

# EFFECTS OF PLANT GROWTH REGULATORS ON THE SEVERITY OF POWDERY MILDEW ON *PHLOX PANICULATA* 'BLUE BOY' AND *RUDBECKIA HIRTA* 'INDIAN SUMMER'

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## ABSTRACT

*Phlox paniculata* L. and *Rudbeckia hirta* L. are popular North American native herbaceous perennials in the landscape. Perennials in general have a tendency to quickly outgrow their containers in the greenhouse. Chemical plant growth regulators (PGRs) are commonly used to control plant size in the horticulture industry. Unfortunately, both *Phlox* and *Rudbeckia* are extremely susceptible to powdery mildew. Certain PGRs, namely the triazoles, have been shown to reduce the severity of some plant diseases. The effects of PGRs on powdery mildew severity on *P. paniculata* 'Blue Boy' and *R. hirta* 'Indian Summer' were investigated. Two greenhouse experiments were conducted on each species, in Fall 2003 and Spring 2004. Based on preliminary rate studies, actively growing *Rudbeckia* and *Phlox* plants were sprayed with the following growth regulator treatments: 10,000 mg·L<sup>-1</sup> B-Nine (daminozide) applied twice; 160 mg·L<sup>-1</sup> Bonzi or Piccolo (paclobutrazol); 60 ppm Topflor (flurprimidol); 60 mg·L<sup>-1</sup> Sumagic (uniconazole); 4000 mg·L<sup>-1</sup> Cycocel (chlormequat) on *Phlox* only; two applications of a tank mix of B-Nine/Cycocel at a rate of 7500/1500 mg·L<sup>-1</sup> applied to *Rudbeckia* in the Fall experiment only; and a nontreated control. The growth regulator treatments that were applied more than once were applied two weeks after the initial PGR application. Half of the plants in each experiment were harvested 2 weeks after initial treatments of PGRs to determine whether or not there were statistical differences in height, average width, and shoot dry weights of the plants. At that time, the remaining plants were inoculated with powdery mildew and disease severity was monitored several times using the Horsfall-Barratt Scale for assessing disease approximately one week following inoculation. Inoculated plants were harvested at the end of the experiment (7 weeks after PGR treatment for Fall studies, 6 weeks after PGR treatment for Spring studies) to look for shoot dry weight differences across treatments, as well as differences in height and average width. Our results indicate that for the *Phlox* studies, the Bonzi and Piccolo treatments significantly lowered powdery mildew severity compared to the controls in the Fall experiment, and Cycocel and Sumagic significantly lowered powdery mildew severity in the Spring experiment. There were no significant differences found in height or average width for either harvest of the Fall or Spring experiments. At the termination of the experiments, dry weights were significantly reduced in plants treated with B-Nine, Cycocel, B-Nine/Cycocel tank mix, or Sumagic treatments during the Fall experiment, and with Cycocel and B-Nine/Cycocel tank mix treatments in the Spring experiment relative to untreated controls. For the *Rudbeckia* experiments, there were no significant differences in height and average width at either of the two harvests, but the Bonzi and Piccolo treatments significantly reduced disease severity compared to the control at the end of the Fall experiment, and Bonzi significantly reduced severity of powdery mildew at the end of the Spring experiment. In conclusion, we have found that there are several PGRs that have been effective in reducing severity of powdery mildew on these cultivars. Paclobutrazol is the only tested PGR that has direct fungicidal activity; however, we have shown that other chemicals also may have indirect effects in reducing powdery mildew severity. For example, PGRs are known to increase cuticle thickness, which may provide a barrier for pathogen attack. Other morphological or physiological changes also may improve disease resistance.

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