APPLYING FERTILIZER TO LOBLOLLY PINE PLANTATIONS

Recent research conducted in the Gulf Coastal Plain and the Ouachita Mountain regions of Arkansas showed significant volume growth responses to nitrogen or nitrogen plus phosphorus fertilizer by loblolly pines.

However, several factors need to be considered before one decides to fertilize. The key points that follow are taken from the Southeastern Forest Experiment Station, General Technical Report SE-36:

When and Where to Apply Fertilizer

- If you are growing loblolly pine in plantations and you are looking for attractive investments in increased wood production, consider forest fertilization.
- Planning for fertilization requires months of lead time to obtain soils information, to take foliage samples, and to have them analyzed.
- The only fertilizer elements currently known to produce economically attractive growth increase in loblolly pine are nitrogen and phosphorus. Potassium, and perhaps other elements, limits growth on some sites, but further research is needed before applications can be recommended.
- Phosphorus fertilization is most likely to produce a response on very poorly to somewhat poorly drained clays and sands on the Lower Coastal Plain where the stand that is being harvested has a site index (age 25) below 60 feet or where the existing stand is not vigorous. Applying 50 pounds of phosphorus per acre has increased loblolly pine site index (age 25) by 10 to 15 feet on typical very poorly, poorly, or somewhat poorly drained soils on the Lower Coastal Plain.
- Growth responses are not obtainable everywhere. Foliar analysis is recommended for identifying sites to fertilize. Even foliar analysis cannot give a perfect prediction of response, but it improves the probability of success.
- Results of foliar analysis are key indicators of needs for soil nutrients, and special procedures for collecting foliage samples must be followed. If a regeneration cut is planned, foliage samples can be taken from the stand before harvest to determine the need for phosphorus application before a new stand is planted.
- A needle phosphorus content of less than 0.10 percent indicates a need for soil phosphorus. The growth response to phosphorus fertilization increases as the needle phosphorus content without fertilization decreases from 0.10 to 0.06 percent.
- Where phosphorus deficiency has been identified, add 40 to 50 pounds of phosphorus per acre at the time of planting or as soon thereafter as practical. The season of application is not important.
- Responses to nitrogen fertilization are best on soils where nutrient supplies are limiting growth but moisture conditions are favorable. Highly responsive stands have basal areas of 70 to 120 square feet per acre and foliage nitrogen concentrations less than 1.2 percent. The site index (age 25) should range between 50 and 75 feet. If the needle phosphorus concentration is less than 0.12 percent, phosphorus should be applied along with nitrogen.
- Where nitrogen is identified as deficient, apply 150 pounds of nitrogen per acre. Where phosphorus is also deficient, apply 25 pounds of phosphorus per acre at the same time. Treat 5 to 8 years before harvest to obtain the most attractive economic return from nitrogen. In well-drained (but not overstocked) stands, 3-year volume increment may be increased by 200 to 500 cubic feet per acre by this treatment.
• Moderately well to well-drained upland soils may show limited response to nitrogen fertilization because of insufficient moisture during the growing season.
• Soils with a fragipan or shallow bedrock may also show little growth response from nitrogen fertilization because of limited rooting volume, in addition to moisture stress during part of the growing season.
• Avoid burning for 6 months prior to application and for 4 years after application of nitrogen to avoid nitrogen fertilizer loss.
• In selected stands, investments in forest fertilization can be expected to yield returns of 10 to 28 percent if increases in product value are taken into account.

Probably the most important point to remember is that pine stands must be well-stocked (but not overstocked) before a response may be observed. This means attention should first be directed toward adjusting the stand density to optimum levels before considering fertilization. The potential for staggered, overstocked natural stands to respond to fertilization is questionable.

More specific fertilization guidelines can be obtained from your local county Extension agent. Forest managers considering large-scale fertilization are especially encouraged to obtain a copy of General Technical Report SE-26 by Wells and Allen. Write to: Publications, Southeastern Forest Experiment Station, 200 Weaver Boulevard, P. O. Box 2650, Asheville, NC 28802. Your local county Extension office may also be able to provide a photocopy of the report.

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References

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