

## RESEARCH BRIEF 20

# Field Trial of Poplar poles, wands and bare-rooted stakes



**Poplar wands and rooted stakes are quicker and cheaper to produce and easier to plant than poles. Increasing their use could accelerate planting rates and soil protection, and they may better handle dry summers in the establishment years than poles.**

A field trial was undertaken between July 2021 and June 2023 in three regions, Taumarunui, Wairarapa and Ahuriri; of which Wairarapa and Ahuriri are drought susceptible. The aim was to test the hypotheses that compared to poles, wands and rooted cuttings are

1. equally likely to survive and grow when planted and protected on pastoral hill slopes in the presence of grazing animals, and
2. will have higher survival in drier sites such as northern faces and in drought prone regions.

Thirty reps of each of the three material types were planted on a north-facing slope and a south-facing slope in a grazed paddock on a single farm in each of the three locations (6 sites in all). Poles (P) were planted 10–12 m apart, with a wand (W)

and a rooted cutting (R) planted between adjacent poles at 3–4 m spacing. At each site, 10 of each of the P, W and R were planted on a lower slope, 10 on a mid-slope and 10 on an upper slope.

P, W and R were planted with a pole-rammer, crowbar and spade respectively.

Dynex sleeves were used to protect the poles (Figure 1) from stock browsing. Tree guards (1.6 m high) were used to protect rooted cuttings and wands (Figure 1). The tree guards were stapled to a poplar batten, which was first hammered 0.4 m into the ground.

Summer rainfall was atypically high in the drought susceptible regions during the two growing seasons of the trial so hypothesis (2) was not adequately tested.



Figure 1 Rooted stake (left), wand (centre) and pole (right) on north-facing slope in Taumarunui.

## Survival and height growth of the planting materials

Pole survival was significantly higher than wand ( $p = 0.026$ ) or rooted stake ( $p = 0.025$ ) survival. There was no significant difference between W and R survival ( $p = 0.77$ ). Survival was not significantly different between the three locations. Across all sites, height growth of P significantly exceeded that of R ( $p < 0.01$ ) and W ( $p < 0.01$ ), and height growth of W significantly exceeded that of R ( $p = 0.04$ ) (Figure 2). Maximum height recorded in June 2023 across all sites for P was 671 cm, for W was 425 cm and for R was 397 cm.

P, W and R growing on a northern aspect were generally taller than P, W or R growing on a southern aspect, though differences were not always significant. Trees planted on the lower slope were taller than trees planted at mid slope and upper slope (Figure 3) but differences were not significant.

## Protectors

Cattle browsing the trees over the top of the tree guards restricted height growth. Taller tree guards (1700 mm) will reduce cattle browsing (recommended practice is to exclude cattle from contact with the trees for two years). Lateral shoot growth occurred within the tree guards, whereas this growth was suppressed with the Dynex sleeves. Treeguard protectors were more expensive than Dynex sleeves, however, they can be dissembled and reused.

## For more information

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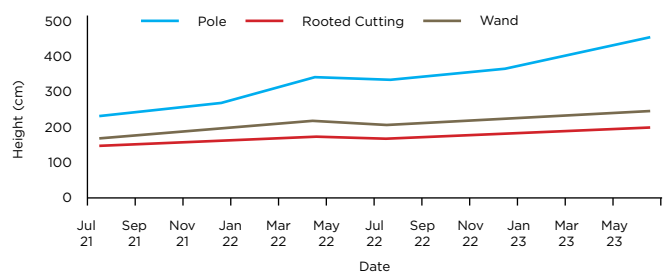


Figure 2. Mean growth of poles, wands and rooted cuttings during the first two growing seasons. Data are collated across all sites.

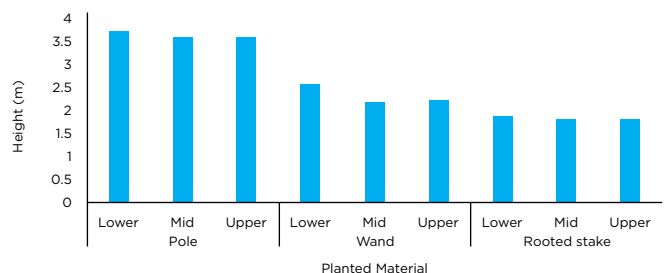


Figure 3. Mean height of planting materials on lower, mid and upper slopes after two growing seasons

## Summary

- Poles still outperformed wands and rooted stakes in survival and height growth under these conditions.
- Wands performed better than rooted stakes, but neither matched poles in growth
- Protection height is a critical factor for young tree survival in grazed paddocks
- Cost-benefit balance between protection types should guide planting decisions
- Drought performance still needs testing in a dry summer