



U.S. Department
of Agriculture

Natural Resources Conservation Service

Jackson, Mississippi

April 2008

AGRONOMY TECHNICAL NOTE

MS- 05

Management and Timing of Application of Nutrients

| Table 1. Forage Crops | Nutrient Management Comment |
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| Nitrogen (N) for grasses | Apply all recommended P and K just prior to planting. Supplemental nitrogen fertilizer, of rates less than 30 pounds N/acre, can be applied in spring on cool-season grasses, and in the summer months on warm-season grasses to provide additional growth. |
| Pasturegrass w/Perennial annual legumes | Perennial or late-maturing annual legumes with summer grass annual pasture includes: white clover, red clover, arrowleaf clover, lespedeza, or subterranean clover with bermuda, dallis, or bahiagrass. Where legume covers less than 1/3 of the ground, apply 60 lbs of N per acre each time the forage is grazed down or cut for hay. For reseeding clover or clover seed harvest, apply 1 to 1 ½ lbs of Boron (B) per acre. Loss of stand is sometimes due to K deficiency. If the pasture is regularly cut for hay, apply an additional 30 lbs. of K per acre for each ton of hay harvested. |
| Perennial winter grass pasture | For perennial winter grass pasture (fescue and orchard grass), 50 lbs. of N and all of the P and K should be applied by September 1. Apply the remainder of the N in 2 applications; the first in February and the second in early-mid April. If the pasture is regularly cut for hay, apply an additional 30 lbs. of K per acre for each ton of hay harvested. |
| Temporary summer grass pasture | Temporary summer grass pasture refers to millet, johnsongrass, sorghum, sundangrass, and sorghum-sudangrass hybrids. Apply recommended P and K and 60 lbs of N per plant. Apply an additional 60-80 lbs. of N after forage is grazed or cut down. |

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| Perennial summer grass pasture | Perennial summer grass pasture includes: bahia, bermuda, and Dallisgrass. Apply all of the P and K and 60-80 lbs. of N before growth starts. Repeat the N application by mid-July if more growth is desired. Loss of stand is sometimes due to K deficiency. |
| Hybrid Bermudagrass hay | The P and K recommendations listed for year 1 assume that this is the establishment year. If the stand is already established, follow the recommendation for year 2 the first year. For established stands of improved varieties of bermuda hay, apply the recommended N, P, and K fertilizer before growth starts and an additional 60 – 80 lbs. of N after each successive cutting until the last cutting. In the establishment years, apply recommended P and K and 60 -100 lbs. of N before sprigging. Apply an additional 50 lbs. of N before August 1 if additional growth is desired. Loss of stand is sometimes due to K deficiency. Apply an additional 30 lbs. of K per acre for each ton of hay harvested. |
| Small grain for grazing | Small grain winter pasture, apply the recommended P and K with 60-80 lbs. of N at seeding. Apply an additional 60 -80 lbs. of N between mid- January and mid-February. In south Mississippi increase forage yield and more uniform distribution may be realized by 3 applications of N: 60-80 lbs. at planting; 60 lbs. December 1; and 60 lbs. February 15. These crops should not be grazed closer than 2-3 inches. |
| Forage legumes | For reseeding clover or clover seed harvest, apply 1 to 1.5 lbs. of boron per acre. |
| Annual legumes with ryegrass | Apply recommended P and K before seeding. When the legume gives less than 1/3 of ground cover, apply 60 lbs of N per acre in late winter or very early spring. Do not graze until grass is about 8 to 12 inches tall. Do not graze closer than 2-3 inches. If soil tests indicate L or M level for magnesium, use 10-20 lbs per acre of a magnesium source. |
| Perennial winter grass pasture w/Clover | Clover and winter perennial grass pasture includes: white clove, red clover, subterranean clover with fescue or orchardgrass. If legume covers less than 1/3 of the ground, apply 60 lbs. N in early fall and repeat if needed in early spring. For reseeding clover or clover seed harvest, apply 1 to 1.5 lbs. boron per acre. Orchardgrass is recommended only for north Miss. When both P & K Levels are medium, an application of 60 lbs. P and 60 lbs. K on alternate years is an acceptable alternative. |
| Pasture grass with annual legume | Annual legumes and summer grass pasture includes: crimson clover, annual lespedeza, arrowleaf clover, ball clover, or subterranean clover with bermuda, dallis or bahiagrass. Where legume furnishes less than 1/3 of ground cover, apply 60 lbs. of N per acre each time forage is grazed down or cut for hay. Loss of stand is sometimes due to K deficiency. If the pasture is regularly cut for hay, apply an additional 30 lbs. of K per acre for each ton of hay harvested. For reseeding clover or clover seed harvest, apply 1 to 1.5 lbs. boron per acre. If soil tests indicate L or M level for magnesium, use 10-20 lbs. per acre of a magnesium source. |
| Mixed grass hay | Apply recommended N, P and K before growth begins. Apply an additional 50 lbs. of N for each successive cutting until last cutting. Loss of stand is sometimes due to K deficiency; apply an additional 30 lbs. of K per acre for each ton of hay harvested. |
| Lespedeza hay annual | For annual lespedeza hay, apply the recommended P and K plus 1 to 1.5 lb. boron per acre in early spring. If soil test indicates L or M level for magnesium, use 10-20 lbs. per acre of a magnesium source. |

| Table 1. Forage Crops | Nutrient Management Comment |
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| Hybrid Bermuda | Test soil annually, since large amounts of fertilizer will gradually lower the soil pH and lime may be needed next year. Follow the fertilization dates of application listed above. Do not apply fertilizer before the first spring date or after the last summer date shown. |
| Tall Fescue | Tall fescue is not recommended in your area because it will die out during the hot summer months. The fertilizer recommendations listed above are guides if you decide to use this grass against our recommendation. |
| Tall Fescue | Tall fescue is a cool season grass for counties in north Mississippi.. Follow the dates of application shown for fertilization. Do not fertilize this grass during host summer weather. Raise mowing height to 2 to 3 inches during the summer months. |

| Table 2. Row Crops | Nutrient Management Comment |
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| Cotton | Use 50-60 lbs of Nitrogen (N) per bale of light texture soils (CEC \leq 7); use 60-70 lbs. of N per bale on medium textured soils (CEC 7-14); and use 70-80 lbs. of N per bale on clays (CEC 14-25). The yield goal must be realistic. Additional N will not increase yields unless N deficiency is the yield limiting factor. Phosphorus (P) and Potassium (K) may be applied in the fall if the soil CEC \geq 8, if the CEC \leq 7 apply all P and K at preplant. Increase the potash (K) by 50% if there is realistic probability of producing 2 or more bales an acre. A recommendation of 40 lbs. of K per acre with high soil test levels of K is suggested in order to maintain existing soil K levels. |
| Corn & Sorghum for silage | Phosphorus (P) and Potassium (K) may applied in the fall if the soil CEC \geq 8, if the CEC \leq 7 apply all P and K at preplant. If not then apply all P and K and 1/2 to 1/3 of the N as a preplant fertilizer. The remainder of the N should be applied as sidedress approximately 1 month later. If a winter legume cover crop (e.g. clover or vetch) is grown, decrease the recommended N rate to 30-60 lbs per acre, depending upon the condition of the cover crop. |
| Corn & Sorghum for grain | Phosphorus (P) and Potassium (K) may be applied in the fall if the soil CEC \geq 8, if the CEC \leq 7 apply all P and K at preplant. Apply .3 lbs of actual N per acre per bushel based on the realistic yield potential. If not then apply all P and K and 1/2 to 1/3 of the N as a preplant fertilizer. The remainder of the N should be applied as sidedress approximately 1 month later. |
| Corn, Irrigated 200 yield | Applicable to 200 bushel irrigated corn: All the P and K and one-half to one-third of the N should be used as preplant fertilizer. The remainder of the N should be applied as sidedress, approximately one month later or when the corn is 16 to 18 in. high. Apply 1.3 lbs of actual N per acre, therefore for 200 bushels of corn per acre then apply 260 lbs of actual N per acre. If soil tests indicate L or M level for magnesium, use 10-20 lbs per acre of a magnesium source. |
| Corn, Irrigated 200 yield (crop rotation) | Growers utilizing crop rotation should base supplemental fertility needs upon the crop with the highest nutrient demand in their rotation system. This may require another soil sample or a maintenance fertilizer application irrespective of a zero fertilizer recommendation for the current crop. |
| Corn, Irrigated 200 yield (nitrogen) | Nitrogen (Corn, Irrigated 200 yield) Comment. Apply 1.3 lbs. of actual N per acre, therefore for 200 bushels of corn per acre then apply 260 lbs. of actual N per acre. Corn or sorghum grown in fields following rice production or winter flooding/duck hunting often experiences severe phosphorus deficiency. The transition from a flooded environment to a dry soil reverts soluble ferrous phosphates to unavailable ferric phosphates. This ties up phosphorus in a form unavailable for crop uptake. |
| Corn (Zinc) | Use 2 to 3 lbs. zinc per acre for corn with a soil test zinc level of low |
| | Use 1 to 2 lbs. zinc per acre for corn with a soil test zinc level of medium |
| | Use 3 to 4 lbs. zinc per acre for corn with a soil test zinc level of very low. |
| Soybeans/Small Winter grain rotation | The recommended P and K should be applied in the fall. Where wheat follows soybeans, no preplant N is necessary; otherwise, apply 20-30 lbs. per acre at preplant. In late winter (Feb.) apply 80-100 lbs of N. Increase rates 20-30 percent on clay soils. |
| Soybeans (Molybdenum) | Soybeans-molybdenum: For top yields of soybeans, apply 1/2 to 1 ounce of sodium molybdate or equivalent annually per bushel of seed if the soil pH is below 7.0. |

| Table 2. Row Crops | Nutrient Management Comment |
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| Peanuts, Vines, Nuts removed | For Spanish peanuts, include 20 lbs. N per acre with P and K fertilizer. Apply 0.3 to 0.5 lbs. of boron per acre in the fertilizer or disease control spray. |
| Small grain (oats, wheat, rye) for grain | Subject to previous yield levels, the N rate can be increased to 80-100 lbs. for wheat and decreased to 60-80 lbs. for other grains. When recommended, P and K and 20-30 lbs. of N should be applied in the fall at or just prior to planting. The spring application of N, at the rate 80-100 lbs. per acre, should be applied in February. Increase N rates 20% to 30% on clay soils. If these crops are to be used for grazing, apply 60 lbs. or more N at planting. Apply the late winter N treatment when cattle are removed (on or about Feb. 1). |
| Rice | Generally, no lime is recommended for rice production regardless of the soil pH. If rice is grown in rotation with soybeans and lime is recommended, a minimum amount of lime (1 ton) should be used for soybeans. N fertilizer is applied based rice variety being grown: $\frac{1}{2}$ - $\frac{1}{3}$ before permanent flood. Apply the other $\frac{1}{2}$ - $\frac{1}{3}$ actual N at mid-season. On soils which have been cut 12 or more inches (land leveled), an additional 40 lbs. P per acre may be beneficial during the initial year after the cut was made even though the soil test may indicate an adequate amount. |
| Rice (Zinc) | Use 2 to 3 lbs. zinc per acre for rice with a soil test zinc level of low. |
| | Use 1 to 2 lbs. zinc per acre for rice with a soil test zinc level of medium. |
| | Use 3 to 4 lbs. zinc per acre for rice with a soil test zinc level of very-low |

| Table 3. Vegetable Crops | Nutrient Management Comment |
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| Commercial Sweet Corn | Phosphorus (P) and Potassium (K) may be applied in the fall if the soil CEC \geq 8, if the CEC \leq 7, apply all P and K at preplant. If not then, apply all P and K and 1/2 to 1/3 of the N as a preplant fertilizer. The remainder of the N should be divided into two sidedress applications: first, when the plants are 8-10 inches tall, and a second application when the plants are 18 inches tall. On deep, sandy soils and on acid soils that have been recently limed to pH 6.0-6.5, apply 3 lbs of zinc per acre as a preplant fertilizer. |
| Commercial Sweet Corn | Use 1 to 2 lbs. zinc per acre for corn with a soil test zinc level of medium |
| | Use 2 to 3 lbs. zinc per acre for corn with a soil test zinc level of low |
| | Use 3 to 4 lbs. zinc per acre for corn with a soil test zinc level of very low. |
| Commercial Field Tomatoes | The per acre rate, when divided by 40, gives the approximate rate per 1000 sq ft. Apply the P and K and 1/2 of N as a preplant fertilizer. Use the remaining N as a sidedress when the first fruits are set. If blossom end rot has been a problem, supply Calcium (Ca) in the form of 500 lbs. per acre of gypsum. |
| Commercial Blueberries | Blueberries usually respond best to a moderate fertilization program. The rate of fertilizer per acre is therefore recommended for mature bearing plants. The commercial fertilizer rate should be reduced proportionately for smaller, younger crops. The crop should be established on an acid soil. Soils with a pH of 4.5 to 5.5 usually promote the best growth. Flour sulfur (finely ground rock sulfur, dusting sulfur, or soil sulfur) applied at the rate of 10 lbs.1000 sq ft (800 lbs/acre) may be applied on medium textured soils to lower the pH. Apply 1/3 to 1/2 of the N and all of the recommended p and K at early bloom. Apply the rest of the N as side-dress about six weeks later. An additional application of N may be used if general plant growth and vigor are poor. |
| Commercial Sweet Potatoes | For sweet potatoes, apply all recommended N, P, and K in a preplant application, sidedress with 25 - 50 lbs. N when vines begin to run. If there is a history of high percentages of jumbo potatoes, reduce the N rate by 25-30 percent. If lime is recommended, and the field has been planted to sweet potatoes within the past few years, it may be desirable to apply reduced rates of lime to assist in controlling the potato soil rot disease. An application of 1/2 the suggested lime rate will generally keep the soil pH below 5.8. |
| Watermelons, Cucumbers, Squash, Pumpkins, Melon | **No recommendations are given for years 2 and 3 because the crops should not be grown in succession.** For watermelons, muskmelons, cantaloupes, squash, cucumbers, and pumpkins, 80 lbs. N and all the recommended P and K should be used in a preplant application. Sidedress with 25-50 lbs. N when vines begin to run. For cucumbers up to100 lbs. of N may be used with the P and K in preplant application. For pumpkins, reduce the N to be used with the P and K fertilizer to 25-50 lbs. for the preplant application. If blossom end rot has been a problem, supply calcium in the form of 500 lbs. of gypsum per acre. |
| Sunflower | Applicable to sunflowers grown for grain. All the P and K and half the N should be used as a preplant fertilizer. The remainder of the N should be applied as a sidedress approximately 1 month later. |

| Table 4. Trees & Shrubs | Nutrient Management Comment |
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| Commercial Pecans | For mature bearing pecan trees, apply recommended fertilizer broadcast in February. For younger trees, apply ½ lb. of N per inch of diameter per tree and equal amounts of P and K (if these elements recommended) per year of tree age. Full benefit from pecan orchard fertilization will not be obtained unless a good spray program for disease control is followed. |
| Nut trees | Fertilizer should be applied in mid-Feb in south Miss., early-March in central Miss., and mid-March in north Miss. Apply the recommended fertilizer or lime in a circle starting about 1 foot from the trunk and extending outward to the dripline. Mature bearing trees should make annual terminal growth of 5 to 12 inches. Younger trees should grow 12 to 24 inches per year. Vary N rates to obtain desired tree growth. Zinc should be applied at 1 lb. zinc per 1000 sq ft if zinc level is VL; apply 0.8 lb. of zinc per 1000 sq ft if Zn level is L; and 0.5 lb. of zinc per 1000 sq ft if Zn level is M. Full benefits of fertilization will not be obtained unless diseases and insects are controlled. The above fertilizer recommendations are based on a 1000 sq ft area. If a per tree recommendation is desired, calculate the area of the tree root zone and adjust the recommendations accordingly. |
| Pine trees | Pine trees generally do not respond to P and K fertilizers. Use about 35-45 lbs. of N per acre per year if weeds are clipped. |
| Pine tree seedlings | Lime should be applied during the cover crop season. If lime must be applied prior to growing seedlings, allow 3 months for reaction to occur. Generally, 25 lbs. of N at seedbed preparation or prior to planting should be adequate. Sidedress N (no more than 100 lbs. ammonium nitrate) at the nurseryman's discretion. All organic matter type of materials should be applied during or prior to cover crop season. If Mg < 1.76% saturation is in the low category, then apply "sul-po-mag" (sulfate of potash-magnesia) at a rate of 300 lbs. per acre which is equivalent to 100 lbs. of Muriate (60% K ₂ O). |
| Pine Trees (loblolly pines) | Best growth of loblolly pines is on moderately acidic soils (Soil pH 4.5-6.5). At the time of planting, a soil test of at least 5 lbs. P per acre is adequate for production; therefore, an application of P fertilizer may not be cost effective. Pines generally do not respond to K fertilizer. After a thinning, apply 150 lbs. of N and 60 lbs. of P fertilizer per acre. Weed control is essential. For more information access the MSU Extension Forestry Dept. web site at http://www.ext.msstate.edu/anr/forestry/forestmgmt/html . |
| Deciduous, Acid-loving trees & shrubs | Do not fertilize newly transplanted trees and shrubs for at least 4 weeks after planting. Apply recommended fertilizer uniformly over the root zone, starting about 6 inches from the trunk and extending 1 to 2 feet beyond the ends of the outer branches. Water thoroughly. If the soil pH is above 6.0, apply 20 lbs. of finely ground sulphur per 1000 sq ft. If the soil pH is above 6.5, apply 30 lbs. of sulphur per 1000 sq ft. If the soil pH is above 7.0, apply 40 lbs. sulphur per 1000 sq ft. Water the sulphur thoroughly into the soil. |
| Evergreen, Non-acid-loving trees & shrub | Do not fertilize newly transplanted trees and shrubs for at least 4 weeks after planting. Apply recommended fertilizer uniformly over the root zone, starting about 6 inches from the trunk and extending 1 to 2 feet beyond the ends of the outer branches. Water the fertilizer thoroughly into the soil. |

Source: Mississippi State University Extension Soil Testing Laboratory Recommendations Manual