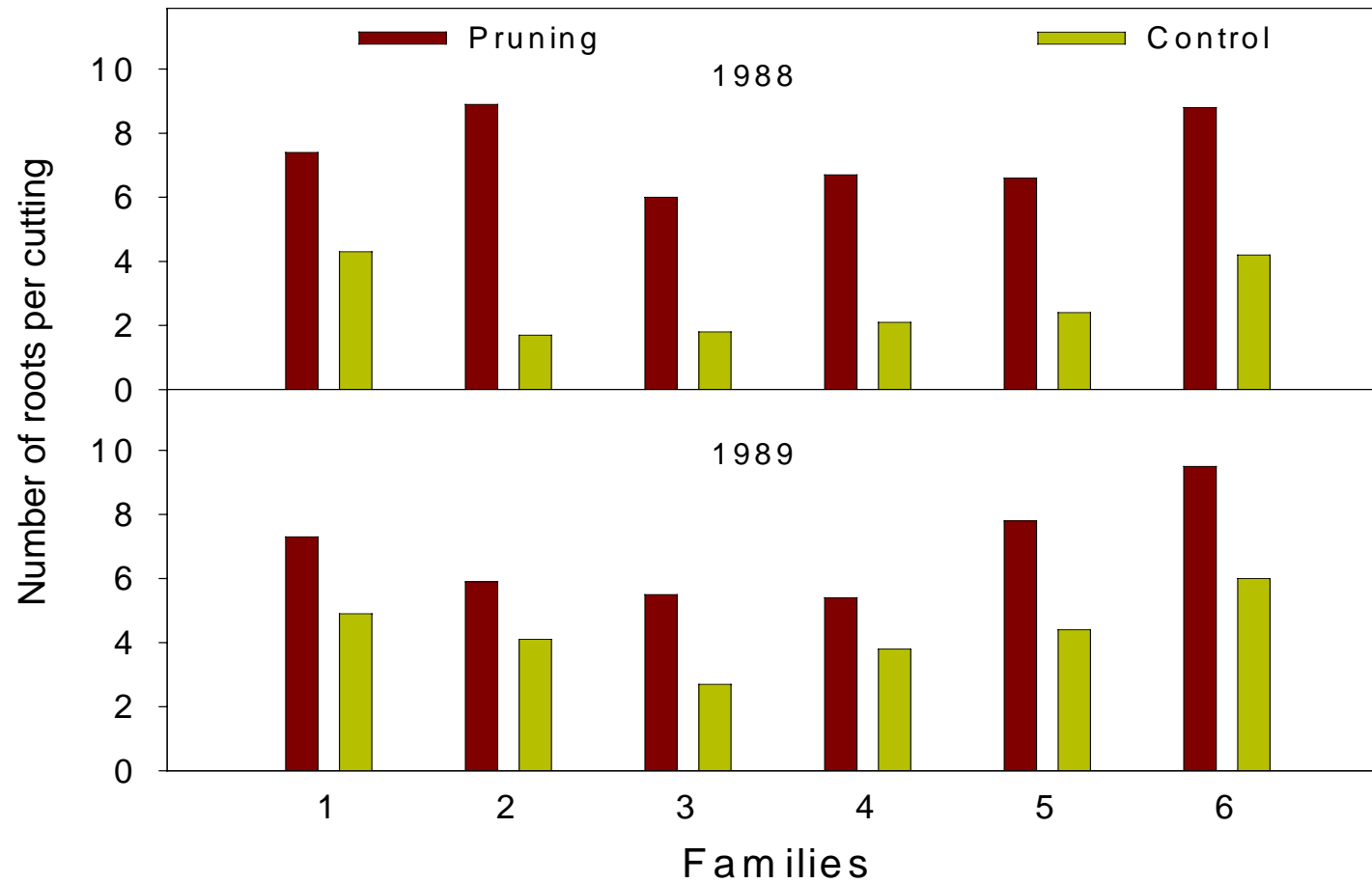
**Pruned yearly
30 - 40 cm tall
7- 8 years old**



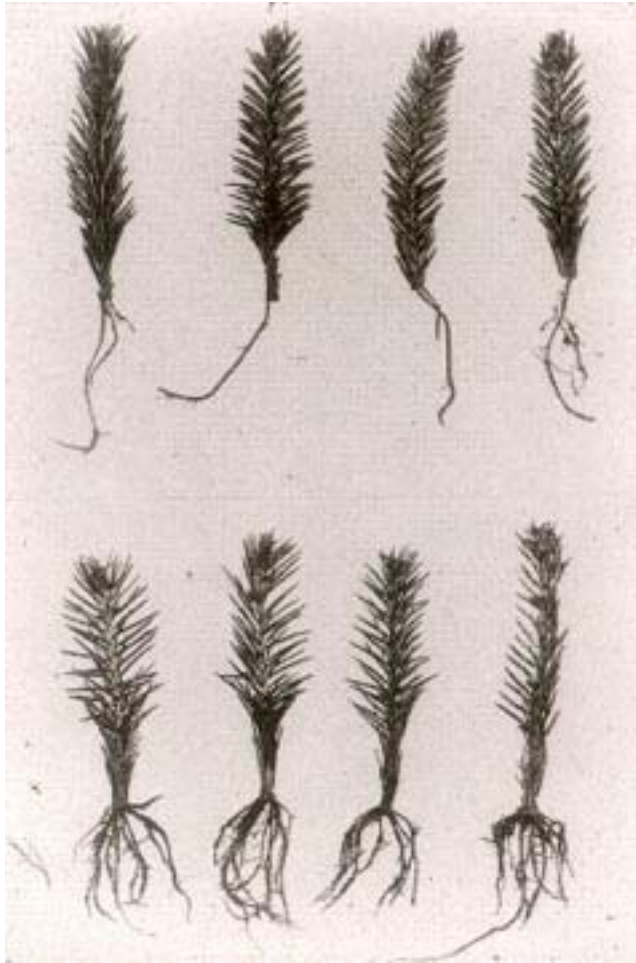
Hard pruning improves rooting



Hard pruning improves root quality



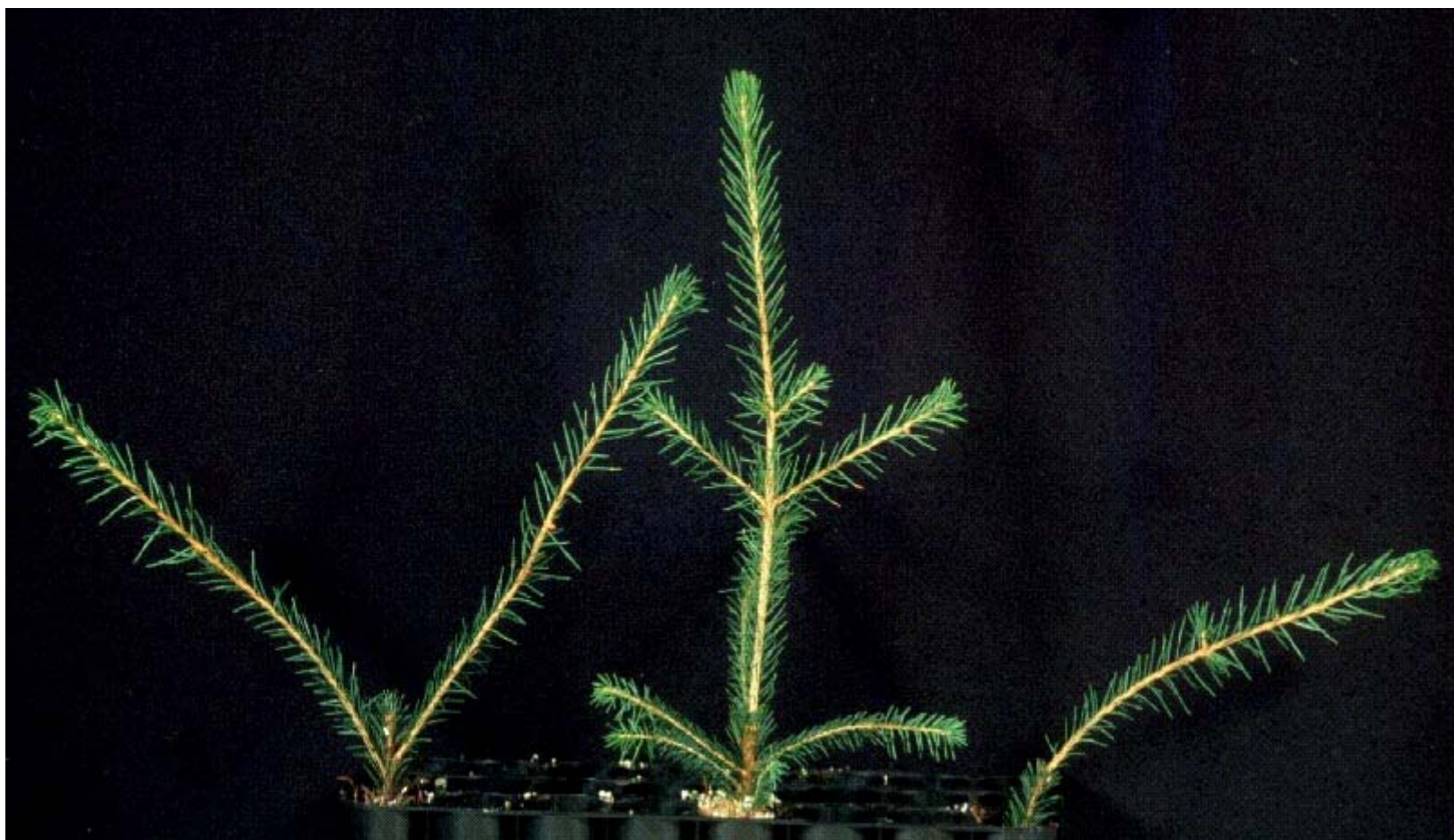
Quality difference



Pruning enhances

- shoot vigour
- root symmetry
- rooting
- orthotropic growth in field trials

Despite pruning, problems do occur



Problems do occur



Problems do occur

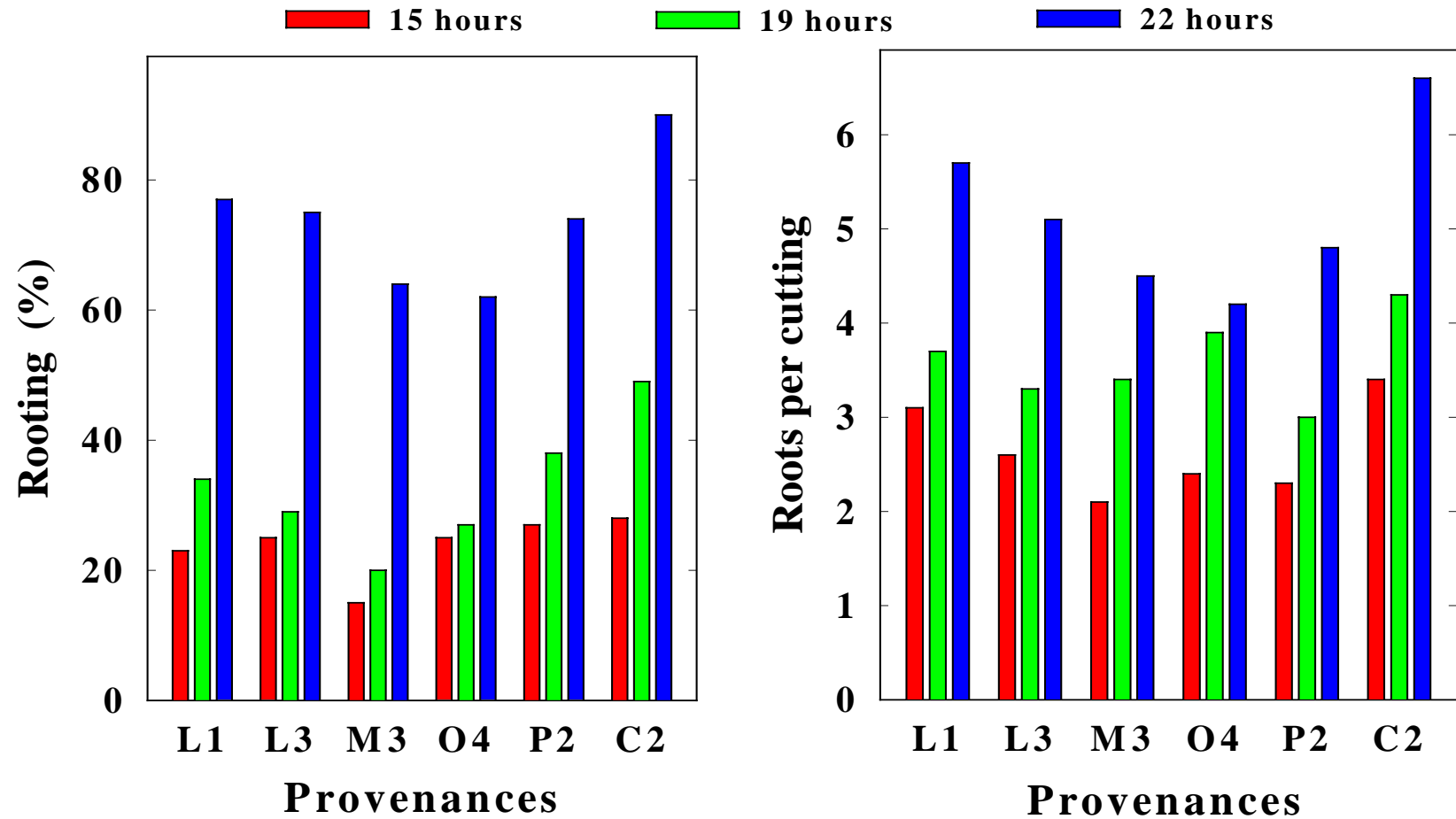


Photoperiodic treatment

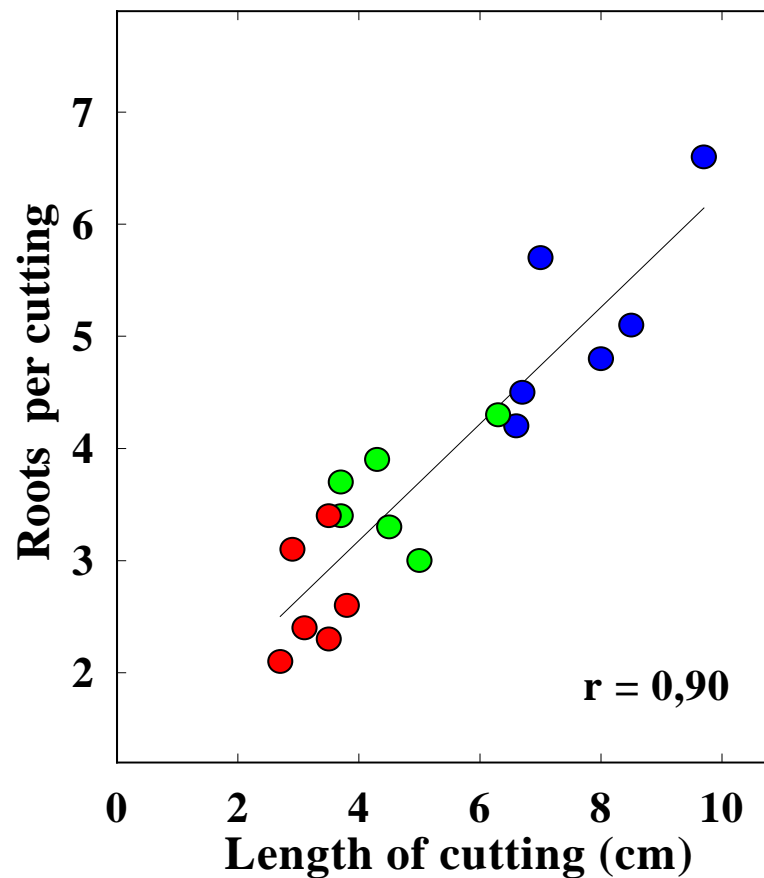
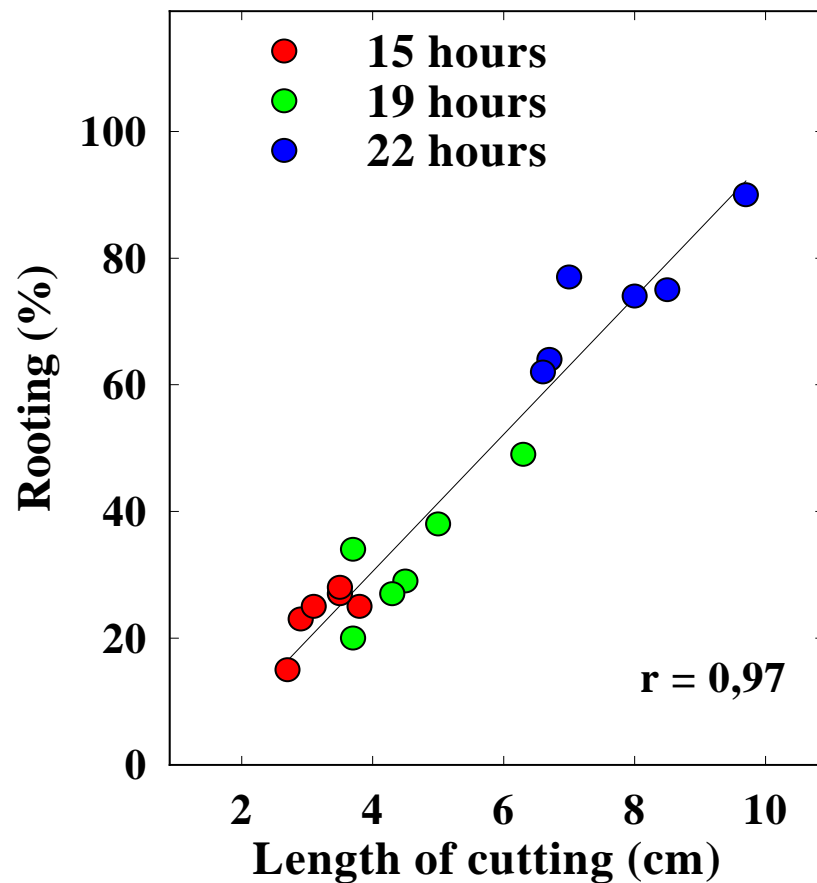
- We have found large provenance, family and clonal differences in plagiotropic growth
- Terminal bud on twigs are formed when attached to stock plants but needle primordia also develop during rooting
- Short days induce dormancy

Could rooting and quality of rooted cuttings be enhanced by long days given to stock plants?

Long days improve rooting



Indirect long day effect

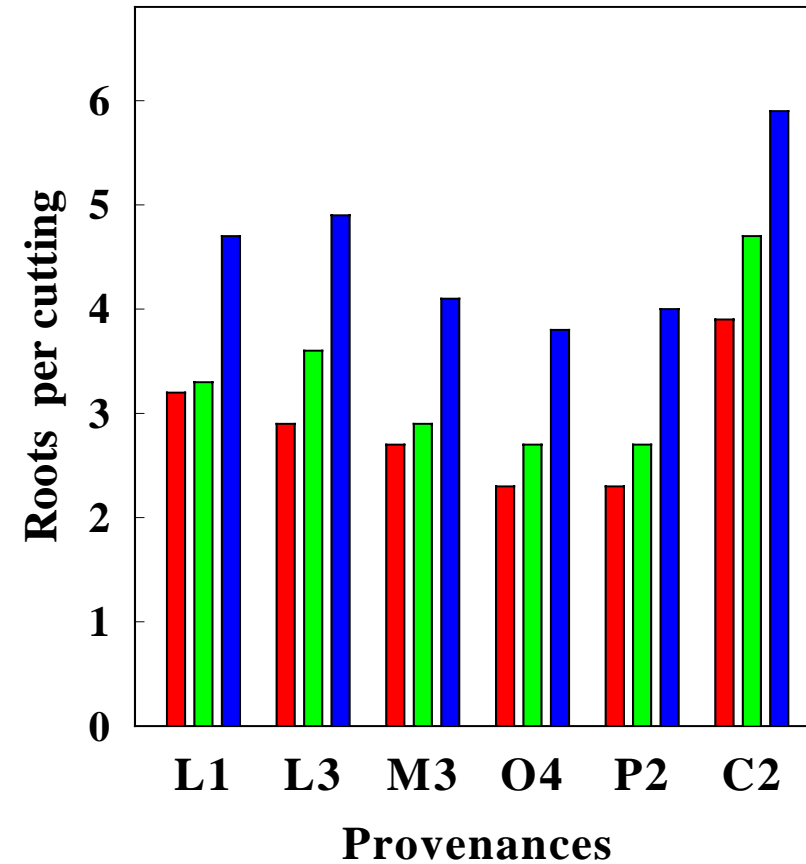
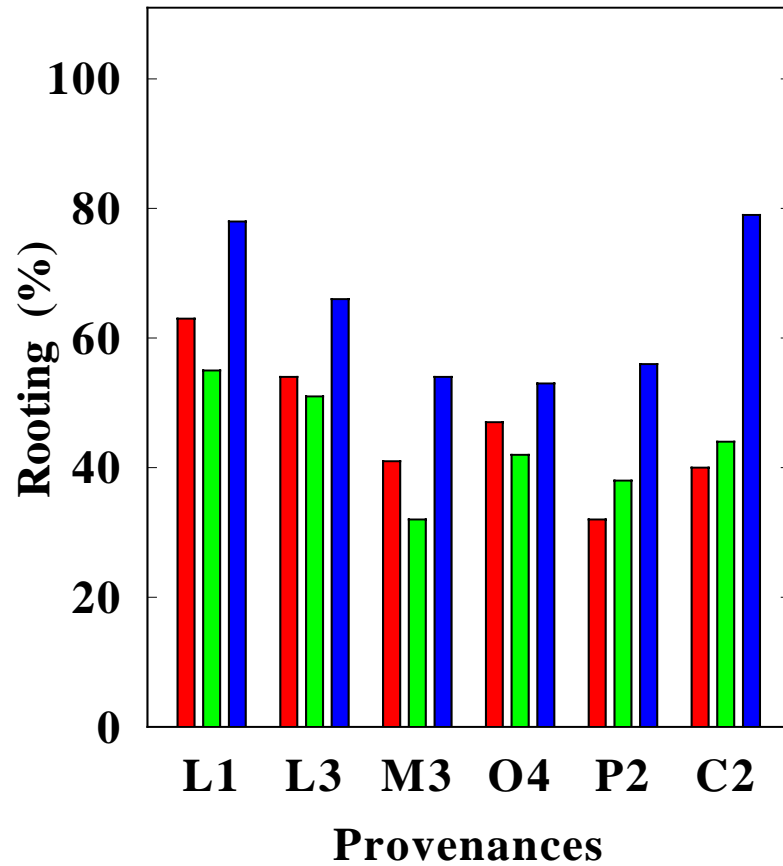


Long day effect, uniform length

16 hours

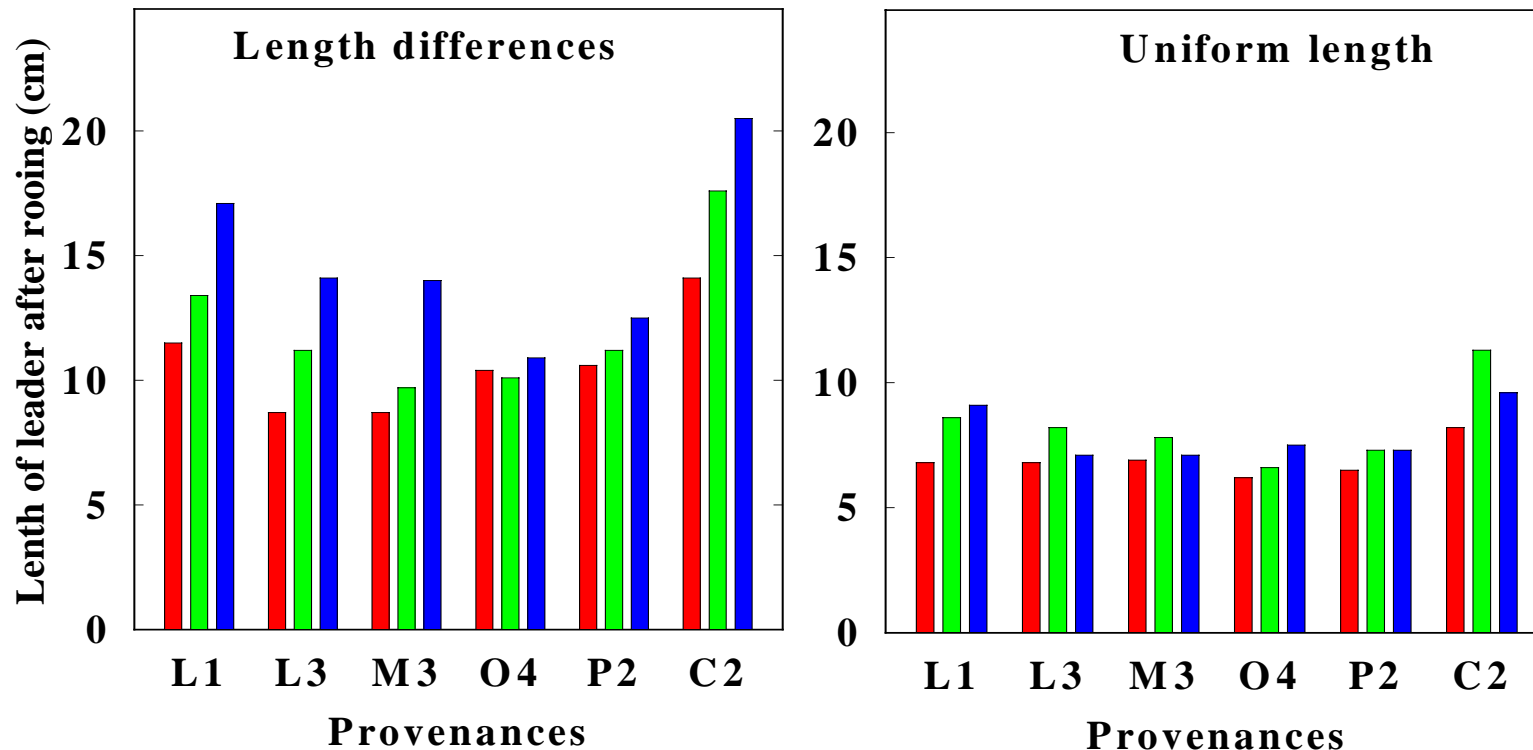
19 hours

22 hours



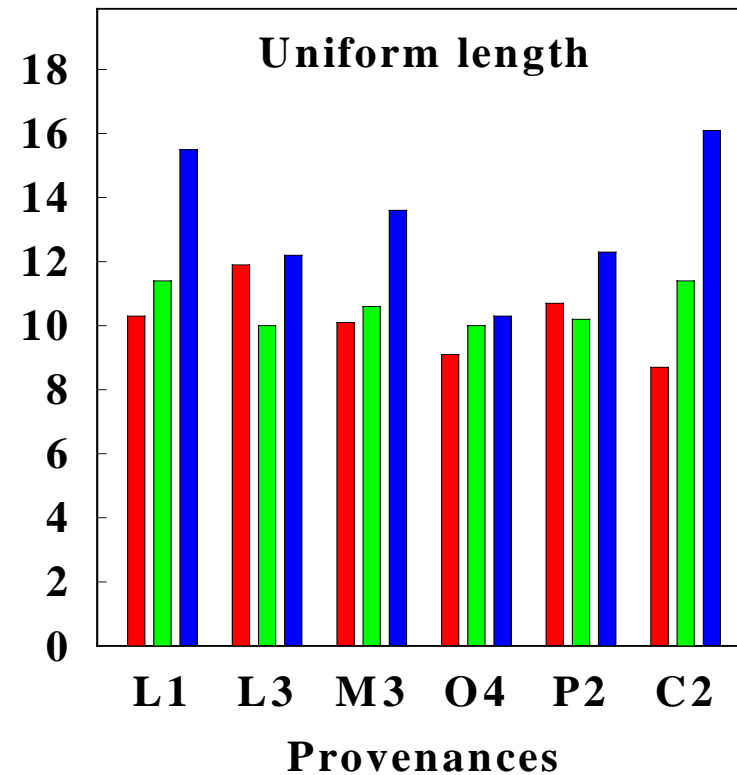
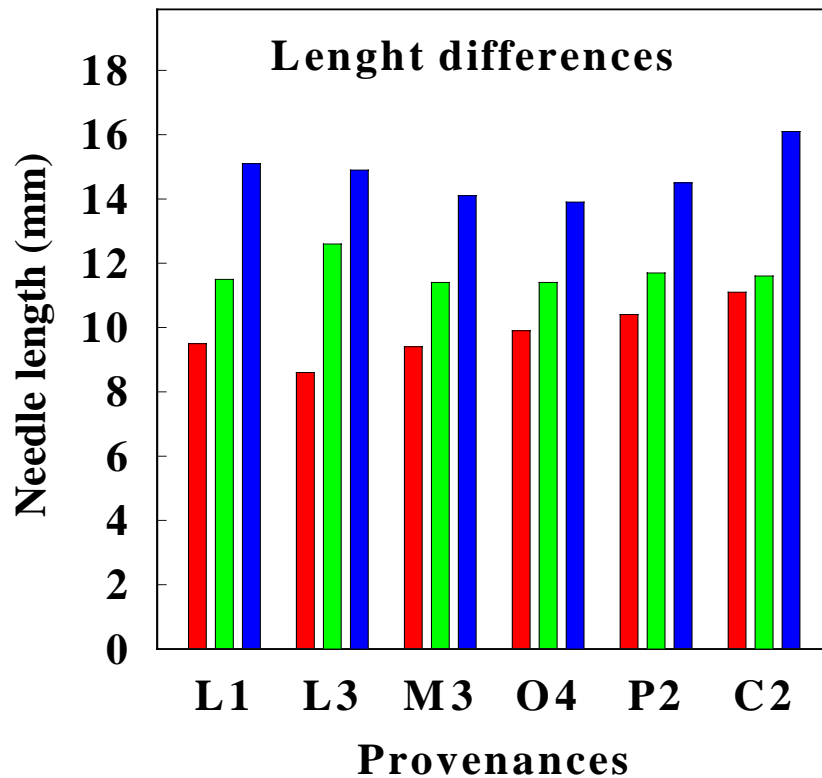
Length of cutting affects growth after rooting (also in field trials)

■ 15/16 hours ■ 19 hours ■ 22 hours

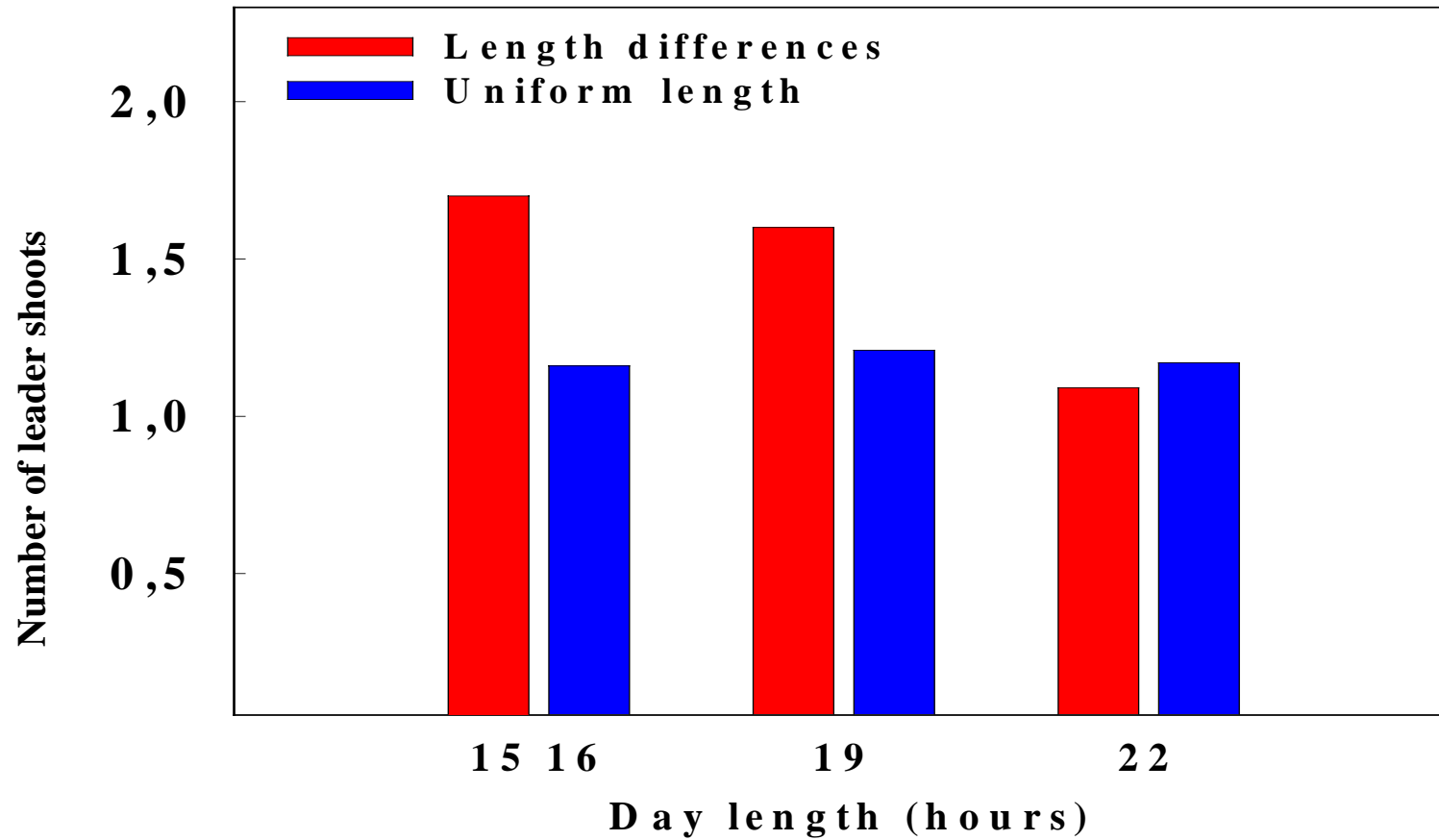


Needle length is affected by photoperiod

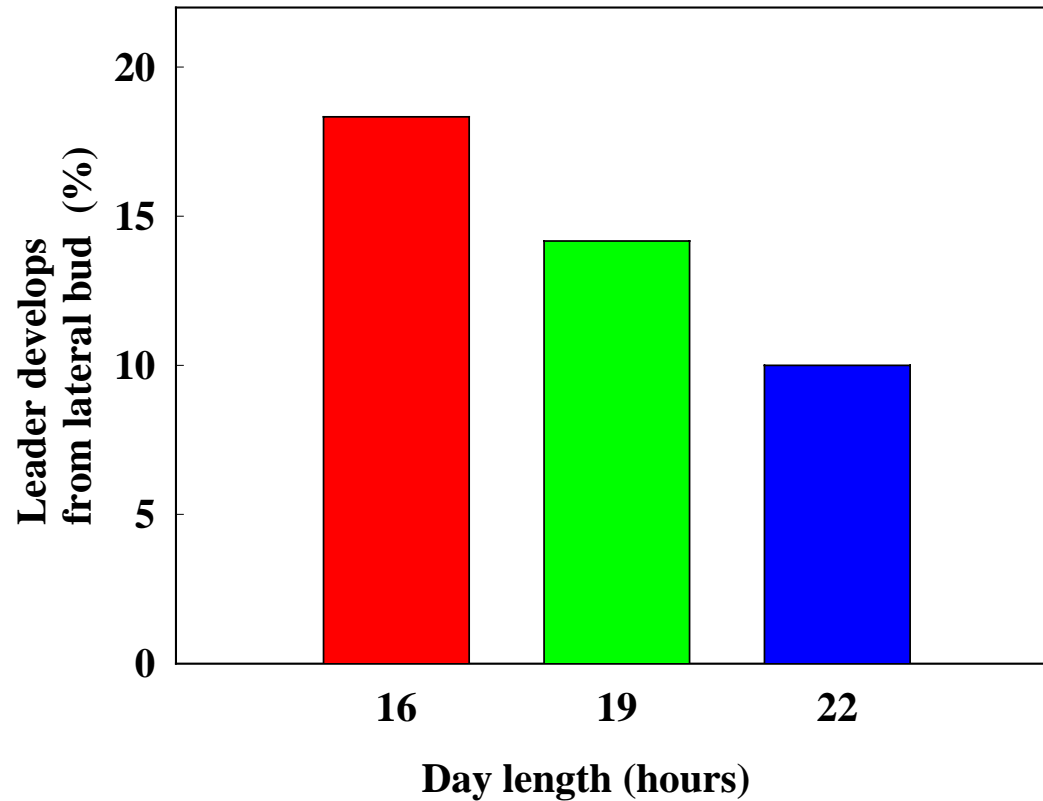
15/16 hours 19 hours 22 hours



Small cuttings; more than one leader

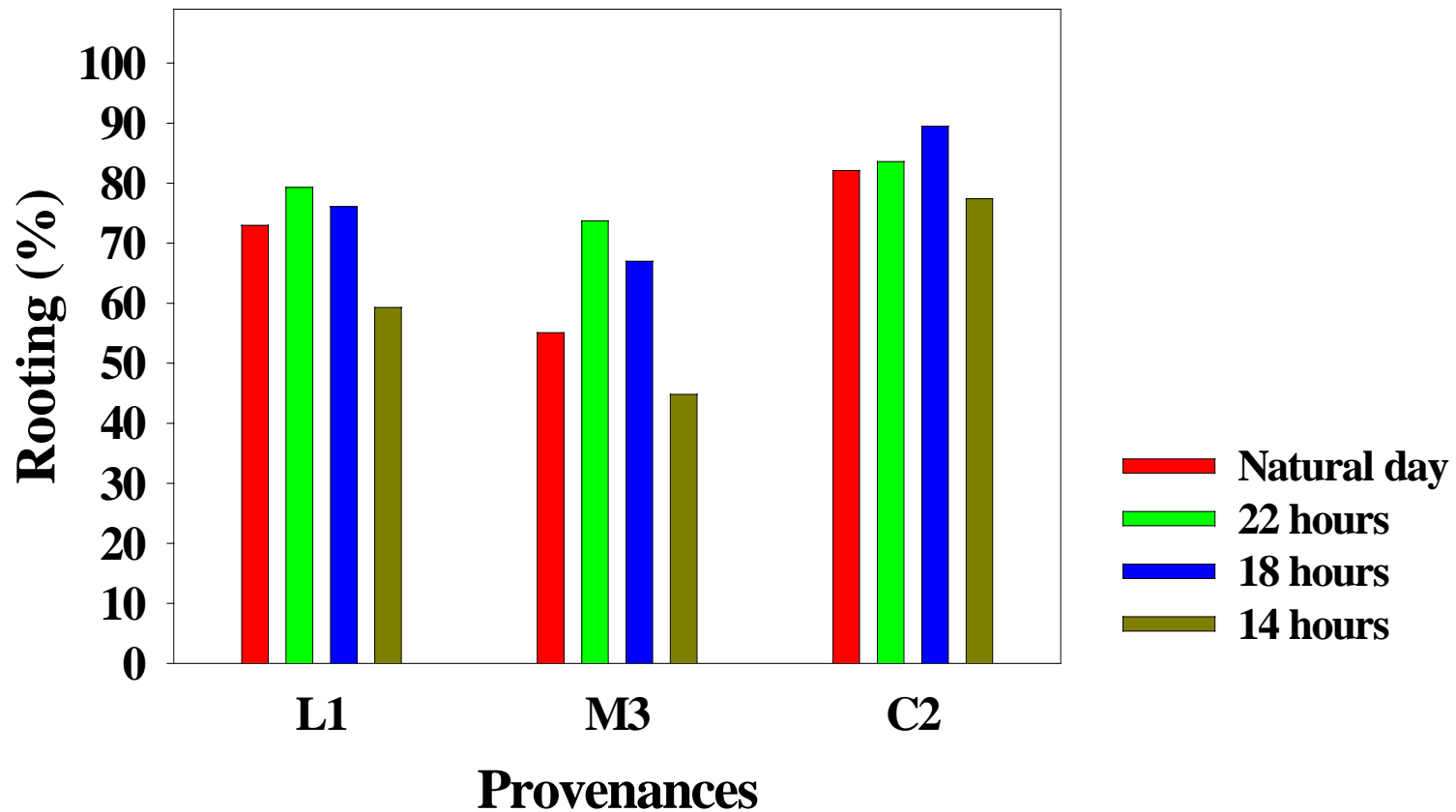


Terminal bud will not burst after rooting



Long days will
reduce this
tendency

Days should not be short during rooting



Conclusions

- **Hard pruning could maintain stock plant in use for at least 8 - 10 years**
- **Do not introduce treatments that could induce dormancy to stock plants and to cuttings when the roots are formed**
- **Differences in artificial supplementary light sources (light quality) not very important (data not shown)**