Effects of European Gypsy Moth Defoliation in Mixed Pine-Hardwood Stands in the Atlantic Coastal Plain

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(ABSTRACT)

As populations of the European gypsy moth (*Lymantria dispar* L.) move into the southeast, laboratory studies indicate that the potential exists for defoliation and possible tree mortality in mixed pine-hardwood stands. This dissertation describes a field study that was initiated to determine the susceptibility and vulnerability of pure and mixed stands of loblolly pine, oaks and sweetgum in pine-oak and pine-sweetgum cover types in the Atlantic Coastal Plain physiographic province. Sixteen stands were defoliated between 1992 and 1996. Stand susceptibility was significantly related to stand composition; stands with a greater proportion of susceptible species experienced greater defoliation. Oaks and sweetgum were heavily defoliated. Pines did not suffer extensive defoliation, and results of the study indicate that the probability of widespread gypsy moth defoliation in pine plantations appears to be low. A multiple linear regression model for the prediction of mean stand defoliation is also presented. Trends in tree mortality were similar to those previously described in northeastern forests. Susceptible tree species were heavily impacted, however, oaks displayed greater vulnerability than sweetgum. Suppressed and intermediate trees in the understory, and trees that were in poor or fair condition, had a greater probability of dying subsequent to defoliation. However, under- and overstory basal area mortality rates were not significantly different in the pine-oak type, and stem mortality rates were not significantly different in either type. Loblolly pine mortality was observed, but it was difficult to isolate the source, and thereby determine whether gypsy moth defoliation was a primary causal factor. In general, the potential for extensive pine mortality in mixed pine-hardwood stands does not appear to exist. Logistic regression was found to be a useful tool in the prediction of individual tree mortality and two logistic regression equations were derived and validated for use in pine-oak and pine-sweetgum cover types.