

Fertilize to optimize your forest's timber production potential

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Anyone who wishes to grow quality stands of sawtimber should consider including fertilization in their management plans. Forest fertilization increases sawtimber yields by as much as 1000 to 1500 bd. ft. (1 to 1.5 short tons) per acre over a 6 to 10 year period and carries up to a 27.5% rate of return on investment. In addition, fertilizing shortens rotation lengths since trees reach merchantable size at a younger age. Simply put, fertilizing forests lets you produce *more timber, more quickly*.

There are several factors to consider before fertilizing. First and foremost is your management objective. If your primary management goal is to produce timber, fertilization can be an important management tool. Secondly, it is important to take into account the acreage you wish to fertilize. Thirty acres is approximately the minimum stand size that can be fertilized profitably. Dense stands of pines do not respond well to fertilization due to pine-on-pine competition for the fertilizer. As such, densities of 300 to 500 trees per acre (60 to 80 ft² basal area per acre) are desirable. Density can be controlled by planting spacing and thinning. The incidence of insect and disease in a stand must be considered as well. For example, a loblolly or slash pine stand with more than 30% of its trees infected with fusiform rust will respond poorly to fertilization. Stand age is another important concern. Pine growth responses to phosphorus fertilizer can last up to fifteen years, so phosphorus can be applied effectively to young stands growing on phosphorus-deficient soils. Growth responses to nitrogen fertilizers last about six years. Therefore, it is biologically and economically desirable to time nitrogen fertilizer treatments within six years of thinnings or harvests.

To explore whether fertilization will be right for your forest, contact your local forestry extension agent. The extension agent will guide you through the decision-making process for fertilization. Important steps in this process are:

- 1. Testing the foliage to assess nutrient needs.** Not all forests need fertilizer, and a \$20 to \$40 test of your trees can save you the cost of fertilizing dozens of acres of

forest that don't need it. To accurately test your trees' nutrient needs, take samples of pine needles. In December or January, pick 6 to 10 trees of good height and form in each stand you wish to fertilize. Prune or shoot a branch from the upper part of the tree, then strip the needles from the lower part of the branches. Mix all the needles you collect in each stand in a bag or bucket, and then pull out 100 to 200 needles. Put the needles in a paper bag and ship them in an ice-pack filled cooler to a laboratory for analysis.

Numerous university and commercial labs are available to run the analysis. The LSU AgCenter has a laboratory capable of this type of analysis for \$14 per sample. For further information, this laboratory can be reached at 225-578-1261 or <http://www.lsuagcenter.com/stpal/contact.asp>.

2. Interpreting the test results. Research has demonstrated the critical amount of nutrients southern pines should have. Needle test results help determine which nutrients, if any, should be added with fertilizer. If test results for a loblolly pine stand show less than 1.2% nitrogen in the needles, the trees need more nitrogen. Similarly, if phosphorus content is below 0.1% or potassium is below 0.35%, the pines need more phosphorus and/or potassium, respectively. If slash pine has less than 0.9% nitrogen, 0.09% phosphorus, or 0.3% potassium, it will be necessary to fertilize with the deficient nutrient. Research and operational experience have shown that if tests reveal a nitrogen deficiency, the best fertilizer responses are attained by adding some phosphorus-containing fertilizer along with the nitrogen fertilizer even if the foliage test shows that phosphorus levels are sufficient. Phosphorus helps trees take up nitrogen and use it for growth, which optimizes the trees' growth responses to nitrogen fertilizer.

3. Selecting the right fertilizer. Urea is a good fertilizer selection for adding nitrogen, and phosphorus can be added through triple superphosphate (TSP) or diammonium phosphate (DAP). DAP has the advantage of adding some nitrogen along with the phosphorus, but the nitrogen can increase weed densities in young forests. As such, it is best to use TSP in forests under five years old. A good source of potassium is muriate of potash (MOP).

4. Applying the fertilizer. Most forest fertilization is currently done by aircraft. However, if there is adequate spacing between rows of trees, fertilizer can be applied by tractor or skidder. Your extension agent will help locate reputable applicators in your

area. A good blend of fertilizer to remedy low nitrogen in loblolly and slash pine forests under 10 years old is 220 lbs of urea per acre and 90 lbs of TSP per acre. If the stands are over 10 years old, a good blend is 330 lbs urea per acre and 95 lbs of TSP per acre. To correct phosphorus deficiencies, 250 lbs of TSP per acre can be used regardless of stand age. If the stand is over 10 years old, 250 lbs of DAP per acre can be used to fix phosphorus deficiencies. MOP can be added at 50 lbs per acre.

Fertilizing forests to improve timber production has benefits that extend beyond purely economic concerns. By producing more timber per acre, we stabilize the amount of acreage devoted primarily to timber production, which enhances forest diversity across the landscape. Furthermore, fertilizing forests has a light ecological “footprint” since it is done one to five times over the course of 20 to 30 years depending on the site’s nutrient needs and the landowner’s available capital. Thus, forest fertilization is both an environmentally and economically sound activity.

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