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LONG-TERM EFFECT OF UNICONAZOLE ON GROWTH OF WOODY LANDSCAPE PLANTS

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Abstract. **The long-term effect of uniconazole [(E)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1,2,4-triazol-1-yl)-1-penten-3-ol] was evaluated on container-grown *Ligustrum* x *ibolium*, *Photinia* x *fraseri*, and *Pyracantha koidzumii* 'Wonderberry'. A soil drench of 0, 2.5, 5.0 or 10.0 mg/plant (in 100 ml tap water) was applied to unpruned and pruned plants on 19 September 1986; plants were moved to the field 22 May 1987. Growth on all three species was inhibited by uniconazole to varying degrees during 1987, and the autumn 1986 pruning stimulated growth of both *Photinia* and *Ligustrum*. The dwarfing effect of uniconazole and any stimulatory effect of pruning wore off during 1988, although *Pyracantha* and *Ligustrum* treated at the 10 mg rate remained slightly smaller than the untreated plants.**

Chemical manipulation of woody plant growth has gained renewed interest in the past few years due to synthesis of new compounds. New plant growth regulators (PGR) include the pyrimidine derivative flurprimidol and the triazole compounds uniconazole and paclobutrazol. These compounds show promise for use in Florida's woody ornamental nurseries as a means of reducing pruning costs and increasing production efficiency (1, 4, 5, 6). The long-term efficacy of these new PGR's on transplanted woody ornamentals has not been examined (1, 6, 7). Plant growth regulators applied during production might continue to suppress growth after plants are installed into the landscape. Plant growth regulators applied to the media may persist in the root ball and remain active long after plants are placed in the landscape. For example, uniconazole has low soil mobility (2) and a half-life of 130 days in a mineral soil (3). If nurseries are to use PGR's they must assure customers that PGR-treated plants will resume normal growth patterns in the landscape. We previously reported the effects of soil-applied uniconazole on growth of container-grown *Ligustrum* x *ibolium*, *Photinia* x *fraseri*, and *Pyracantha koidzumii* 'Wonderberry' (4). The purpose of this study was to evaluate the growth of these uniconazole-treated plants after transplanting them in a simulated landscape situation.

Materials and Methods

Six plants each of *Pyracantha koidzumii* 'Wonderberry', *Photinia* x *fraseri*, and *Ligustrum* x *ibolium* were pruned for shaping and treated with a 0, 2.5, 5.0, or 10.0 mg uniconazole soil drench as previously described (4) on 19 September 1986. An equal number of plants were left unpruned and treated similarly. On 22 May 1987 all plants were pruned again for shaping on an "as needed" basis. Three randomly selected plants of each species and uniconazole/pruning treatment combination were transplanted to the field in a completely randomized design (within each species) on 11 June for long-term evaluation. The remaining plants were repotted in 11.4-1 containers, the growth monitored until Spring 1988, and then harvested (4). A top dressing of Osmocote 18N:2.64P:9.96K (18-6-12) was applied every 3 months starting 11 June 1987. Plants were irrigated at transplanting, and then only by rain.

Plant height and width, recorded monthly through 10 October 1988, were used to calculate a growth index (GI = [height + width]/2). All data were analyzed with analysis of variance.

Results and Discussion

1987. Growth of pruned *Photinia* x *fraseri* seemed more inhibited by the higher rates of uniconazole than growth of unpruned plants (Fig. 1). For example, 5 or 10 mg uniconazole reduced the height increase of pruned plants (height LSD = 19.8 for pruned plants), but not unpruned

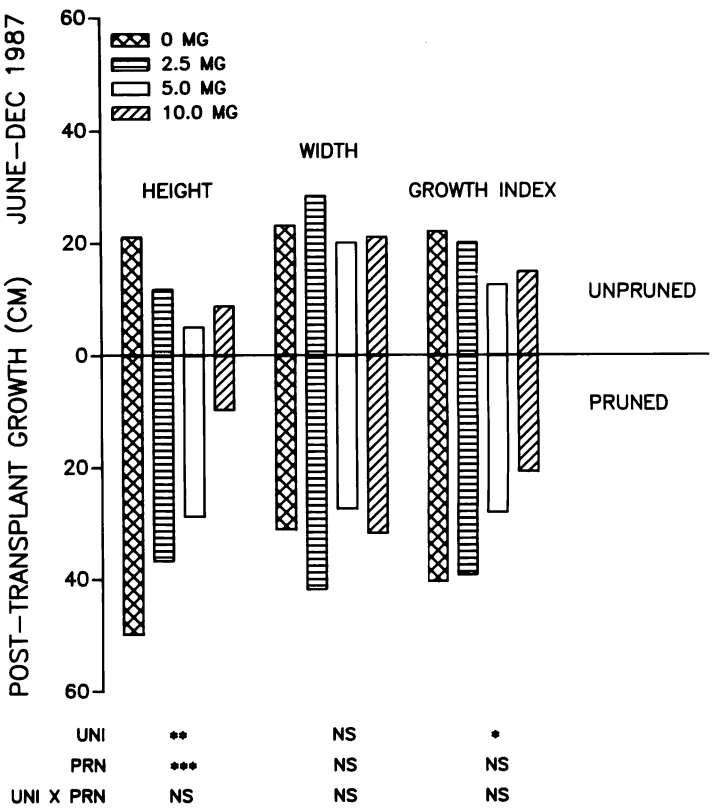

Fig. 1. Post-transplant growth (June-Dec 1987) of container-produced *Photinia* x *fraseri* treated with 0, 2.5, 5.0 or 10.0 mg soil-applied uniconazole on 19 September 1986. Plants were transplanted to the field on 22 May 1987.

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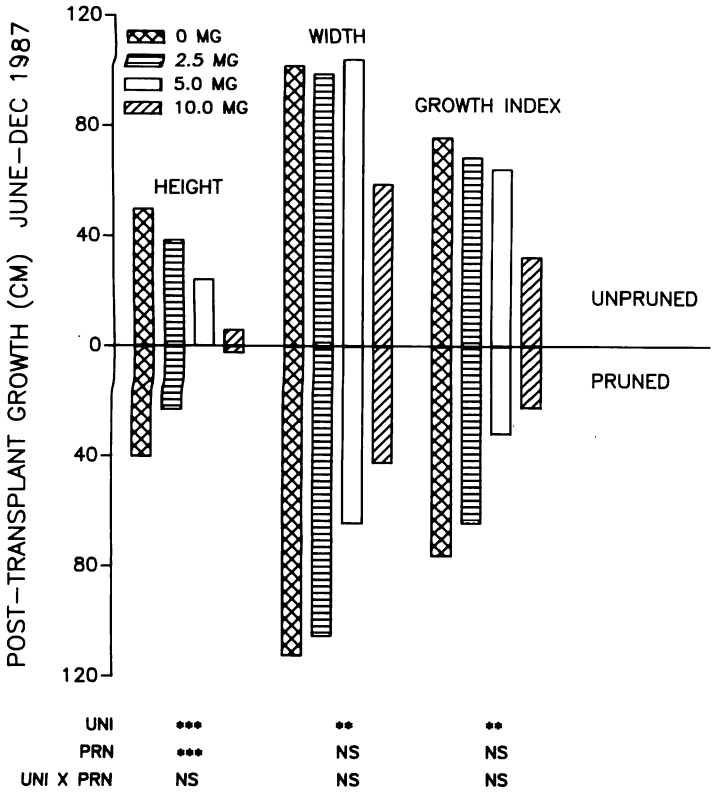

Fig. 2. Post transplant growth (June-Dec 1987) of container-produced *Pyracantha koidzumii* 'Wonderberry' treated with 0, 2.5, 5.0 or 10.0 mg soil-applied uniconazole on 19 September 1986. Plants were transplanted to the field on 22 May 1987.

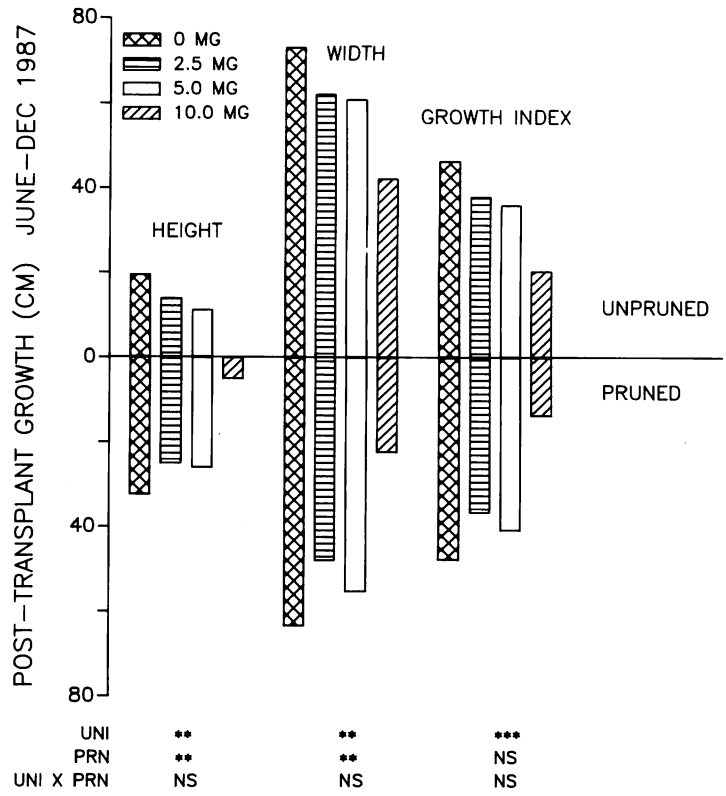

Fig. 3. Post-transplant growth (June-Dec 1987) of *Ligustrum* x *ibolium* treated with 0, 2.5, 5.0 or 10.0 mg soil-applied uniconazole on 19 September 1986. Plants were transplanted to the field on 22 May 1987.

plants (height LSD = 21.2 for unpruned plants). However, pruning in September 1986 significantly stimulated growth of *Photinia* (increase in height for pruned and unpruned plants = 31.2 and 11.6 cm, resp.; LSD = 9.4). This stimulatory effect of an autumn pruning on the following season's growth did not occur with *Photinia* treated similarly, but left in the container (4). Growth of field-grown pruned *Photinia* may have been stimulated because of its larger root system.

Height of pruned *Pyracantha koidzumii* 'Wonderberry' was totally inhibited by only 5 mg uniconazole during 1987, whereas 10 mg was required to elicit the same response on unpruned plants. Less uniconazole was required to totally inhibit the height increase of pruned plants most likely because of the inhibitory effect of the fall pruning on growth during 1987 (height increase for pruned vs. unpruned plants = 16.2 and 29.5 cm, resp.; LSD = 9.8). Growth of plants treated with 2.5 mg uniconazole, which was an excessive rate for *Pyracantha* that remained in containers (4), was not inhibited during 1987.

Ligustrum x *ibolium* treated with 2.5 or 5 mg uniconazole grew the same as untreated plants (Fig. 3), even though 2.5 mg severely stunted the growth of *Ligustrum* that remained containerized (4). Plants treated with 10 mg uniconazole remained dwarfed due to extremely short internodes. Autumn pruning stimulated an increase in height but less so than with *Photinia*.

1988. Growth rates among treatments of all plants within a species were not significantly different (results not shown). There were, however, a few differences in appearance at the end of the experiment on plants treated with the 10 mg rate: *Photinia* were slightly denser at the base, *Pyracantha* remained shorter than and not as wide as the other plants, and *Ligustrum* were narrower.

Conclusion

The inhibitory effects of uniconazole on growth of *Ligustrum* x *ibolium*, *Photinia* x *fraseri*, and *Pyracantha koidzumii* 'Wonderberry' transplanted to the field wore off by 1988, even at rates that severely inhibited growth of plants that remained in containers. The recuperative ability was probably due to an increasingly greater percentage of roots penetrating untreated soil and degradation of uniconazole.

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