DIPLODIA TIP BLIGHT TRIALS

OBSERVATIONS

Tip browning of pines is symptomatic of Diplodia tip blight (*Diplodia pinea, syn. Sphaeropsis sapinea*). Most affected are Austrian pine (*Pinus nigra*) and Ponderosa pine (*P. ponderosa*), and to a lesser degree, Scots pine (*P. sylvestris*) and Mugo pine (*P. mugo*) (Ziems, 2008). Stanosz and Smith (2009) reported *D. pinea* on native pines including Loblolly (*Pinus taeda*) and longleaf (*P. palustris*) in the gulf coast region. Ong et al (2007) reported *D. pinea* shoot blight of Afghan and Austrian pines in Texas. Diplodia tip blight primarily affects established landscape trees, generally 30 years or older (Ziems, 2008). Untreated, repeat infections can spread from needle fascicles to the entire tree branch, and ultimately result in tree death. It kills branches by causing cankers and infects the vascular tissue with bluestain (Flowers et al., 2003). Environmental stresses are factors eliciting disease. Storm damage (wind, ice, hail) and moisture stress are factors that predispose the tree to infection. Moisture stress was shown to predispose red pine (*P. resinosa*) to infection and occurred in the driest year of study in Wisconsin (Blodgett et al., 1997). Austrian pine (*Pinus nigra* subsp. *nigra)* is widely planted and valued for its tolerance to drought, ice, wind and salt. However, Sherwood et al., 2015 demonstrated that drought-stress increased Austrian pine susceptibility to *D. pinea.*

BEST TIME TO TREAT

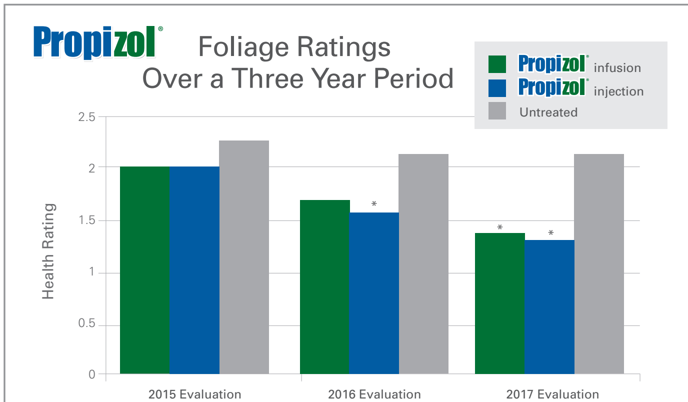
Treatments applied in late fall when resin flow is reduced, aid in systemic uptake. Applications using the closer (4 inch) spacing alone expedites uptake. Each injection site ought to be drilled, plugged and injected sequentially to minimize the impact of the resin flow. The fall or late fall applications has an added advantage in that it places product in the tree prior to the infection period, and is therefore recommended when using the Propizol® fungicide.

SUMMARY OF TRIAL RESULTS

Propiconazole is a broad spectrum fungicide that acts to inhibit the biosynthesis of sterols, which are critical to cell wall formation in fungi. This mode of action may help to explain the differential activity observed, that is, we observed a greater reduction in pre-infection candles in fall (i.e., prior to infection) compared to the spring applications (applied post-infection). These observations help to guide recommendations to protect pines of a size and age that are susceptible to infection.

The introduction and uptake of liquid into resinous conifers is slow due to the restrictive architecture of the vascular tissues (i.e., tracheids), and to resin exudate (from preformed resin ducts), a defense response to wounding. In order to expedite tree injections, several options were considered to address

1.



Foliage was rated on a scale of 1 to 3, with 1 being the best condition and 3 being the worst condition. Propizol injection showed significant improvement after one year and by the third year of observations both treatments with Propizol were showing significant improvements.

Figure 1 Evaluations of new candles in Austrian pine at the commencement of study in 2015 through 2017. In 2016, only the winter 2015 injected Propizol was statistically different (*) compared to all other treatments. In 2017, the propiconazole micro-infusion and injection treatments were statistically different (*) compared to the untreated controls at $\alpha = 0.05$.

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these challenges. We compared close and far circumferential spacing, 10 cm (4 inch) and 20 cm (6 inch) apart, respectively. The most efficient time of application was the late fall and the closer injection spacing was the most efficient method.

2.

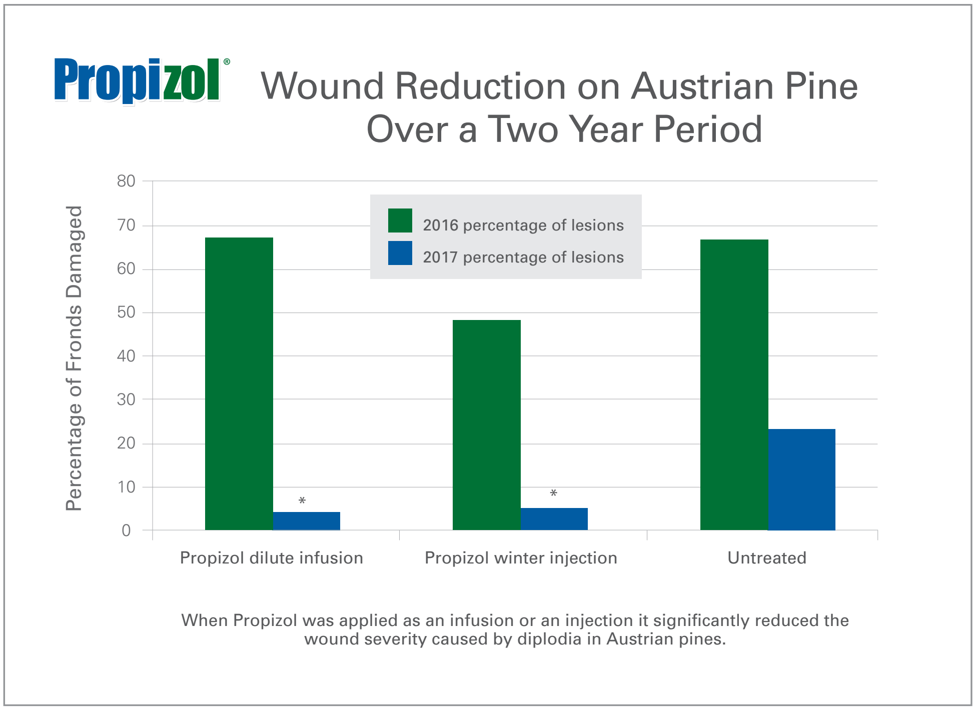

Figure 2 Comparison of percent Diplodia lesions on needle fascicles for 2016 and 2017 growth increments on excised candles by treatment. (The greatest reduction in % lesions was observed in 2016 only in the winter Propizol injections (applied December 2015), though this was not significant statistically.) However, the PPZ treatments (*) were statistically different in 2017 compared to the untreated controls at α =0.05.

References

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