Auburn University
Southern Forest
Nursery Management
Cooperative

RESEARCH REPORT 04 – 3

CONTROL OF *RHIZOCTONIA* FOLIAGE BLIGHT BY FUNGICIDES AND FUMINGATION

PART II
LOWER APPLICATION RATES & FUMIGATION EFFECTS

by

Bill Carey and Ken McQuage

INTRODUCTION

Trials at the Pearl River Nursery in 2002 evaluated three fungicides for control of *Rhizoctonia* foliage blight. Despite optimal conditions for disease development, as demonstrated by severe defoliation in control plots, all fungicide treated plots remained disease free. Although this proved that the active ingredients of tested fungicides were effective it was obvious that lower rate applications were necessary to determine optimal cost effectiveness. Therefore, we again utilized basically the same experimental design, in 2003, with the application rate of each fungicide dramatically reduced.

Descriptions of *Rhizoctonia* blight, its symptoms on pine, and the problems it causes in southern forest seedlings' nurseries can be reviewed in Research Report 03-04. In addition, that report presents moisture and temperature data from within the foliage of a nursery bed that characterize conditions optimal for the development of *Rhizoctonia* foliage blight.

METHODOLOGY

Three fungicides were evaluated at the Plum Creek Timber Company's Pearl River Nursery for control of *Rhizoctonia* foliar blight of loblolly pine. Te experimental design was a randomized complete block (RCB) of three replicate blocks and four treatments (three fungicides and a control) applied to each block. This design was replicated in three locations within the nursery,

each with a different fumigation history, having been fumigated either the previous fall (2002) or 1 or 2 years before. Each RCB was a riser-line-section (9-beds-wide) and consisted of twelve 9-ft-long by 58-ft-wide treatment plots separated by buffer plots of the same size. Each fungicide application was made in one pass of a Hardee 550 gallon sprayer with a 9-bed (58-foot-wide) spray boom with nozzles on 20` inch centers. Each fungicide was applied at half the rate evaluated the previous year (RR 03-04). Iprodione (Chipco-26019) was applied at 5.59 oz ai/ac, fludioxonil (Medallion) at 3 oz ai/ac and azoxystrobin (Heritage) at 3.0 oz ai/ac. Fungicide applications were at 16 day intervals beginning in mid-August through early October.

Treatments effects were evaluated October 28, 2003 when disease incidence in buffer plots and severity in treatment plots was measured. Incidence was assessed as 1 or 0 where, respectively, there were any or no foliage symptoms among the lower needles of seedlings in the three interior buffer plots of 8 beds in each RCB. Severity was assessed for each treatment plot by measuring the length of symptomatic drill for a 1-foot-long section of each of the eight drills at six locations per treatment plot (that is, for 48 foot of drill). The length of symptomatic drill per plot was converted to percent and for statistical analyses was transformed (arcsine). Differences in incidence and severity among fungicides and fields within each year were analyzed using SAS ANOVA and the effect of fumigation history on disease severity for both years was analyzed using SAS GLM.

In the 2003 study, one RCB was in a field fumigated just before the present crop, one was in a second crop and one in a third crop since fumigation. Without replication for fumigation history, fumigation effects cannot be assessed. However, combining data from the 2002 study, (when two RCBs were in 2nd year fields and one was in a 3rd year field), with the 2003 study provides replication for fumigation history.

RESULTS

Average percentages of seedling drill classed as symptomatic for foliage blight in control plots for both years is presented by fumigation history in Table 1.

Table 1. Disease severity in non-fungicide-treated plots (controls) by the number of crops since most recent fumigation at the Pearl River Nursery in the 2002 and the 2003 studies.

Crops Since Fumigation	# Fields Averaged	% Symptomatic Drill †
None	1	7.0 a
One	2	8.4 a
Two	3	28.6 b
lsd	*na*	*12.7*

† Percentages followed by the same letter do not differ (0.05 SAS GLM).

In 2003, blight severity differed among fields ($P < 0.01$), treatments ($P < 0.01$), and for the interaction of those effects (p 0.04). The significant interaction confounds considering the main effect of fungicide over all fields (by extension fumigation) so data are presented by field in Table 2 where blight severity does not differ among treatments except in that field producing its third crop after fumigation where fludioxonil plots had less disease.

Table 2. Severity of Rhizoctonia foliar blight in 2003 by fungicide and by field (where fields differ for crops since most recent fumigation) at the Pearl River Nursery.

Fungicide	Foliage blight severity † by number of crops since fumigation Severity in 1st crop	Severity in 2nd Crop	Severity in 3rd Crop
None	7.0	7.0	34.8 a
Azoxystrobin	4.0	0.2	22.3 b
Iprodione	0.1	4.8	20.0 bc
Fludioxonil	2.1	2.1	8.8 c
lsd	*10*	*10*	*11.5*

† Where severity is the percent of symptomatic drill feet per treatment plot.

The interaction for the main effects of field and fungicide precludes combining them in a single analysis. It indicates that the main effects can vary at different levels of each other. That is, averaging the responses across fields could confound the relative efficacy of the treatments. We conclude that the three fungicides were equally effective at the concentrations tested where *Rhizoctonia* inoculum levels were those found in fields that had produced no more than one crop of seedlings since fumigation but that at higher inoculum levels, fludioxonil (at the rates tested in 2003) was superior. Further, it can be concluded that at higher application rates of the 2002 study (just like at lower inoculum rates) no difference occurred among fungicides.

Combining both years' data allows us to test the hypothesis that foliage blight differs by fumigation history. Among control plots in both years, blight severity increased for the third crop after fumigation compared to either of the prior two crops.

Abundant inoculum and ideal conditions for the disease development were widespread at Pearl River, and in much of the South, in 2002. The data from buffer plots and that from control plots indicates strongly, that at the high tested rates, the fungicides were very effective despite severe disease pressure. Because several nurseries across the South reported seeing foliar blight in their loblolly for the first time in 2002 we infer that the environment for foliar blight was better than normal.

MANAGEMENT IMPLICATIONS

Each fungicide (iprodione, azoxystrobin or fludioxonil) controlled *Rhizoctonia* foliar blight at the higher rates tested in 2002, apparently without respect to the fumigation history. At lower rates, in 2003, control differed among fungicides between blocks producing a third crop after fumigation but not those producing a first or second seedling crop. Apparently, separating

fungicidal control efforts based on the fumigation history of the nursery blocks being treated should make biological and economic sense.