AGALINIS – A ROOT PARASITE ON LOBLOLLY PINE

Alan Byron Wilson and Lytton John Musselman

Abstract—Loblolly pine (*Pinus taeda* L.) is the most widely planted pine species in the Southern United States due to its ability to grow well on many different sites. After a tree is planted, insects and disease can have an impact by reducing growth that sometimes leads to mortality. Parasitic plants can also reduce the growth of loblolly pine by attaching to the roots. Over the years, several publications have documented the devastating impact Seymeria (*Seymeria cassioides* Orobanchaceae) can have on loblolly pine. The related fascicled gerardia or purple false foxglove (*Agalinis fasciculata* Orobanchaceae*)* has recently has been found in numerous locations in young loblolly pine stands. This paper provides information on its impact on loblolly pine, how to identify *A. fasciculata*, where the plant has been found, and ways to control it.

Landowners in the Southeastern United States are planting loblolly pine more than any other pine species because it can be grown on many different soil types and drainages. Also, it responds well to silvicultural inputs such as fertilization. It was estimated that in 2013, over 756 million seedlings of loblolly pine were grown in forest tree nurseries (South and Harper 2016), more than any other pine species.

After a tree is planted, diseases and insects can reduce growth. Fusiform rust (*Cronartium fusiforme*), pitch canker (*Fusarium circinatum*), and Nantucket pine tip moth (*Rhyacionia frustrana)* can negatively impact loblolly pine growth. Recently, *A. fasciculata* was observed in some 3-year-old loblolly pine plantations causing loss of growth, and occasionally, mortality. In many cases, where *A. fasciculata* is growing adjacent to the planted pine tree, height growth is greatly reduced and needles are brown. Often the tree's lower limbs are dead, resulting in crown recession which further reduces the tree's growth (fig. 1).

Agalinis fasciculata is an annual, herbaceous plant that parasitizes several pine species (Musselman and Mann 1978) including loblolly pine, longleaf pine (*P. palustris* Mill.), sand pine (*P. clausa* Chapm. ex Engelm.), slash pine (*P. elliotii* Engelm.), and shortleaf pine (*P. echinata* Mill.). Root parasites have highly specialized roots known as haustoria which attach to the host's roots. The haustorium is the conduit which allows moisture and nutrients to move from the host to the parasite. *Agalinis fasciculata* is native to the Southeastern United States (Miller and Miller 1999), has pink or purple flowers lasting one day, and grows 5 to 6 feet tall by the end of the growing season. In the late fall and early winter, the plant may be identified by the numerous seed capsules located at the top of the plant (fig. 1).

After a tract is harvested and before planting, it is common practice to prepare the site using herbicides to control vegetation that will compete with the

Figure 1—Loblolly pine impacted by *A. fasciculata* growing between two trees. (photo by Alan Wilson)

Author information: Alan B. Wilson, R&D Coordinator, Rayonier, Yulee, FL 32041; Lytton J. Musselman, Professor, Department of Biological Sciences, Old Dominion University, Norfolk, VA 23529.

Kirschman, Julia E., comp. 2018. Proceedings of the 19th biennial southern silvicultural research conference. e-Gen. Tech. Rep. SRS-234. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 444 p.

seedling. It is thought that herbicide rates used to control hardwoods and shrubs are sufficient to control *A. fasciculata*. Since the parasitic plant is an annual, applying the herbicide before flowering, or no later than late August in the Southeastern United States, is crucial for the treatment to be effective. Additional work is planned to better understand how to control *A. fasciculata* in loblolly pine plantations.

LITERATURE CITED

Miller, J.H.; Miller, K.V. 1999. Forests plants of the southeast and their wildlife uses. Champaign, IL: Southern Weed Science Society.

Musselman, L.J.; Mann, W.F., Jr. 1978. Root parasites of southern forests. Gen. Tech. Rep. SO-20. New Orleans, LA: U.S. Department of Agriculture Forest Service, Southern Forest Experiment Station. 76 p.

South, D.B.; Harper, R.A. 2016. A decline in timberland continues for several southern yellow pines. Journal of Forestry. 114(2): 116–124.