

*Enhancing White-tailed Deer Habitats on Your Property***Food Plots**

**L**andowners who are managing their land for white-tailed deer may consider planting food plots to provide a supplemental food source (Figure 1). On some properties, establishing and maintaining food plots can provide supplemental food and nutrition for deer, but food plots should never be considered a substitute for managing the native vegetation to provide quality food sources. In situations where food plots would contribute to deer management objectives, the plots need to be established and maintained properly.

**Deer nutrition**

Deer are selective browsers; therefore, a variety of foods make up their diet, including broad-leaved herbaceous plants (forbs), woody plants, grasses, mast (acorns, fruits and berries) and mushrooms. No one food dominates a deer's diet throughout the year because deer select foods based on plant availability, palatability and nutritional content, all of which vary throughout the year.

The nutritional needs of deer also vary throughout the year. During the spring and summer, pregnant and lactating does and antler-growing bucks need more protein in their diets. During the fall and winter, deer have greater energy demands and therefore need more carbohydrates. Food plots can be planted to provide supplemental nutrition during times of stress, such as when does are pregnant or lactating and when bucks are growing antlers. Stress periods often coincide with times of the year when native vegetation is lacking or poor in quality, typically from late summer to early fall and from mid- to late winter. Refer to MU Extension publication G9487, *Nutritional Requirements of White-tailed Deer in Missouri*, for more complete information on deer nutrition.



*Figure 1. Food plots can provide supplemental food sources for deer.*

**Food plot considerations**

Before establishing a food plot for deer, consider these questions as you determine what is best for your property:

- What management objectives will a food plot accomplish on your property?
- Will the forage be available during stress periods and provide nutritional benefits?
- Will the forage benefits justify the required costs and effort?
- What areas on the property are good locations for food plots?
- Are deer likely to use the food plot?
- Do you have the necessary equipment to establish and manage food plots?

**Set objectives**

In most cases, managing existing native vegetation is a more practical and cost-effective way to increase the quantity and nutritional quality of available forage, as establishing and maintaining food plots can be expensive. However, if food plots are warranted, the first step is to determine the objectives for the food plots, as the objectives will guide all of the establishment and management decisions. In addition to providing supplemental nutrition during stress periods, food plots can be established to improve hunting or viewing opportunities, or to alter deer movement patterns.

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**Figure 2.** Woodland openings, logging roads and right-of-ways provide excellent locations for establishing food plots.

### **Determine the cost**

Establishing and managing a food plot requires a financial investment. Depending on the objectives, establishing a food plot can cost up to \$200 an acre in seed, herbicide, fertilizer and lime, in addition to the costs for equipment, labor and fuel.

The expense of managing a food plot from year to year will vary based on its size, annual fertility needs, weed control and the seed planted. If properly managed, some food plots may provide supplemental nutrition for over three years.

The cost of food plot establishment can be reduced in various ways. Cost-saving possibilities include partnering with nonprofit wildlife organizations that may provide seeds for planting, buying seed in bulk as a group of landowners or a cooperative, or working with a neighboring landowner and sharing equipment that can be used in establishing the plots.

### **Identify the location**

Areas where deer travel and areas near habitats that provide protective cover are ideal locations for food plots. Food plots can also be established in woodland openings



**Figure 3.** When establishing a food plot along a woodland edge, locate it 30 to 50 feet from the tree line and conduct edge feathering practices to allow a soft edge and transition zone of forbs, shrubs and vines to develop around it.



**Figure 4.** Visual barriers and screening cover such as hedgerows or corn plantings provide security for deer and can result in more deer sightings and hunting opportunities.

or adjacent to forest edges, idle areas or open fields. Other possible food plot locations include along rights of way, logging decks, fire lines and woodland roads (Figure 2).

Food plots are commonly established adjacent to a forested edge. These areas can be made even more attractive to deer and other wildlife through the development of a transition zone or field border with edge feathering or shrubs (Figure 3).

Because of the possibility of increased poaching or deer-vehicle accidents, a food plot should not be located next to a public road. Also, to prevent unnecessary issues with neighboring landowners and hunters, avoid planting a food plot along a property boundary.

### **Consider size and shape**

Topography and the surrounding habitat will dictate the type and amount of acreage that should be planted to a food plot. However, evenly distributing food plots over 2 to 5 percent of a property, using a combination of warm- and cool-season forages is generally recommended.

Recommended sizes vary from ½ to 5 acres depending on the forages being used and the configuration of the property. Generally, larger food plots of 3 to 5 acres are



**Figure 5.** Consider what equipment and implements are available when planning a food plot, as they can affect the plant species that can be successfully planted, as well as the size and location of a food plot. For example, remote plots can be inaccessible for some equipment, such as large tractors, planters and other implements.

more beneficial for deer. Smaller food plots can be useful but tend to produce less forage due to browsing pressure and shading. Food plots larger than 5 acres can be designed with corridors or hedgerows of trees planted at 50-yard intervals to create visual breaks and provide screening cover (Figure 4).

The size of a food plot may also be determined by access, size of equipment or location on the property. For example, small isolated fields may be available, but poor access limits the size of equipment that can reach them. Smaller equipment, such as an all-terrain or utility-terrain vehicle (ATV or UTV), might be the only means of maintaining a food plot in these isolated areas (Figure 5).

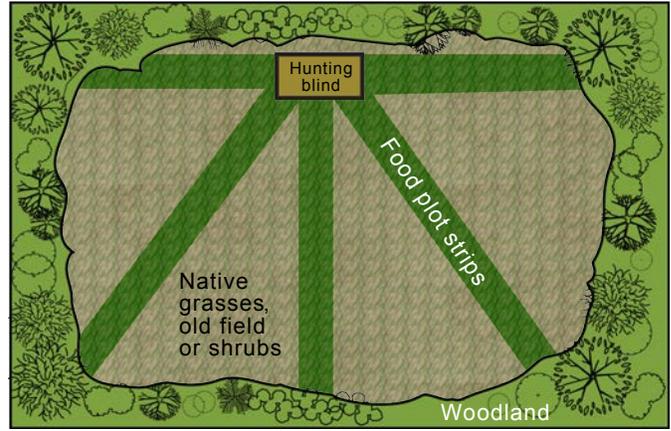
The shape of a food plot will often depend on the area's topography. Food plots can be rectangular, square or irregular, and the border can have edges that are wavy or straight. A hub-and-spoke design, where several food plots are established as lanes beside areas of early successional vegetation, can also be used to increase hunting opportunities (Figure 6). Large rectangular or square food plots could be established in areas of high deer density to reduce browsing pressure and increase the chance of forage establishment (Figure 7).

## Select forages

Selecting the right combination of forages or plant mixtures to use in a food plot is important. Various combinations of warm-season and cool-season forages that are either annuals or perennials can be considered (Table 1).

The type of planting that is suitable for an area depends several factors:

- Soil fertility (see *Food plot establishment* section)



**Figure 6.** Different food plot designs can achieve various goals. The hub-and-spoke design simultaneously provides natural habitat for cover and food plot strips that provide hunters with shooting lanes.



**Figure 7.** Plots can be planted with a grain crop and a cool-season forage such as winter wheat and clover. Larger plots have a better chance of withstanding heavy browsing pressure.

- Sunlight availability
- Soil drainage
- Equipment available
- Deer herd density
- Surrounding land-use practices

Planting a variety of cool- and warm-season forages will offer a diversity of foods that will be used at various times of the year. Select forages that are palatable and that provide nutrition during stress periods for deer.

## Annual vs. perennial

Annual plants germinate, grow, flower and produce a seed in one growing season. Perennial plants germinate, grow, flower and produce seeds on a continual basis over multiple years. Most food plot forages are annuals or perennials, but some can be biennials. Plants such as red clover have a biennial life span and generally live two years, growing roots, stems and leaves the first year, and flowering and then dying the second year.

## Cool-season vs. warm-season

Plants used in a food plot can be classified as either cool-season or warm-season. Cool-season, or “green browse,”



**Figure 8.** Adding legumes, such as various species of clover, with plantings of winter wheat or oats can provide a nutritious source of food during fall and winter.

food plot forages — such as clover, winter wheat and rape — grow during the fall and spring when temperatures are cooler. These forages provide sources of quality nutrition when other foods may be limited. They help bucks recover from the stress associated with breeding season and can increase hunting opportunities on the property. Annual grains such as winter wheat or oats planted alone or with various clover varieties will provide a source of nutritious foods during the late fall and winter (Figure 8).

Planting a variety of cool-season forages will ensure that adequate nutrition is available during the early fall when warm-season forages may be lacking and through late winter when green browse is at a premium.

Crops in the *Brassica* genus can also be very attractive to deer. *Brassica* species include turnips, rape, radishes, kale and canola (Figure 9).

Warm-season forages are typically planted in the spring (late April through May) after the threat of frost has passed and before the drier summer months. Both corn and grain sorghum produce grains that are high in carbohydrates and fat for energy and are very attractive to deer in the fall and winter. Soybeans are a warm-season crop that is heavily consumed as green forage in the summer and whose beans are used throughout the winter. Warm-season forages can supply supplemental nutrition that is important for lactation, fawn growth and antler development.

A variety of native forbs and legumes typically make up a large percentage of a deer's diet during the warm, summer growing season. Thus, warm-season plots can also be planted that contain a variety of high-quality legumes and other forbs to supplement naturally occurring vegetation.

### **Mixtures**

Planting mixtures of forage can provide multiple benefits (Table 2). One benefit is nutritional, as mixtures provide diverse nutrients and potentially lengthen the availability of forage. In addition, planting mixtures provides an insurance of sorts: if one species doesn't establish, the other may, which generally prevents a total food plot failure.

The use of cool-season perennial forages in various mixtures can be beneficial. Perennial clovers and many



**Figure 9.** Plants in the *Brassica* genus, including turnips (pictured), rape, radishes, kale and canola, can be used in food plots.

other legume species are a preferred food for deer and provide excellent nutrition. Species such as crimson clover, red clover and ladino white clover are commonly planted in mixtures with winter wheat, oats or both to provide a nutritious source of protein through the winter months. Also, the grain crop often protects the legume from drought or overgrazing, while the legume provides needed nitrogen for the grain. This relationship between the plants increases the chances of planting success and decreases the need for fertilizer.

## **Food plot establishment**

Once you have decided on the size of the food plot, you can ensure the success of the planting by determining soil fertility needs, preparing the seedbed and planting the forage at the recommended rates and depths. Keep in mind that establishing food plots on highly fertile soils and areas with flat topography will minimize establishment cost and reduce potential problems associated with soil erosion.

### **Determine soil fertility**

The quality and overall fertility of the soil will influence the ability of the plants to persist in the stand and can also indirectly affect the nutritional quality of the forages. The nutritional quality of the vegetation is a byproduct of the soil fertility level, which is therefore an important factor to consider before establishing a food plot.

### **Soil testing**

At least three months before planting, have the soil tested to determine whether any fertilizer or liming is required for the seeding mixtures you plan to use (Figure 10). A soil test will determine if fertility and pH need to be modified before planting. Collecting soil samples involves gathering four to six random samples of soil, about 4 inches deep, throughout the food plot. Be sure to collect samples of soil from several locations in the field. Mix together all the samples from within a single food plot and allow the soil to dry before sending it to a local MU Extension center or directly to the Soil and Plant Testing Laboratory for

**Table 1. Food plot forages commonly used in Missouri.**

Forage	Growing season	Life span	Soil pH	Seeding rate (pounds per acre)	Planting date	Additional information
Alsike clover	Cool	Perennial	6.0–6.5	Broadcast 4–6	August or April	Short-lived perennial that tolerates wet, heavy soils and flooding better than other legumes. Best to include in a mixture with wheat or oats.
Arrowleaf clover	Cool	Annual	6.0–6.5	Broadcast 10–15	September	Grows best on well-drained soils. Can be planted with winter wheat and oats.
Crimson clover	Cool	Annual	5.5–6.5	Broadcast 20–25	July to November	Excellent forage that can be planted with winter wheat or oats.
Forage radish	Cool	Annual	6.0–6.5	Broadcast 12 or drill 7–10	August to September	Plant on a well-drained seedbed in late August to early September, 8–10 weeks before a frost.
Kale	Cool	Annual	5.5–6.5	Broadcast or drill 4–5	August to September	Cold-hardy; does not thrive in hot weather.
Ladino clover	Cool	Perennial	6.0+	Broadcast 1–3	September or February to March	Tolerates wetter soils. Best to plant with annual grain.
Oats	Cool	Annual	5.8–6.5	Broadcast 80–120	August to September	One of the most palatable small grains. Easy to establish. Can tolerate heavy grazing but cannot tolerate poor drainage or drought.
Rape	Cool	Annual	5.3–6.8	Broadcast 4–9 or drill 2–6	August to September	Requires good soil drainage. Best planted in strips rather than in a mixed seeding where other plants may shade it.
Red clover	Cool	Perennial	5.5+	Broadcast 10	August or April	Adapted to poorly drained, shallow or infertile soils. Will not tolerate intense, long-term browsing or drought.
Rye (grain)	Cool	Annual	5.8–6.5	Broadcast 90–120	August to September	Good for erosion-prone areas. Tolerates acidic, poor soils.
Turnip	Cool	Annual	6.0–6.5	Broadcast or drill 3–6	August to September	Deer eat these after a deep freeze.
Wheat	Cool	Annual	5.8–6.5	Broadcast or drill 100–150	August to September	Highly palatable to deer. Good mixed with red, crimson, alsike or arrowleaf clover.
Alfalfa	Warm	Perennial	6.5–7.5	Broadcast 20–25 or drill 12–15	August or April	Alfalfa produces and persists poorly on shallow or poorly drained soils and should not be planted on such sites. Sensitive to competition and heavy browsing pressure. Requires precise soil fertility conditions.
Corn	Warm	Annual	5.8–7.0	Drill 10–15	April to June	Low in protein but high in carbohydrates. Susceptible to drought. Requires good soil and fertilization.
Cowpea	Warm	Annual	5.2–7.5	Broadcast 60–90 or drill 40–60	May to June	Susceptible to overgrazing. Can tolerate drought, low fertility and acidic soil conditions.
Grain sorghum	Warm	Annual	5.6–7.0	Drill 8	May to June	Seed heads are preferred by deer after the first freeze.
Lablab	Warm	Annual	5.5–7.5	Drill 15–20	May to June	Cannot tolerate wet soils or heavy deer browsing.
Soybean	Warm	Annual	5.5–7.0	Drill 50–75	May to June	Sensitive to deer browsing, especially the first 30–45 days.

For more information, refer to MU Extension publication G4652, Seeding Rates, Dates and Depths for Common Missouri Forages, <http://extension.missouri.edu/g4652>.

analysis. The soil test report will provide fertilizer and lime recommendations based on the vegetation to be planted. For more information on collecting and submitting soil samples, visit the MU Extension Soil and Plant Testing Laboratory website, <http://soilplantlab.missouri.edu/soil>.

### Key soil nutrients

The most important nutrients that plants need for growth are nitrogen (N), phosphorus (P) and potassium (K), which are the basis of most fertilizers. A soil test report will provide recommended fertilizer amounts and time of application that will ensure success. Typically, legumes have a high P and K requirement and do not need nitrogen because they “fix” nitrogen from the bacteria that occur on the nodules of their root systems.

Nitrogen is the key ingredient in plant proteins. It helps increase plant growth, palatability and crude protein levels.

Plants that aren’t getting enough nitrogen often have light green to yellow-green foliage. Grasses and grain crops are often the first to suffer from nitrogen deficiency and greatly benefit from timely nitrogen applications.

Phosphorus is essential for plant root and leaf growth. Without enough phosphorus, plant growth is stunted and foliage often is purplish.

Potassium helps plants regulate water, absorb nitrogen, perform photosynthesis and transport nutrients. This important nutrient also increases root



**Figure 10. Collect samples and have the soil tested to determine fertility needs of area before establishing a food plot.**



Seeding rates of forages used for food plots are generally similar to those recommended for agricultural production. However, reducing the seeding rates for various mixtures will promote the growth of annual forbs and other broad-leaved plants that can enhance the plant diversity and value of the food plot for other wildlife, such as bobwhite quail and songbird species.

### ***Inoculate legume seed***

Legumes are plants that have adapted a symbiotic relationship with certain species of bacteria. The bacteria attach to the legume's roots, where nodules form. These nodules allow the bacteria to extract nitrogen from the air for the plant's use. In exchange, the plant provides energy and nutrients for the bacteria's growth. Both the bacteria and the plant benefit from this relationship. As a result of this relationship, legume seed must be inoculated with a bacterium to ensure that it germinates. The sticking agent in the inoculant adheres the bacterium to the seed. Different legumes require different strains of bacteria, so be sure to buy the correct inoculant for the seed. Inoculant is usually available from the seed dealer. Follow directions on the inoculant bag for application.

Preinoculated legume seed is available, but its PLS may be low because the seed coating can account for 20 to 30 percent of the material in the seed bag.

### ***Select planting methods***

Follow recommended planting dates, seeding rates and depths to ensure a successful food plot. The preparation, planting and available maintenance equipment will generally determine the plant species that can successfully be planted. Refer to MU Extension publication G4652, *Seeding Rates, Dates and Depths for Common Missouri Forages*, for more planting and agronomic recommendations for establishing forages that can be used for establishing food plots.

Seeding can be done by drill, broadcast seeder or conventional planter, depending on the equipment that is available. A no-till drill is recommended when planting plants with larger seeds, such as corn and soybeans, or in rocky soil or sloped areas. No previous tillage is required when using a no-till drill. Whatever method you use, be sure to calibrate your seeder.

## **Food plot maintenance**

For food plots to succeed and remain productive, they must be maintained and managed. Maintenance often includes controlling weeds, ensuring proper soil fertility and monitoring browse pressure.

### ***Control weeds***

Controlling competing vegetation is a recommended management practice. Grasses are generally not considered to be a preferred food for deer in the summer, so various grass-selective herbicides may need to be applied as a postemergence application in broad-leaved warm-season



**Figure 11. Weeds may need to be controlled with herbicides to prevent them from competing with forages.**

food plots. Cool-season forages, especially perennial plots that contain clover or alfalfa, are also vulnerable to broad-leaved annual weeds. Several preemergence herbicides are available for controlling winter annual weeds; however, adding oats or winter wheat to these mixtures may be beneficial, as they tend to germinate quickly and can help suppress weed growth to some extent. The appropriate herbicide depends on the food plot plants and the problem weed species. Follow all directions on the herbicide label and properly calibrate herbicide sprayers so the correct rates are applied to ensure success (Figure 11).

Mowing or bush-hogging can also reduce broad-leaved weed competition. Food plots should be mowed before weeds flower and produce seeds. Mowing before a herbicide application can also help control weeds, particularly in mid-summer.

### ***Manipulate the planting frequency***

Instead of replanting annuals in a food plot each year, either allow the entire area to go fallow for two to three years or alternately replant half the area and allow the other half to go fallow. Either practice will result in a diversity of vegetation and will provide nutritional forage for deer.

### ***Monitor food plot success***

The planting success and overall use of food plots should be monitored using exclusion cages. These cages allow you to see how much forage is being eaten — the “browse pressure” — over time and to assess use by deer.

Exclusion cages prevent deer and other wildlife from feeding on plants in a small portion of the plot (Figure 12). The plants within the cages can be compared to those outside the cages to determine browsing pressure and planting success. The dimensions of these cages vary but generally need to be 4 feet high and 2 to 3 feet in diameter to provide useful comparisons.

## **Conclusion**

The benefits of a food plot depend on management objectives and surrounding land-use practices. Although

food plots can be beneficial, they will not resolve habitat problems, nor are they a replacement for habitat provided by native plant communities. However, properly managed food plots can provide supplemental food for deer during nutritional stress periods and can be an integral component of a deer management plan.

A successful food plot program requires planning, dedication and a knowledge of farming practices. Food plots are a management practice that can be fairly expensive and labor-intensive to implement. There is no “magic mix” or gimmick that provides a quality year-round food source for wildlife. Rather, using food plots to provide supplemental nutrition for deer often requires multiple plantings in appropriate locations combined with effective management of habitat provided by native plant communities.

## Additional information

Adams, A., and B. Burhans, eds. 2001. *Get in the game:*

*Attracting wild turkey and other wildlife to your land.*

Edgefield, SC: National Wild Turkey Federation.

Harper, C.A. 2004. *Growing and managing successful food plots for wildlife in the Mid-South* (PB1743). Knoxville:

University of Tennessee Agricultural Extension Service.

Kammermeyer, K., K.V. Miller, and L. Thomas Jr. 2006.

*Quality food plots: Your guide to better deer and better deer hunting.* Bogart, GA: Quality Deer Management

Association.



**Figure 12. Enclosure cages are easy to construct out of 2-by-4-inch-mesh welded wire and a T-post, and provide a way to monitor browse pressure.**

Roberts, C., and J. Gerrish. 2001. *Seeding rates, dates and depths for common Missouri forages* (G4652). Columbia: University of Missouri Extension. <http://extension.missouri.edu/g4652>.

Stewart, D. 2000. *Wildlife food planting guide for the Southeast* (Publication 2111). Mississippi State University Extension Service.

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### ALSO FROM MU EXTENSION PUBLICATIONS

For a complete list of MU Extension publications on the ecology of white-tailed deer, go to <http://extension.missouri.edu/deer>.

G9492 *Enhancing White-tailed Deer Habitats on Your Property: Evaluating Habitat*

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