Micropropagation of Crape Myrtle (*Lagerstroemia indica* L.)

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Donor plants for crape myrtle micropropagation were produced in vitro from seeds which were sown on a modified half-strength Murashige and Skoog (MS) medium. Axillary shoots were induced from the nodal segments taken from the donor plants. The shoots were transferred to the MS medium supplemented with hormones. The combination of BA (1 mg litre-1), NAA (0.02 mg litre-1), and GA_3 (0.5 mg litre-1) gave the best results for the multiplication of shoots. The multiplied shoots rooted easily in the MS medium supplemented with NAA (0.05 to 0.1 mg litre-1). By these procedures, a number of regenerated plants of crape myrtle were obtained. The potted plants were vigorous and bloomed early.

INTRODUCTION

Crape myrtle, because it blooms for a long time in summer, is a popular small tree for garden and street plantings from southern to central Japan. In addition, dwarf cultivars have been used as potted ornamental plants (Shimizu, 1992). Crape myrtle is propagated by cuttings or seed. The technique of micropropagation has been used to obtain quantities of elite clones of many plants and has the potential to be used with crape myrtle. The present paper describes the effects of hormones on the multiplication of shoots in vitro and the growth of micropropagated plants compared with those from seeds.

MATERIALS AND METHODS

The seed coats of seed from crape myrtle (*Lagerstroemia indica* L.) 'Little Chief' were peeled after soaking the seeds in water for 6 h. After sterilization with 1% sodium hypochlorite solution, the peeled seeds were sown on a half-strength Murashige and Skoog (MS) medium without hormones. Three weeks after germination, the plantlets were about 5 cm in height. Nodal segments (3 mm in length) were excised from the plantlets and placed on the same medium as that used for germination. All media were adjusted to a pH of 5.8, and solidified with 0.2% Gelrite. Each nodal explant has two axillary meristems so that leaves unfold on opposite sides of the shoot. When the shoots induced from axillary meristems of the nodal explant attained 1 to 2 cm in height, each explant was divided into two parts, so that each had one shoot. The shoots obtained by these procedures were cultured on the MS media shown in Table 1 to clarify the effect of combinations of BA (benzyladenine), NAA (naphthaleneacetic acid), and GA_3 (gibberellic acid) on the branching of shoots. The new shoots multiplied through branching were transferred to the rooting medium supplemented with NAA. Cultures were maintained at 25C with a 16-h photoperiod. For acclimatization, the regenerated plants were transferred to pots (9 cm in diameter) containing a vermiculite medium. To

compare the growth between the transplants cultured in vitro and seedlings, these plants were grown under 25C, 10,000 lux, and a 16 h-photoperiod, and the shoot length, number of leaves, and fresh and dry matter weights were measured.

RESULTS AND DISCUSSION

When the nodal explants were cultured on the half-strength MS medium without hormones, the rate of induction of axillary shoots from the meristems of the explants reached about 90% within 1 week. This result was consistent with the findings for cacao (Flynn et al., 1990), *Smilax oldhami* (Yamamoto, 1992), and sweet pepper (Yamamoto, 1993), and show that axillary bud growth could be easily induced on the medium without hormones. The resulting explants with two axillary shoots were divided in two and the effect of exogenous hormones on their multiplication was examined. As shown in Table 1, the combination of BA, NAA, and GA_3 gave the best results for the multiplication of shoots. BA was effective in multiplying the shoots, while the combination of NAA and GA_3 had no effect on the multiplication of shoots without BA. Similar results had been observed with *Fuchsia* (Yamamoto, 1994).

The multiplication of shoots often consisted of a two-step process (Table 1). Within about 1 month of culture, the development of axillary shoots was observed, then axillary shoots formed from the original shoots. Figure 1 shows an example of shoot multiplication from the original shoot cultured on the MS medium supplemented with 1 mg $litre^{-1}$ BA, 0.02 mg $litre^{-1}$ NAA, and 0.5 mg $litre^{-1}$ GA_3. These shoots were then subcultured on the rooting medium. The half-strength MS medium supplemented with 0.05 or 0.1 mg $litre^{-1}$ NAA achieved good rooting results, while the rooting was poor in the medium without NAA. The period necessary for acclimatization of the regenerated plant was 1 week. After acclimatization, the growth of the plant was very rapid.

Table 1. Hormonal effects on shoot branching of *Lagerstroemia indica* in vitro.

Hormones (mg $litre^{-1}$)			Rate of branching (%)[a]			Rate of multiplication[b]		
BA	NAA	GA_3	7	28	61(days)	7	28	61(days)
0	0	0	0	14	28	0	0.2	0.4
0	0.02	0.5	0	0	5	0	0	0.1
1	0.02	0.5	62	76	92	1.7	2.9	5.1
1	0.02	0	63	72	82	1.8	2.7	4.3
1	0	0.5	8	23	29	1.7	1.8	1.7

[a] The ratio(%) of shoots showing branching to the original shoots induced from nodal explants.
[b] Number of shoots multiplied per original shoot.

Figure 2 shows the anthesis of the regenerated crape myrtle 1 month after acclimatization. The growth of the transplants cultured in vitro by the present methods was compared with that of seedlings. When the two types of plants reached about 5 cm in height and had 10 leaves, these were transferred to the

Figure 1. Multiplication of a crape myrtle shoot. The MS medium was supplemented with 1 mg litre^{-1} BA, 0.02 mg litre^{-1} NAA, and 0.5 mg litre^{-1} GA_3.

Figure 2. Anthesis of regenerated plants of crape myrtle 1 month after acclimatization.

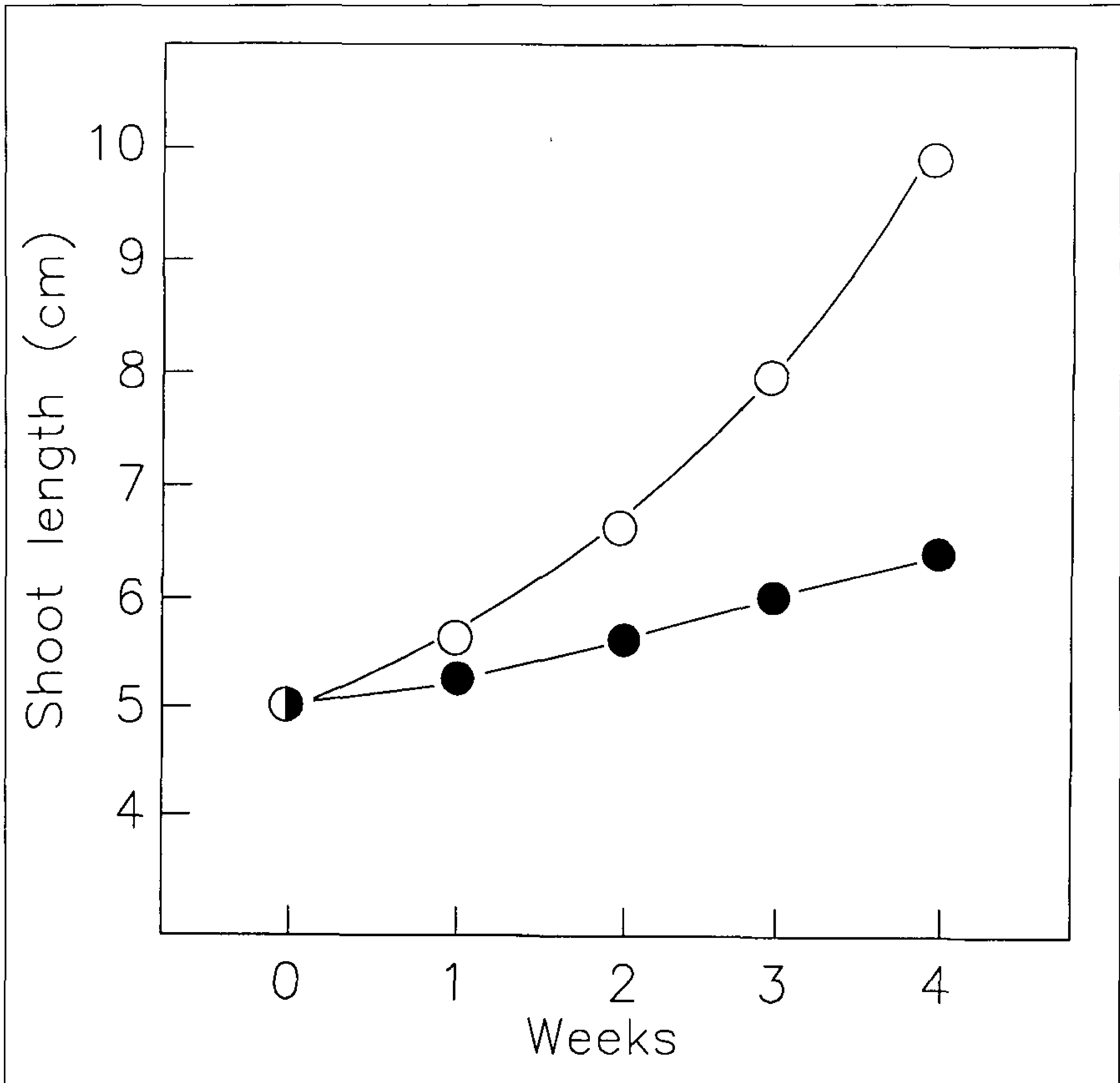

Figure 3. Comparıson of shoot length between transplants cultured in vitro and seedlings: (○) transplants cultured in vitro, (●) seedlıngs. Each value shows average of 20 samples.

growth chamber at 25C and 10,000 lux of light intensity to compare their growth. Figures 3 and 4 show the time-course changes of shoot length and number of leaves for the two types of plants, respectively. The shoot length and number of leaves of the transplants cultured in vitro increased more rapidly with time than those of the seedlings. The marked variation in the growth between the two types of plants is considered to be due to the difference in root development between them. The transplants cultured in vitro had a lot of adventitious roots formed in the medium supplemented with NAA, while the seedlings had a relatively small number of roots.

By these methods of micropropagation, we were able to obtain within several months, a number of potted plants of crape myrtle which were vigorous and flowered early.

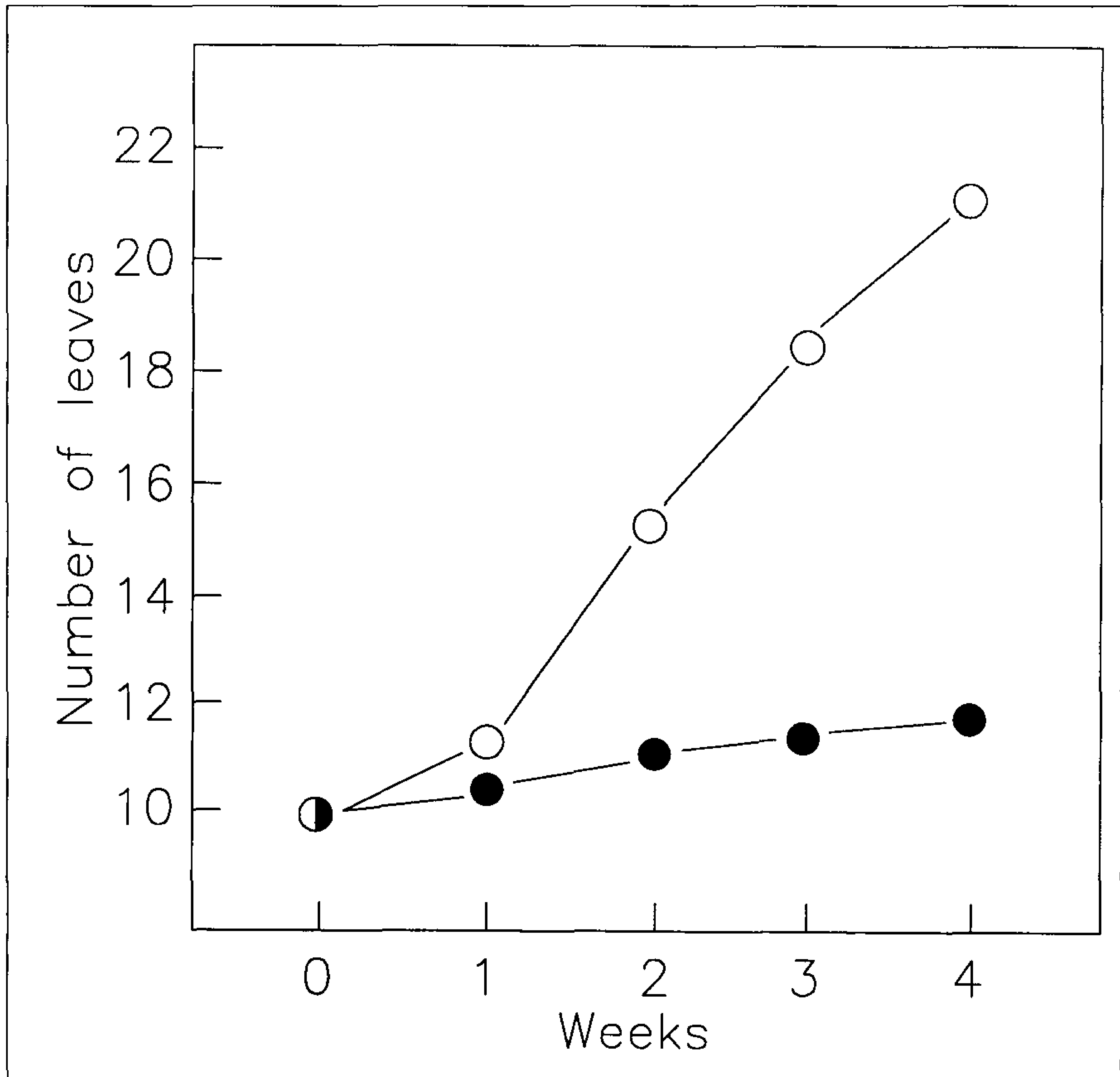

Figure 4. Comparison of number of leaves between transplants cultured in vitro and seedlings: (○) transplants cultured in vitro, (●) seedlings. Each value shows average of 20 samples.

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