Protea Stock Plant Nutrition

Andrew Mathews
Proteaflora Enterprises Pty. Ltd., PO Box 252, Monbulk, Victoria 3793

INTRODUCTION

This paper describes some of the trials carried out at Proteaflora in Monbulk, Victoria. The general aim of the trials was to achieve consistent production of good quality cutting material. The work described in this paper concentrates on the importance of nitrogen and phosphorus in the rooting and subsequent growth of cuttings.

In previous experiments we established that nitrogen and phosphorus were the most critical elements in the fertilization of our stock plants.

In the trial described here two clonal cultivars were used:*Telopea* 'Shady Lady' red and *Leucospermum cordifolium* #27.

THE TRIAL

The stock plants under consideration were potted into 15-cm pots in standard Debco potting mix (pine bark and sand) without nitrogen, phosphorus, or potassium, but including those elements added to the bark during composting.

The plants were liquid fed twice weekly. Potassium, iron, calcium, and magnesium were applied equally to all plants. Nitrogen (applied as ammonium nitrate) and phosphorus (applied as monosodium phosphate) were applied at one of the following levels:

N0 = 0 ppm of nitrogen
N1 = 50 ppm of nitrogen
N2 = 100 ppm of nitrogen
N3 = 160 ppm of nitrogen
P0 = 0 ppm of phosphorus
P1 = 4.5 ppm of phosphorus
P2 = 7.0 ppm of phosphorus
P3 = 9.0 ppm of phosphorus
P4 = 14.0 ppm of phosphorus

After 12 months, 10 cuttings were taken from each group of plants at each fertilizer level. The cuttings were placed under normal propagation conditions (media: peat and perlite; environment: mist, igloo).

At the appropriate time assessments were made of:

- Strike rate
- Quality of the roots
- Vigour of cutting
- Subsequent growth of the cutting

Figure 1. Growth of *Telopea* 'Shady Lady' red stock plants in response to applications of N and P.

RESULTS AND DISCUSSION

***Telopea* 'Shady Lady' red**. Response of the stock plants to the various fertilizer levels is seen in Fig. 1. The stock plants responded to higher fertilizer levels, and generally the higher the level (within the range tested) the greater the number

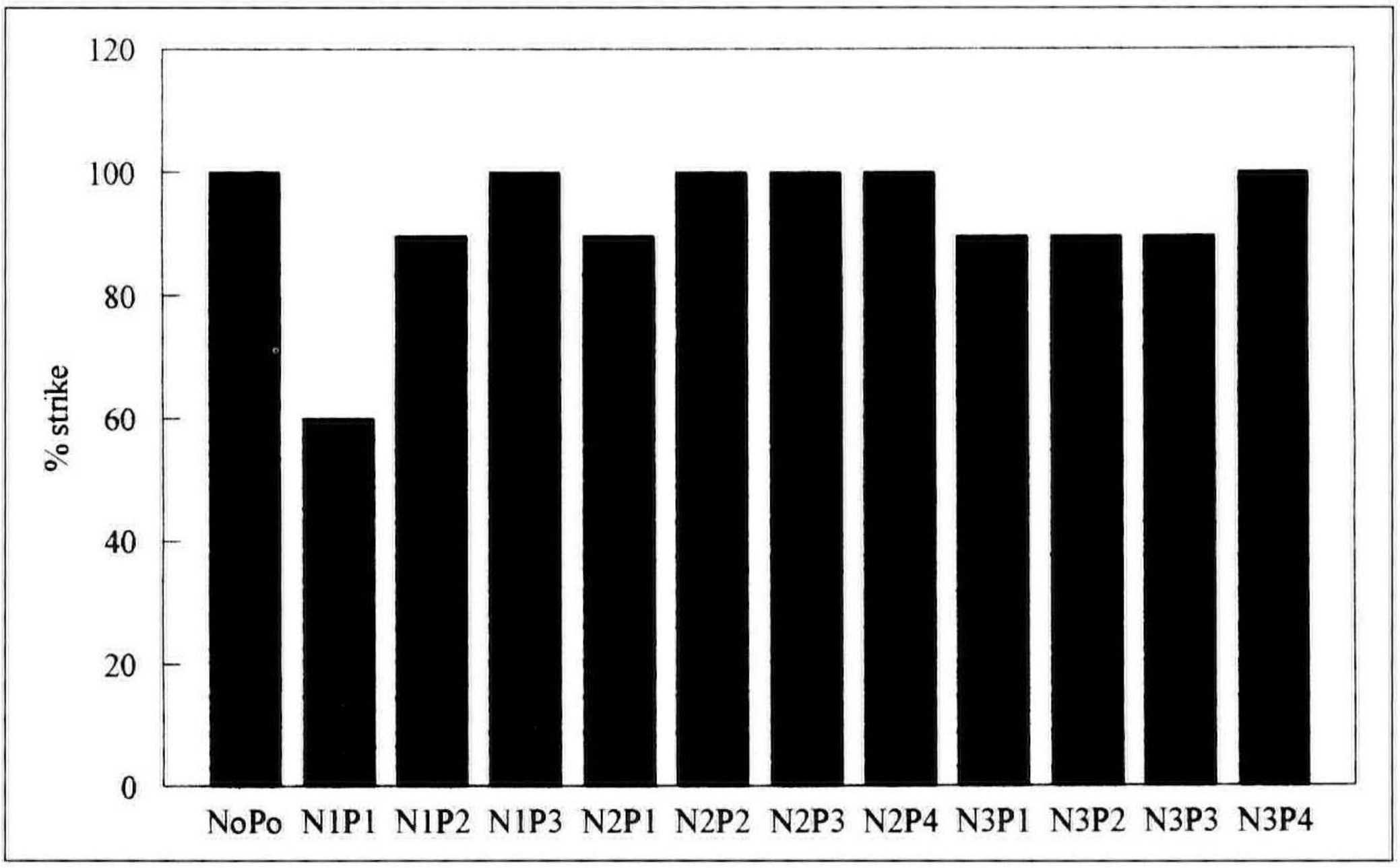

Figure 2. Percentage strike of *Telopea* 'Shady Lady' red as affected by N and P fertilization.

of cuttings that were available. As phosphorus was increased at the N2 and N3 levels of nitrogen, plant growth increased.

Strike rate was generally good at most levels of fertilizer (Fig. 2), but the number of buds increased with increasing fertilizer level (Fig. 3).

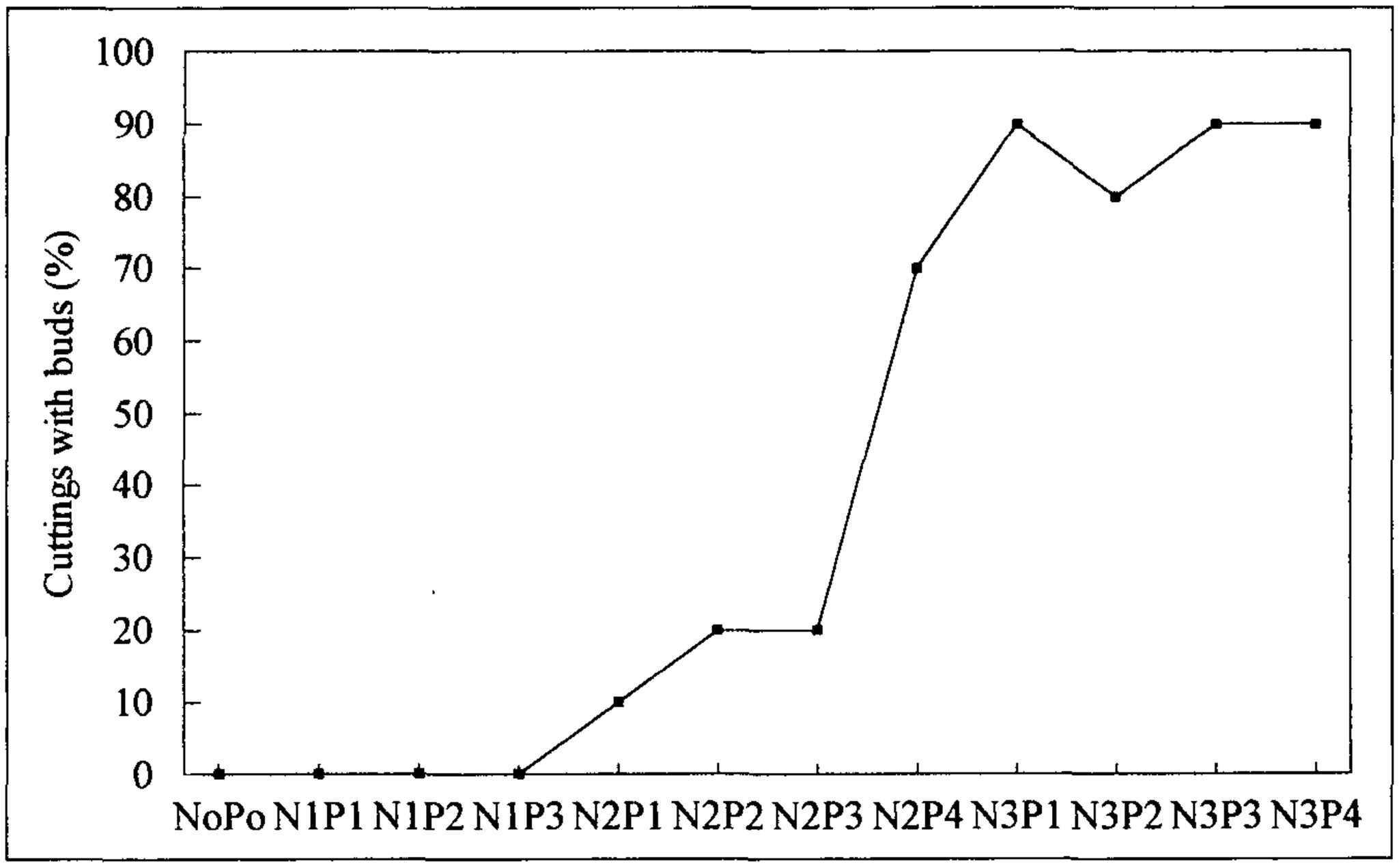

Figure 3. Percent of *Telopea* cuttings with growth buds.

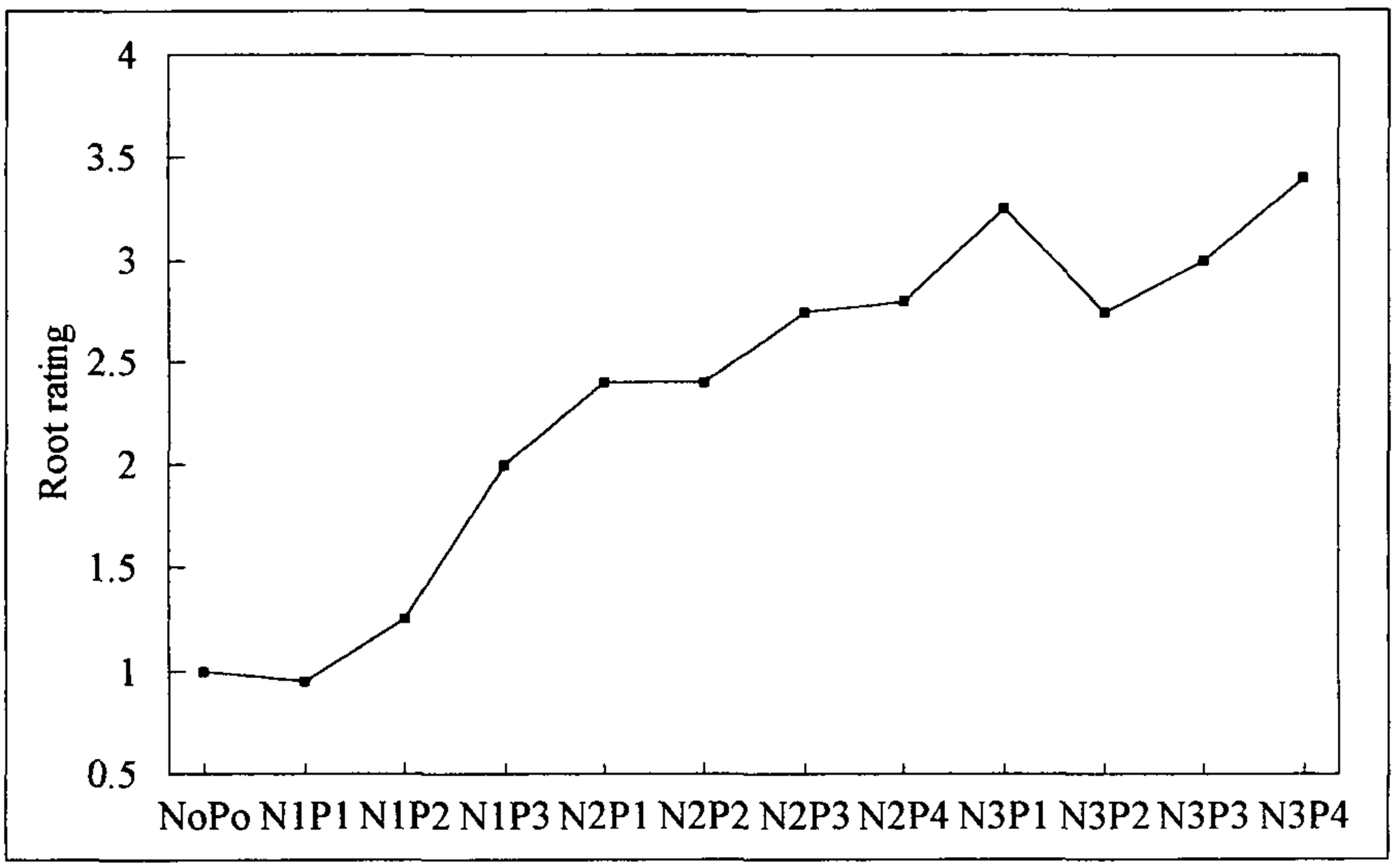

Figure 4. Root rating of *Telopea* cuttings (0 = worst; 4 = best).

A greater difference between the cuttings is seen when we examine the root development (Fig. 4). As phosphorus was increased at the N2 level of nitrogen both the roots and shoots of the cuttings improved.

The plants that grew on from the cuttings initially showed great differences in vigour but after 10 months they had all reached similar heights (Fig. 5).

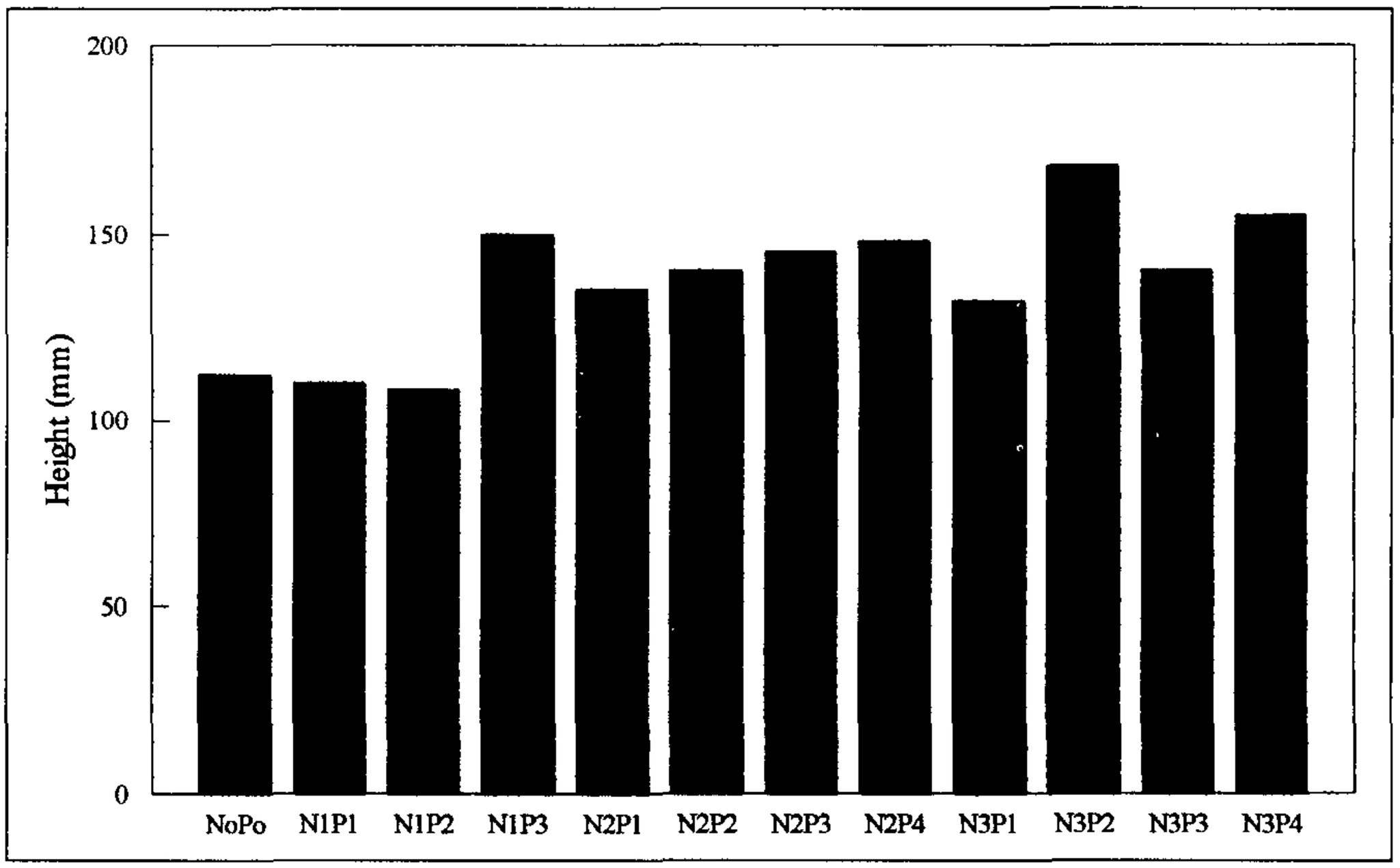

Figure 5. Height of *Telopea* plants 10 months after taking the cuttings.

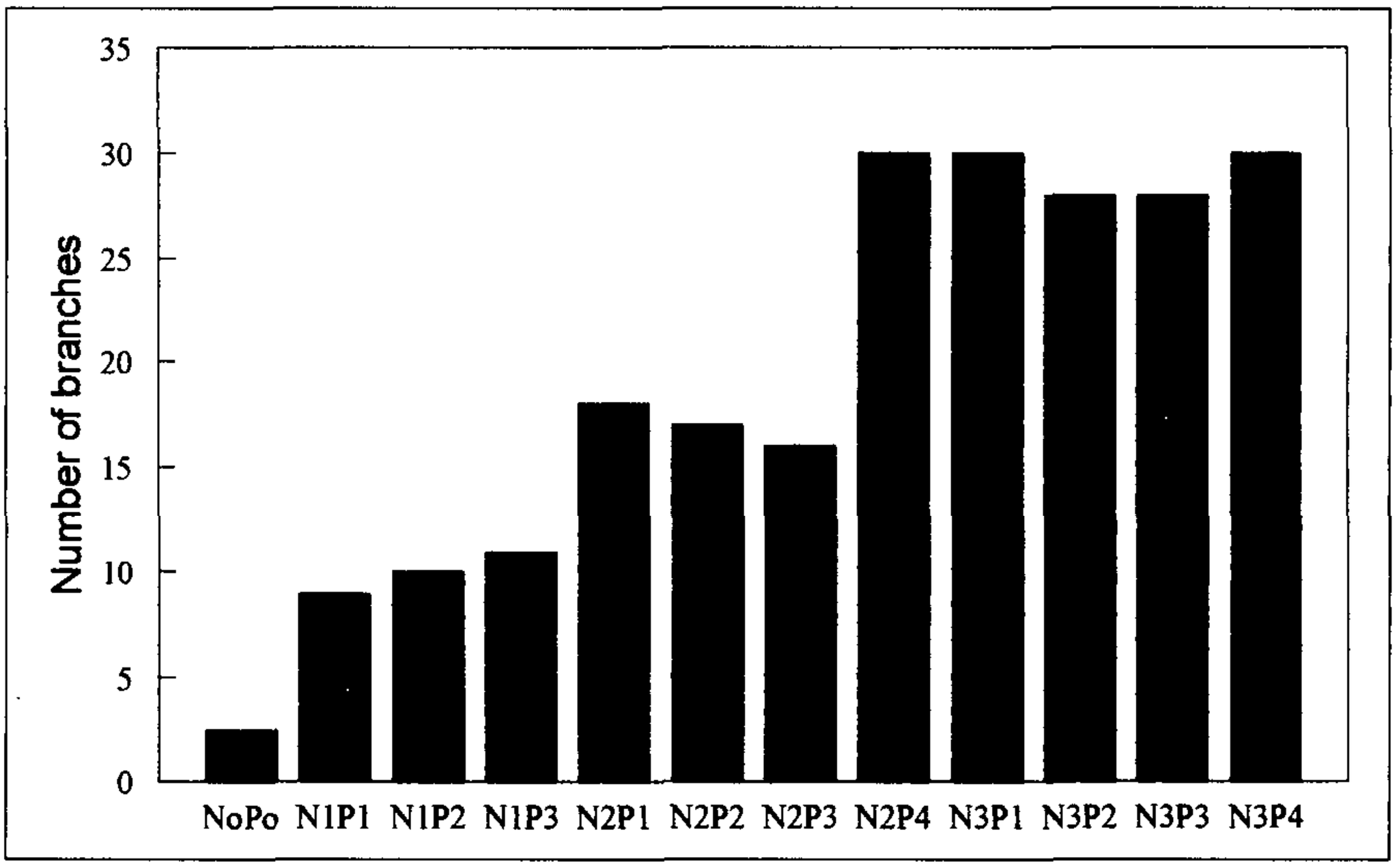

Figure 6. Mean number of branches on *Telopea* plants 10 months after taking the cuttings.

The total number of branches on the plants was clearly influenced by higher fertilzer levels of the stock plants (Fig. 6).

After considering all the factors we aim for a fertilizer level of N3P3.

Figure 7. Growth of *Leucospermum cordifolium* #27 stock plants as affected by applications of N and P.

***Leucospermum cordifolium* #27**. We restricted the fertilizer levels on the stock plants compared with the *Telopea* because earlier trials had indicated that N2P3 was the highest level at which the plants survived. Response in the current trial is shown in Fig. 7.

Early striking of cuttings (6 weeks) was enhanced at the N2P2 level, but the eventual strike rate (after 12 weeks) was similar at various levels (Fig. 8). Whilst the N0P0 level produced a good strike rate, the number of cuttings available per stock plant was very limited.

Root development was enhanced by increased phosphorus levels in the N1 range of nitrogen (Fig. 9). The N2 range was also beneficial until the phosphorus level was too high (N2P3). Good root development was noted also on the zero fertilizer cuttings.

The height at 10 months of plants arising from the propagation trial generally increased in relation to fertilizer level (Fig. 10). However the zero fertilizer level cuttings performed well. A possible explanation for this may be that a low nutrient level in the cutting encouraged the formation of proteoid roots which are very efficient feeding roots. The branchiness of the plants (Fig. 11) followed a similar pattern to the height.

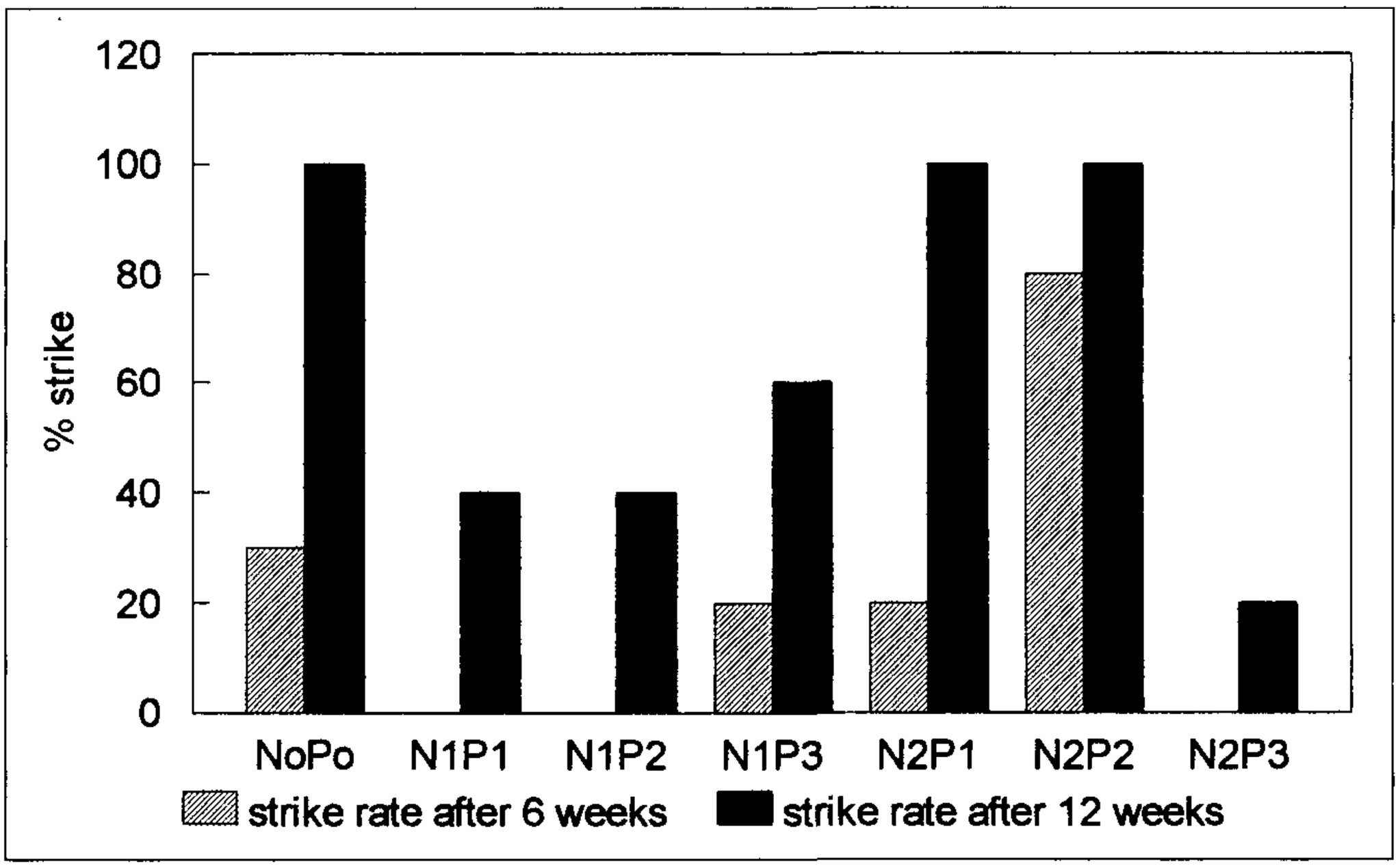

Figure 8. Strike rate of *Leucospermum cordifolium* cuttings at 6 and 12 weeks.

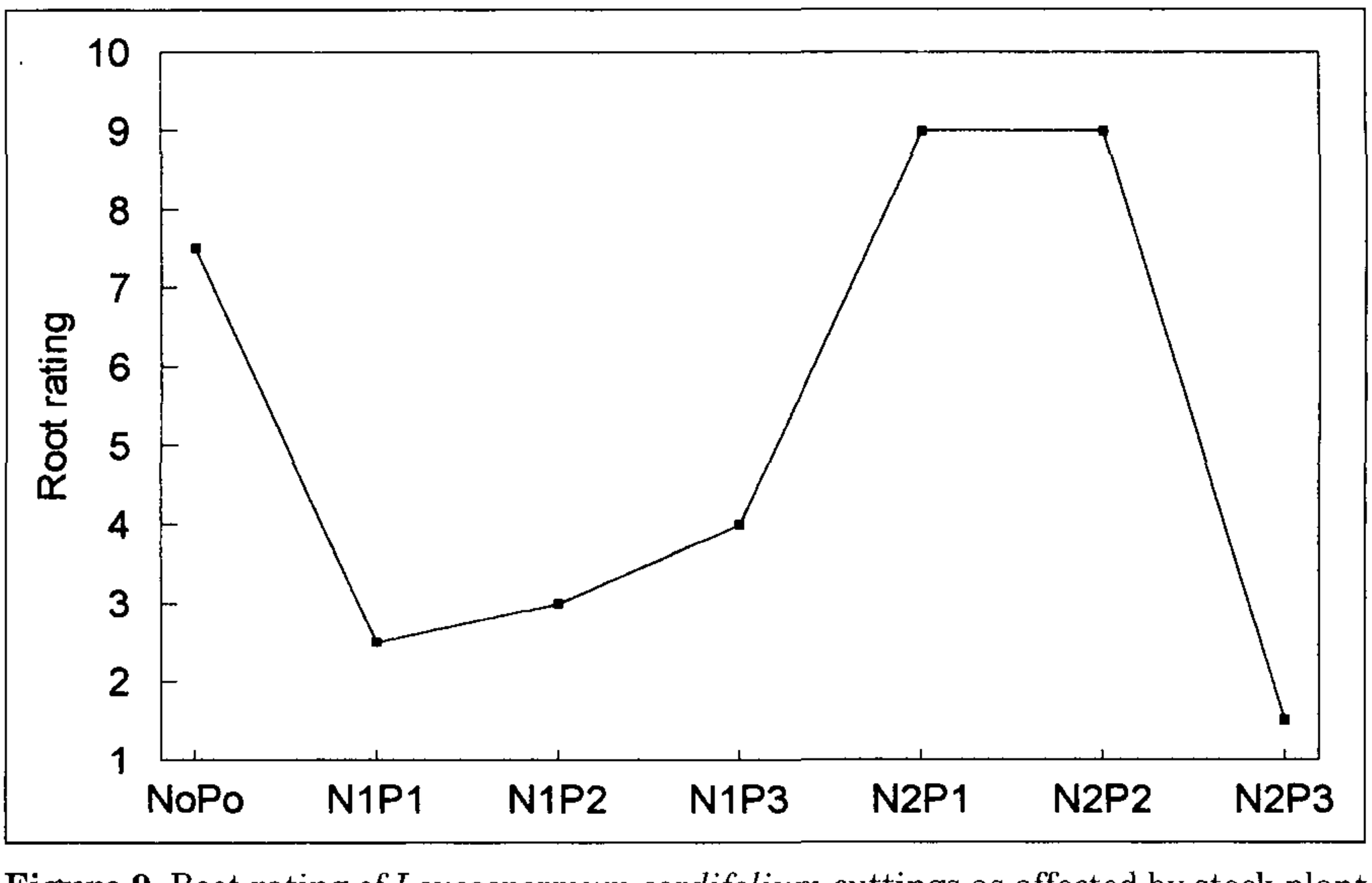

Figure 9. Root rating of *Leucospermum cordifolium* cuttings as affected by stock plant fertilization (0 = worst, 10 = best)

CONCLUSIONS

The nutritional balance in a stock plant influences the subsequent growth of cuttings taken from the plant. Optimum levels of fertilization have to be determined for each cultivar grown. To record strike rate alone as a measure of propagation success is only looking at half the story.

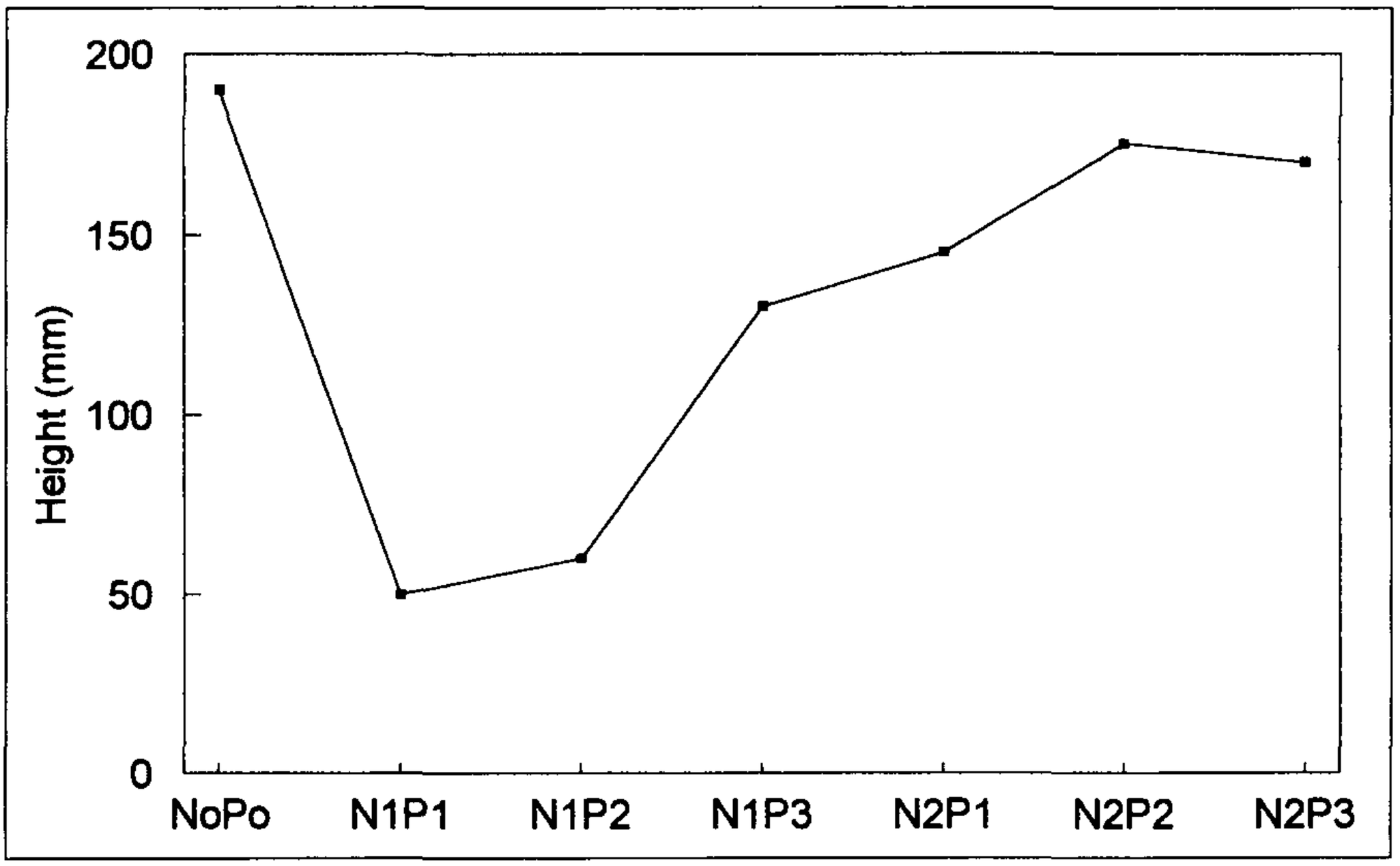

Figure 10. Height of *Leucospermum cordifolium* plants 10 months after propagation.

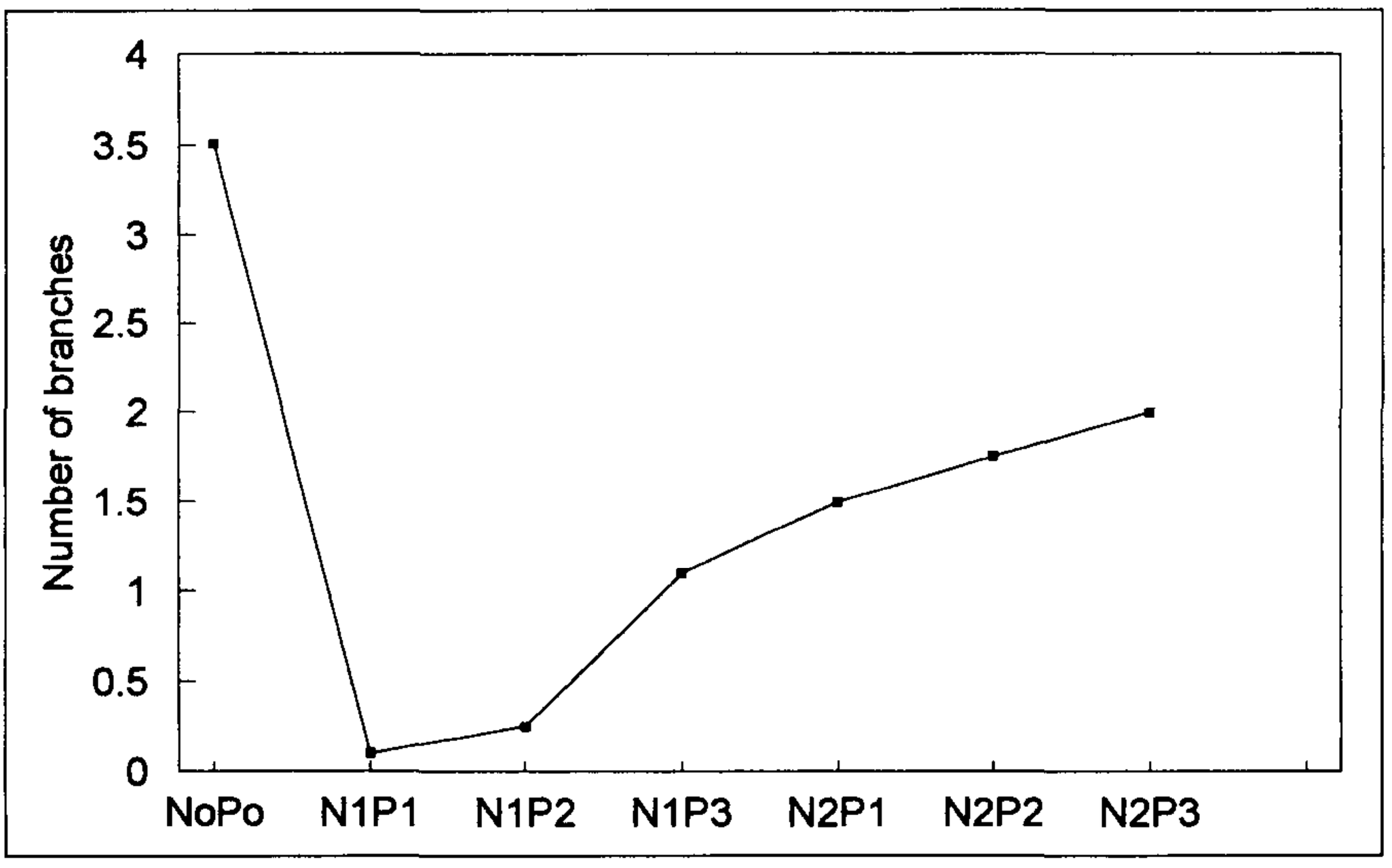

Figure 11. Mean number of branches on *Leucospermum cordifolium* plants 10 months after propagation.