

Orchard Sod and Cover Crops

Management Highlights

- Target pH: 6.5
- Monitor soil P and K levels. It is more economical to maintain soil fertility than to re-establish the crop.
- Fertilize established sod in March or April.
- When a broadcast fertilization program is used in the orchard, sod needs no additional fertilization.
- Watch for micronutrient deficiency during the growing season.

Introduction

Nutrient management of orchard crops can be divided into three separate programs:

- 1) initial site preparation and establishment of cover crops;
- 2) management of the trees; and
- 3) management of the tree-row middles and the permanent sod or cover crop.

The first program, initial site preparation and cover crop establishment, is very important to the future success of the orchard. It enables the grower to correct problems prior to setting the trees and enhance conditions that will benefit the growth of the trees.

Programs 2 and 3, management of the trees and tree-row middles, are interrelated and refer to the annual nutrient management of the orchard. As with several other perennial crops, orchard management may involve either broadcast applications of nutrients or individual tree fertilization. When broadcast applications are used, the nutrient and lime needs of the row middles, and therefore the permanent sod or cover crop, will be met and a separate management program for the sod is not required.

When an individual tree fertilization program is being used, it is necessary to follow a separate nutrient management program for the row middles to ensure that the permanent sod or cover crop will be properly limed and fertilized.

Performance Goals

Permanent stands of grass sod or other cover crops are used in orchards for several reasons: first, to establish optimum soil fertility for establishment of orchard stock and, after trees have been planted, to help prevent soil compaction, minimize erosion and runoff, increase water infiltration rates, reduce weed competition with the trees, conserve plant nutrients and make equipment movement through the orchard easier during wet periods.

Nutrient recommendations for orchard sod and cover crops, then, are designed to support establishment and longevity of the crop which will maximize the benefits listed above rather than to produce the maximum economic yield as a harvestable hay crop. Recommended nutrient rates, especially those for nitrogen (N), will be lower than for comparable crops grown for hay. Growers should use these nutrient recommendations along with field history data, tissue testing, knowledge of specific crop requirements, management plans, and conditions from the current growing season to develop an appropriate fertilizer program for the crop.

Soil pH and Liming

The target pH for orchard sod and cover crops on most Delaware soils is 6.5. Soils that are higher in organic matter ("black" soils) have a lower target pH (5.6) because organic matter moderates some of the effects of excessive soil acidity (e.g., aluminum toxicity). The lime recommendation for a specific field is calculated from the soil pH and

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buffer pH measurements using the steps outlined in *Calculating the Lime Requirement -- Chapter 3, Section 3.4*. Avoid overliming in order to prevent deficiency of micronutrients such as manganese or zinc.

In most cases, the lime requirement can be met by either calcitic or dolomitic limestone.

Dolomitic limestone is recommended if:

- soil test Mg is less than 50 FIVs, or
- soil test Mg is between 50 and 100 FIVs *and less than soil test Ca.*

Calcitic limestone is recommended if:

- soil test Mg is greater than 100 FIVs, or
- soil test Mg is between 50 and 100 FIVs *and greater than soil test Ca.*

Nitrogen Management

The nitrogen (N) requirement of sod or cover crops used in orchards is dependent upon stand establishment and composition. All stands should receive an application of N at seeding to aid in establishment. After seeding, stands consisting solely of grass species will require annual applications of N to support growth. Stands that include legumes, such as clover, will require less N once established than those dominated by grass. Over-application of N to stands high in legumes increases the competitiveness of the grass species and will result in loss of the legumes. *In orchards where broadcast fertilization of trees is practiced, separate N application to the sod or cover crops is not required.*

Table 1 gives a summary of recommended N rates for orchard sod or cover crops as a function of stand establishment and composition. At planting, the higher N rate should be used on sandier soils to compensate for greater leaching losses. That rate can be reduced or eliminated when planting into a legume cover or when manure has been applied prior to planting. To adjust N rates, see *Nitrogen Rate Adjustments -- Chapter 3, Section*

3.5.1.2. On established stands, N should be top-dressed in March or April of each year.

Table 1. Recommended N rates for orchard sod or cover crops.

Stand Status	N Rate
<i>Seeding:</i>	
	--- lbs / ac ---
Grass/legume mix	20 - 30
Ggrass only	25 - 50
<i>Established stand :</i>	
Grass/legume mix	0
Grass only	20-30

Phosphorus Management

Yield-limiting phosphorus (P) deficiency is rarely a concern on Delaware soils. Long-term applications of fertilizers and manures have resulted in P accumulations in many soils that are capable of supplying crop needs for many years with no further additions.

Adequate concentrations of soil test P are important to sod and cover crop growth and stand longevity. To determine whether P fertilization is necessary for a specific field, conduct a routine soil test. University of Delaware P recommendations for orchard sod and cover crops are dependent upon soil test P value, stand composition and establishment and orchard management practices. *In orchards where broadcast fertilization of trees is practiced, separate application of P to the sod or cover crops is not required.* In orchards where row-middles are managed separately, P should be top-dressed on sod or cover crops in March or April. A summary of P recommendations for orchard sod and cover crops on Delaware soils is given in Table 2.

Table 2. Phosphorus recommendations for orchard sod and cover crops.

Stand Status	P Index Value						
	0	10	20	30	40	50	60
	————— lbs P ₂ O ₅ / ac —————						
Seeding	100	80	60	45	35	25	20
<i>Later years:</i>							
Grass/legumes	100	80	60	45	35	25	20
Grass only	75	65	55	45	35	25	20

Potassium Management

Potassium (K) is very important to orchard sod and cover crop growth and longevity. The need for K fertilization of the site is best determined by the use of a routine soil test. Potassium recommendations for orchard sod and cover crops are dependent upon soil test K value, stand composition and establishment and orchard management practices.

In orchards where broadcast fertilization of trees is practiced, separate application of K to the sod or cover crops is not required. In orchards where row-middles are managed separately, K should be topdressed on sod or cover crops in March or April. A summary of K recommendations for orchard sod and cover crops on Delaware soils is given in Table 3.

When establishing a new field, K should be broadcast before or immediately after planting. Incorporating K by disking or plowing down will decrease potential salt effects from higher application rates.

Table 3. Potassium recommendations for orchard sod and cover crops.

Stand Status	K Index Value						
	0	10	20	30	40	50	60
	————— lbs K ₂ O / ac —————						
Seeding	100	80	60	45	35	25	20
<i>Later years:</i>							
Grass/legumes	100	80	60	45	35	25	20
Grass only	75	65	55	45	35	25	20

Calcium and Magnesium Management

Calcium (Ca) and magnesium (Mg) needs of orchard sod and cover crops are usually met through routine liming. *Magnesium application is recommended if the soil test Mg value is less than 38 FIVs.* If liming has been recommended, use dolomitic limestone to raise soil pH and increase soil Mg. If, however, liming is not necessary but Mg is still indicated, apply Mg as Mg sulfate or Mg chloride to increase soil Mg. Appropriate application rates are given below in Table 4.

Table 4. Application rates for soluble Mg as a function of Mg fertility index value.

Mg Index Value							
0	5	10	15	20	25	30	35 40
————— lbs soluble Mg / ac —————							
80	70	60	50	50	30	20	10 0

Other Nutrients

No other nutrients are known to be limiting to orchard sod and cover crops in Delaware.

Additional Information

See Soil Test Notes 1 (Appendix 7) and Extension Bulletin 40-R, *Commercial Tree Fruit Production Recommendations*, for additional information concerning nutrient management of orchard sod and cover crop production.