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Estimating Timber Losses from a Town Ant Colony with Aerial Photographs[1,2]

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ABSTRACT. Aerial photographs were used to locate an individual nest of Atta texana *(Buckley) and to estimate the area of damage in a plantation of loblolly pine (*Pinus taeda *L.). Stumpage loss from the nest over a period of 30 years was estimated to be $653.*

Landowners who begin pine planting or seeding operations without first checking for town ant colonies are inviting disaster in certain areas of Louisiana and East Texas. Town ants defoliate field and garden crops, shrubs, and young trees. These ants are a forest pest because they cut the needles from both natural and planted pine seedlings. Severe or repeated defoliation kills young trees; but pines that reach a height of 3 ft usually survive, making damage difficult to assess. The pines usually escape destruction as long as there is other green vegetation, but during the colder months when grasses and weeds have died back and hardwood leaves have fallen, pine needles satisfy the ants' need for green plant material.

A colony of town ants will endanger young seedlings around their nest because underground "feeder" tunnels and surface runways may extend 10 yd or more in all directions. However, this damage has never been quantified because colonies have either been killed before their damage could fully occur; because the areas surrounding nests were disturbed frequently by forestry, agricultural, or other land clearing activities; or because colonies established themselves in areas where the trees were too large to destroy. Ideally, a colony would have to be founded at about the same time that a plantation was established, and the plantation would have to remain undisturbed for a number of years for the colony to fully make an impact. Such instances are rare. This paper describes such a colony and its damage to a plantation of loblolly pine (*Pinus taeda* L.).

MATERIALS AND METHODS

The nest was located in central Bienville Parish, Louisiana, about 2 mi north of Lucky. It was me-

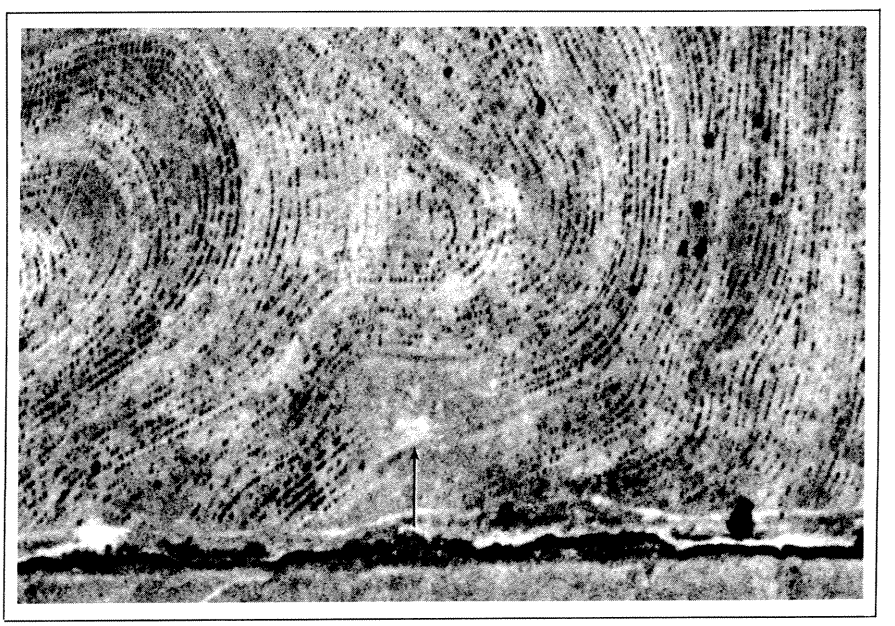

Figure 1. Enlargement of the February 1959 ASCS aerial photograph, showing nest (arrow) in the center of the damaged area.

[1] *Atta texana* (Buckley 1860) (Hymenoptera:Formicidae). Because "texas leaf-cutting ant," the common name approved by the ESA, is not in general use outside of the literature, the term "town ant" is used in this paper. This is the name used by the majority of foresters and rural residents of East Texas and Louisiana.

[2] The author thanks Mary Dyer, USDA Agricultural Stabilization and Conservation Service, Salt Lake City, UT, for her many helpful suggestions on aerial photographs; and Willie F. Cooper, USDA Agricultural Stabilization and Conservation Service, Alexandria, LA, and Andrew Schaar, Continental Forest Industries, Inc., Bienville, LA, for reviewing the manuscript. In addition, I am grateful to William C. Postle (deceased), Continental Forest Industries, Inc. (formerly Continental Can Co., Inc.), Hodge, LA, for locating the nest and subsequently helping to collect the data.

dium-sized and oblong, with mounds and spoil covering an area of about 15 × 20 ft. The accumulated layer of dirt from subsurface digging by the ants averaged about ½-ft deep. The nest was situated on Ruston fine sandy loam with a rolling topography. According to SCS soil interpretations information LA 0057, the Ruston Soil in this locality has a site index of about 85 ft (base age 50). The topsoil (A horizon) was a black, sandy, organic layer about 1-ft deep. Underlying the surface soil was a red, moderately permeable sandy-clay layer about 14-ft thick. Below this was a soft white sand having excellent drainage. A 10-ft-deep gulley, which provided excellent surface drainage, ran 90 ft southeast of the nest. When the colony was killed for this evaluation in June 1959 (Neelands 1959), its age was estimated to be 4 to 6 yr. The nest was within a 4-yr-old plantation of loblolly pine in which all town ant colonies were believed eliminated before planting.

Damage to the plantation was evaluated by using aerial photographs taken at an altitude of 13,000 ft. They were purchased from the Aerial Photography Field Office of USDA's Agricultural Stabilization and Conservation Service, Box 30010, Salt Lake City, UT 84130.

RESULTS

A 1955 aerial photograph of the area revealed no evidence of a nest, confirming foresters' beliefs that the colony was either not there or that it was too small to be noticed at the time of planting.

Both the nest and a surrounding "circular" area of damage in the plantation could be seen in the 1959 aerial photograph (Figure 1). All pines within this area were dead or stunted; trees nearest the nest were injured the most, with damage progressively lessening toward the periphery (Figure 2). Losses apparently occurred in winter because there was little evidence of needle clipping in June. The pines surrounding the damaged area were about 4 ft tall—already too large for the ants to inflict further significant damage. The damage was still clearly visible on subsequent aerial photographs until 1979, when vegetation began filling the gap.

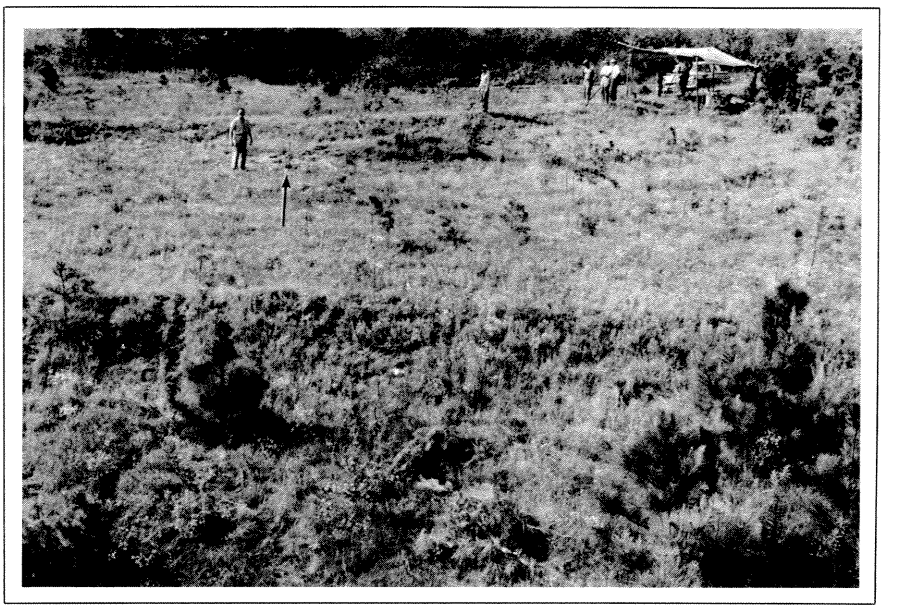

Figure 2. Ground view of nest (arrow) and a portion of the damaged area that had occurred by May 1959. Pines at the periphery of the area (foreground) were healthy, but those that had survived within the area were stunted.

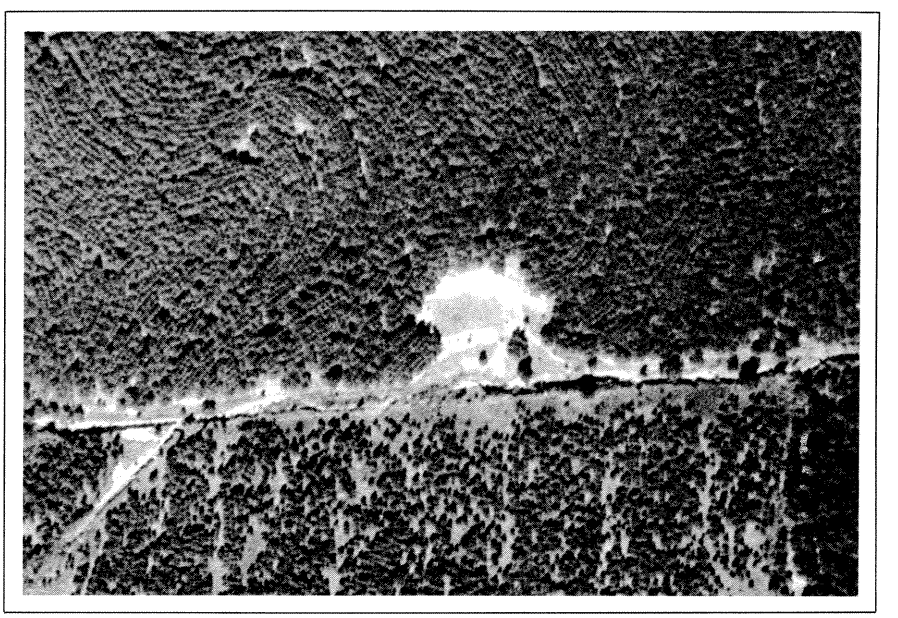

Figure 3. Enlargement of the October 1966 aerial photograph. Although the nest was killed in 1959, the damaged area is still clearly evident.

A length of 1 in on the 1959 aerial photograph equals about 1667 ft on the ground. Hence, the damaged area, which measured about ⅛-in in diameter on the print, equalled about 208 ft in diameter on the ground. This represents a loss of about 0.78 ac. Left uncontrolled, the plantation 7 years later would have appeared similar to the bare area (arrow) in the 1966 photograph (Figure 3), at which time the trees had reached a height of about 30 ft.

On similar soils, the average loblolly site in Bienville Parish,

LA, is capable of producing 1.5 cords/ac/yr, or a total of 45 cords through age 30. At present prices (March 1985), one cord is worth about $18.60; hence, to date the total stumpage value loss approximates $653. Since many timber growers now clearcut at age 30, this cost figure might seem the actual loss caused by the ant colony for this particular plantation.

For purposes of analysis by means of a real discount rate, the total stumpage value should be converted to constant 1955 dollars so that a present-day stumpage of $653 is equal to $166 if inflation is factored out. The approximate cost of labor and materials to control the nest in 1955 would have been $2.50. To determine if this $2.50 investment was worthwhile (that is, it returned at least 10% over and above inflation), the 1985 $166 stumpage value in constant 1955 dollars must be discounted to 1955 at 10%. Such a calculation yields a present value of $9.50. The benefit-cost ratio is thus $9.50/$2.50 = 3.8 to 1. This ratio indicates that when the town ant control project is valued at a 10% real rate of return, then benefits exceed costs by a factor of 3.8 to 1. Total return on such a project (internal rate of return) would be 15% in real terms. That is to say, an investment in town ant control of $2.50 in 1955 yielded a 15% annual rate of return during the 30-yr period over and above inflation.[3] □

Literature Cited

NEELANDS, R. W. 1959. Exposing the town ant. For. and People 9:16,19,50.

[3] Assistance in the economic feasibility analysis was given by Clair Redmond, USDA Forest Service, Southern Region, Athens, GA; Wesley Nettleton, USDA Forest Service, Southern Region, Pineville, LA; and Eugene Shoulders, USDA Forest Service, Southern Forest Experiment Station, Pineville, LA.