

NUTRIENT RECOMMENDATIONS FOR COMMERCIAL LOBLOLLY PINE PLANTATIONS IN MARYLAND

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Stages of Growth

Managing the application of nutrients in commercial Loblolly pine plantations depends upon the growth stage of the plantation. For example, nutrient application at establishment is dictated by soil test levels for phosphorus and potassium, whereas nutrient application at mid-rotation thinning depends upon both soil test levels and, under some conditions, one or two indicators of tree nutrient status (i.e., Leaf Area Index (LAI) or foliar nutrient levels).

Nutrient Management During Establishment

Nitrogen (N)

No commercial nitrogen fertilizer is recommended for establishment of Loblolly pine plantations.

Phosphorous (P) and Potassium (K)

Application of phosphorus (P) and potassium (K) to areas of Loblolly pine establishment is based on the amount of plant-available P and K already in the soil, as expressed by the Fertility Index Value (FIV). See Table 1.

Table 1. P and K recommendations for the establishment of Loblolly pine plantations

Rate (lbs./acre)	Soil Test Category			
	Low (FIV 0-25)	Medium (FIV 26-50)	Optimum (FIV 51-100)	Excessive (FIV >100)
P₂O₅	115	115	55	0
K₂O	60	60	30	0

Nutrient Management at Mid-Rotation Thinning Using Commercial Fertilizer

Application of nutrients as commercial fertilizer at mid-rotation thinning considers both soil test FIV-P and, under some conditions, LAI or foliar nutrient levels. No potassium is recommended at mid-rotation thinning.

When soil test FIV-P is low or medium, follow recommendations in Table 2.

Table 2. N and P recommendation at mid-rotation thinning when soil test FIV-P is low or medium

If soil test FIV-P is...	apply...	and apply...
low	125-250 pounds N per acre	115 pounds P ₂ O ₅ per acre.
medium	125-250 pounds N per acre	55-115 pounds P ₂ O ₅ per acre.

When soil test FIV-P is optimum, determine LAI and consult Table 3 for recommendation. For information on determining LAI, contact a consulting forester or the Extension & Natural Resource Specialist at the University of Maryland Wye Research and Education Center, or consult *Ocular LAI Comparator for Loblolly Pine*. See the “References” section for ordering information.

Table 3. Utilizing LAI to determine N and P recommendation when soil test FIV-P is optimum

If LAI is between...	then...
0.65 and 2.0	Apply 125– 50 pounds N and 55 pounds P ₂ O ₅ per acre.
2.01 and 3.0 (optimum range)	Rely on foliar analysis.
3.01 and 4.5	Do not fertilize.

When soil test FIV-P and LAI are both optimum, rely on foliar analysis. Collect a representative sample of foliage and obtain a total N and P analysis from an agricultural analytical laboratory. Compare the Loblolly pine foliage N and P levels to those reported in Table 4.

Table 4. Interpretive information for N and P concentrations in Loblolly pine foliage

Nutrient	Critical Level (%)	Optimum Upper Limit (%)
N	1.1 – 1.2	2.3
P	0.10 – 0.12	0.17

Consult Table 5 to determine the N and P recommendations when soil test P and LAI are both optimum.

Table 5. N and P recommendation at mid-rotation thinning when soil test FIV-P and LAI are both optimum

If N...	then...
is less than 1.1% in the Loblolly pine foliage	apply 125 – 250 pounds N per acre.
is 1.1% or greater in the Loblolly pine foliage	Do not apply any N.
If P...	then...
is less than 0.10% in the Loblolly pine foliage	apply 55 pounds P ₂ O ₅ per acre.
is 0.10% or greater in the Loblolly pine foliage	do not apply any P.

Organic Waste Applications

Application rates for organic wastes, such as poultry litter and biosolids, etc., at establishment and at mid-rotation thinning depend upon soil test FIV-P and the plant-available nitrogen (PAN) content of the organic waste. A representative sample of an organic waste must be collected and analyzed prior to determining the appropriate application rate. See *Sampling Manure for Nutrient Content* for information on collecting a representative sample. Consult Table 7 for organic waste application rates.

Table 7. Organic waste application rates

If FIV-P is...	and growth stage is...	then...
between 1 and 50 (low and medium)	establishment	apply 60 pounds per acre PAN.
between 1 and 50 (low and medium)	mid-rotation thinning	apply 180 pounds per acre PAN.
between 51 and 100 (optimum)	establishment	apply 30 pounds per acre PAN.
between 51 and 100 (optimum)	mid-rotation thinning	apply 90 pounds per acre PAN.
greater than 100 (excessive)	establishment or mid-rotation thinning	do not apply organic waste.

Nutrient Best Management Practices (BMPs) for Loblolly Pine Plantations

BMPs should be observed and utilized to protect soil and water quality.

Timing BMPs

1. Application of nutrients to Loblolly pine plantations should be limited to either the spring (March 1 – May 15) or fall seasons (August 15 – October 15).
2. Do not apply nutrients to Loblolly pine plantations from October 15 to February 28.
3. Nutrient applications to newly established Loblolly pine plantations should be avoided in July and August to avoid foliage burning.

Site BMPs

1. Do not apply any nutrient source near watercourses or Stream Management Zones:
 - for sites with a slope between 1 – 5%, within 50 feet of a pond, stream or other water body;
 - for sites with a slope of more than 5%, within 100 feet of a pond, stream or other water body.
2. Do not apply nutrients to a site with standing water at the time of application.
3. Do not apply nutrients on bedrock outcrops.
4. Do not apply **any** P-bearing nutrient sources to sites whose soil test FIV-P is greater than 100.

Nutrient Application Frequency BMP

Nutrient applications may occur at mid-rotation or as often as every 5-7 years, if appropriate, based on soil test and foliar analysis or LAI.

Organic Waste BMP

If an organic nutrient source is applied at establishment, it is critical to apply an approved herbicide to control unwanted vegetation.

References

Sampson, D.A., H.L. Allen, E.M. Lunk and D.P. Blevins. *1997 Ocular LAI Comparator for Loblolly Pines*. Version 4.1. Department of Forestry and Environmental Resources, North Carolina State University, Raleigh, NC, 27695-8008. (\$15)

Steinhilber, P. and J. Salak. *Sampling Manure for Nutrient Content*. NM-6. University of Maryland Cooperative Extension and Department of Natural Resource Sciences and Landscape Architecture, College Park, MD 20742.