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## *Longleaf Pine: A Southern Legacy Rising From the Ashes*



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THE LONGLEAF ALLIANCE

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**FIRE-INDUCED FLOWERING AND HERBIVORY OF THE FEDERALLY ENDANGERED AMERICAN CHAFFSEED (*Schwalbea americana* L.)**

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**ABSTRACT:** The fire-maintained longleaf pine ecosystem of the southeastern coastal plain harbors nearly 200 rare and endangered plant species, many of which are dependent on frequent fire for persistence. One such fire-dependent species is the federally endangered hemiparasite, *Schwalbea americana* (American chaffseed) in the family Scrophulariaceae. Regardless of season of burn, fire stimulates flowering and subsequent seed production in this species; however, the specific mechanisms involved in this fire-induced flowering response are unknown. The purpose of this study was to determine the mechanism controlling the flowering response to fire. Using experimental treatments in both the field and greenhouse, we addressed the following question: Is flowering and subsequent viable seed production induced by fire a result of: a) increased light availability by removal of surrounding vegetation, b) partial plant destruction due to removal of the above-ground stem, c) pulses of phosphorus or ethylene released following fire, or d) smoke exposure? Our field treatments included fire, shading following fire, phosphorus addition, stem clipping, competing vegetation exclusion, stem clipping plus vegetation exclusion, and mowing plus raking. Our greenhouse treatments consisted of ethephon application, smoke incubation, and a combination of three light levels plus stem clipping. Our findings indicate that flowering is stimulated by a combination of clipping and light. Flowering was not induced by phosphorus, ethephon, or smoke treatments. An unexpected result of our field study was the occurrence of insect herbivory at one site, with the greatest amount of herbivory in the stem clipping plus competing vegetation exclusion treatment. These results may have management implications for this species during years in which prescribed fire is not possible.