Influence of IBA Concentration, Bottom Heat, and Medium on Propagation of Camellias

Peter Goodwin
Department of Crop Sciences, University of Sydney, SYDNEY NSW 2006

C. Cowell
Cowell's Nursery, TERESA PARK NSW 2570

The influence of IBA concentrations in the range 0 to 3000 ppm on the rooting of either japonica or sasanqua camellias was examined. The response depended on genotype; the two sasanquas showing a response to rooting hormone, but not the japonica. *Camellia sasanqua* 'Shishigashira' gave optimum rooting with 750 ppm IBA and *C. sasanqua* 'Jennifer Susan' gave optimum rooting with 3000 ppm IBA. In a trial comparing the use of bottom heat and various media on three sasanquas, there was a good response to bottom heat in all three camellias ('Jennifer Susan', 'Gulf Glory', and the ground cover 'Marge Miller'), and all rooted best on a mixture of sand and peat (10 : 1, v/v) or sand and pinebark (10 : 1, v/v).

INTRODUCTION

Propagation of camellias is normally by rooting cuttings. Successful propagation depends on the source of the cuttings, the type of cutting, and the propagation conditions (for a review see Scott, 1986). The results tend to vary with the cultivar, for example *Camellia reticulata* 'Captain Rawes' and *C. japonica* '66' gave no rooting without the application of rooting hormones (Gonzalez et al., 1989; Iglesias et al., 1989) whereas *C. japonica* 'Orando-Ko' gave 92% rooting without hormones. In a study comparing *C. hiemalis* 'Hongchamei' and *C. japonica* 'Xiaodaohong', Huang and Li (1986) found good rooting in *C. japonica* without rooting hormones, but improved rooting with hormones in *C. hiemalis*. Another issue is the propagation medium. Of particular interest is the report by Gleeson (1992) of the faster rooting of *C. sasanqua* in coal ash compared to a more conventional mixture of sand, peatmoss, and perlite. This paper reports the effect of rooting hormone concentration and rooting medium on the propagation of a number of camellia lines.

MATERIALS AND METHODS

The trials on auxin concentration used two sasanquas and one japonica, all known to be sunhardy and to prefer warm conditions, namely *C. sasanqua* 'Shishigashira' and 'Jennifer Susan' and *C. japonica* 'Dona Herzilia de Freitas Magalhaes'. The hormone was IBA, supplied in a liquid dip from the product Initiator at concentrations up to 0.9% (9000 ppm), depending on the cultivar. The propagation mix was Kangaloo sand and peat moss (10 : 1, v/v). Kangaloo sand is a white mined sand with most particles larger than 2 mm.

The trial comparing various mixes, with and without bottom heat used three sasanquas, 'Jennifer Susan', 'Gulf Glory', and the ground cover 'Marge Miller'. All were given a standard liquid dip of 3000 ppm IBA from Initiator. In addition to testing bottom heat (18 to 21°C) the following media were compared:

- Ash
- Ash and peat (10 : 1, v/v)
- River sand
- Sand and peat (10 : 1, v/v)
- Sand and pinebark (10 : 1, v/v)

Both the auxin concentration and propagation mix trials were set up with 25 cuttings per community pot (170 mm wide, 100 mm deep, volume 1.8 litre), with four blocks (auxin trial) or two replicates (rooting mix trial), each with one community pot per treatment. Humidity control was by a fog system, with the plants watered by hand. The trials were set up early in March, and assessed in early September.

The rooting of each cutting was assessed using a scoring system: 1 = dead, 2 = callus or otherwise healthy with no roots, 3 = one root or 2 to 3 small roots, 4 = good rooting, 5 = abundant rooting on a vigorous healthy cutting.

The mean score was calculated for each treatment/cultivar combination, and the mean scores were subjected to an analysis of variance. The bars in all figures are standard error bars.

RESULTS

In the study of hormone response the japonica, 'Dona Herzilia' de Freitas Magalhaes, showed no response to rooting hormone. However, both sasanquas showed better rooting with hormone (Figs. 1 and 2). 'Shishigashira' showing best rooting with 750 ppm IBA and 'Jennifer Susan' with 3000 ppm IBA. Statistically the response to hormone by 'Shishigashina' was significant at a 17% level, but not at the 5% level. In 'Jennifer Susan' the response was significant at the 5% level.

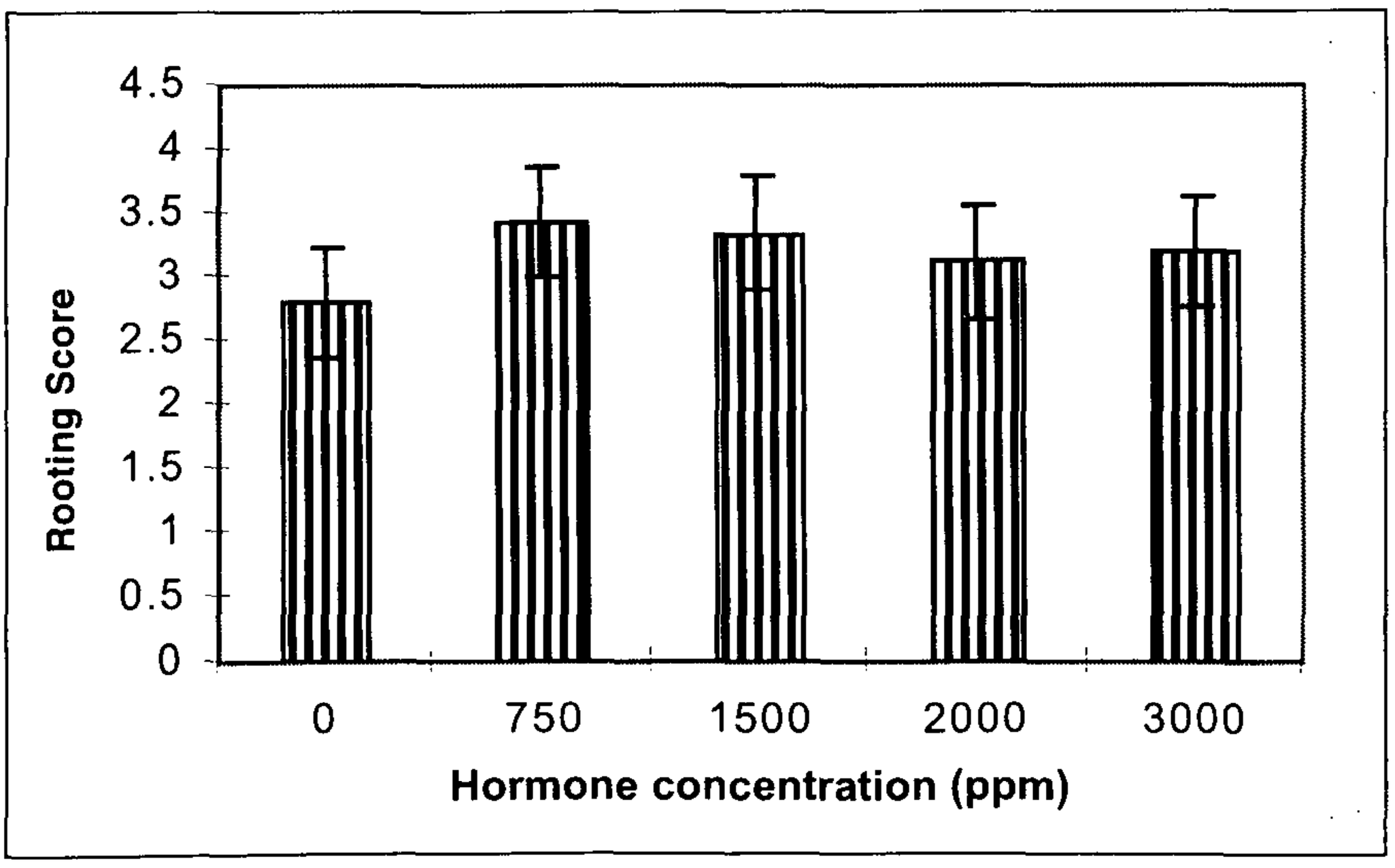

Figure 1. Effect of IBA concentration on rooting in *Camellia sasanqua* 'Shishigashina'.

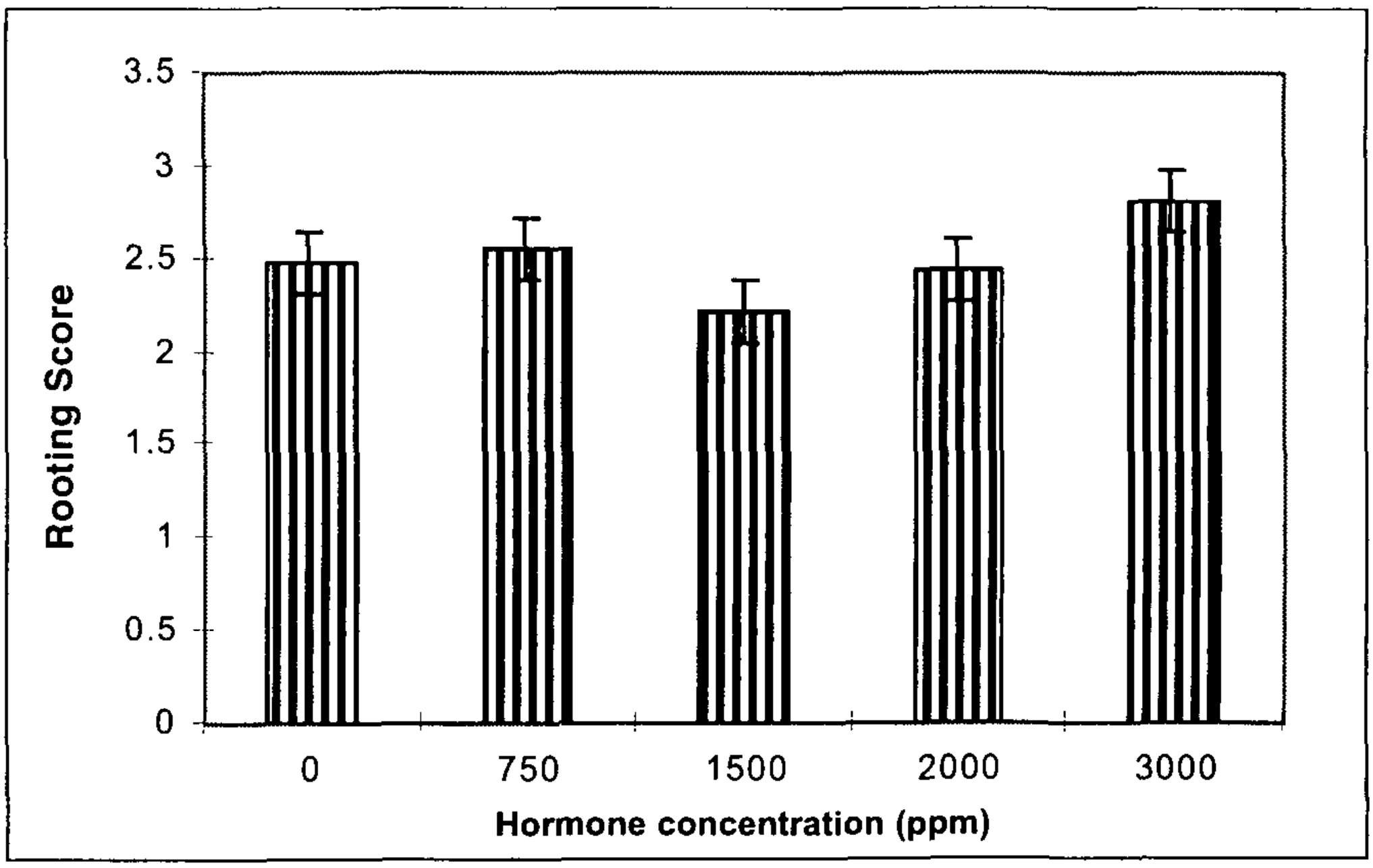

Figure 2. Effect of IBA concentration on rooting of *Camellia sasanqua* 'Jennifer Susan'.

In the tests of media and bottom heat, all three cultivars gave a significant response to bottom heat, as illustrated by the results for 'Jennifer Susan' in Fig. 3. The sand and peat medium was the best for 'Jennifer Susan'. With 'Gulf Glory', except for poor rooting with pure ash in the absence of bottom heat, all media gave similar results.

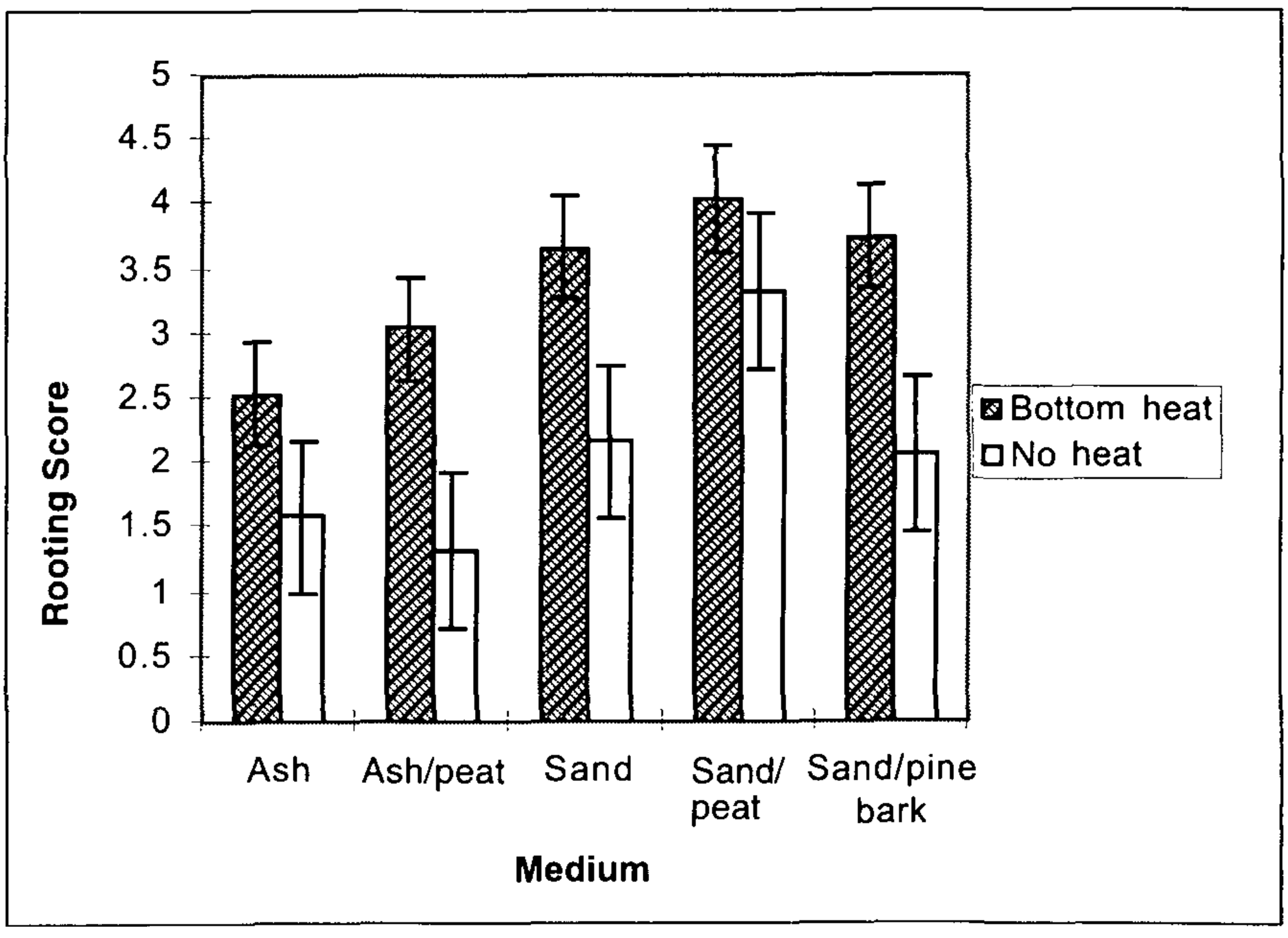

Figure 3. Rooting scores in various media, with or without bottom heat, for *Camellia sasanqua* 'Jennifer Susan'.

With Marge Miller the best two media were sand and peat, and sand and pinebark (Fig. 4).

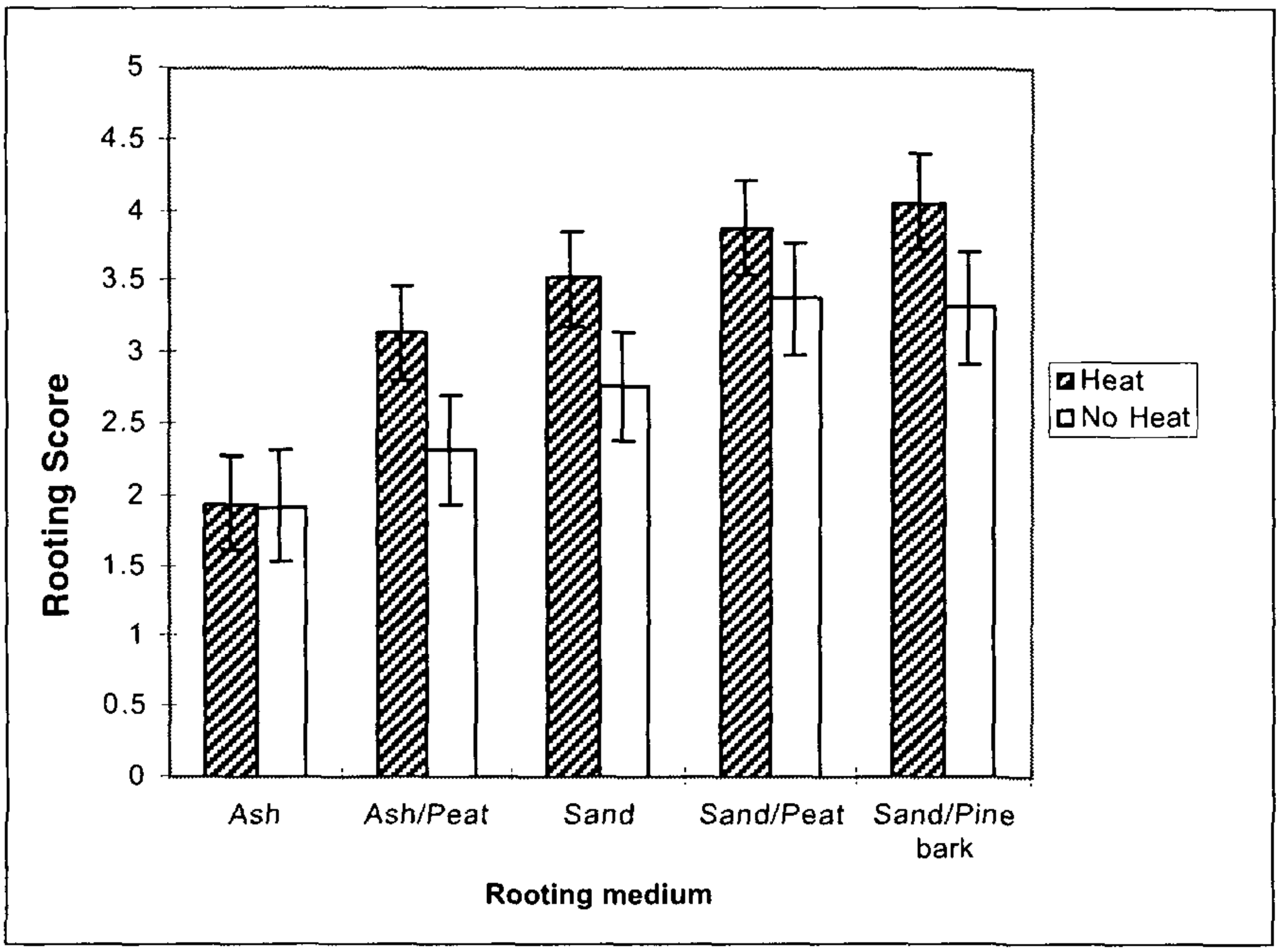

Figure 4. Effect of bottom heat and medium on rooting scores for *Camellia sasanqua* 'Marge Miller'.

DISCUSSION

Probably the most clear-cut response in this study was the response to bottom heat. Bottom heat is commonly used, but before these trials had not been in use in this nursery. Scott (1986) recommends a minimum bottom heat temperature of 15°C, but also reported that, in some seasons, 18°C improved the speed of rooting. It is possible that bottom heat would aid the strike rate of any autumn-propagated camellias.

The response of *Camellia* species to rooting hormones is known to be variable (Gonzalez et al., 1989; Huang and Li, 1986; Iglesias et al., 1989). Similarly in this study, there was a clear difference between the two sasanquas, showing some response to rooting hormone, and the japonica, showing no response. At this point there can be no clear recommendation.

A number of potting media have been used for camellias, with several reports of good results with rockwool (Gonzalez et al., 1989; Inglesias et al., 1989; Scott, 1986). The poor rooting in ash, in contrast to the results of Gleeson (1992), indicates that the properties of the ash need careful evaluation before a particular source is used as a propagation medium.

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Steps in the Development of a New Nursery

Ian Ravenwood
Nursery Manager, North Forest Products Nursery, SOMERSET TAS 7320

INTRODUCTION

North Forest Products (NFP) has recently commissioned a new 10 million per year capacity container nursery in N.W. Tasmania to produce *Eucalyptus nitens* and *E. globulus* seedlings, mainly for its own tree farm program in Tasmania.

BACKGROUND

The Company. NFP is Tasmania's largest private forestry company with tree farm programs (including Australia's largest tree farm south of Burnie), a leading tree breeding and research centre, and export woodchip operations. North Forest Products is the leading supplier of hardwood to the Japanese pulp and paper industry and operates four export pulpwood mills in Tasmania. It is part of North Limited, a diversified resources company.

Previous Nursery Operations. For about 40 years NFP has operated forest nurseries to produce seedlings for its own tree farm programs. The new nursery replaced two older nurseries:

Container Nursery. This nursery had been built up incrementally over the years as the company's operation increased. Maximum production of about 4.5 million plants in paper pots per annum was the limit for the site we were on. All this was achieved using a very simple but labour-intensive pricking out system. The main component of the potting substrate was the typical NW Tasmanian red basaltic soil, which was difficult to keep free of weeds. Its high organic matter content, coupled with the necessary use of controlled-release fertilisers, made it difficult to manage seedling growth and quality. Our internal customers had no option but to take what they were given.

Field Nursery. About half the annual container nursery crop was transplanted into a field nursery to produce a "half: half". The term half: half is used in forest nurseries to describe a seedling that has started life in a container nursery (i.e., spent half its life there) and finished off in a field nursery (i.e., the other half of its nursery life) within the same year. The main difference between half: half and regular container seedlings (i.e., those that went directly to the field from the container nursery) is one