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Establishment of Food Plots for White-tailed Deer in Central and South Florida[1]

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The establishment of food plots has become a popular white-tailed deer management practice. Although food plots should never be viewed as a substitute for properly managed, natural deer habitat, when used in combination with other habitat management techniques their establishment on private and public lands has proven beneficial.

In Florida, poor soil fertility, cool winters, and frequent droughts can restrict plant growth, resulting in natural forages of low nutritional quality and causing seasonal fluctuations in the quantity of food available to deer. In well managed habitats, food plots and supplemental plantings can compensate for seasonal fluctuations in food availability and the poor nutritional quality of natural forages. This may help raise the carrying capacity of an area for deer and maintain or improve the nutritional status, productivity, and quality of a deer herd (Figure 1). In addition to improving deer health and condition, food plots can increase the chance of successful deer viewing or harvest. Deer often shift their center of activity to locations where food plots have been established, causing them to become concentrated in a particular area and increasing the chance they can be successfully observed and/or hunted. Finally, the establishment of food plots can show a landowner's commitment to deer management, potentially aiding in the marketing of hunting leases and other programs to prospective hunters.

Figure 1. Food plots and supplemental plantings can compensate for seasonal fluctuations in deer food availability and the poor nutritional quality of natural forages. Credits: K.M. Gale, www.forestryimages.org.

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Location, Size, Shape, and Distribution of Deer Food Plots

The location, size, shape, and distribution of deer food plots are important considerations, particularly if their effect is to be maximized.

Location

The location of a food plot determines its size and growing conditions, as well as the likelihood it will be utilized by deer. Deer are unlikely to use food plots located a long distance from escape cover. Therefore, plots should be established near natural cover regularly frequented by deer. Other considerations when establishing a food plot should include its proximity to water and distance from areas of high human activity. If the primary purpose of the food plot is to attract deer for hunting, it may also be desirable to consider wind direction when deciding on location. Deer will often avoid plots upwind of escape cover. Lower elevation sites should also be avoided as flooding will make foods less available and inhibit establishment. Establishment costs are typically minimized if deer food plots are located in existing openings, e.g., natural meadows, abandoned or fallow fields, edges of interior roads, utility rights of way, and firelanes.

Size

Food plots for deer are typically between 1 and 3 acres. Deer are an “edge species,” preferring to occupy the area where different habitats meet. These areas provide them with access to cover and food resources. As a result, they are usually reluctant to feed in the center of large plots during daylight hours, especially if they are subject to regular disturbance or hunting. Therefore, several small food plots are usually preferable to one large one.

Shape

When considering the shape of a deer food plot, the objective should be to maximize the amount of edge. This is most easily achieved through the establishment of long narrow plots (Figure 2). These have considerably more edge than square or circular plots of similar size. Irregularly shaped food plots planted in natural openings also increase the amount of edge. However, in areas where a fence must be erected to prevent consumption and damage of deer forage by grazing livestock or feral hogs, a square plot may be preferable as such a design minimizes fencing costs. Fencing costs can also be reduced by designing food plots so that they utilize existing fences or gates, e.g., those often found separating native and improved pasture, on one or more sides. Square plots may also be more appropriate when the sole aim is to attract deer for hunting. A square plot concentrates deer in a smaller area than does a long narrow plot making them easier to harvest.

Figure 2. Long, narrow food plots are favored by deer as they maximize the amount of edge while minimizing the distance to escape cover. Credits: E.V. Willcox.

Distribution

Depending on the availability and quality of native wildlife forages, deer food plots containing warm- and cool-season forages should comprise between 1 and 3 percent of the land area utilized by deer. This is equivalent to 1 to 3 acres per 100 acres of deer habitat, with no less than one plot per 160 acres.

What to Plant

To overcome seasonal fluctuations in the quantity and quality of deer food in Florida, it is necessary to plant both warm- and cool-season supplemental forages. These provide deer with a high quality food source year round.

Different plant species are adapted to different soil and growing conditions. Therefore, if planting deer forages for the first time, within each 1-3 acre

plot start by planting 1/8 to 1/2 acre each of a wide variety of seeds and seed mixtures. This will allow for the determination of which plant species are most productive on a particular piece of land. Once productive species are determined for an area, combination plantings, i.e., mixtures of two or more species planted at the same time, should be used. Combination plantings provide a diverse food source for deer and, as different plant species grow at different rates and times, ensure new species are available to replace those that have matured. This lengthens the period of time over which food is available and, when both warm- and cool season forages are planted, ensures food is available to deer throughout the year. In addition, combination plantings provide a more diverse food source for wildlife and reduce the risk of losing entire food plots to poor weather, insect pests, or disease. There are many commercially available deer food plot seed mixes that may provide nutrious and preferred deer foods. However, the establisment of most such mixes under Central and South Florida soil and climatic conditions has not been evaluated. The following sections list the different warm- and cool-season legume and grass species readily consumed by deer that could potentially be grown in food plots in Central and South Florida. In addition, for each species recommended, it details the soil and growing conditions needed for successful establishment, along with information on planting. Seeding rates listed below are for single species plantings. When planting multiple speices together, adjust seeding rates proportionately. Care should be taken to ensure that, if planting legumes, they are properly inoculated with nitrogen-fixing bacteria prior to seeding. Inoculant varieties vary depending on the legume species being planted. Therefore, care should be taken sure to use the appropriate inoculant. For additonal information on innoculation, see http://edis.ifas.ufl.edu/AG140.

Highly Preferred Legumes

Deer Vetch/Aeschynomene—*Aeschynomene americana*: Warm season annual; seeding rate: 5-8 lbs/acre of de-hulled seed or 20-25 lbs/acre of seed with hull; plant: 1/2-1 1/2 inches deep prior to beginning of summer rains in April and May; pH: 5.0-6.0; new land requires inoculation (cowpea type); tolerates flooding.

Alyceclover—*Alysicarpus vaginalis*: Warm season annual; seeding rate: 15-20 lbs/acre; plant: 1/4- 1/2 inches deep from April 15 through June; pH: 6.0-7.0; new land requires inoculation; currently available varieties are susceptible to nematode damage.

Cowpeas—*Vigna seninsis/Vigna unguiculata*: Warm season annual; types: black eye peas, Crowder peas, cream peas, iron/clay peas; seeding rate: 60 lbs/acre; plant: 1/4- 1/2 inches deep from March through September; pH: 5.5-6.5; excessive nitrogen levels stimulate vine growth and prolong the period to harvest; new land requires inoculation (cowpea type).

Soybeans—*Glycine max*: Warm season annual; recommended varieties: Donegal and Hinson Long Juvenile; seeding rate: 35-100 lbs/acre; plant: 1/2-1 inches deep from March through June; pH: 5.8-6.5; new land requires inoculation (soybean type); Hinson Long Juvenile: soybean released by UF has resistance to the southern root-knot nematode and pod and stem blight.

Vetch—*Vicia* spp.: Cool season annual; recommended varieties: Americus, Cahaba White, Hairy, and AU-Early Cover; seeding rate: 20-30 lbs/acre; plant: 0- 1/2 inch deep from September 15 through November 15; pH: 5.5-7.0; requires inoculation (pea and vetch type) grows best on well-drained, fertile, loamy soils; has a spreading, viney growth habit; reseeds itself fairly well.

Austrian Winter Pea—*Lathyrus hirsutus*: Cool season annual; seeding rate: 50 lbs/acre; plant: 1/2 inch deep from September through October; pH: 6.0-7.5; requires inoculation (pea and vetch type).

Perennial Peanut—*Arachis pintoi*: Warm season perennial; recommended varieties: Florigraze and Arbrook; seeding rate: 80 bushels (rhizomes)/acre; plant: 1 1/2-2 inches deep during February; pH: 5.0-7.5; requires inoculation (cowpea type); adapted to the well-drained soils.

Alfalfa—*Medicago sativa*: Cool season perennial, but will often act as an annual in Central

and South Florida; recommended variety: Florida 99; seeding rate: 18-22 lbs/acre; plant: 1/4- 1/2 inches deep from October 15 through November 15 in Central and South Florida; pH: 6.0-6.5; requires inoculation (alfalfa type); does best on high clay soils and does not tolerate wet soil conditions.

Red Clover—*Trifolium pretense*: Cool season perennial, but may not perreniate in Florida; recommended varieties: Cherokee, Southern Belle, Kenland, and Redland III; seeding rate: 8-10 lbs/acre under good conditions, but 12-15 lbs/acre under less favorable conditions; plant: 1/4- 1/2 inches deep during October and November; pH: 6.0-7.0; requires inoculation (clover type); some varieties tolerate nematodes.

White Clover—*Trifolium repens*: Cool season perennial; recommended varieties: Osceola and Louisiana S-1; seeding rate: 3-4 lbs/acre; plant: 0- 1/4 inches deep between October 1 and November 15, when soil moisture is adequate for germination; pH: 6.0-7.0; requires inoculation (clover type); susceptible to nematode damage; to allow for natural re-seeding, rest during bloom period and disturb soil in fall.

Moderately Preferred Legumes

Hairy Indigo—*Indigofera hirsute*: Warm season annual; seeding rate: 10-15 lbs/acre; plant: < 1/2 inch deep (may be broadcast) during late March through June; pH: 6.0; requires inoculation (cowpea type); adapted to sandy soils that have good drainage; can be grazed when 12-18 inches high; can be invasive.

Partridge Pea—*Cassia fasciculate*: Warm season annual; seeding rate: 10-15 lbs/acre (scarified seed); plant: 1/2 inch deep (may be broadcast) in warm, moist soil between early March and early June; pH: wide range and tolerant of acidic soils; requires inoculation (cowpea type); will grow on a wide range of soils, however, moist, sandy soils are best.

Highly Preferred Grasses

Oats—*Avena* spp.: Cool season annual; recommended varieties: Horizon 314, Horizon 474, Horizon 321, Plot Spike LA 9339, and LA604; seeding rate: 96-128 lbs (3-4 bushels)/acre; plant: 1-2 inches deep during October in Central Florida and November in South Florida; pH: 6.0; does not tolerate wet conditions; Horizon 474, Horizon 321, and Plot Spike LA 9339 are relatively new varieties that have improved crown rust resistance, winter hardiness, and good grain and forage production in Central and South Florida.

Rye—*Secale cereale*: Cool season annual; recommended varieties: Wrens 96, Florida 402, Wrens Abruzzi, Bates, Elbon, Bonel, Oklon, Maton, Pennington Wintergraze 70, Early Graze, Wintermore, and AGS 104; seeding rate: 84-112 lbs (1.5-2.0 bushels)/acre; plant: 1/2 inch deep during October in Central Florida and November in South Florida; pH: 6.0; drought but not wet tolerant.

Wheat—*Triticum aestivum*: Cool season annual; recommended varieties: AGS 2000, Pioneer 26R61, Pioneer 2684, Coker 9835, Roberts, GA-Gore, GA-Dozier; AGS 2000, and Pioneer 26R61 (only Hessian fly-resistant varieties should be used); seeding rate: 90-120 lbs (1.5-2 bushels)/acre; plant: 1-2 inches deep during October in Central Florida and November in South Florida; pH: 6.0.

Moderately Preferred Grasses

Japanese Millet—*Echinochola crusgalli*: Warm season annual; seeding rate: 24-30 lbs/acre; plant: 1/2-1 inch deep between February 15 and August 15; pH: 6.0; tolerates moderately wet conditions.

Ryegrass—*Echinochloa crus-galli* var. *frumentacea*: Cool season annual; recommended varieties: Jumbo, Jackson, Gulf, Attain, and Beefbuilder III; seeding rate: 20-30 lbs/acre; plant: 0- 1/2 inch deep during October in Central Florida and November in South Florida; pH: 6.0; tolerates moderately wet conditions.

Forages with Questionable Growth in Central and South Florida or of Unknown Value as Deer Feed

Aeschynomene—*Aeschynomene evenia*
Buckwheat—*Fagopyrum esculentum*
Chicory—*Cichorium* spp.
Chufas—*Cyperus esculentus* (Ocala North)

Crimson Clover—*Trifolium incarnatum* (Pasco County North)
Carpon Desmodium—*Desmodium heterocarpon*
Leucaena—*Leucaena spp*.
Lespedeza—*Lespedeza* spp. (*Bicolor lespedeza* may become invasive)
Maku Lotus—*Lotus pedunculatus*
Savanna Stylo—*Stylosanthes guianensis*

Planting

Proper site preparation is crucial for successful food plot establishment. Inadequate site preparation can lead to crop failure. Ideally, seedbed preparation should begin several months prior to food plot establishment to provide sufficient time for fertilization and/or liming, to be conducted and have an effect. The most appropriate method for seedbed preparation depends on a number of factors such as the forage planted, condition of the planting site, and equipment available. However, with any preparation method employed, the ultimate aim should be to provide a moist, firm, level, weed-free seedbed.

Tilling is the practice most commonly used in food-plot seedbed preparation. Tilling methods involve the plowing, turning, or loosening of the soil prior to seed sowing (Figure 3), with the objective of removing all vegetation and providing a bare soil surface for planting. Seeds are then broadcast over the area or planted with a seed drill, usually followed by cultipacking or rolling. As all competing vegetation is removed, crops are usually most productive if soil is fully tilled prior to planting. In addition, as tilling incorporates organic plant material in to the ground, the process can improve the nutrient status and water holding capacity of the soil for future crops. Nevertheless, this method of land preparation requires considerable labor and mechanized equipment, and establishment costs can be considerable. In addition, cool- and warm-season forages must usually be grown in separate plots to permit tilling prior to each planting. As a result, twice the land area must exist for food plot establishment. If both are to be planted in the same food plot, warm-season plantings must be plowed under in preparation for cool-season forage plantings and vice versa. However, this does not provide an even forage supply and deer are left without a supplemental food source until new crops grow. Unfortunately, tilling also removes native weeds, some of which may be as nutritious to deer as the forage crop being planted, increases the risk of seed loss to drying, leaves soil prone to erosion, and removes habitat important to other game and non-game wildlife species.

Figure 3. A disk can be used to prepare the seedbed of a food plot for planting. Credits: E.V. Willcox.

Overseeding provides an alternative to tillage. This method can be used when there is a desire to maintain perennial pasture grasses or to leave some native vegetation standing. Typically, when overseeding, the area to be planted is first lightly disked or chopped. This causes disturbance to the soil surface and can provide a suitable seedbed for some larger seeded species. After disking, seeds are broadcast over the plot area or planted using a seed drill. If seed is to be drill planted, simply mowing the area prior to planting may also be appropriate

Overseeding reduces the risk of soil erosion and seeds drying out prior to germination, as well as helping to maintain wildlife habitat in the area while food plot crops are initially growing. In addition, it is easier to grow both warm- and cool-season forages on the same site using this practice. As one season nears an end, the food plot can be lightly re-disked and seeds of the new seasons crop broadcast or planted. This leaves some of the previous seasons forage standing while new plants germinate, providing deer with a continuous food supply. However, certain methods of overseeding require specialized equipment, e.g., cultipacker, pasture drill, or no-till drill. In addition, native vegetation and perennial pasture grasses often compete for resources with

germinating seedlings resulting in lower crop production than on fully tilled sites. To help overcome this, the seeds planted should be of a competitive species or variety. This is especially important during the warm-season when application of fertilizer enhances the growth of perennial grasses and native vegetation. Planting seeds before already established vegetation gains enough height to crowd out new seedlings, can aid in food plot establishment, as can mowing or bush hogging tall grass and weeds. The use of a mower or bush hog may also be needed if crops planted in the previous season limit the germination of new plantings.

Whether tilling or overseeding a food plot, it is essential the area be leveled and firmed before and/or after seeds are planted. A cultipacker or roller is often most useful for leveling and firming the seedbed prior to and/or after planting (Figure 4). However, if neither of these are available, dragging a weighted board or section of chain-link fence over the area serves as a good alternative. A firm seedbed ensures good soil-seed contact and enhances water movement to the seed while leveling helps maintain a consistent planting depth. This is especially important for many of the small-seeded legumes, e.g., white clover, which can fail to successfully germinate if planted too deep. Site leveling is also important for water management as it helps avoid the formation of standing water in low areas. This can be important in areas of South Florida prone to seasonal flooding.

Figure 4. A cultipacker or roller can be used to level and firm the seedbed of a food plot before and after planting. Credits: E.V. Willcox.

Fertilization and Liming

Very few sites in Florida naturally contain appropriate amounts of nutrients to permit the successful establishment and growth of forage species typically planted in deer food plots. Deficiencies in nitrogen, phosphorus, and potassium are most common. However, several other nutrients essential for plant growth but required in smaller amounts can also limit plant growth, e.g., calcium, magnesium, and sulphur. Soil testing is the best way to determine which soil nutrients are deficient and may potentially limit plant production. By conducting soil tests on food plot sites, the appropriate type and quantity of fertilizer can be added to the site and plant growth and performance enhanced.

In Florida, many food plots are also unlikely to have a pH suitable for growth of deer forage species. Liming raises soil pH to a level that permits or improves plant growth and performance, whichis particularly for legumes. Again, soil tests are essential to determine the pH of food plot soils and the amount of lime that should be applied.

It should be emphasized that periodic soil testing, followed by liming and fertilization according to soil test recommendations, is very important if food plots are to be productive. The first of these soil tests should ideally be conducted 4 to 6 months prior to the food plot being planted. This will allow appropriate quantities of fertilizer and lime to be added during site preparation. If food plots are being tilled prior to planting, fertilizer and lime should be broadcast and disked into the soil as the seedbed is being prepared. If a no-till system is used, fertilizer and lime will be broadcast but not mechanically incorporated into the soil. Soil tests should be repeated at least every 3 years to ensure additional fertilizer or lime application is not necessary.

Additional information on soil fertility in food plots can be found at http://edis.ifas.ufl.edu/SS468. The University of Florida Extension Soil Testing Laboratory can supply information on how to take soil samples. For a nominal charge, they also conduct soil tests for landowners and provide fertilization and liming recommendations. For more information, visit their website at http://soilslab.ifas.ufl.edu.

Food Plot Economics

Generally, it is cheaper to establish food plots in existing openings, e.g., natural meadows, abandoned or fallow fields, edges of interior roads, utility rights of way, and fire lanes, than in wooded areas. Clearing an area of trees can significantly increase site preparation costs.

Table 1 provides an estimate of the establishment costs for a one acre deer food plot. If land must be cleared of trees prior to site preparation, an additional $200-400 per acre should be added to this estimate. Seed costs have not been included as they will vary considerably depending on the seed combination or variety selected and the seeding rate. However, you should expect to spend between $30-100 per acre on seeds. Therefore, depending on the condition of the site where the food plot is to be located, the amount of land preparation needed, and the seeds planted, you should budget between $287 and $357 per acre plus the cost of seed for food plot establishment. There will be an additional cost associated with those plots that need to be fenced to prevent grazing and damage by livestock and feral hogs.

There will be annual maintenance costs associated with established food plots. It will usually be necessary to conduct a soil analyses and fertilize and lime according to soil test results. As many deer forages are annuals, you should be prepared to renovate and reseed food plots on a yearly basis. Although many annuals will re-seed naturally, the artificial application of some seed is usually necessary.

Table 1. Estimated establishment costs for a 1 acre deer food plot where tree removal is not required.

Activity	Unit	Cost/Unit ($)
Soil analyses	Plot	7.00
Fertilizer	Acre	50.00
Liming	Acre	75.00
Plowing	Acre	45.00
Disking	Acre	44.00
Mowing	Acre	19.00
Seeding	Acre	17.00
Total	Acre	257.00