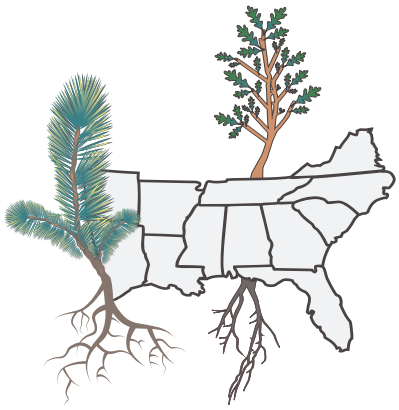

Auburn University
Southern Forest Nursery
Management Cooperative

RESEARCH REPORT 18-06

TESTING ALTERNATIVE FIPRONIL PRODUCTS FOR THE PROTECTION OF SEEDLINGS AGAINST PINE TIP MOTH

by
Ryan Nadel and Scott Enebak

INTRODUCTION

Pine tip moth (*Rhyacionia* spp.) still remains a pest of major concern for pine seedling growers across the Southeastern US (Asaro et al. 2003, Asaro and Creighton 2011, Mangini 2017). Feeding damage of this pest results in a reduction in seedling growth coupled with an increased incidence of stem deformities, such as forking, reduced height growth and mortality to small seedlings. Larvae feeding on the buds and terminal shoots of newly established seedlings, results in the death of the shoot. Damage is often first noticed when the shoots turn brown in color, often coupled with the presence of frass (solid excreta of the moth larvae), indicative of larvae feeding on the shoot (Asaro and Berisford 2001).

Chemical products are effective in reducing the effect of this pest on recently established pine stands. To date, several contact and systemic insecticides have been registered for pine tip month control (Asaro et al. 2003). The systemic insecticides most commonly used are reported to provide approximately 1 – 2 years of pest control. These insecticides are either applied in the containerized seedling root plug prior to planting or at planting when the seedling is placed within the planting hole (Berisford et al. 1984, Asaro and Creighton 2011, Mangini 2017). The most commonly used and effective active ingredients (a.i.) for the control of pine tip moth, used and applied by seedling growers, is that of Fipronil (5-amino-[2,6-dichloro-4-(trifluoromethyl)phenyl]-4-[(1R, S)-(trifluoromethyl)sulfinyl]-1H-pyrazole-3-carbonitrile) (Mangini 2017). There is currently only one registered labelled fipronil product for use on pine seedlings, namely that of PTM® by BASF chemical company. In an attempt to determine whether other products with the same a.i. could effectively be used, a study was undertaken to determine whether alternative fipronil products (not labelled for use with pine seedlings) could potentially protect pine seedlings without resulting in seedling phytotoxicity.

MATERIALS AND METHODS

Treatments:

For this study a total of 600 container grown Loblolly pine (*Pinus taeda*) seedlings were used. There were 4 treatments of 150 seedlings that included PTM® and two other products, Tarus® and Termidor® (**Table 1**). All seedlings had their root plugs injected with a 1ml solution (water and a.i.). This application volume was based on the labelled a.i. rate for pine seedlings planted at 400 – 600 trees per acre. This would equate to the equivalent to 21 fl oz. / acre of product (0.13 lb a.i.) diluted in water before being injected into the seedling root plugs.

Outplanting:

Treated seedlings were outplanted in a completely random block design with each treatment having 10 replicates of 15 seedlings. Seedlings were planted at a 1.5 x 6 ft (45cm x 180cm) spacing. Seedlings received no additional care, following outplanting, so as to simulate normal establishment conditions. Seedling growth (root collar diameter (RCD), height (Ht)) and survival were measured over a one year time period following outplanting.

RESULTS AND DISCUSSION

There were no significant difference for either height or RCD between the 3 different chemical products tested (Figure 1 and 2). All products were, however, significantly different from that of the untreated controls which were significantly smaller in both height and RCD when compared to that of the treated trees.

This study found no signs of phytotoxicity for products tested nor any growth or survival differences between the two products when compared to that of the currently labelled product. The study found that these two additional products show promise for the control of Pine Tip Moth but still require registration labelling prior to being allowed for such use on pine seedlings.

MANAGEMENT IMPLICATIONS

- Alternative unlabeled products are effective in reducing the impact of pine tip moth on recently established pine stands.
- These products, however, require label registration for use on pine seedlings prior to being used commercially.

REFERENCES

Asaro, C. and Berisford, C.W. (2001). Predicting Infestation Levels of the Nantucket Pine Tip Moth (Lepidoptera: Tortricidae) Using Pheromone Traps. Environmental Entomology **30**(4): 776-784.

Asaro, C. and Creighton, J. (2011). Use of Systemic Fipronil and Imidacloprid to Control Regeneration Pests of Loblolly Pine. Journal of Economic Entomology **104**(4): 1272-1279.

Asaro, C., Fettig, C.J., McCravy, K.W., Nowak, J.T. and Berisford, C.W. (2003). The Nantucket Pine Tip Moth (Lepidoptera: Tortricidae): A Literature Review with Management Implications. Journal of Entomological Science **38**(1): 1-40.

Berisford, C.W., Gargiullo, P.M. and Canalos, C.G. (1984). Optimum timing for insecticidal control of the Nantucket Pine Tip Moth (Lepidoptera: Tortricidae). Journal of Economic Entomology **77**(1): 174 - 177.

Mangini, A.C. (2017). Regeneration insect pests: protecting southern pine seedlings after outplanting. Tree Planters' Notes **60**(2): 70 - 80.

Table 1. Seedling treatments for testing alternative fipronil products (#indicates currently labelled product for use with pine seedlings)

Treatment code	Fungicide	Manufacturer	Active ingredient
Control	N/A		Water
Product 1#	PTM®	BASF chemical company	9.1 % fipronil
Product 2	Tarus® SC	Control Solutions Inc.	9.1 % fipronil
Product 3	Termidor® SC	BASF chemical company	9.1% fipronil

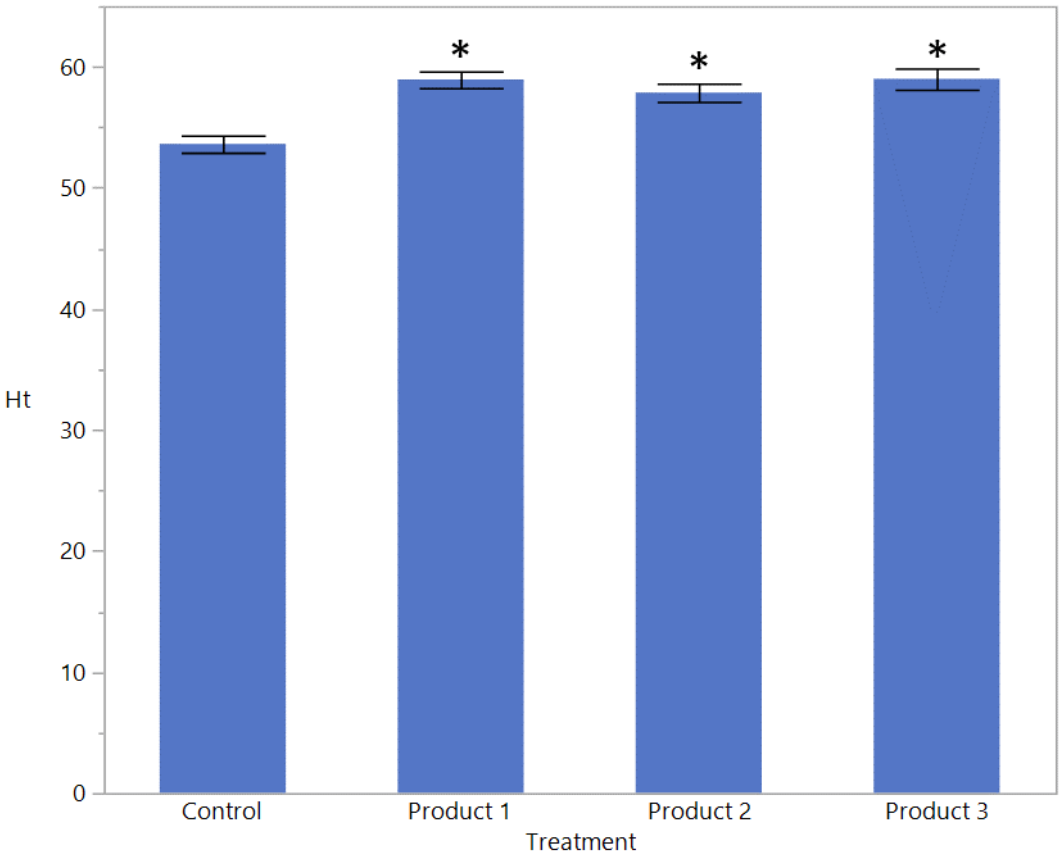

Figure 1. The height (cm) of loblolly pine seedlings treated with different Fipronil products compared to untreated controls. (* indicate significant differences at $p<0.05$ when compared to that of the control)

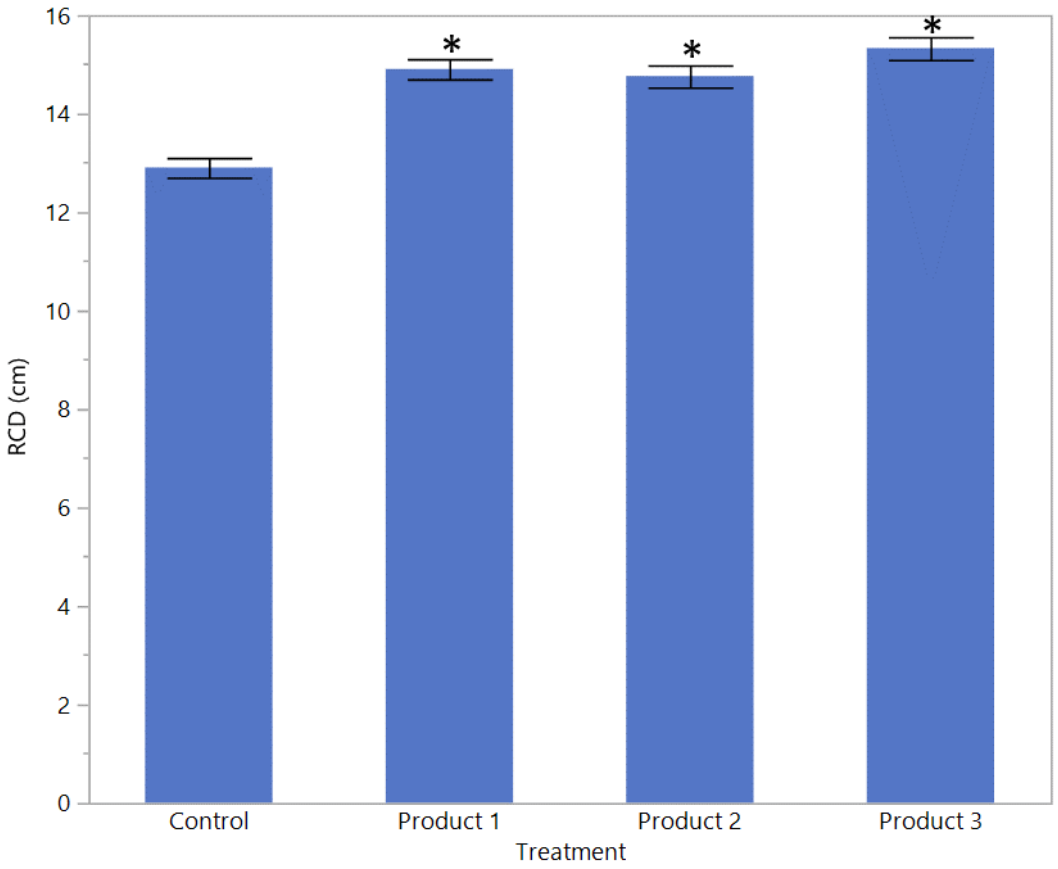

Figure 2: The root collar diameter (RCD)(cm) of loblolly pine seedlings treated with different Fipronil products compared to untreated controls. (* indicate significant differences at $p<0.05$ when compared to that of the control)