Effective Food Plots for White-Tailed Deer in Alabama

Photo by Tess R. Jolly

By Chris Cook and Bill Gray
Wildlife Biologists

Alabama Department of Conservation and Natural Resources
Division of Wildlife and Freshwater Fisheries

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Cover photo by Tes Randle Jolly.

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Introduction

Of all the management practices available for improving white-tailed deer habitat, none is more popular in Alabama than planting agricultural crops in food plots. Millions of dollars are spent on growing agricultural crops for deer each year. Historically, most food plots were planted with small grains in the late-summer or early-fall. These food plots were planted primarily to attract deer to the gun or bow during hunting season. Food plots now are an integral part of many intensive deer habitat management programs. Today, more and more deer hunters and deer managers plant food plots for reasons other than hunting only. Cool-season food plots are planted with highly nutritious crops to help deer through nutritionally stressful periods. Warm-season crops are planted to provide high-protein, high-quality food during the antler growing and fawn producing periods of spring and summer. Warm-season crops also are planted to help deer through the nutritionally stressful late-summer/early-fall period.

Food plots planted for deer also benefit many other species of wildlife. In addition to the obvious increase in food production, food plots increase habitat diversity in forested landscapes by creating openings and edge in areas where they normally would not exist. The openings and edges created by the food plots allow plants that normally cannot survive in a forested landscape to flourish. Soil disturbance, fertilization, and liming associated with preparing and planting food plots for deer also enhance the quality and types of native plants that grow along the food plot edges. Many of the native plants that grow along the edge of food plots provide feeding, nesting, and brood-rearing habitat for wild turkeys, bobwhite quail, and many other game and non-game species of wildlife. Regardless of the intended purpose of food plots, planning and preparing for planting food plots for deer ahead of time provide the most benefit for your investment.

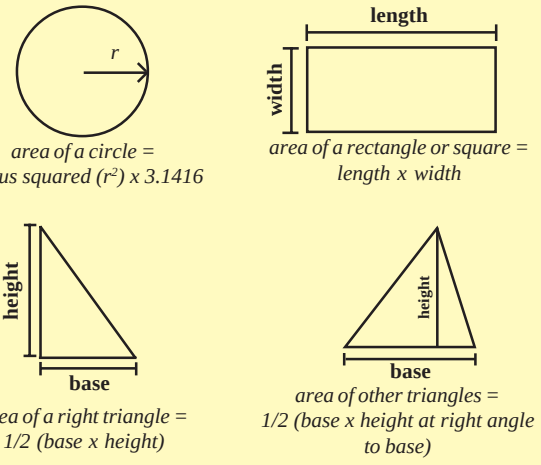
Location and Size

The first thing to decide before planting is where to plant. On many properties, the options are limited. Small log-loading decks, turn-arounds on dead end roads, or utility company rights-of-way may be the only options. In cases where space is limited, it is best to plant all possible areas in the fall. In these situations, planting numerous small food plots probably will not provide much food for the deer, but these small areas may increase the number of deer sightings and the chances of reaching established harvest goals.

Planting agricultural crops for deer can be an important component of an overall deer management program. These crops also enhance the habitat of many other game and non-game wildlife species.

Disperse plantings evenly over the property if the number and location of food plots are not limiting. Planted food plots should be located away from public roads and property lines. This lessens the chances of poaching in these areas. It also reduces the number of confrontations with neighbors who like to hunt on the property line. Irregularly shaped food plots are preferred where practical. These irregularly shaped food plots

FIGURE 1: Estimating the Size of Food Plots



area of a circle = radius squared (r^2) x 3.1416

area of a rectangle or square = length x width

area of a right triangle = 1/2 (base x height)

area of other triangles = 1/2 (base x height at right angle to base)

have more edge than a square or circular food plot of the same size and should get more use since deer tend to feed close to the edge of most open areas.

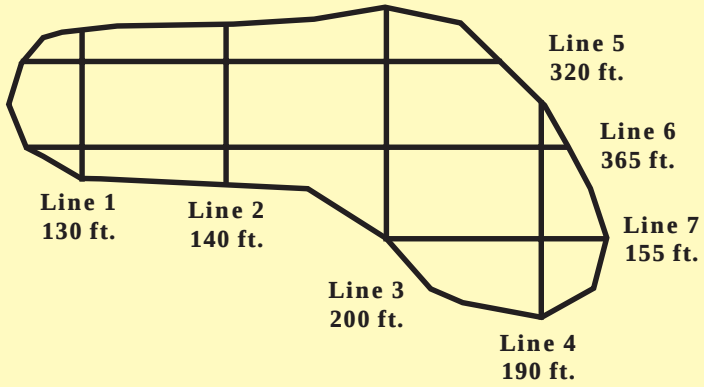
A typical winter in Alabama is very wet. For this reason, food plots planted with cool-season crops should be located in well-drained areas. Very few crops commonly planted in the fall for deer can survive prolonged periods of flooding. Flooding also makes these food plots useless for hunting. Upland sites usually are great locations for fall and winter plantings.

On the other hand, summers can be very dry in Alabama. Food plots planted during the spring and summer should be located on sites that retain some soil moisture, even during the dry times. Upland sites should be avoided during this time because they generally are the driest areas during the summer.

Other factors that determine the number and size of food plots are the purpose of the plantings and the time of year the food plots are planted. Food plots planted solely to attract deer during hunting season do not have to be numerous or big. Under the right situation, a one-half acre food plot placed in the right location and planted with the right crop works well. If the purpose of the plantings is to provide a supplemental food source for the deer, then larger, more numerous food plots usually are better. To get the most nutritional benefit out of food plots, a minimum of two percent of the total acreage of a property should be planted with high-quality cool and warm-season crops. For example, a 2,000-acre tract should have at least 40 acres of planted food plots evenly distributed over the property. Even one percent or less of an area planted in high-quality crops improves deer diets and enhances reproduction, body growth, antler development, and harvest.

It is important to determine a reasonable estimate of each food plot's total acreage. This is important when determining seeding and fertilization rates. Under estimating or over estimating food plot size results in too much or too little seed and fertilizer being put on the ground. This wastes money that could be used for other habitat management practices or results in poor crop establishment and production. Acreage can be estimated by measuring the food plots by using pacing, a tape measure, or a laser rangefinder. A square or rectangular food plot is the easiest to measure, but round and triangular shaped food plots also can be estimated. Formulas for calculating acreage of several common shapes are shown in **FIGURE 1**. Remember, one acre is equal to 43,560 square feet. This is an area approximately

FIGURE 2: Estimating the Size of Odd-Shaped Food Plots

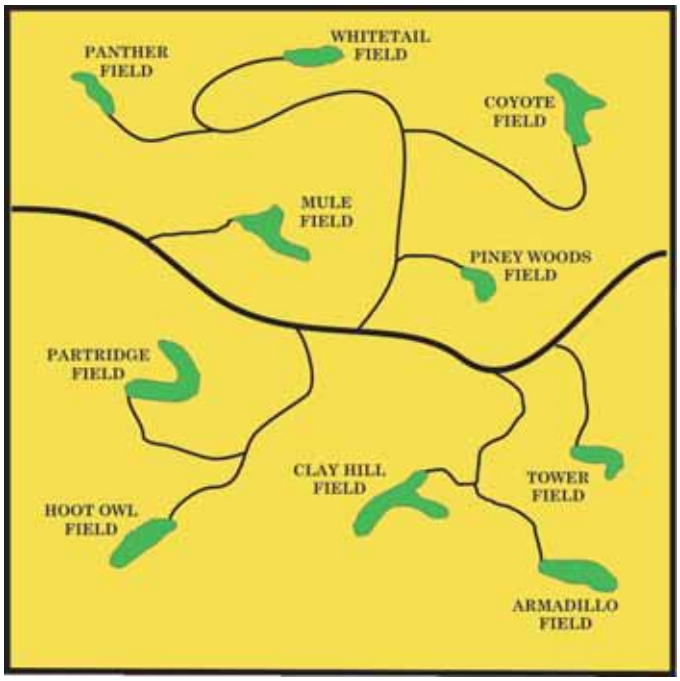


average width = (sum of lines 1-4) divided by 4
average length = (sum of lines 5-7) divided by 3
estimated acreage = (average width x average length) divided by 43,560

average width (130 ft. + 140 ft. + 200 ft. + 190 ft.) / 4 = 165 ft.
average length (320 ft. + 365 ft. + 155 ft.) / 3 = 280 ft.
estimated acreage (165 ft. x 280 ft.) / 43,560 = **1.06 acres**

209' X 209' or 300' X 145'.

Unfortunately, estimating food plot size is not always this simple. Most food plots are odd shaped and require a little more work to determine their size. Measure the food plot's width at several different points parallel across the food plot and then calculate an average width in feet. Take more measurements on larger food plots. Do the same thing to determine an average length. Multiply the average width by the average length and divide by 43,560 to determine the total acreage. In **FIGURE 2** (page 2), the average width of the food plot is 165 feet and the average length is 280 feet, so the estimated acreage is 1.06 acres. Many GPS units have features that calculate acreage. This makes measuring any shape easy.



Evenly distributing well-prepared and managed food plots throughout a property ensures all deer have equal access to high-quaility food.

Cool-Season Considerations

Most cool-season food plots are planted to attract deer to the gun or bow. Food plots and the areas surrounding the food plots provide the primary and often only huntable locations on some properties. This especially is true on properties with extremely thick cover and very little visibility. Even on properties with more options for hunting stand locations, increased deer activity in and around food plots can increase the number of deer sightings and improve hunter success. This is true even for relatively small food plots (i.e., one-half acre or less). Small food plots can attract deer on a consistent basis, particularly later in the season as other food sources become scarce.

Some consideration must be given to the number of hunting food plots planted in the fall. If hunting near or in food plots is the primary hunting strategy and the number of food plots available to plant is not limited, plant fewer hunting food plots. Limiting the number of hunting food plots increases the chances of attracting deer to a specific food plot. Plant these food plots with crops that actively grow and attract deer during the hunting season. Crops such as small grains (e.g., wheat, oats, rye, and triticale), winter peas, and the various Brassica species (e.g., rape, turnips, kale) are excellent choices for hunting food plots. These crops reach their peak production during mid-winter (November-January) and are highly attractive to deer during this time.

If feeding and not attracting deer for hunters is the primary objective of cool-season crops plant as many acres as possible. Attracting deer to a specific food plot is not as important as having an adequate supply of high-quality food during the nutritionally stressful late-winter/early-spring period. Most areas have very little naturally occurring foods remaining by mid-winter. Also, deer have lost much of their fat reserves developed in the fall at this time. This is particularly true for bucks during the post-rut period. High-quality food plots planted with highly palatable and digestible crops can be important in helping deer stay in good condition and even survive until the flush of new growth of naturally occurring foods arrives at spring green-up.

As a rule, most food plots planted during the cool-season should be one to three acres. Crops typically planted during the cooler months can handle a substantial amount of grazing pressure. A two-acre food plot planted with the right combination of crops can produce a great deal of forage for eight or more months during the fall, winter, and early-spring months.

Warm-Season Considerations

Before considering a warm-season planting program, deer managers should realize such an endeavor requires considerable acreage. The one-half to one-acre food plots common with most cool-season plantings do not provide the necessary acreage to ensure a successful warm-season crop. Although deer densities vary from one location to the next, it is rare that warm-season food plots of less than three acres yield desired results on any property. Because most warm-season plantings are highly preferred by deer, larger food plots are required to ensure that a significant portion of the crop persists to maturity. Smaller food plots eaten down in a matter of days, or even weeks, provide no real benefit in terms of nutritional enhancement. The whole idea of warm-season food plots is to provide access to high-quality forage on a sustained basis. If these acreage requirements cannot be met (i.e., food plots ≥3 acres), engaging in a warm-season planting program often is a waste of time and money.

In areas of higher deer densities, use of a reversible or "plot saver" type fence may be required to establish warm-season crops in food plots less than three acres. Companion plants, such as corn, grain sorghum, or sunflowers, provide some relief from early grazing pressure and serve as growing platforms for many forage plants, such as lablab and cowpeas. In nearly all of these situations, reducing the deer population to a level compatible with the habitat is a much wiser management practice than planting warm-season food plots.

At least one three-acre or larger warm-season food plot per 160 acres is necessary to provide maximum nutritional benefit to all deer on a property. Food plots should be evenly distributed across the property on a food plot per 160-acre grid (quarter section). If possible, warm-season food plots should be used exclusively for warm-season plantings and not double cropped with cool-season plantings.

As with anything, the final determining factors on the size and number of food plots to plant are available time and money. If time and money are not limiting, plant as many acres as practical with the most productive plants available. If time and money are limiting, decide which food plots produce best and plant these with highly productive, highly nutritious crops. The benefits may not be as substantial as when time and money are not limiting, but even a few food plots of adequate size are better than none at all.

Preparing to Plant

Soil Testing

Once the locations of the food plots are established, soil samples should be taken from each area to be planted and sent to a soil testing lab for analysis. A soil test determines how much lime and fertilizer is needed to grow a specific crop to its maximum potential. Soil tests should be conducted at least every two years. Tremendous amounts of nutrients are removed from the soil each year by the growing plants and by leaching due to rain.

Taking a soil sample is an easy task. The only materials needed are a shovel or soil probe, a clean bucket, and boxes or bags to ship the samples. Boxes often are available at no cost from the county extension office or at many feed and seed stores. Take the sample using the shovel or soil probe. The

Take subsamples from the top six inches of soil using a soil probe or shovel. Take subsamples from all portions of the food plot. **CHRIS COOK**

Mix the subsamples and then take one sample from the mixed subsamples (top photo). Make sure each soil sample is properly labeled with the food plot's name and the crop to be planted before sending it to the soil-testing lab (bottom photo). **CHRIS COOK**

sample should come from the top six inches of soil in each food plot to be planted. This is the region where the roots of the crops will grow. Make sure the sample is free of grass and other vegetation. This added material affects the test results.

On small food plots (one-half acre), it is okay to take the sample from one spot in the food plot, but on larger food plots (one acre or larger), several subsamples taken from many locations within the food plot are needed to make sure the lime and fertilizer recommendations are accurate. Soil types and fertility can vary from one end of a large food plot to the other. Taking only one sample from this food plot can give inaccurate test results. Subsamples from larger food plots should be mixed together in a clean bucket and one sample from the entire food plot should then be taken from these mixed subsamples. On food plots three acres or larger, two or three samples may be needed to get an accurate report from the soil testing lab.

Place approximately 1-1/2 to 2 cups of the soil in a container (e.g., cardboard box, paper bag) suitable for shipping to the soil testing lab. Label the sample with the name of the food plot and the crop to be planted. If more than one food plot is tested and their locations or names are not written on the samples, it will be impossible to match test results with the source food plot. Different crops have different pH and nutrient requirements. Make sure the crops to be planted are indicated on the container so the lab can make the correct recommendations.

Most soil testing labs charge a small fee (<$10 per sample) for their services, but some of the larger feed and seed stores provide free or reduced cost soil tests to their customers. **APPENDIX 1** (page 28) lists contact information for some soil testing labs in the Southeast. Regardless of the costs, taking soil samples and getting soil tests for each food plot are two of the most cost efficient things that can be done prior to planting. Knowing exactly how much lime and fertilizer to apply maximizes the productivity of each food plot, which saves money in the long run.

Interpreting Soil Test Results

Once soil test results are received, it may be necessary to get some assistance with interpreting the recommendations. Most test results give recommendations as tons of limestone per acre and pounds of nitrogen (N), phosphorous (P), and potassium (K) per acre. For many people, the confusion comes from the recommendations and the way fertilizers are labeled. Commercial fertilizers are labeled to indicate the *percentage* of N (first number), P (second number), and K (third number) in each

FIGURE 3: Example of Report from Soil Testing Lab

REPORT ON SOIL TESTS
AUBURN UNIVERSITY
SOIL TESTING LABORATORY

NAME JOE HUNTER
ADDRESS 123 MAIN STREET
CITY MONTGOMERY, AL 36130

COUNTY MONTGOMERY
DATE 7/1/05

				SOIL TEST RESULTS					RECOMMENDATIONS			
LAB No.	SENDER'S SAMPLE DESIGNATION	CROP TO BE GROWN	SOIL* GROUP	pH**	Phosphorous P***	Potassium K***	Magnesium Mg***	Calcium Ca***	LIME-STONE	N	P_2O_5	K_2O
					Pounds Per Acre				Tons/Acre	Pounds Per Acre		
2002	PANTHER FIELD SEE COMMENTS 4 and 224	WHEAT/OATS	1	5.7	VH 121	L 33	H 72	350	1.0	100	0	70
2003	PANTHER FIELD SEE COMMENTS 4, 224, and 7	CLOVER	1	5.7	VH 121	L 33	H 72	350	1.0	0	0	130

COMMENT NO. 4: On grass legume mixtures, apply 60 pounds of N in early spring unless no additional forage growth is needed or the legume occupies one-half or more of the ground cover.

COMMENT NO. 224: Soil acidity (low pH) can be corrected with either dolomitic lime or calcitic lime.

COMMENT NO. 7: For reseeding clover, or clover seed harvest, apply 1 to 1.5 pounds B (boron) per acre.

FINAL COMMENT: As a precautionary measure, consider applying 10 lb. sulfur per acre per year. Mixed fertilizers often contain enough sulfur to apply this amount.

* 1. Sandy soils (CEC<4.6 $cmol_c kg^{-1}$)
2. Loams and Light clays (CEC=4.6-9.0 $cmol_c kg^{-1}$)
3. Clays and soils high in organic matter (CEC>9.0 $cmol_c kg^{-1}$)
4. Clays of the Blackbelt (CEC>9.0 $cmol_c kg^{-1}$)

** 7.4 or higher - Alkaline 6.6-7.3 - Neutral 6.5 or lower - Acid 5.5 or lower - Strongly Acid

*** Extractable nutrients in pounds per acre

bag of fertilizer. A 50 lb. bag of 13-13-13 fertilizer contains 6.5 lbs. of N, 6.5 lbs. of P, and 6.5 lbs. of K. On the other hand, soil test results give recommendations as *pounds* per acre. In **FIGURE 3** (above), the soil test report for the Panther Field sample recommends an application of 100 lbs. of N, 0 lbs. of P, and 70 lbs. of K per acre if only wheat and oats are planted (Lab Number 2002). An application of 300 lbs. of ammonium nitrate (34-0-0 fertilizer) and 120 lbs. of muriate of potash (0-0-60 fertilizer) per acre will yield 102 lbs. of N and 72 lbs. of K per acre. This fertilizer application will meet the recommended rates for N, P, and K. If only clover is planted (Lab Number 2003), the test results recommend an application of 0 lbs. of N, 0 lbs. of P, and 130 lbs. of K. An application of 220 lbs. of muriate of potash (K) per acre is all that is needed to meet the fertilizer needs of clover on this food plot. The pH for this food plot is 5.4. The soil-testing lab recommends applying one ton of dolomitic or calcitic lime per acre to correct the soil pH.

In addition to recommendation for N, P, K, and limestone, recommendations for secondary nutrients, such as calcium (Ca), magnesium (Mg), and sulfur (S), and micronutrients, such as boron (B), manganese (Mn), zinc (Zn), and copper (Cu), also may be given on soil test results. These recommendations usually appear as comments attached to the

soil test results. Recommendations for these nutrients most often are expressed in pounds per acre. In **FIGURE 3** (page 6), the soil testing lab recommends adding 10 lbs. of sulfur per acre as a precautionary measure. Sulfur can increase yields and nitrogen use efficiency in some crops. Most complete fertilizers, such as 13-13-13, contain enough sulfur to cover this recommendation. High analysis fertilizers, such as 34-0-0 and 0-0-60, usually do not have this much sulfur as a component, so adding sulfur is a good idea. In **FIGURE 3** (page 6), the soil testing lab also recommends adding 1.0 to 1.5 lbs. of boron (B) per acre if reseeding clovers, such as crimson clover and arrowleaf clover, are planted. Adding boron improves seed production in these crops, which reduces future planting costs. Alfalfa requires slightly more boron (3.0 lbs. per acre) for adequate seed production. Farmers' co-ops and most seed and fertilizer dealers can provide further assistance with interpretation of soil test results.

Lime and Fertilizer

To get the most production from a crop, it is very important to follow the lime and fertilizer recommendations exactly. Skimping on lime and fertilizer results in wasted money and crops that do not produce to their potential. Of the two, the most benefit is gained from adding the recommended amount of lime to raise the soil pH to the recommended level. Having the soil pH in the optimum 6.5 to 7.0 range enables plants to utilize a much larger percentage of the available soil nutrients than when the soil pH is more acidic (see **FIGURE 4**) or basic.

Apply lime well in advance of planting. Apply the lime three to six months ahead of time to give the lime adequate time to affect the soil's chemistry and increase the soil pH. Since lime is typically applied in the form of limestone, several thousand pounds per acre often are required to correct soil pH. It is best to have the product applied with a spreader truck or with a spreader buggy pulled behind a tractor. Distributing limestone with a normal seed/fertilizer spreader on a farm tractor may be necessary on harder to access food plots, but this method can be very labor intensive. The limestone can be applied to either plowed or unplowed food plots, but plowing it in after application enables it to work faster.

Other sources of lime, such as hydrated lime or pelletized lime, are available for correcting soil pH. Many of these products are more convenient than limestone since they can be applied with smaller equipment in areas inaccessible to a spreader truck or tractor and spreader buggy. The recommendations for lime on soil test results are given for limestone, which has a calcium carbonate equivalent (CCE) of 100. Pelletized lime has a CCE of 100 and can be applied at the same rate as limestone. Some of the other forms of lime have a CCE much higher than 100 and do not require as much product to raise the soil pH. For example, quick lime or burnt lime has a CCE of at least 140 and hydrated lime or builder's lime has a CCE of at least 110. Divide 100 by the CCE of the product being used and multiply

FIGURE 4: Percentage of Soil Nutrients Not Available to Plants in Acidic Soils

Soil Acidity	Nitrogen Not Available	Phosphorous Not Available	Potassium Not Available
Extremely Acid 4.5 pH	70%	77%	67%
Very Strong Acid 5.0 pH	47%	66%	48%
Strongly Acid 5.5 pH	23%	52%	23%
Medium Acid 6.0 pH	11%	48%	0%
Neutral 7.0 pH	0%	0%	0%

Figure 4 shows the high percentage of soil nutrients tied up by low pH soils. Low soil pH prevents plants from utilizing soil nutrients as they should.

The easiest and quickest way to apply lime is with a large-capacity buggy or spreader truck. These are available at most agricultural supply stores and farmers' cooperatives. **CHRIS COOK**

it by the limestone recommendation of the soil test report to determine the amount of these products needed to equal the recommended amount of limestone. For example, if a soil test recommends 2 tons (4,000 lbs.) of limestone per acre, only 3,200 lbs. of a product with a CCE of 125 is needed [(100/125) x 4,000 lbs./acre = 3,200 lbs./acre]. Consult with someone knowledgeable in this field, such as a county extension specialist or someone at an agriculture supply center, before using these products.

Apply fertilizer at the time of planting. Fertilizer is easily applied with a spin-type seed/fertilizer spreader or a spreader buggy. Using the smaller spin-type spreader allows better control of fertilizer distribution than the buggy and generally works best on average-sized food plots.

Plow, disc, or till the fertilizer into the soil before applying the seed for best results. Some components of fertilizer, for example phosphorous, are not mobile in the soil. They need to be distributed in the root region of the soil (the top four to six inches) to improve utilization by the plants. Allowing the fertilizer to remain on the soil surface leaves most of these immobile components out of reach of the plant roots. Plowing, discing, or tilling too deep also puts much of the fertilizer out of the plant's reach.

Tillage Considerations

Preparing a firm, smooth seed bed is essential for a good food plot. A good seed bed improves seed to soil contact, improves seed germination, and leads to better crop establishment. This all results in better forage production.

Seed bed preparation starts with the removal of existing vegetation. Mowing or bush-hogging existing vegetation just prior to plowing is the most common way to accomplish this. The biggest problem with mowing just prior to planting is the layer of freshly-cut green vegetation makes it difficult to get adequate soil disturbance with the type of farm implements used by most hunting clubs and small landowners. A very heavy disc harrow can cut and bury the vegetation sufficiently, but most food plots for deer are prepared using relatively light equipment. Mowing vegetation two weeks ahead of discing or tilling allows enough time for much of the mowed vegetation to decay and break down. This

Applying a broad-spectrum herbicide, such as glyphosate, well ahead of planting makes plowing and preparing a proper seed bed easier. **CHRIS COOK**

makes discing or tilling easier than discing or tilling immediately after mowing.

Another method to make discing or tilling easier, even with smaller and lighter farm implements, is to spray the existing vegetation with glyphosate herbicide (e.g., Roundup®, Glypro®, Gly-Flo®) at la-

beled rates one month or more before mowing, tilling, or planting. Glyphosate kills the growing grasses and broadleaf plants. Only dry brittle plant material remains at planting time. In many instances, mowing is not necessary prior to tilling, but closely mowing the dead vegetation makes tilling the soil with a disc harrow more effective. Closely mowing the dead vegetation also prepares food plots for planting with a no-till planter. Plowing, discing, or tilling the top four to six inches of soil is adequate for most cool-season food plots, since most cool-season crops (e.g., small grains, clovers) are shallow-rooted.

Warm-Season Considerations

Unlike most cool-season crops, many high-quality warm-season forages are deep-rooted plants. Deep roots enable these plants to hold up better under droughty conditions. The presence of a hardpan prevents these plants from establishing deep root systems. A hardpan forms over time under the stresses of compaction. Compaction can be the result of frequent use of heavy farm or logging equipment, or even cattle trampling the ground over a period of time, such as in a pasture. In these situations, a disc harrow alone is not a sufficient way to till the soil. Deep tillage often is necessary to break up a hardpan and provide optimum growing conditions for these warm-season forages. There are several options/implements available for this task.

Subsoiler

This implement shatters any hardpan and rips from 14-20 inches deep. One drawback of a subsoiler is it requires a fairly large tractor (i.e., 40-50 hp per shank). Depending on the amount of tractor traffic on a food plot, this operation should be performed every other year.

Chisel Plow

A chisel plow breaks up some hardpan and penetrates 12-15 inches deep. It requires less hp than a subsoiler. Generally, 20-30 hp per shank is sufficient to operate this implement. On average, this implement does not fracture hardpans like a subsoiler, but it does fracture the soil well enough, breaks up clods, and opens up the soil. It is a good all around deep tillage implement. One drawback of the chisel plow is it can actually enhance weed growth. It is recommended that any new ground to be chisel plowed be sprayed with glyphosate herbicide (e.g., Roundup®, Glypro®, Gly-Flo®) at labeled rates prior to plowing.

A moldboard or bottom plow deeply buries unwanted weed seed and prevents them from germinating. This helps reduce future weed problems. **CHRIS COOK**

Moldboard Plow/Bottom Plow

A moldboard or bottom plow **does not** fracture any hardpan that may be present. However, it serves to bury weed seeds deep enough to prevent them from germinating and is one of the best methods for cleaning up "dirty" food plots. Soil moisture must be right to properly use a moldboard or bottom plow. If the soil is too wet, this operation produces a food plot of wet clods and if the soil is too dry, this operation produces a food plot of dry clods. Proper soil moisture is more critical in heavy loams or clays—sandier soils tend to be more forgiving. At least 25 horsepower (hp) per plow is necessary for proper operation. Soil test **after** using a moldboard or bottom plow, as low-pH soils may be brought to the surface during this operation.

What to Plant

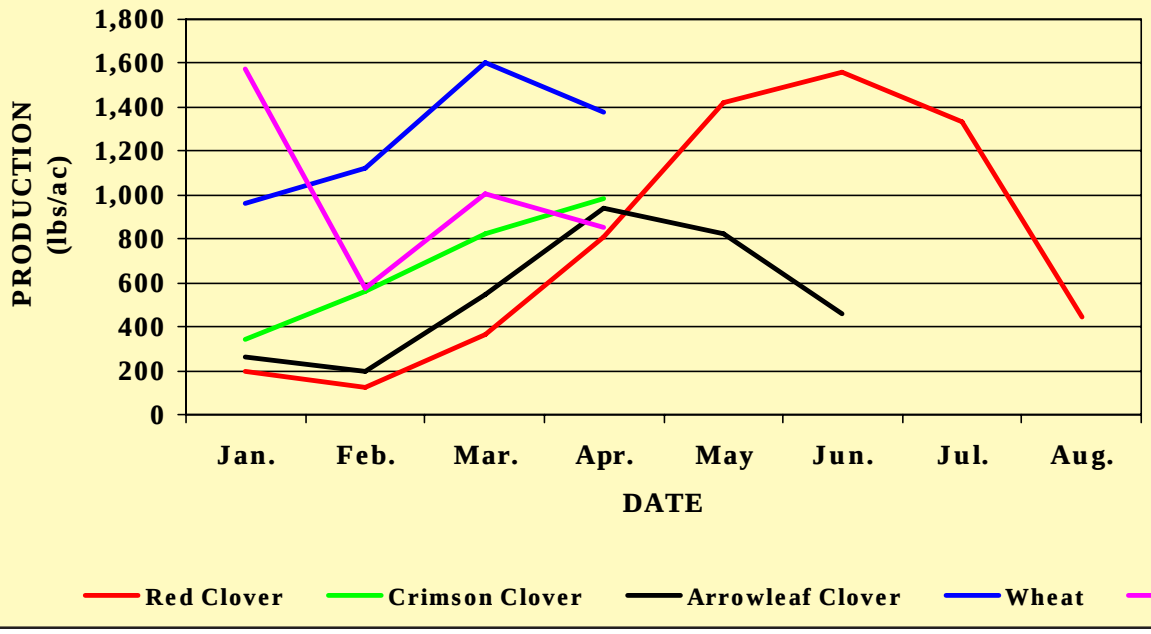
Just as the decision of size and number of food plots depends on the purpose of the plantings, the decision of what species to plant also depends on the purpose and timing of the plantings. Cool and warm-season plantings both must be attractive and easily digestible, contain adequate levels of protein and energy, and produce enough tonnage of palatable vegetation/seeds to warrant the expense of planting. In addition, each period (cool and warm-season) has specific considerations deer managers should address before, during, and after planting.

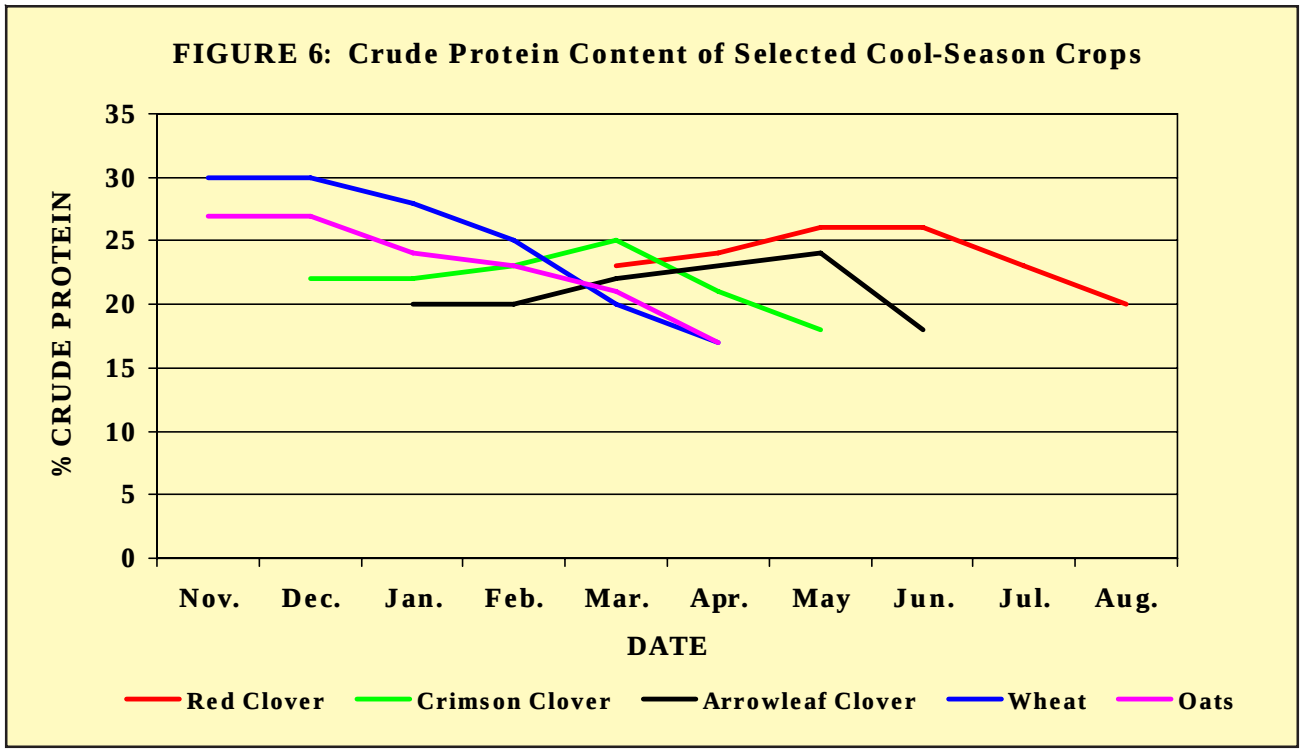
The wide array of available seed species and varieties often makes it difficult to decide the best thing to plant for white-tailed deer. New crop varieties appear on the market each year, making the decision even more difficult. Many of these new crops show promise as deer forages. They are highly nutritious and highly palatable and many grow on a wide variety of sites. Unfortunately, many of these new crops are expensive, which is a major drawback for most hunting clubs and landowners. Still others do not produce as advertised. Luckily, several crops used by wildlife managers over the years are consistent producers of high-quality forage. Always choose the seed varieties best suited for the food plot sites, soils, and climate.

It is best to plant a combination of seeds in food plots. This applies to both warm-season and cool-season crops. Planting a combination helps minimize the chances of total crop failure due to drought, poor seed, pests, diseases, or any of a number of other problems. Ideally, the various plants in the combination mature at different times and extend the productivity of the food plots. The production levels of several commonly planted cool-season crops are shown in **FIGURE 5** (below). The crude protein levels for the same crops are shown in **FIGURE 6** (page 11). By combining specific plants, food plots planted in the fall can remain productive and nutritious well into the following summer. Using combinations also reduces grazing pressure on certain crops until they become established.

There are many commercially available warm and cool-season seed combinations currently on the market. Many of these combinations are very expensive and most deer managers are skeptical of the advertised claims of production and deer utilization. Through trial and error, most deer managers find it cheaper to purchase different seeds individually and blend the combinations themselves. However, some prepackaged mixtures contain hard to find, but effective, forage species not readily available to most deer managers. Again, trial and error

FIGURE 5: Production of Selected Cool-Season Crops





often is required to determine which commercially available combinations deliver as promised. The best rule of thumb on purchasing and planting prepackaged seed combinations for the first time is test the seed in small plantings and do not rely solely on advertised claims.

Cool-Season Crop Choices

Crop choices for cool-season food plots are determined by the purpose of the planting. Hunting food plots should be planted with crops that are palatable and productive during hunting season. The various small grains, including wheat, oats, rye, and triticale, are the most common choices. Other choices include winter peas (e.g., Austrian winter peas) and the many plants in the Brassica family (e.g., rape, kale, turnips). These crops are quickly established, highly productive, and attractive to deer throughout hunting season.

Cool-season food plots planted primarily to feed deer during the nutritionally stressful winter and early-spring period should include later maturing crops, in addition to small grains. The various species of clovers make excellent additions to cool-season food plot seed combinations. Many clover species (e.g., berseem, crimson, subterranean) reach peak productivity during late-winter and early-spring, are highly nutritious and palatable to deer, and extend the productivity of cool-season food plots well beyond spring green-up. Other species of clovers, such as red and arrowleaf, reach maturity even later in the year—further extending the productivity of most cool-season food plots.

Plant a combination of crops (e.g., small grains, clovers, and brassicas) in cool-season food plots to increase seasonal food plot productivity, nutrient levels, and deer utilization of the food plots. **CHRIS COOK**

TABLE 1: Suggested Cool-Season Seed Combinations for Deer

Meat and Taters Combo	
Wheat	50 lbs.
Oats	35 lbs.
Crimson Clover	15 lbs.
Estimated Seed Cost Per Acre	$45.00
Standard Alabama Deer Combo	
Wheat	45 lbs.
Oats	30 lbs.
Crimson Clover	15 lbs.
Arrowleaf or Red Clover	10 lbs.
Estimated Seed Cost Per Acre	$67.00
Hot and Cold Combo[a]	
Wheat	40 lbs.
Oats	20 lbs.
Austrian Winter Pea	15 lbs.
Crimson Clover	10 lbs.
Red Clover	8 lbs.
Rape	5 lbs.
Chicory	2 lbs.
Estimated Seed Cost Per Acre	$85.00
Hunting Season Supreme Combo	
Wheat	60 lbs.
Austrian Winter Pea	25 lbs.
Crimson Clover	15 lbs.
Estimated Seed Cost Per Acre	$50.00
Creek Bottom 6.5 Combo	
Wheat	40 lbs.
Alfalfa	15 lbs.
White (Ladino) Clover	5 lbs.
Estimated Seed Cost Per Acre	$84.00
Super Clover Combo	
Wheat	40 lbs.
Crimson Clover	15 lbs.
Red Clover	10 lbs.
White (Ladino) Clover	5 lbs.
Estimated Seed Cost Per Acre	$78.00
Cadillac Combo	
Wheat	30 lbs.
Oats	20 lbs.
Austrian Winter Peas	15 lbs.
Crimson Clover	10 lbs.
Red Clover	8 lbs.
White (Ladino) Clover	5 lbs.
Chicory	2 lbs.
Estimated Seed Cost Per Acre	$93.00
Perennial Clover and Chicory Combo	
Wheat	40 lbs.
Red Clover	10 lbs.
White (Ladino) Clover	5 lbs.
Chicory	2 lbs.
Estimated Seed Cost Per Acre	$72.00

[a]Exclude chicory if planting as an annual food plot.
Seeding rates are for one acre.
Seed costs estimated using 2005 prices.

One of the best combinations for an all-purpose, annual cool-season food plot in Alabama includes wheat (45 pounds per acre), oats (30 pounds per acre), crimson clover (15 pounds per acre), and arrowleaf clover (10 pounds per acre). This seed combination works in a wide variety of soil types. If planted in late September or early October, this mixture remains productive and palatable from November through June. Red clover (10 pounds per acre) can be substituted for arrowleaf clover on more fertile sites. Using red clover extends the productivity of a fall food plot well into late-summer (August or September) in years with adequate rainfall. These and other cool-season combinations are listed in **TABLE 1** (above).

A popular perennial clover mix planted in the fall includes white (ladino) clover (5 pounds per acre), red clover (10 pounds per acre), and wheat (40 pounds per acre). This combination provides high-quality forage all the way though the summer months. Ladino clover is a nutritious food source during most of the year and persists indefinitely if properly planted and maintained. Chicory also can be added to this perennial mix at a rate of 2 pounds per acre. Like ladino clover, chicory persists for several years if properly managed. Annual labor, equipment, and seed costs drop significantly if food plots remain productive for two or more years without replanting.

Planting dates and seeding rates for other commonly planted cool-season forages are found in **APPENDIX 2** (pages 29-37).

Warm-Season Crop Choices

Ideal warm-season forages are preferred by deer, drought tolerant, suited to a wide variety of soils, and able to withstand considerable grazing pressure once established. Also, protein levels should remain at approximately 17 percent or greater throughout the life of the planting. Because weeds often are a significant problem during the warm-season, legumes generally are the best choice

TABLE 2: Suggested Warm-Season Seed Combinations for Deer

Safe and Simple Combo	
Cowpeas	40 lbs.
Grain Sorghum	8 lbs.
Estimated Seed Cost Per Acre	$48.00
Indian Blanket Combo	
Alyce Clover	10 lbs.
Aeschynomene	10 lbs.
Estimated Seed Cost Per Acre	$120.00
Pro-Carb Combo	
Cowpeas	40 lbs.
Lablab	10 lbs.
Peredovik Sunflowers	5 lbs.
Grain Sorghum	5 lbs.
Estimated Seed Cost Per Acre	$76.00
Dustbuster Combo	
Cowpeas	40 lbs.
Aeschynomene	10 lbs.
Grain Sorghum	8 lbs.
Estimated Seed Cost Per Acre	$118.00
Heavy Hitter Combo	
Soybeans	25 lbs.
Lablab	10 lbs.
Grain Sorghum	8 lbs.
Estimated Seed Cost Per Acre	$54.00
Muleshoe Standard Combo[a]	
Lablab	10 lbs.
Corn	5 lbs.
Estimated Seed Cost Per Acre	$38.00
Dove and Deer Combo	
Soybeans	40 lbs.
Peredovik Sunflowers	10 lbs.
Estimated Seed Cost Per Acre	$36.00
All In One Combo	
Cowpeas	40 lbs.
Alyce Clover	10 lbs.
Hairy Indigo	10 lbs.
Estimated Seed Cost Per Acre	$128.00
No Hassle Combo	
Cowpeas	40 lbs.
Buckwheat	15 lbs.
Grain Sorghum	5 lbs.
Estimated Seed Cost Per Acre	$56.00
Kitchen Sink Combo	
Soybeans	25 lbs.
Cowpeas	15 lbs.
Lablab	10 lbs.
Peredovik Sunflowers	5 lbs.
Grain Sorghum	5 lbs.
Estimated Seed Cost Per Acre	$69.00

[a]Seeding rate is for row planter (plate type). If broadcasting seed, increase seeding rate to 20 lbs. of lablab and 10 lbs. of corn.

Seeding rates are for one acre.

Seed costs estimated using 2005 prices.

since they are not only high in protein, but lend themselves to the application of selective herbicides often necessary to control weed competition.

If improvements to body weights and antler development are a primary goal of a warm-season planting program, use of legumes nearly always is recommended. This is especially true if a single species is planted. Lablab, soybeans, and cowpeas are perhaps the best choices for use across Alabama.

Alyce clover, Aeschynomene (American jointvetch), and hairy indigo are other high-quality, warm-season legumes often planted for deer, but they are somewhat less preferred and more expensive than the three previously mentioned plants. However, deer preference can be site specific and some managers may experience heavy use with the latter species. These plants work best when planted in combination with other high-quality legumes or high-carbohydrate forages, such as corn or grain sorghum. Alyce clover is quite drought tolerant, but does not do well on extremely moist or wet sites. Aeschynomene is somewhat shade tolerant and can be planted with success in thinned pine stands.

Buckwheat is another warm-season choice that may work well for some deer managers. Buckwheat can be established with minimal preparation and grows quickly to out compete undesirable weeds and grasses in the absence of heavy grazing pressure during the first few weeks of growth. It is short-lived, which limits the time it is available to deer. Buckwheat generally is best suited as a companion plant with other forages, such as alyce clover.

Forages that provide energy and fat can be an important part of a warm-season planting program. Corn and grain sorghum are perhaps the best choices for use across Alabama. Corn is highly preferred by deer and can help build fat reserves for the winter months, but its protein level is below the

The combination of corn and lablab is an excellent choice for warm-season food plots. **CHRIS COOK**

16-18 percent level needed for deer to achieve optimum antler, skeletal, and muscular development. Another drawback of corn is the expense and difficulty in growing a good crop. Grain sorghum is similar to corn in nutritional quality and grows over a wider variety of soils. Grain sorghum is more drought tolerant than corn and requires less maintenance to produce a good crop.

Sunflowers also can provide many benefits similar to corn and grain sorghum. Deer often utilize the young plants and seed heads of sunflowers, which reduces seed production. Sunflowers also can provide an excellent attractant to doves when planted in larger food plots and should definitely be a part of the planting program if dove hunting is a consideration.

Planting a combination of high-protein and high-carbohydrate forages during the spring and summer provides deer a more nutritionally complete choice of foods. The taller, erect nature of corn, grain sorghum, and sunflowers allows vining plants, such as lablab, cowpeas, and some varieties of soybeans, to climb among their stalks and can help reduce early overgrazing.

One of the most effective warm-season combination plantings is corn and lablab. This combination can provide nutritious forage from spring until first frost, with energy rich corn available into late-winter. Planted together, lablab produces nitrogen that in turn benefits the companion corn plants. Seeding rates for this combination also are low (5 pounds of corn and 10 pounds of lablab per acre). This makes it a truly economical forage planting. Other simple combinations include a mixture of grain sorghum (8 pounds per acre) and cowpeas (40 pounds per acre), or sunflowers (10 pounds per acre) and soybeans (40 pounds per acre). These and other suggested warm-season combinations are listed in **TABLE 2** (page 13). A complete planting guide for most warm-season crops is found in **APPENDIX 3** (pages 38-43).

Inoculation of Legume Seed

Legumes, such as clover, soybeans, and lablab, are able to obtain large amounts of nitrogen from the air. They are able to do this because of the symbiotic (mutually beneficial) relationship these plants have with nitrogen-fixing bacteria in the genera *Rhizobium* and *Bradyrhizobium*. The bacteria live in the roots of the legumes and obtain nitrogen from the soil. The nitrogen is "fixed" in a form usable by

Legumes, such as arrowleaf clover, cannot properly fix nitrogen without adequate seed inoculation. Inadequate seed inoculation stunts both plant growth and quality.
POTASH AND PHOSPHATE INSTITUTE

FIGURE 7: Inoculation Groups and Codes for Legumes Commonly Planted for Deer Forage

Alfalfa Group
(*Rhizobium meliloti*)
- Alfalfa - Code A
- White Sweetclover - Code A
- Yellow Sweetclover - Code A

Clover Group
(*Rhizobium trifolii*)
- Alsike Clover - Code B
- Arrowleaf Clover - Code O
- Ball Clover - Code B
- Berseem Clover - Code R
- Crimson Clover - Code R
- Ladino Clover - Code B
- Red Clover - Code B
- Subterranean Clover - Code WR
- White Clover - Code B

Cowpea Group
(*Bradyrhizobium japonicum* spp.)
- Aeschynomene - Code EL
- Alyce Clover - Code EL
- Cowpeas - Code EL
- Lablab - Code EL
- Lespedeza - Code EL
- Partridge Pea - Code EL
- Peanut - Code EL

Pea and Vetch Group
(*Rhizobium leguminosarum*)
- Austrian Winter Pea - Code C
- Bigflower Vetch - Code C
- Caleypea - Code C
- Common Vetch - Code C
- Field Pea - Code C
- Flat Pea - Code C
- Hairy Vetch - Code C

Other*
- Birdsfoot Trefoil (*Rhizobium loti*) - Code K
- Soybean (*Rhizobium japonicum*) - Code S

* The same inoculum can be used for all species listed within an inoculation group except for legumes listed under **Other** and those which require species-specific strains.

One type of inoculant does not work for all legumes. The chart above lists the inoculant groups and codes for most legumes commonly planted for deer forage.

the legumes and stored in nodules that form on the plant's roots. Legumes can fix 100 to 300 pounds of nitrogen per acre, per year. This process not only produces enough nitrogen for the legumes, but companion plants, such as wheat, corn, or grain sorghum, also can use some of the excess nitrogen produced by the legumes.

Large numbers of these bacteria must be present in the soil for the nitrogen fixing process to occur efficiently. This requires inoculating the seeds with live bacteria. Many of the smaller legume seeds, such as white clover, ladino clover, alfalfa, and red clover, come pre-inoculated, but most legume seeds must be inoculated at planting time. Inoculants are species-specific (see **FIGURE 7**), so it is important to read the package and make sure the correct inoculant is used. In addition, make sure the expiration date on the package of inoculant has not passed. The inoculant should be kept out of direct sunlight at a temperature between 40 and 70 degrees prior to use. The inoculant is a living organism and should be handled as such. Some of the bacteria will persist in the soil for several years after the initial planting, so it may not be absolutely necessary to inoculate legume seed every year if the same crop is planted in the same food plots year after year. On the other hand, applying inoculant each time legumes are planted is inexpensive and helps ensure a healthy, productive stand of high-quality deer forage.

The seed should be moistened with a sticking agent prior to applying the inoculant. Commercial products are available, but a small amount of sugar water (i.e., four parts water, one part sugar) can be used. Do not use colas. The acidity of these soft drinks can kill the bacteria. Apply just enough to lightly moisten the seed. Stir the seed to make

Inoculate legume seed in a separate container and allow the seed to dry before planting. This prevents clumping and improves seed distribution during planting.
KEVIN McKINSTRY

sure all of the seed are moistened. Apply the inoculant according to directions on the package. Stir the seed once again to make sure all seed have some inoculant attached. The seed should be spread and allowed to dry before planting. Spreading the seed on a bed sheet, piece of plastic, or newspaper works well. Remember, direct light and heat can kill the bacteria so place the seed in the shade to dry. Allowing the seed time to dry before planting is important because it prevents damp seed from clumping together, which results in an uneven distribution of seed.

Applying the Seed

Seed should be applied to a firm, well-prepared seedbed to help ensure the seed have good soil contact and are covered to a uniform depth. Use a cultipacker or drag (log, heavy pipe, section of chain link fence, etc.) on a plowed food plot prior to applying seed to create a smooth, firm seedbed. This is a very important step in the planting process. This is an especially true if small seed, such as clover, rape, or alfalfa, are to be broadcasted. This step is not necessary if a grain drill or row planter is used to plant the seed. No-till drills are another option and work well in some situations, especially when retaining soil moisture is critical. Remember seeding rates vary depending on the method used to plant. Broadcast seeding typically requires a larger amount of seed than drilling or row planting. These differences are noted in **APPENDIX 2** (pages 29-37) and **APPENDIX 3** (pages 38-43).

Regardless of the planting method, it is important to distribute the seed uniformly across the food plot. To do this, apply large (e.g, wheat, oats, winter peas) and small (e.g., clover, alfalfa, rape, chicory)

FIGURE 8: Helpful Hints for Successful Food Plots

- After mowing a food plot, be sure to clean weed seeds and other clippings from the mower deck. A small broom makes removal of plant debris a relatively quick procedure. This practice helps reduce the spread of weeds and other undesirable vegetation from one food plot to the next.

- If access to water is a problem when spraying herbicides, a 12-volt bilge pump and a 55-gallon drum or large garbage can can provide water in remote areas. Mount the bilge pump to a section of PVC pipe, connect a sufficient length of flexible bilge hose, and submerge in the water storage tank. A power source (12-volt battery) is all that is necessary to refill your spray tank.

- Be sure to keep extra top-link, lift-arm, and snap-pins on hand. These items often are lost or damaged while planting—having spares will save valuable time.

- Before planting, make sure tractors and implements are properly serviced and in good working condition. Be sure to grease all lubrication points and be sure bearings are in good condition.

- Keep a chainsaw on hand, along with a section of strong chain or rope. Fallen trees and large limbs can be cleared in a matter of minutes with this equipment.

- It is a good idea to have a cellular phone or some other method of communication on hand—they can be lifesavers in cases of medical emergency.

- A basic set of tools is a must and should include a hammer, screwdrivers, adjustable wrench, pliers, and a pipe wrench. Many repairs can be handled in the field with these tools—a pipe wrench can make tightening disc axles an easy chore.

- Eye and ear protection are always good ideas. A long day of operating a tractor can take a toll on one's hearing and unseen limbs can cause a serious eye injury. A dust mask will reduce respiratory irritation caused by dust, pollen, and other plant residues.

- Keep bungee cords on hand—they have a variety of uses, including securing tool boxes, water jugs, and empty seed and fertilizer bags to trailers, ATVs, and tractor implements.

- Above all, be safe and take your time. Most accidents and equipment failures are the result of "getting in a hurry" to finish the job. An extra hour or even an extra day is well worth preventing injuries or costly repairs.

Hand seeders often are the best way to apply small seeds, such as clover, rape, and alfalfa, on small and mid-sized food plots. **CHRIS COOK**

seeds separately. It often is difficult to evenly spread a mix of large and small seed using most planting equipment, especially large capacity broadcast spreaders. A handheld spreader or ATV mounted spreader works well for spreading small seeds, such as clover, chicory, alfalfa, and rape. Some grain drills and drop seeders have separate seed bins for large and small seeds. These implements work well for planting a mixture of large and small seeds.

Covering the Seed

Covering the seed, especially larger seed like cowpeas, lablab, and small grains, may be necessary if they are broadcasted. Leaving seed uncovered is risky. High temperatures, dry weather, and seed-eating animals all can reduce forage production of top-sewn food plots. It also is important not to plant or cover the seed too deep. Covering or planting seed too deep keeps most of the plants from emerging from the soil. Recommended planting depths vary from species to species and are listed in **APPENDIX 2** (pages 29-37) and **APPENDIX 3** (pages 38-43). Larger seed, such as wheat or soybeans, should be planted no more than about 1/2 to 1-inch deep. Smaller seed, such as clovers, should be planted no more than 1/4 to 1/2-inch deep. Broadcasted seed should be covered using a drag (e.g., heavy log or pipe, section of chain link fence), culti-packer, or by lightly plowing with a disc harrow. Check the planting depth of grain drills or row planters periodically while planting to avoid burying seed too deep.

Exclosures

Many hunting clubs and landowners use wire exclosures or utilization cages in their food plots. These exclosures generally measure about three feet in diameter and four feet in height. They can easily be constructed from a piece of 4-foot or 5-foot tall 2" x 4" net wire, 10 feet in length. These cages prevent deer and other animals from using small portions of the food plots. By noting the differences in plant height and species composition inside and outside of the cages, hunters can gauge how heavily their crops are being utilized, how much forage is being produced, and which crops are being eaten most heavily. The differences inside and outside of the cages usually are obvious. By using this information, it is possible to fine-tune the crop mixtures that perform best in a particular area. This also allows

A culti-packer is one of the best ways to cover seed after planting. This implement also does a great job of preparing a firm, smooth seed bed after plowing. **CHRIS COOK**

A wire exclosure provides clear evidence of deer use of food plots. It also enables deer managers to estimate forage production. **CHRIS COOK**

the utilization and production of new seed varieties to be field tested in one or two food plots before being applied on a much larger scale.

Food Plot Maintenance

Often it is necessary to perform some maintenance after establishing food plots. Food plot maintenance may include removing competing plants with mowing or herbicides, soil testing, and/or applying additional fertilizer and lime. Performing these tasks helps ensure food plots produce and persist as they should. This is especially important for perennial and warm-season food plots, although most annual cool-season food plots require maintenance as well.

Weed/Grass Control

For optimum forage production, it often is necessary to use a selective herbicide to control weeds and grasses in warm-season food plots. Many herbicides, in addition to the ones listed below, are available for grass and broadleaf control in food plots, but using the wrong types or amounts of herbicides can be disastrous. ***Consult with someone experienced in using agricultural herbicides prior to applying herbicides to any food plot. Also, always read and follow label instructions when using any type of herbicide.*** For grass control, sethoxydim (e.g., Vantage®, Poast®, Poast Plus®, Arrest®) at 2.25-3.75 pints (36-60 oz.) per acre depending on height of grasses, or clethodim (e.g., Select®, Arrow®) at 8 oz. per acre are both effective. For broadleaf control, imazethapyr (e.g., Pursuit®, Pursuit® DG, Slay®) at 2-2.5 oz. per acre works well. If legume only plantings are planned—a pre-emergence application of imazethapyr (e.g., Pursuit®, Pursuit® DG, Slay®), pendimethalin (e.g., Pendimax® 3.3, Prowl® 3.3 EC), or trifluralin (e.g., Treflan EC) is recommended at label directions. Pendimethalin and trifluralin also can be used on legume/sunflower plantings. Imazethapyr and pendimethalin are very effective at controlling crabgrass. The herbicides listed above do not kill legumes, but some will kill companion plants like buckwheat, grain sorghum, rape, chicory, or sunflowers. Herbicides other than the ones listed are available for use on agricultural crops. Check with a herbicide supplier for other options.

It probably will be necessary to control weeds and grasses in some cool-season food plots con-

Applying the proper herbicide often is the most long-term and cost-effective method of removing competing vegetation in food plots, especially perennial clover and chicory food plots. **CHRIS COOK**

taining clover or alfalfa. Alfalfa, white clover, and ladino clover are perennials and can persist for several years with proper maintenance. Red clover produces abundant forage into late summer. Most other clovers typically planted in the fall persist until late-spring or summer. Weed and grass competition can be a serious problem for all of these crops. Mowing is one way to control some weed and grass competition in clover food plots. Mowing to a height of about four inches in May controls much of the competing vegetation and stimulates growth in alfalfa and some clovers, including red, white, and ladino. Mow alfalfa, red clover, white clover, and ladino clover as needed throughout the summer to maintain control of competing weeds and grasses.

Herbicides are another option for controlling weed and grass competition in cool-season food plots, especially long-lived legumes like red clover, ladino clover, white clover, and alfalfa. Most of the same herbicides (e.g., sethoxydim, clethodim, imazethapyr) and rates used on legumes in warm-season food plots also work on clover and alfalfa planted in the fall. 2,4-DB (e.g., Butyrac® 200) also can be applied at 1-4 pints (16-64 oz.) per acre in established legume stands to control non-legume broadleaf competition. ***The label instructions for all herbicides should be read and followed before using on any crop.*** Appropriate herbicides should be applied as soon as competing grasses and weeds start to appear, usually by early May. A second application to control weeds and grasses that appear later in the summer may be necessary in food plots planted with alfalfa, red clover, ladino clover, or white clover.

A surfactant should be added to all post-emergent herbicides before application. Surfactants are oil or water-soluble additives that make herbicides more effective by helping the chemical stick and penetrate the targeted weeds and grasses. Consult with someone experienced in using agricultural herbicides about which surfactant to use with each herbicide.

Most herbicides are expensive, but small amounts treat large areas. All spray rigs should

An ATV equipped with a boom sprayer is ideal for applying herbicides to most one-acre or smaller food plots. **CHRIS COOK**

be calibrated before applying herbicides to ensure the product is applied at the proper rate. Most manufacturers include instructions for calibration of their products. To calibrate a sprayer, two things must be known: 1) area covered and 2) amount of liquid applied. Measure the spray width of the spray rig (e.g., 12 ft.) and the distance traveled in a given time when driving at the spraying speed (e.g., 198 ft. in 45 seconds driving at 3 mph). In this example, an area of 2,376 sq. ft. is covered when spraying at normal spraying speed. The next thing to calculate is the amount of liquid applied during a given amount of time. Cover each spray nozzle with a container to catch the liquid (use water when calibrating) and spray for the same length of time used to calculate the area covered (45 seconds). Measure the total amount of water in the containers (e.g., 135 ounces = 1.05 gallons). Using these calculations, one acre can be sprayed with 14.5 gallons of liquid in 13.75 minutes (825 seconds) when spraying at a speed of 3 mph.

Follow-up Fertilizer and Lime

Cool-Season Food Plots

It may be necessary to apply a follow up application of fertilizer to cool-season food plots several weeks or more after planting. Nitrogen is short-lived in the soil and used in large quantities by the rapidly growing plants. Food plots planted only with small grains or ryegrass require an additional application of 100 lbs. of ammonium nitrate (34-0-0) per acre in early to mid December. The additional nitrogen increases plant productivity and helps the plants handle heavy browsing pressure through the winter. This is especially important if a limited amount of acreage is planted in cool-season food plots.

Food plots planted with legumes (e.g., clovers) do not require follow-up applications of nitrogen fertilizer, but a second application of potassium usually is needed. Like nitrogen, potassium is depleted rapidly from the soil. Ideally, soil samples should be taken before any additional fertilizer is applied, but if soil samples are not taken, apply 100 lbs. of muriate of potash (0-0-60) per acre in March.

Cool-season food plots planted with combinations of legumes (e.g., clovers, winter peas, vetch) and non-legumes (e.g., wheat, oats, rape) may or may not require a follow up application of nitrogen. Legumes produce their own nitrogen and once the plants' root systems are well established, they produce excess nitrogen that can be used by the companion non-legume plants. Unfortunately, most of this excess nitrogen is not available until after the legume's root systems or above ground vegetation dies. If the non-legume plants are pale green in color or if the food plots are receiving heavy use, apply 100 lbs. of ammonium nitrate per acre in early to mid December. A follow up application of 100 lbs. of muriate of potash also should be applied just prior to spring green-up (early March).

Perennial legumes (i.e., ladino clover, white clover, red clover, and alfalfa) require additional applications of fertilizer periodically after establishment. Soil samples should be taken in mid to late-summer following the initial fall planting to determine what nutrients are lacking in the soil and if the pH is adequate. If a soil test is not taken, fertilize with a zero nitrogen fertilizer (e.g., 0-10-20, 0-20-30, or 0-20-20) in September at a rate of about 60 lbs. of phosphorous per acre and 90 lbs. of potassium per acre. An application of 300 lbs. of 0-20-30 or 600 lbs. of 0-10-20 fertilizer per acre should be sufficient.

Warm-Season Food Plots

Under most conditions, warm-season food plots do not need follow up applications of fertilizer. Most warm-season food plots are planted with legumes or combinations including legumes. These plants do not need nitrogen. Most also are short-lived and do not warrant additional potassium fertilizer. A follow-up application of nitrogen fertilizer to legumes only feeds problem weeds and grasses. If weeds are not a problem, fertilize established non-legumes (e.g., corn) with nitrogen at 100 lbs of 34-0-0 per acre.

Fallowing

"Fallowing" is an old and established agricultural practice. This technique involves allowing a food plot to lay out several months or even up to one year before planting. Benefits of fallowing

Leaving a food plot fallow or idle for up to one year helps reduce soil erosion, revitalizes soil nutrients, and enhances the topsoil. **CHRIS COOK**

include reduced soil erosion, revitalization of soil nutrients, and enhancement of topsoil. In areas where deer densities are excessive and use of food plots is heavy, fallowing may reduce exposure to parasites and diseases that have accumulated in the soil. Depending on the number of food plots available, one or more food plots may be fallowed each year with no appreciable decline in nutritional enhancement of the deer's diet or hunting success. In situations where food plot space is at a premium, fallowing may not be a technique some hunters are willing to consider. Fallow food plots also provide excellent brood rearing habitat for wild turkeys and bobwhite quail.

Hunting and Food Plots

Food plots also can provide an excellent place for hunters to observe or harvest deer. Cool-season food plots are typically the most common type of food plot hunters use to attract deer for harvest, but some warm-season food plots may serve this purpose earlier in the hunting season. Some legumes, such as cowpeas and lablab, can produce until the first heavy frost and make good early-season hunting food plots for archery hunters. Warm-season food plots that include corn as a part of the planting combination also make excellent hunting food plots.

All too often, hunters make the mistake of "over-hunting" food plots in their attempts to harvest deer. Deer quickly respond to hunting pressure and human activity. Hunting the same food plot several days per week is a sure way to discourage daylight use of these plots. Ideally, food plots should be hunted sparingly, with travel to and from these food plots kept as inconspicuous as possible. While food plots do make good areas to harvest deer, especially does, hunters must learn to adapt their hunting methods to enhance success. Hunting a food plot day after day when a bumper acorn crop is hitting the ground is an exercise in futility. Ironically, for all the benefits they can provide, food plots have contributed to a lack of hunting savvy among many of today's deer hunters. ***Hunters must learn to hunt where the deer are rather than where they want the deer to be.***

Setting up on a food plot can be as simple as constructing a small ground blind from tree limbs and brush, or as involved as erecting a large, weatherproof shooting house. In either case, it is important to consider wind direction when attempting to hunt a food plot. Smaller blinds can be moved to adjust to wind conditions, but larger hunting platforms, such as tripods or shooting houses, are more or less permanent. As a rule of thumb, ideal hunting conditions occur on a prevailing wind from the northwest. In fact, in the absence of approaching warm fronts, a northwest wind is generally the prevailing wind during much of hunting season in Alabama. Permanent hunting platforms should be placed with this in mind. ***If wind conditions are not suited for hunting a food plot on a particular day, hunt somewhere else!*** A deer's sense of smell is phenomenal—in most cases, hunting a food plot with the wrong wind usually results in not seeing a deer at all.

Enclosed shooting houses often turn food plots into crutches for deer hunters, rather than tools of deer management. Hunters who hunt these stands many times neglect basic hunting skills, such as paying attention to wind direction. **CHRIS COOK**

Hunting ***near*** food plots can be as productive as hunting directly on them. This is especially true when it comes to harvesting bucks during the rut. Mature bucks often approach food plots without entering. Their strategy is to circle the food plots and attempt to wind a receptive doe before proceeding into the open. Hunters who set up in these staging areas adjacent to food plots often are rewarded with the opportunity to harvest a nice buck. Does also may be harvested along travel routes to food plots—this allows harvest opportunity without providing excessive disturbance and human activity directly on a food plot. Again, repeatedly focusing hunting activity directly on food plots can deprive hunters of better harvest opportunities that are just a short distance away.

Three-Acre Warm-Season Food Plot with Reversible Fencing

Because they are highly preferred, many warm-season forages cannot be grown in smaller food plots. However, use of a reversible fence can exclude deer from grazing these crops during the first weeks of growth. Typically, after four to six weeks, most forages are sufficiently established to permit routine browsing. To provide protection during the early stages of growth, some landowners erect 6-foot reversible fence systems that successfully control deer access to their warm-season forage crops. This system requires the use of two strands of overlapping wire fence. Each strand is four feet in width. A top strand is installed at a height of six feet and a second strand is installed below with a 2-foot overlap. Wooden posts (or metal T-posts) can be used and should be spaced 20 feet apart. Once forage crops are established, the bottom portion of the fence is pulled up and fastened with a nail or tied with wire. This creates intermittent openings around the food plot for deer to enter and exit.

Investing in a reversible fence system may appear to be cost prohibitive. However, it should be noted that the initial cost of the fencing system is a one-time expense—the fencing system should provide years of service and a proper cost analysis should average the cost of fencing over a period of years. When compared to the cost of supplemental feeding, this fencing system actually provides quality forage at a lower cost (see cost comparison in **FIGURE 9**, page 23).

A six-feet tall, reversible fence (above left) protects young warm-season crops, such as lablab, from overgrazing during the first few weeks following germination. Once the crops reach an age of four to six weeks old, the fence can be reversed or raised (above right) and deer can start feeding on the high-protein forage. **CHRIS COOK**

FIGURE 9: Comparison of Six-Year Costs of a Three-Acre Reversible Fence Lablab Food Plot vs. Supplemental Feeding of Soybeans*

Three-Acre Reversible Fence Warm-Season Food Plot

Fencing System (one time expense)

Fence	1,460 ft. at $0.64 per ft. ($0.32/ft. per strand)	$934.40
Posts	73 pressure treated 4-5" diameter X 8' long fence posts at $3.50 each	$255.50
Nails/Staples	500 staples and 25 20-penny nails	$45.00

Planting Costs (annual expense)

60 lbs. of lablab seed at $2.25/lb.**	$135.00 x 6 years = $810.00
6 tons lime at $30.00/ton***	$180.00 x 3 years = $540.00
1,200 lbs. of 0-20-20 at $210.00/ton	$126.00 x 6 years = $756.00
Tractor at $60.00/acre (including operator)	$180.00 x 6 years = $1,080.00

Annual Cost of a Three-Acre Reversible Fence Lablab Food Plot **$4,420.90 / 6 years = $736.82 per year**

Single Soybean Feeder (Trough Type)

Feeder (one time expense)	$200.00
5.25 tons of feed soybeans @ $180.00 per ton (annual expense)**	$945.00 x 6 years = $5,670.00

Annual Cost of Feeding Soybeans in a Single Trough Feeder **$5,870.00 / 6 years = $978.33 per year**

* Costs calculated using 2005 prices.
** Lablab annually produces a minimum of 5.25 tons of forage per 3-acre food plot (3,500 lbs. per acre). Cost comparison calculated using an equal amount of feed soybeans per year.
*** Lime applied every other year.

Mineral Supplements

A practice that often goes hand in hand with planting food plots to improve the health of a deer herd is establishing supplemental mineral licks. Like all animals, white-tailed deer require a certain amount of a wide array of minerals in their daily diet. Deer are able to get the required doses of these minerals in their normal daily diet under most conditions. Regardless, many deer hunters and managers provide mineral supplements, in block or granular form, to deer on their property. Many do in an attempt to improve antler size on bucks using their property. Yet, no research shows a positive effect of mineral supplements on antler size of wild, free-ranging white-tailed deer. This makes the use of mineral supplements suspect as a way to improve antler quality on most areas.

Some things should be kept in mind if a min-

Deer of all ages and both sexes frequently use salt licks throughout spring, summer, and early fall. **CHRIS COOK**

eral supplement is used. Mineral supplements for white-tailed deer should contain less than 35 percent salt to be most effective. However, most commercial mineral supplements contain 50 percent or more salt by volume. Of all the minerals possibly lacking in a deer's diet, the two that appear to be the most important for antler and skeletal development are calcium and phosphorous. To be effective, supplements should contain the right ratio of these two minerals. For whitetails, the proper ratio is two parts calcium for one part phosphorous. All supplements should be clearly labeled with a tag showing the percentages of each of the minerals they contain. It is important to read this tag to make sure the supplement contains the right amounts of each of these minerals, as well as other trace minerals. Another consideration is the form in which the supplement is provided. Deer seem to more readily consume a granular supplement than a block form.

Deer hunters may experience problems hunting near mineral licks in Alabama. The only supplement legal for use during deer hunting season is pure, white salt (NaCl). According to Alabama law, it is illegal to hunt deer with the aid of mineral licks containing anything other than salt.

Summary

Food plots often are an integral part of many deer management programs, but they should never be viewed as "magic beans" to resolve all deer management issues. Unfortunately, some deer managers and hunters rely too heavily on food plots as the main focus of their deer management program. Planting food plots should be a management practice in conjunction with, not instead of, sound native habitat management. In many instances, food plots are valued above management practices that can have an equal or greater impact on the deer herd. Controlled burning, fertilizing/liming native food sources, and application of selective herbicides are techniques that can improve deer habitat quality on any property—often at costs comparable to establishing food plots. Food plots do not compensate for failure to maintain deer at an appropriate density, nor do they improve buck age structure. Good harvest management practices alone can improve deer quality, even in the absence of a single food plot. But, when adequate numbers of high-quality food plots are coupled with sound deer herd and native habitat management practices, deer herd quality can reach levels none of these practices can achieve alone.

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APPENDICES

APPENDIX 1: Contact Information for Some Soil Testing Labs

Auburn University
Soil Testing Laboratory
118 Funchess Hall
Auburn University, Alabama 36849-5411
(334) 844-3958
www.ag.auburn.edu/dept/ay/soiltest.htm

Soil Testing Laboratory
University of Florida IFAS
Wallace Building No. 631
P.O. Box 110740
Gainesville, Florida 32611
(352) 392-1950 ext. 221
edis.ifas.ufl.edu/SS312

University of Tennessee Soil Test Lab
5201 Marchant Drive
Nashville, TN 37211
(615) 832-4936
bioengr.ag.utk.edu/soiltestlab

Soil Testing Laboratory
Mississippi State University
Cooperative Extension Service
Box 9610
Mississippi State University, Mississippi 39762
(662) 325-3313
msucares.com/crops/soils/testing.html

Soil, Plant, and Water Analysis Laboratory
The University of Georgia,
College of Agricultural and Environmental Sciences
2400 College Station Road
Athens, Georgia 30602
(706) 542-5350
aesl.ces.uga.edu/

Waters Agricultural Laboratories
P.O. Box 382
257 Newton Highway
Camilla, Georgia 31730-0382
(229) 336-7216
watersag.com/frame.htm

APPENDIX 2: Cool-Season Planting Guide

CHRIS COOK

Alfagraze Alfalfa

ALFALFA

Planting Date: September 1 - October 15

Seeding Rate[a]: 18-20 pounds per acre (broadcasted)
14-16 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Alfalfa is a perennial legume that produces high-quality, highly preferred forage for deer from mid-spring until mid-fall. Growing and maintaining a good stand of alfalfa can be intensive and expensive. Alfalfa requires a well-prepared, firm seedbed. Alfalfa also requires extensive weed and insect control once a stand is established. It should be planted alone or with lower rates of companion plants, such as clover. Not all varieties of alfalfa are suited for planting in the Deep South, but many varieties suited to the region's warm climate have been developed in recent years. Common varieties include Alfagraze, Amerigraze 702, Ameristand 403T, Apollo, Cimarron, Geneva, Winter Gold, Laser, Vernal, Vanguard, Florida 77, and Florida 99.

CHRIS COOK

Yuchi Arrowleaf Clover

ARROWLEAF CLOVER

Planting Date: September 1 - November 15

Seeding Rate[a]: 8-15 pounds per acre (broadcasted)
8-10 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Arrowleaf clover does well in a wide variety of soils, but does best on fertile, well-drained sites. This clover provides good forage production from late-winter (February) until early-summer (June). Arrowleaf clover is a good producer of hard seed, which makes it a good reseeder. It does well when planted with small grains such as wheat or oats. It may cause problems when planted with other species of clover due to its tall growth form and the potential for shading. Varieties include Yuchi, Meechee, Amclo, Apache, and Chief.

DON BALL

Ball Clover

BALL CLOVER

Planting Date: September 1 - November 15

Seeding Rate[a]: 4-5 pounds per acre (broadcasted)
3-4 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Ball clover is not as productive as most other annual clovers, such as crimson, berseem, and arrowleaf. Peak production only lasts for a short time during early-spring (late March to April). This is one reason ball clover is not commonly planted for deer food plots. It often is difficult to locate a source for ball clover seed, but once it is established, ball clover is an excellent reseeder. Ball clover also is adapted to a wide variety of soils and can grow on sites not suited for other clovers.

DON BALL

Berseem Clover

BERSEEM CLOVER

Planting Date: September 1 - November 15

Seeding Rate[a]: 18-20 pounds per acre (broadcasted)
12-16 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Berseem clover is not very tolerant of freezing conditions. This clover is tolerant of alkaline soils and is more tolerant of wet soils than most annual crops. Berseem clover is well-suited for non-acid Black Belt soils and high rainfall areas near the coast. This clover often produces more fall and winter forage than any other clover when planted in areas near the Gulf Coast (i.e., within 100 miles), but cool-season production falls off further north. This clover usually does not reseed well due to its low level of hard seed production, but moderate reseeding is possible with some cold hardy varieties. Berseem clover can be planted with other crops, such as small grains and other clovers. Varieties commonly planted for deer include Bigbee, Multicut, 9092, Trialex, and Calipso

Birdsfoot Trefoil

Photo © 2004 Oregon State University, Forage Information Systems

BIRDSFOOT TREFOIL

Planting Date: September 1 - November 15

Seeding Rate[a]: 4-6 pounds per acre (broadcasted)
2-4 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Birdsfoot trefoil is an excellent food source for northern areas, but is not suited for much of Alabama. It is drought tolerant, long-lived (5-10 years), and can tolerate soil acidity down to 5.5 pH once established. It should be planted with companion plants, such as small grains and clovers, since young seedlings are susceptible to overgrazing. Rates of companion plants should be less than in most combination plantings if a solid stand of birdsfoot trefoil is the objective. AU Dewey is a variety suited for north Alabama. This variety can handle heavy grazing pressure and weed competition.

CHRIS COOK

Chicory

CHICORY

Planting Date: August 15 - November 1

Seeding Rate[a]: 5-6 pounds per acre (broadcasted)
3-4 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: This perennial herb is a member of the lettuce family. Chicory is found in several commercially available deer food plot seed mixtures and makes an excellent companion plant for white and ladino clovers. This combination can last for several years with proper maintenance. Although planted in the fall, chicory does not begin rapid growth until spring. It continues producing until prolonged periods of cold weather slows its growth. This plant can last for up to three years. Common varieties include Puna, La Nina, Timaru, Forage Feast, Grouse, and Facon.

CHRIS COOK

AU Robin Crimson Clover

CRIMSON CLOVER

Planting Date: September 1 - November 15

Seeding Rate[a]: 20-30 pounds per acre (broadcasted)
15-20 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Crimson clover is an excellent forage producer during the winter and early-spring. It can grow in a variety of sites and tolerates acid soils better than many other clovers. It does best on well-drained soils. Crimson clover initiates growth earlier in the fall than other clovers and seeds out sooner than most other clovers. This makes it an excellent plant to include in combinations of small grains and clovers having peak forage productivity in late-spring and early-summer. Varieties include AU Robin, AU Sunrise, Chief, Dixie, Flame, and Tibbee.

CHRIS COOK

Oats

OATS

Planting Date: September 1 - November 1

Seeding Rate[a]: 90-120 pounds per acre (broadcasted)
75-90 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Oats are one of the most popular plantings for cool-season food plots in the Southeast. They are quick to establish and are an early season favorite of deer. Most varieties of oats are not as cold hardy as wheat or rye, so they may suffer some cold weather damage later in the winter, especially in northern portions of Alabama. Oats do well on most well-drained sites, but are not tolerant of poorly drained or sandy soils. Oats do well in combinations with other small grains and clovers. Varieties well-suited for most of Alabama include Bob, Buck Forage, Buck Magnet, Arkansas 833, Mitchell, Harrison, Coker 820, Florida 501, Florida 502, and Coker 227.

CHRIS COOK

Dwarf Essex Rape with Dixie Reseeding Crimson Clover

RAPE

Planting Date: August 15 - November 1

Seeding Rate[a]: 10-12 pounds per acre (broadcasted)
8-10 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Rape is one of the four Brassica species (i.e., rape, kale, swede, turnips) planted for deer forage production in the Southeast. Of these, rape probably is more commonly planted for deer. Rape is a high-protein forage and has the potential to produce large amounts of forage due to its broadleaf growth form. It is susceptible to early grazing pressure. Rape can be planted as a warm-season crop, but most often is planted in the fall. Rape does well on damp sites. The variety most commonly planted for deer is Dwarf Essex. Other varieties, including Rangiora, T-Raptor, Barnapoli, Maikari, Bioroa, Kurow, Omaru, Molina, and Emerald, are found in commercially available food plot seed mixtures.

CHRIS COOK

Cherokee Red Clover

RED CLOVER

Planting Date: September 1 - November 15

Seeding Rate[a]: 12-15 pounds per acre (broadcasted)
6-8 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Red clover is an excellent deer forage with a very long growing season. It is either an annual (Deep South), biennial (mid South), or weak perennial (North), depending on the location. With proper management (i.e., weed/grass control, lime, fertilizer) on appropriate sites, red clover can remain productive for several years. This clover remains productive throughout most of the spring and summer and can last until early October in cooler regions. Red clover may be the most productive of all the clover species in areas where it is well adapted. This clover does best when planted alone on fertile, well-drained sites, but it can be planted with small grains (e.g., wheat and oats) or other clovers. Red clover is moderately drought resistant. Commonly planted varieties include Cherokee, Redland II & III, Kenland, Cinnamon, Cinnamon Plus, RedlanGraze, Marathon, Red Gold, Mammoth, and Rudolph.

CHRIS COOK

Rye with Dixie Reseeding Crimson Clover

RYE

Planting Date: September 1 - November 1

Seeding Rate[a]: 120-150 pounds per acre (broadcasted)
90-120 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Rye is a commonly used component of many cool-season food plots. It is best suited to well-drained soils, including sandy sites, and is not as tolerant of wet sites as wheat. Of the cereal grains, rye is the most drought tolerant. Rye also is more cold hardy than oats. It does well when planted in combination with other small grains and clovers. Rye can be a problem when planted in combination with later maturing crops, such as red clover and chicory, because of its tall growth form and the potential for shading. Common varieties include Wren's Abruzzi, Florida 401, Wintergrazer 70, Maton, and Elbon.

CHRIS COOK

Ryegrass

RYEGRASS

Planting Date: September 1 - November 1

Seeding Rate[a]: 40-60 pounds per acre (broadcasted)
30-40 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Ryegrass is not considered a top crop choice for planting in food plots for deer. Ryegrass is only moderately preferred by deer and does not receive much use in areas where more palatable foods are available. There are many other cool-season crop choices that are much more palatable and nutritious for deer than ryegrass. Ryegrass grows on most sites and poorly prepared seedbeds. It also reseeds well. For these reasons, ryegrass is best suited for low maintenance food plots on poor quality sites, such as sites with compacted or low pH soils and areas with limited equipment access. Ryegrass food plots can be maintained for many years by discing and fertilizing in the fall. Additional seed may need to be applied to get thick stands. Ryegrass can be planted with a variety of other plants, including small grains and clovers, but its weak stem causes it to lay over in late spring and form a dense mat over other crops planted in the same food plot. This mat of ryegrass can cause problems due to shading, especially with later maturing species, such as ladino clover, white clover, red clover, and chicory. Common varieties of ryegrass include Gulf and Marshall.

KENT KAMMERMEYER

Subterranean Clover

SUBTERRANEAN CLOVER

Planting Date: September 1 - November 1

Seeding Rate[a]: 10-20 pounds per acre (broadcasted)
8-10 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Like nearly all clovers, subterranean clover is a nutritious forage that is readily consumed by deer. It typically does not produce as much forage as arrowleaf, berseem, or crimson clovers. This species of clover reaches peak productivity in late-winter to mid-spring and reaches maturity before the summer stress period. Subterranean clover does best in open areas, but it is more tolerant of shade than most clovers. This clover is a good choice for seeding logging roads and under thinned timber stands. It is best suited for well-drained sites with medium to heavy textured soils that have a good moisture holding capacity. Subterranean clover does best in areas with mild winters. This clover can be planted with other clovers and small grains. Varieties include Mt. Barker, Denmark, Meterora, Woogenellup, Nangech, and Tallarook.

CHRIS COOK

Triticale with Vetch, Winter Peas, Red Clover, and Chicory

TRITICALE

Planting Date: September 1 - November 1

Seeding Rate[a]: 120-150 pounds per acre (broadcasted)
90-120 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Triticale is a hybrid between rye and wheat. Two advantages triticale has over wheat or rye are that it often does better in colder climates and it grows well on less fertile sites. This small grain can be used in combinations much the same as wheat, oats, or rye. It is becoming more common in commercially available seed blends. Common varieties include Sunland, Florico, Trical 5, Florida 201, Alzo, Bogo, and Beagle 82.

CHRIS COOK

Hairy Vetch

VETCH (BIGFLOWER, COMMON, HAIRY)

Planting Date: September 1 - November 1

Seeding Rate[a]: 25-40 pounds per acre (broadcasted)
15-25 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Vetch is most productive from late-winter (February) until late-spring (May). Vetch does best in well-drained, medium textured soils. It is not extremely tolerant of heavy grazing, especially when plants are less than six inches tall. Vetch can be planted with small grains and clovers. Reseeding can be encouraged by discing in February every third year. Bigflower vetch is usually more preferred by deer than either hairy or common vetch. **Vetch can be a problem because it can form a dense mat of vegetation that shades and hinders growth of more preferred crops, such as clovers and chicory. More preferred crops are available for planting in cool-season food plots.**

CHRIS COOK

Wheat

WHEAT

Planting Date: September 1 - November 1

Seeding Rate[a]: 120-150 pounds per acre (broadcasted)
90-120 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Of the small grains, wheat is probably the most commonly planted for cool-season food plots. Wheat does well in a variety of sites, including fairly wet soils, and is readily consumed by deer. Like rye, it also is more cold hardy than oats. Wheat begins growth early in the fall so it is an excellent choice for including in mixtures with later growing clovers, such as arrowleaf, crimson, red, white, and ladino. Varieties sold at local seed stores and farm centers should be adapted for use in the Southeast. These include Saluda, Florida 304, Roane, Pioneer 2684, GA-Gore, GA-Dozier, Roberts, Stacy, and Williams.

CHRIS COOK

Osceola Ladino Clover

WHITE (LADINO) CLOVER

Planting Date: September 1 - November 15

Seeding Rate[a]: 4-6 pounds per acre (broadcasted)
3-4 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: White clovers are highly preferred and nutritious deer forages. They initially are slow growing in the fall, but produce abundant forage from late-winter through early to mid-summer once established. These clovers are somewhat tolerant of wetter soils and dry weather, but most varieties do not do well on droughty soils. Once established, white clover stands can persist for several years on good sites if competing weeds and grasses are controlled. Control of weed and grass competition can be accomplished using mowing or treatment with herbicides. White clovers do well when planted with small grains (wheat, oats, rye), other clovers, and chicory. Larger varieties of white clovers usually are referred to as ladino clovers. In the Southeast, the two most commonly planted varieties of ladino are Osceola (best for sandy soils) and Regal (fairly drought tolerant). Two relatively new varieties of white clover that perform well in the Southeast are Durana and Patriot. Other varieties of white and ladino clovers include Huia, Tripoli, California, Louisiana S-1, Colt, Seminole, Balansa, Rivendale, Super Haifa, White Dutch, and Advantage.

CHRIS COOK

Austrian Winter Peas

WINTER PEAS

Planting Date: September 1 - November 1

Seeding Rate[a]: 30-50 pounds per acre (broadcasted)
30-40 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Winter peas are very attractive to deer and provide excellent fall, winter, and early-spring deer forage. They are easily overgrazed, so they are best suited for planting in combination with other cool-season crops. Winter peas do well when planted with small grains (wheat, oats, rye), as well as annual clovers, such as arrowleaf and crimson. They do well in well-drained sites, but can tolerate soils that may be too wet for most clovers and small grains. Austrian winter peas are the most commonly planted variety in Alabama, but similar varieties of winter peas, including WW II and Magnus, are found in commercially available seed mixtures.

[a]All seeding rates are for planting a single plant species. If planting in combination with other species, reduce seeding rates by 1/2 to 2/3, depending on the number of species used in the combinations.

APPENDIX 3: Warm-Season Planting Guide

CHRIS COOK

Aeschynomene

AESCHYNOMENE (AMERICAN JOINTVETCH)

Planting Date: March 1 - June 30

Seeding Rate[a]: 10-15 pounds per acre (broadcasted)
8-10 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Aeschynomene or American jointvetch provides excellent, high-protein forage for deer during the summer months. It can be slow to establish due to grass and weed competition. Aeschynomene grows best in moist, light textured soils and is not suited for dry sites or sandy soils. It does best when planted with companion plants such as grain sorghum, alyce clover, or cowpeas.

CHRIS COOK

Alyce Clover

ALYCE CLOVER

Planting Date: March 15 - June 30

Seeding Rate[a]: 15-20 pounds per acre (broadcasted)
15-17 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Alyce clover provides high-quality forage from late-spring until first frost. It does not grow well on moist sites and is quite tolerant of dry conditions once established. Alyce clover is not very tolerant of weed competition. It does best when planted with other crops, such as Aeschynomene, cowpeas, or grain sorghum. It can be top-sown or drilled into annual cool-season food plots the following May or early June.

CHRIS COOK

Buckwheat

BUCKWHEAT

Planting Date: April 15 - August 31

Seeding Rate[a]: 50-70 pounds per acre (broadcasted)
30-40 pounds per acre (drilled)

Planting Depth: 1/4 to 1-inch

Comments: Buckwheat grows well in a variety of soil types and can be planted in areas with only minimal soil preparation. Buckwheat is very quick to establish and usually does a good job of shading out weeds. This trait can cause problems when buckwheat is planted with legumes. Non-legume crops, such as corn and grain sorghum, do fair in combination with buckwheat. Buckwheat has a short growing season of 8-12 weeks, depending on planting date. Buckwheat does not produce the same amount of forage on a per acre basis as other commonly grown warm-season forages. Buckwheat is highly palatable to deer, but cannot handle heavy browsing. It can be quite difficult to establish in areas with high deer numbers, but in many areas, it can take two or more years for deer to start using this crop.

CHRIS COOK

Corn

CORN

Planting Date: March 15 - May 31

Seeding Rate[a]: 12-15 pounds per acre (broadcasted)
10-12 pounds per acre (drilled)

Planting Depth: 1-inch

Comments: Corn is highly preferred by deer, both during development and after the corn has dried. Corn is a high-carbohydrate food that enables deer to put on large amounts of fat during the fall. Corn is low in protein when compared to many other crops planted for deer. Although planted in the spring, most of the crop is not utilized until fall and winter. Corn makes an excellent companion plant for vining warm-season crops, such as lablab, cowpeas, and forage-type soybeans. Like alfalfa, it can be expensive and require a lot of maintenance to produce a good crop. Corn is best suited to well-drained, upland sites.

CHRIS COOK

Cowpeas

COWPEAS

Planting Date: May 1 - July 15

Seeding Rate[a]: 40-90[b] pounds per acre (broadcasted)
15-30[b] pounds per acre (drilled)

Planting Depth: 1-inch

Comments: Cowpeas are highly nutritious (high-protein), highly productive, and highly preferred by deer. They cannot handle heavy browsing, so larger food plots should be planted to maximize production. Cowpeas grow on a variety of sites, but do best when planted on well-drained, fertile sites. They can be planted with companion plants, such as grain sorghum, Aeschynomene, or alyce clover. Numerous varieties of cowpeas are available, including both bush and climbing/trailing varieties. Varieties commonly planted for deer include combine, iron clay, Catjang, Tory, and Wilcox.

CHRIS COOK

Grain Sorghum

GRAIN SORGHUM

Planting Date: April 15 - June 30

Seeding Rate[a]: 15-20 pounds per acre (broadcasted)
8-12 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Grain sorghum is a warm-season grain that grows in a wide variety of soils. Although deer sometimes consume the plant during early growth and the seed heads once they mature, sorghum is most valuable as a support crop for more nutritious deer forages, such as Aeschynomene, alyce clover, and cowpeas. In addition, grain sorghum produces an abundance of seeds that are readily consumed by dove, quail, and turkey.

CHRIS COOK

Hairy Indigo

HAIRY INDIGO

Planting Date: May 1 - June 30

Seeding Rate[a]: 20-30 pounds per acre (broadcasted)
10-20 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Hairy indigo provides abundant growth in late-summer and early-fall, but may not be heavily grazed if more preferred foods are available. This legume has a deep taproot, which gives it excellent drought tolerance. This characteristic makes hairy indigo a good insurance plant for planting with higher preference species, such as cowpeas, lablab, or soybeans. Hairy indigo historically has not commonly been planted for deer in Alabama, although it is suited for many of the droughty coastal plain soils.

CHRIS COOK

Lablab

LABLAB

Planting Date: April 15 - June 30

Seeding Rate[a]: 20 pounds per acre (broadcasted)
10-12 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Lablab is a highly nutritious (high-protein), highly preferred deer forage. It grows well on sandy, well-drained upland sites. Lablab is very drought resistant and can grow in areas that may be too dry for other warm-season legumes. It does not tolerate wet conditions. Weed competition can be a problem during early stages of growth. Once established, lablab is tolerant of moderate to heavy grazing pressure. Lablab can be planted with other drought resistant legumes, as well as corn and grain sorghum.

CHRIS COOK

Dwarf Essex Rape

RAPE

Planting Date: April 15 - June 15

Seeding Rate[a]: 10-12 pounds per acre (broadcasted)
8-10 pounds per acre (drilled)

Planting Depth: 1/4 to 1/2-inch

Comments: Rape is one of the four Brassica species (i.e., rape, kale, swede, turnips) planted for deer forage production in the Southeast. Of these, rape probably is more commonly planted for deer. Rape is a high-protein forage and has the potential to produce large amounts of forage due to its broadleaf growth form. It is susceptible to early grazing pressure. Rape can be planted as a warm-season crop, but most often is planted in the fall. Rape does well on damp sites. The variety most commonly planted for deer is Dwarf Essex. Other varieties, including Rangiora, T-Raptor, Barnapoli, Maikari, Bioroa, Kurow, Omaru, Molina, and Emerald, are found in commercially available food plot seed mixtures.

CHRIS COOK

Soybeans

SOYBEANS

Planting Date: April 15 - June 30

Seeding Rate[a]: 50-70 pounds per acre (broadcasted)
30-50 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Soybeans are one of the most highly preferred and nutritious of all crops planted for deer. Unfortunately, soybeans cannot handle heavy browsing pressure in the early stages of development. As a result, they most often do not last long when planted in small food plots or in areas with high deer densities. Other browse tolerant legumes probably are better suited for warm-season food plots. If sufficient acreage is planted, soybeans will produce high-quality forage throughout most of the summer. They grow best in well-drained soils and are only slightly drought tolerant. Soybeans can be planted with companion plants, such as cowpeas, grain sorghum, or corn. Hundreds of varieties of soybeans are available for planting, but a slow maturing variety (i.e., maturity group V, VI, or VII) and/or forage variety is recommended for deer food plots. Laredo, Tyrone, Quail Haven, and Hutcheson all are varieties commonly planted for deer.

DAVID NELSON

Velvetbean with Corn

VELVETBEAN

Planting Date: April 15 - June 15

Seeding Rate[a]: 40-60 pounds per acre (broadcasted)
20-30 pounds per acre (drilled)

Planting Depth: 1/2 to 1-inch

Comments: Velvetbean is a viney, annual legume that can grow up to 40 feet in length. This legume is tolerant of acid soils and low fertility. Velvetbean is eaten by deer, but it is not highly preferred. It often is planted as a companion plant to corn. The corn stalks provide support for the long, trailing velvetbean vines. Other legumes, such as soybeans, cowpeas, and lablab, are more preferred by deer and better choices for planting as companions with corn.

[a]All seeding rates are for planting a single plant species. If planting in combination with other species, reduce seeding rates by 1/2 to 2/3, depending on the number of species used in the combinations.

[b]Seeding rate varies depending on variety.

APPENDIX 4: Useful Weights and Measures

Weights

ounce = 28.35 grams = 437.5 grains
pound = 16 ounces = 7,000 grains = 454 grams
kilogram = 1,000 grams = 2.205 pounds
ton (U.S.) = 2,000 pounds = 908 kilograms

Length

inch = 0.083 foot = 2.54 centimeters = 25.4 millimeters
foot = 12 inches = 0.3048 meters = 30.48 centimeters
yard = 36 inches = 3 feet = 0.9144 meters
chain = 66 feet = 22 yards = 20.108 meters
mile = 1,760 yards = 5,280 feet = 1.61 kilometer = 80 chains

Area

square foot = 144 square inches = 929.03 square centimeters
square yard = 9 square feet = 0.836 square meters
acre = 4,840 square yards = 43,560 square feet = 4,046.9 square meters = 0.405 hectares
hectare = 10,000 square meters = 2.47 acres
square mile = 640 acres = 2.59 square kilometers = 1 section

Volume (liquid)

teaspoon = 0.1667 fluid ounce = 4.93 milliliters
tablespoon = 3 teaspoons = 0.5 ounce = 14.8 milliliters
fluid ounce = 2 tablespoons = 29.58 milliliters
cup = 8 fluid ounces = 16 tablespoons = 236.6 milliliters
pint = 2 cups = 16 fluid ounces = 473.2 milliliters
quart = 4 cups = 2 pints = 32 fluid ounces = 0.946 liters
gallon = 4 quarts = 8 pints = 128 fluid ounces = 3.785 liters
cubic foot of water = 7.5 gallons = 62.4 pounds = 28.3 liters

Volume (dry)

peck = 8 quarts = 16 pints = 538 cubic inches = 8.8 liters
bushel = 4 pecks = 2,150 cubic inches = 32 quarts = 35 liters

APPENDIX 5: Approximate Pounds Per Bushel and Seeds Per Pound of Some Commonly Planted Deer Forages

Crop	Approximate Pounds/Bushel	Approximate Number of Seeds/Pound (x 1,000)
Alfalfa	60	227
Alyce Clover	60	301
Arrowleaf Clover	60	400
Ball Clover	60	1,000
Berseem Clover	60	207
Bigflower Vetch	60	32
Birdsfoot Trefoil	60	370
Caleypea	60	18
Cowpea	60	4
Crimson Clover	60	150
Grain Sorghum	50	24
Hairy Vetch	60	16
Oats	32	15
Red Clover	60	272
Rye	56	18
Ryegrass	24	224
Soybean	---	5
Subterranean Clover	60	54
Sweetclover	60	259
Triticale	48	15
Wheat	60	11
White Clover	60	768

APPENDIX 6: Additional Sources of Information on Food Plots and White-tailed Deer Management

BOOKS AND PUBLICATIONS

Biology and Management of White-tailed Deer in Alabama (2003) by Chris Cook and Bill Gray. Alabama Division of Wildlife and Freshwater Fisheries. 175 pages.

Quality Whitetails - The Why and How of Quality Deer Management (1995) Karl V. Miller and R. Larry Marchinton, editors. Stackpole Books, 332 pages

Southern Forages - Third Edition (2002) by Donald M. Ball, Carl S. Hoveland, and Garry D. Lacefield. Potash & Phosphate Institute and the Foundation for Agronomic Research, 322 pages.

Forage Crop Pocket Guide (2001) by Donald M. Ball, Carl S. Hoveland, and Garry D. Lacefield (D. L. Armstrong and B. C. Darst editors). Potash & Phosphate Institute and the Foundation for Agronomic Research, 52 pages.

White-tailed Deer - Ecology and Management (1984) Lowell K. Halls, editor. Stackpole Books, 870 pages.

Producing Quality Whitetails - Revised Edition (1998) by Al Brothers and Murphy E. Ray, Jr. (Charly McTee, editor). Texas Wildlife Association, 226 pages.

Manage Your Way To Better Hunting (2004) by Grant Woods, Bryan Kinkel, and Robert Bennett. Woods and Associates, Inc., 236 pages.

The Southern Food Plot Manual (1994) by Ben H. Koerth and James C. Kroll. Institute for White-tailed Deer Management and Research, 132 pages.

A Practical Guide to Producing and Harvesting White-tailed Deer (1994) by James C. Kroll. Institute for White-tailed Deer Management and Research, 491 pages.

Managing Wildlife - Managing Wildlife on Private Lands in Alabama and the Southeast (1999) Greg K. Yarrow and Deborah T. Yarrow, editors. Sweetwater Press, 588 pages.

Wildlife of Southern Forests - Habitat and Management (2001) James G. Dickson, editor. Hancock House Publishers, 480 pages.

ORGANIZATIONS AND AGENCIES

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and Freshwater Fisheries, Wildlife Section
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Wildlife Sciences - Extension
122 M. White Smith Hall
School of Forestry & Wildlife Sciences
Auburn University, AL 36849-5418
(334) 844-1002
www.sfws.auburn.edu/extension

Mississippi State University Extension Service
Box 9601
Mississippi State, MS 39762
(662) 325-3036
www.msucares.com

Auburn University
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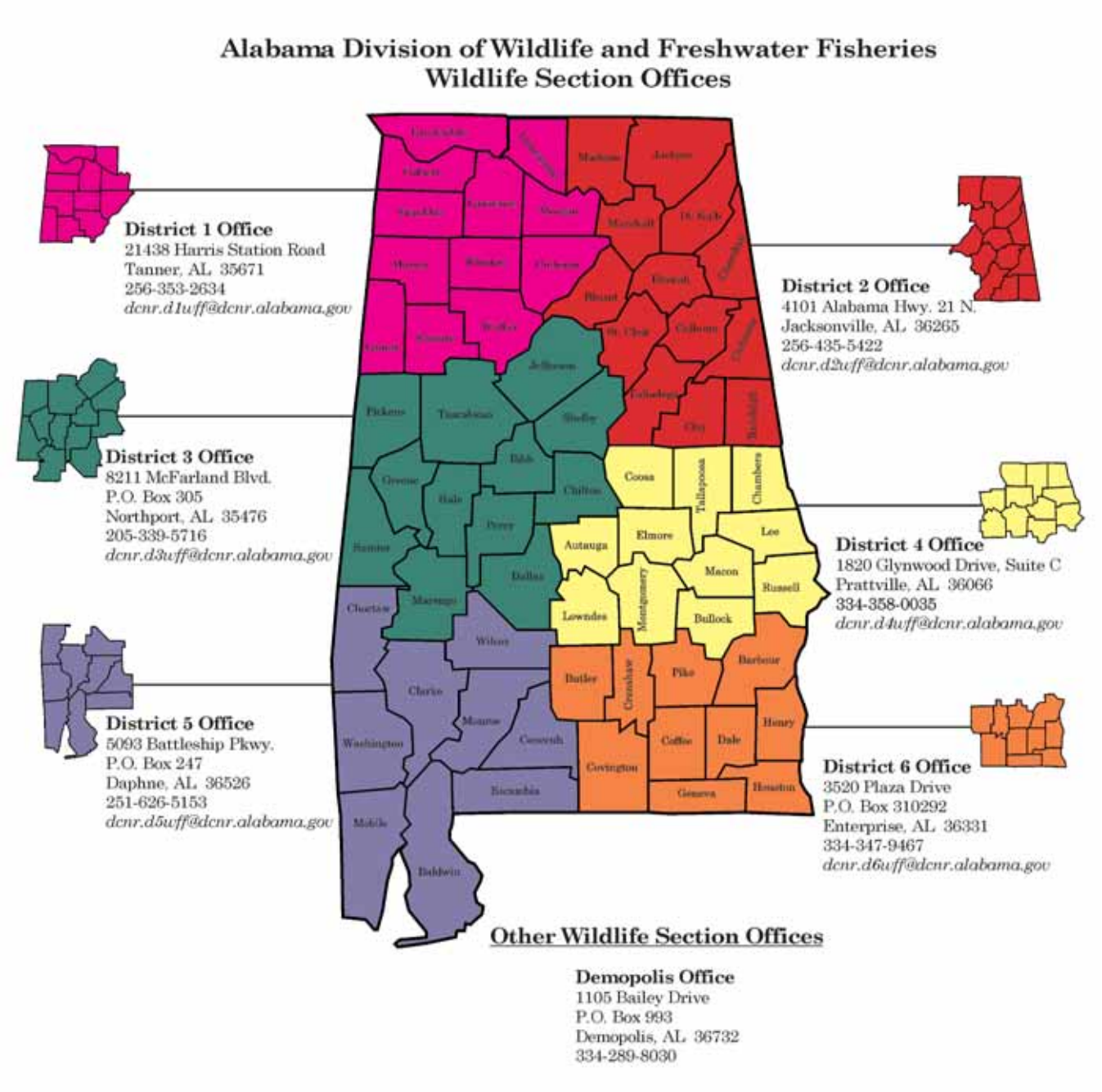
Alabama Cooperative Extension System
109-D Duncan Hall
Auburn University, AL 36849
(334) 844-4444
www.aces.edu

Quality Deer Management Association
P.O. Box 227
Watkinsville, Georgia 30677
1-800-209-3337
www.qdma.com

APPENDIX 7: Contact Information for Division of Wildlife and Freshwater Fisheries, Wildlife Section Offices



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Chris Cook received a B.S. (1990) and a M.S. (1993) in Wildlife Science from Auburn University. He began work with the Alabama Division of Wildlife and Freshwater Fisheries in 1993 as an area biologist in Walker County. In 1995, Chris transferred to Demopolis to begin work as a technical assistance biologist. He currently provides technical assistance on wildlife management to cooperators enrolled in the Deer Management Assistance Program, as well as other landowners and hunting clubs throughout Alabama. Chris also serves as the Deer Studies Project Leader for the Division of Wildlife and Freshwater Fisheries. Chris lives in Demopolis with his wife, Aprille, and son, Jackson.

Bill Gray received a B.S. in Wildlife Science from Auburn University in 1990. He began his career with the Alabama Division of Wildlife and Freshwater Fisheries in 1991 as an area biologist in northwest Alabama. Beginning in 1994, Bill worked as a deer management biologist in east central and southeast Alabama until taking his current position as Supervising Wildlife Biologist for District VI in southeast Alabama in 2004. Bill lives in Ashford with his wife, Aimee, and son, Forrest.

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