

# WHITE-TAILED DEER FOOD HABITS AND PREFERENCES IN THE CROSS TIMBERS AND PRAIRIES REGION OF TEXAS



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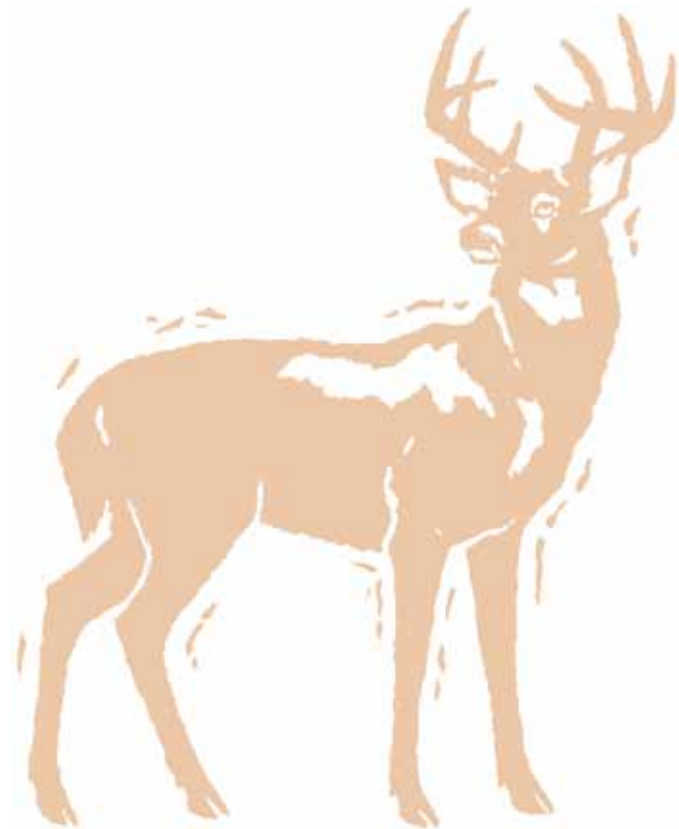
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## INTRODUCTION

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The Cross Timbers and Prairies Region of Texas is a land of contrast. From the dense post oak-blackjack oak woodlands of Cooke and Montague counties on the Red River to the fertile sandy fields of Comanche County and prairies of Lampasas County, it is a land like none other in Texas. It is an area rich in history and natural resources, woodlands and wildlife and people, whose diverse cultural influences continue to shape and mold the region today.

White-tailed deer provide an important resource to landowners and land managers in the Cross Timbers and Prairies Region of Texas. Their presence adds aesthetic as well as economic value to farms and ranches throughout the region. The demand for lease hunting recreation for white-tailed deer creates an economic incentive for landowners to manage land and habitat resources to meet the biological needs of white-tailed deer. Increasing demands for the space that white-tailed deer and their habitat occupies in the Cross Timbers and Prairies Region have created serious management challenges for landowners. Most

land in the region is privately owned; consequently, management responsibilities rest almost entirely with individual landowners. The degree of importance they place on the management of this species and its habitat will determine the quantity and quality of present and future populations of white-tailed deer and other native wildlife species found in this vast ecological region of Northcentral Texas. The development of strategies for managing populations of white-tailed deer and their habitat requires knowledge of seasonal food habits and preferred plant species used for food. Many of these plant species also serve an important role as cover for white-tailed deer and many other species of wildlife found in the Cross Timbers and Prairies Region. Habitat requires the application of proper management techniques by landowners to sustain, manage and conserve populations of white-tailed deer and other wildlife. This publication provides detailed information about which plants are seasonally important in the diet of white-tailed deer in the Cross Timbers and Prairies Region.

## HISTORY

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Only a few adventurers in North Texas had traveled west of the Trinity River before the 1840s. In the 1850s the army established a scattering of military forts on the frontier of Texas to protect settlers from depredating Indians. At this time, only early military roads crossed through this region. Early travelers from Louisiana, Arkansas and Oklahoma crossed the vast expanses of the Blackland Prairies of Northcentral Texas, largely unencumbered by features of the terrain. On the western horizon they encountered a dark, green ominous feature on the landscape, a barrier to travel that slowed their progress.

These “timbers” of dense growths of oak trees, brush and vines occupied a rough, hilly terrain bisected by creeks, canyons and deep gullies. These early settlers found abundant game, water, wood for fuel and building and lands well suited for livestock production. They also found Indians whose tenacity to hold onto their ancestral lands ushered in almost 50 years of conflict over who would ultimately inherit and husband the Cross Timbers and Prairies Region.

Although openings occurred in this timbered area and natural prairie areas were present, much of the region was still difficult to cross through to the western frontiers of Texas. It is



believed that because of their repeated crossings through the “timbers”, early travelers and settlers coined the name “Cross Timbers”, a term still used today to describe the region.

Early travelers knew the location of the East and West Cross Timbers and used them as points of reference in travel. In 1772, De Mezieres (Dyksterhuis 1948) stated that from the Brazos River north “...one sees on the right a forest that the native appropriately call the Grand Forest...Since it contains some large hills, and because of the great quantity of oaks, walnuts, and other large trees, it is a place difficult to cross...On the farther edge of this range, or forest, one crosses plains having plentiful pasturage...” and in 1778 “...I crossed the Colorado and Brazos, where there are...an incredible number of Castilian cattle, and herds of mustangs that never leave the banks of these streams. The region from one river to the other, is no less bountifully supplied with buffalo, bear, deer, antelope, wild boars, partridges, and turkeys.”

In 1840, Col. Stiff (Dyksterhuis 1948) upon approaching the Cross Timbers of Texas from the western prairies stated, “In turning to the northeast, something much resembling an irregular cloud is dimly seen. This is a skirt of woodland...called the Cross Timbers...Whether this was once a beach of a mighty lake or a sea we must leave to the geologist to determine.” On July 21, 1841, Kendall (1841) stated, “We are now fairly within the limits of the Cross Timbers...The immense western prairies are bordered, for hundreds of miles on their eastern side, by a narrow belt of forest land, well known to hunters and trappers under the above name.” He stated, “The growth of timber is principally small gnarled, post oaks and black jacks, and in many places the traveler will find an almost impenetrable undergrowth of briars (sic) and other thorny bushes.”

Marcy (1866) stated of the Cross Timbers, “At six different points where I have passed

*through it, I have found it characterized by the same peculiarities; the trees, consisting principally of post-oak (sic) and blackjack, standing at such intervals that wagons can with out difficulty pass between them in any direction. The soil is thin, sandy, and poorly watered.”* In 1854, W. B. Parker traveled with a survey party of the United States Government to locate and survey lands for Indian reservations in north Texas. He noted, “The timber is a short, stunted oak, not growing in a continuous forest, but interspersed with open glades, plateaus, and vistas of prairie scenery, which give a very picturesque and pleasing variety.” On crossing the Upper (Western) Cross Timbers west of present day Gainesville in Cooke County, Parker stated, “Below, stretching as far as the eye could reach, lay the apparently interminable forest of the Cross Timbers, like a barrier; on passing which we were to be shut out from civilization, its joys and cares, for many, many weeks.” Dyksterhuis (1948) described the Western Cross Timbers as an area “...extending 150 miles south from the northern limits near the Red River, curving westward at the southern extremity. The Main Belt and the Fringe together, though much interrupted, occupy the major portion of an area 150 miles long, varying in width from about 25 miles at the north to about 110 miles at the south.”

Settlers came during the mid-1800s searching for a new land to raise families, to farm and ranch and to make a better life. Legendary cattlemen like Charles Goodnight and Oliver Loving came to the region to build their cattle herds and trail them to northern markets. The lure of the land and new beginnings also brought changes to the Cross Timbers and Prairies Region, changes that continue to influence this broad zone of woodlands and prairies and its wildlife.

# THE CROSS TIMBERS AND PRAIRIES REGION

The Cross Timbers and Prairie Region encompasses approximately 26,000 square miles in Northcentral Texas. It is bordered on the east by the Blackland Prairie, the west by the Rolling Plains and extends south and south-westward to the Llano Basin and Edwards

Plateau in central Texas. It can be further subdivided into four vegetative subregions: East Cross Timbers, Fort Worth Prairie, Lampasas Cut Plain and West Cross Timbers. This broad vegetative region also extends northward into Oklahoma and southern Kansas. (Figure 1 - Diggs et. al. 1999).

## VEGETATIONAL AREAS OF NORTH CENTRAL TEXAS

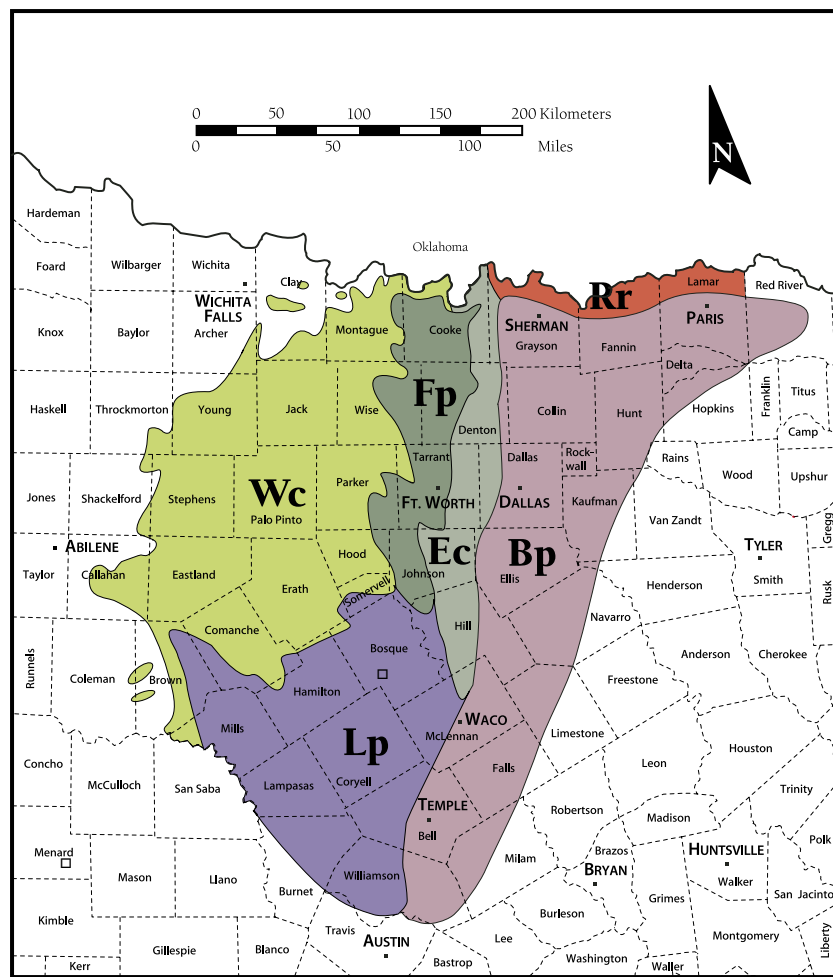
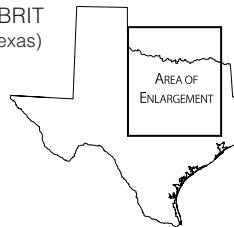


Figure 1 - Image courtesy of BRIT (Botanical Research Institute of Texas)



- Bp** BLACKLAND PRAIRIE
- Ec** EAST CROSS TIMBERS
- Fp** FORT WORTH PRAIRIE
- Lp** LAMPASAS CUT PLAIN
- Rr** RED RIVER AREA
- Wc** WEST CROSS TIMBERS

A basic understanding of the location and physical description of these vegetative subregions of the Cross Timbers and Prairies Region is important to individuals interested or involved in management of wildlife and wildlife habitat. The transition between these subregions is often subtle or unrecognizable to the casual observer. However, distinct changes in topography, soil types and vegetation serve as visual signposts to their delineation.

The soils and terrain seen today give little evidence of the enormous forces involved in shaping the Cross Timbers and Prairies Region. Complex geologic events formed this region of Texas. Plant and animal life that occurs here today is a direct result of those events and the soils that ultimately were formed. Nearly all surface rocks of Northcentral Texas were deposited during the Cretaceous Period (145-65 millions years ago). Some exposed surface formations in the western part of the West Cross Timbers subregion date from the 300-million-year-old Pennsylvanian Period. Soils of the East and West Cross Timbers subregions were developed on sandy Cretaceous Woodbine and Trinity strata. In the Fort Worth Prairie and Lampasas Cut Plain subregions, shallow soils were formed over Cretaceous limestone parent materials. Elevations across the region range from 500 to 1,500 feet.

Soils throughout the region are not uniform. Consequently, plant communities change dramatically within short distances resulting in different land use potential for livestock grazing, farming, wildlife management or other uses.

Although white-tailed deer occur throughout the ecological region as a whole, populations vary considerably between and within the subregions. Populations of white-tailed deer and other wildlife species are influenced by the diversity and configuration of plant communities that provide food and cover. Other factors such as fragmentation of once continuous habitat into smaller land holdings, competition for

food and cover with livestock, conversion of woodland habitat to improved pastures or other agricultural enterprises, urban and rural developments and lack of proper wildlife and habitat management also influence the ability of the land to support populations of deer and other wildlife species.

## The East Cross Timbers



The East Cross Timbers subregion is a narrow strip of timbered country extending from eastern Cooke County on the Red River south to western Hill County and includes portions of Grayson, Denton, Dallas, Tarrant, Johnson and McLennan counties. Early travelers called this region the Monte Grande (Grand Forest) and later the Lower Timbers. Its location was well known and served as a landmark reference for travelers. Today, few large tracts of undisturbed woodlands remain in the East Cross Timbers subregion which is perhaps one of the most fragmented vegetative regions in Texas. Soils are slightly acidic, sandy or sandy loam and produce woodlands dominated by post oak, blackjack oak, cedar elm, hickory, osage orange, eastern red cedar, mesquite, bumelia, hawthorn, greenbriar and a variety of other brush and grass species.

Many woodland areas in this region have been cleared for tame-grass pastures, croplands, horse and cattle ranches and urban and rural developments, including portions of the cities of Denton, Dallas, Fort Worth, Arlington and other expanding urban and rural fringe communities. Considerable human population expansion throughout this region will continue to



impact wildlife habitat resources in the future. White-tailed deer management in the East Cross Timbers subregion will prove to be challenging to landowners and will require innovative approaches to management of the habitat resources found there.

### Fort Worth Prairie



Jim Dillard

The Fort Worth Prairie subregion is located between the East and West Cross Timbers subregions, extending from extreme eastern Montague County and Cooke County on the north, southward to northern McLennan County near Waco. Portions of Denton, Wise, Tarrant, Parker, Johnson, Hood and Hill counties occur within the subregion. Terrain of the mostly treeless vegetative region, located north of the Brazos River, is characterized by gently sloping flat surface features with thin soil over hard layers of resistant limestone. Underlying layers of limestone slope eastward with the exposed ends of younger layers forming escarpments or “cuestas” that produce the scenic topography typical for the area.

Vast tallgrass native prairies once covered this region. Most grasslands have been degraded and remain only as remnants where shallow soils prevented cultivation. Considerable farming and livestock grazing operations were initiated by early settlers in areas of sufficient soil depth in this subregion. Extensive areas are still used for livestock grazing, but climax plant communities have been altered. Urban sprawl and developments have rapidly expanded into this subregion as the human population continues to increase in this area of North-

central Texas that includes Fort Worth and several surrounding towns. These landscape scale changes will have long lasting consequences for the future of wildlife and habitat resources in this subregion.

### Lampasas Cut Plain



Jim Dillard

The Lampasas Cut Plain subregion lies south and southwest of the East and West Cross Timbers and Fort Worth Prairie subregion, extending to the upper reaches of the Edwards Plateau in Burnet and Williamson counties. Other counties found in the subregion include parts of Johnson, Somervell, Erath, Hamilton, Comanche, Brown, Mills, Coryell, Bosque, Hill, McLennan, Bell and Lampasas counties. Most of this region is underlain by various limestone formations. The Lampasas Cut Plain subregion is more rugged than the Fort Worth Prairie subregion, being bisected by numerous low buttes and mesas formed by erosion during its geologic formation. There are extensive regions of grasslands and valleys with higher, narrow, often wooded mesa-like divides. Soils at the surface, consequently, support the growth of plants adapted to higher alkalinity, such as live oak and juniper. Historic records indicate much of this region existed as a grassland or open live oak savannah that supported herds of bison and other herbivores dependent on the tall grasses that dominated the region.

The rich loam soils now support agricultural croplands in many areas that produce cotton, corn, oats, wheat, sorghum, milo and other crops. Much of the land in this region is also used for livestock ranching for cattle, sheep

and goats. Habitat for white-tailed deer, Rio Grande turkey, bobwhite quail, mourning doves, fox squirrels, rabbits and a variety of nongame wildlife species is found here.

After the introduction of domestic livestock, farming operations and control of wildfires, the landscape of much of the Lampasas Cut Plain subregion changed. Land use practices associated with these and other ventures created a landscape that experienced the invasion and domination in some areas by problematic brush species such as mesquite, Ashe juniper and other native woody species.

Overgrazing by livestock and elimination of naturally occurring fire also reduced native grass cover and allowed the invasion of other less desirable annual grasses and forbs. This change in plant life on the landscape, however, has increased habitat for a number of wildlife species and can be viewed as a positive result of historical land use in the Lampasas Cut Plain subregion.

Management of habitat for white-tailed deer and other wildlife species in the Lampasas Cut Plain subregion can be financially rewarding to landowners and land managers.

White-tailed deer numbers exist at or substantially above habitat potential (the ability of native habitat to support them without sustaining long-term degradation of plant communities or loss of plant species) in much of this subregion. Farm and ranch size is relatively large, making accomplishment of land management strategies for white-tailed deer and habitat both productive and feasible.



## West Cross Timbers



The West Cross Timbers subregion, located immediately west of the Fort Worth Prairie subregion and north of the Lampasas Cut Plain subregion, extends from the Red River in Montague and Cooke counties south and southwestward to the Lampasas Cut Plain subregion and west to the Rolling Plains Region. This zone also includes portions of Archer, Clay, Wise, Young, Throckmorton, Jack, Tarrant, Parker, Palo Pinto, Stephens, Callahan, Eastland, Erath, Hood, Somervell, Johnson, Hamilton, Comanche, Mills and Brown counties. This region was called the Upper Timbers by early travelers due to its higher elevation.

This subregion has a complex geologic history, resulting in a variety of soil types, terrain features and vegetative plant communities. The terrain in most of this subregion is very hilly, with sandstone and limestone escarpments, steep slopes, and irregular surface features. Watersheds of the Red, Colorado, Trinity and Brazos Rivers cross the region from northwest to southeast. Exposed sandstone rocks and boulders dominate landscape features in many areas. Sandy loam soils are productive for agricultural crops such as peanuts, small grains, fruit trees, sorghum, pecans and truck crops. In other areas, limestone surface formations and shallow clay soils support grasslands and vegetative plant communities adapted to higher alkalinity.

Features of the Fort Worth Prairie subregion extend into the West Cross Timbers subregion

along the eastern boundary, forming irregular ecotones of diverse tree and brush species common to both zones.

Extensive open grasslands and brushy rangelands also occur in the West Cross Timbers subregion. In the western counties, where the average size of land tracts increases, cattle ranching is the predominant land use. Winter agricultural forage crops such as wheat and oats are commonly planted.

Post oak-blackjack oak woodlands characterize much of the West Cross Timbers subregion. Other associated woody species include shin oak, Spanish oak, live oak, Texas ash, mesquite, osage orange, Ashe juniper, eastern red cedar, cedar elm, skunkbush sumac, elbowbush, lotebush, tasajillo, rough-leafed dogwood, flame-leaf sumac, hawthorn and hackberry.

Much of the subregion contains habitat that supports populations of white-tailed deer and many other wildlife species. Many of these populations exist at or above the habitat potential of the land. Leasing land for deer hunting is an important economic enterprise of the subregion. Fragmentation of wildlife habitat is also rapidly increasing in the eastern counties of the West Cross Timbers subregion where larger land holdings are being subdivided and sold as small home building sites, farms and ranchettes.

## Climate and Rainfall

Rainfall in the Cross Timbers and Prairies Region ranges from 36 inches per year in the Eastern Cross Timbers subregion to 24 inches per year in the western portion of the Western Cross Timbers subregion, with most of the Forth Worth Prairie and West Cross Timbers subregions averaging between 28 and 32 inches. During summer months, temperatures may exceed 100° F for several days and extensive drought periods are not uncommon. Winter low temperature extremes occasionally approach 0° F, however, only a few days each winter drop below 20° F. Mean annual temperature is

65° F. Seasonal flooding along major watercourses may occur during spring and early summer from storms and weather systems that move through the region. Snowfall during winter is uncommon and usually of limited intensity and duration. Hail, high winds, tornadoes and thunderstorms occur seasonally, affecting only small portions of the region at any given time. However, these events may result in localized damage to wildlife habitat and resident populations of wildlife.

The growing season ranges from 218 days in Jack County in the north to 260 days in Williamson County in the south, with most counties in the Cross Timbers and Prairies Region averaging between these two extremes. Rainfall patterns and temperatures throughout the year are a significant factor influencing white-tailed deer habitat in the Cross Timbers and Prairies Region. Peak rainfall occurs normally in May and September. Below average rainfall during late summer and winter reduces the growth of forb, grass and brush species important to white-tailed deer. Mast production from a wide variety of plants used by white-tailed deer depends on timely rainfall patterns throughout the year. During periods of drought, acorn production on oak species is highly variable. Growth of cool season forbs and grasses also depends on timely rainfall during the early fall and winter months.

Agricultural crops planted for livestock grazing or crop production provide forage for white-tailed deer in the Cross Timbers and Prairies Region and have become important seasonal foods. In many areas, white-tailed deer distribution is directly influenced by the presence or absence of these planted agricultural crops. During wet cycles, marginal habitat for white-tailed deer may become occupied if adequate agricultural crops are present within their home range. When rainfall is inadequate or extreme temperatures occur, crops become unproductive and white-tailed deer populations and habitat cannot be sustained. These artificially



high white-tailed deer populations ultimately will decline.

Annual rainfall also directly influences range conditions and, thus, grazing pressure by domestic livestock. Unless landowners and managers adjust stocking rates or grazing intensity on rangelands during droughts, white-tailed deer populations suffer. Competition between livestock and white-tailed deer for available forage will occur as food and cover resources diminish. During periods of drought, increased consumption of browse by livestock may reduce the availability of important seasonal forage for white-tailed deer.

The impoundment of water for domestic livestock has produced one of the most important changes to the landscape of the Cross Timbers and Prairies Region and has increased the potential of the land to sustain populations of white-tailed deer and other wildlife species. The countless number of lakes, small ponds and stock tanks constructed as water sources

for domestic livestock in the Cross Timbers and Prairies Region also serve as important seasonal sources of water for white-tailed deer and other wildlife species. However, the availability of water depends on runoff of surface water from heavy rainfall events. With the exception of the major rivers that cross the region, most streams in the Cross Timbers and Prairies Region are intermittent and do not provide reliable surface water. During years of below average rainfall, many water sources become dry, directly affecting white-tailed deer and other wildlife species.

Extremes in temperature and rainfall patterns affect white-tailed deer habitat and cannot be controlled by land managers, only anticipated. They will occur in the Cross Timbers and Prairies Region of Texas as they have for eons. Land managers should consider the likelihood that these events will occur and make appropriate decisions during the initial planning stages of white-tailed deer habitat and population management strategies.



TPWD stock photo

The countless number of lakes, small ponds and stock tanks constructed as water sources for domestic livestock in the Cross Timbers and Prairies Region also serve as important seasonal sources of water for white-tailed deer and other wildlife species.

## CHANGING LAND USES IN THE CROSS TIMBERS AND PRAIRIES REGION

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White-tailed deer habitat in the Cross Timbers and Prairies Region today continually changes in response to natural environmental forces and human influences that mold and shape plant communities on the landscape. These changes have occurred primarily due to the cumulative effects of overgrazing by livestock, elimination and control of naturally occurring fire in the environment, and changes in land use by man. The influence of farming and livestock ranching in this region for food and fiber production has had long-term influences on habitat for white-tailed deer and other wildlife species found in the Cross Timbers and Prairies Region.

Large herds of free ranging livestock had begun to influence the plant communities of the Cross Timbers and Prairies Region by the end of the 19th Century. The introduction of fences on the landscape in the 1880s further compounded the problem by allowing increased stocking rates and grazing duration. As a result, native grasslands began to diminish and the invasion of brush and non-native plants accelerated.

It has been estimated that by the 1920s and 1930s, 26 million acres of forested and prairie land in the Cross Timbers and Prairies Region were converted into fields, primarily for the production of cotton, corn and wheat. Of that figure, approximately 8 million acres had been developed from formerly forested land (Francaviglia, 2000). Many areas in the Cross Timbers and Prairies Region that once had native prairies, savannahs or open rangelands have since been invaded by woody species, annual forbs and non-native grasses. Many of these species have become dominant on range sites, making recovery or restoration of historic grasslands or savannahs difficult for land managers.

The increase in density and distribution of woody plants such as post oak, blackjack oak, live oak, Spanish oak, mesquite, Ashe juniper

and many other native tree and brush species has created improved habitat for white-tailed deer and other wildlife species in some areas. White-tailed deer have benefited from these changes in the distribution and patterns of tree and brush plant communities that provide their habitat needs for food and cover. Development of reliable water sources to accommodate livestock ranching operations also has had a positive influence on the land to help support and sustain populations of white-tailed deer and many other wildlife species.

Most woody tree and brush species found in the Cross Timbers and Prairies Region, with the exception of live oak, juniper species and a few others, are deciduous. White-tailed deer habitat during the winter months often becomes limited in its capacity to provide food and cover. Seasonal availability of food and forage may be the most critical limiting factor for white-tailed deer in the Cross Timbers and Prairies Region.

Economic influences have played an important role in changing land uses in this region to meet the public demands and markets for food, fiber, minerals, agricultural crops, livestock, oil and gas production. Development of land for urban expansion has also increased dramatically during the last 50 years. This change in land use will continue to be a significant influence on habitat for white-tailed deer and other wildlife species in the future. Beautiful wooded hillsides and tree-covered valleys are not only good habitat for white-tailed deer and other wildlife species, they are also attractive home building sites for people. Land clearing for improved pastures, construction of reservoirs, urban expansion, rural developments, mechanical and chemical brush control efforts and other changes to the landscape to accommodate the ever increasing human population has resulted in fragmentation of habitat for white-tailed deer and other native species. The challenge for landowners in the Cross Timbers



and Prairies Region of Texas for the 21st Century will be to manage and sustain wildlife habitat for white-tailed deer and other native

species in harmony with present and future land uses of the region.

## WHITE-TAILED DEER FOOD HABITS

Landowners, land managers, sportsmen, wildlife biologists and others have long recognized the need for a comprehensive study on food habits and seasonal preference of plants used by white-tailed deer in the Cross Timbers and Prairies Region of Texas. Knowledge about deer food habits is fundamental to land and wildlife managers for a better understanding of unique habitat and food requirements for this important game species. Food habits studies conducted in other parts of Texas do not represent the seasonal availability or preference for plants used by white-tailed deer in the Cross Timbers and Prairies Region of Texas.

In 1996, a research study was initiated by the Texas Parks and Wildlife Department to address these questions. Prior to this work, no definitive research had been conducted in the Cross Timbers and Prairies Region of Texas. The purposes of the study were to identify what plants are seasonally important in the diets of white-tailed deer and which plants they prefer with regard to seasonal availability (spring, summer, fall and winter). In addition, foods represented in their diets could be grouped into general forage classes (grasses-forbs-browse-mast-other) by season to provide land managers information for conservation and management of key habitat components

for white-tailed deer.

Deer were collected from private ranches in six counties (Jack, Wise, Parker, Erath, Bosque and Brown) north to south throughout the Cross Timbers and Prairies Region of Texas (Figure 2). Collection sites were grouped specifically to represent the two major soil and geologic regions containing sandstone or limestone based soil groups and associated plant communities. A wide variety of habitat types and land management operations occurred on these properties. These included

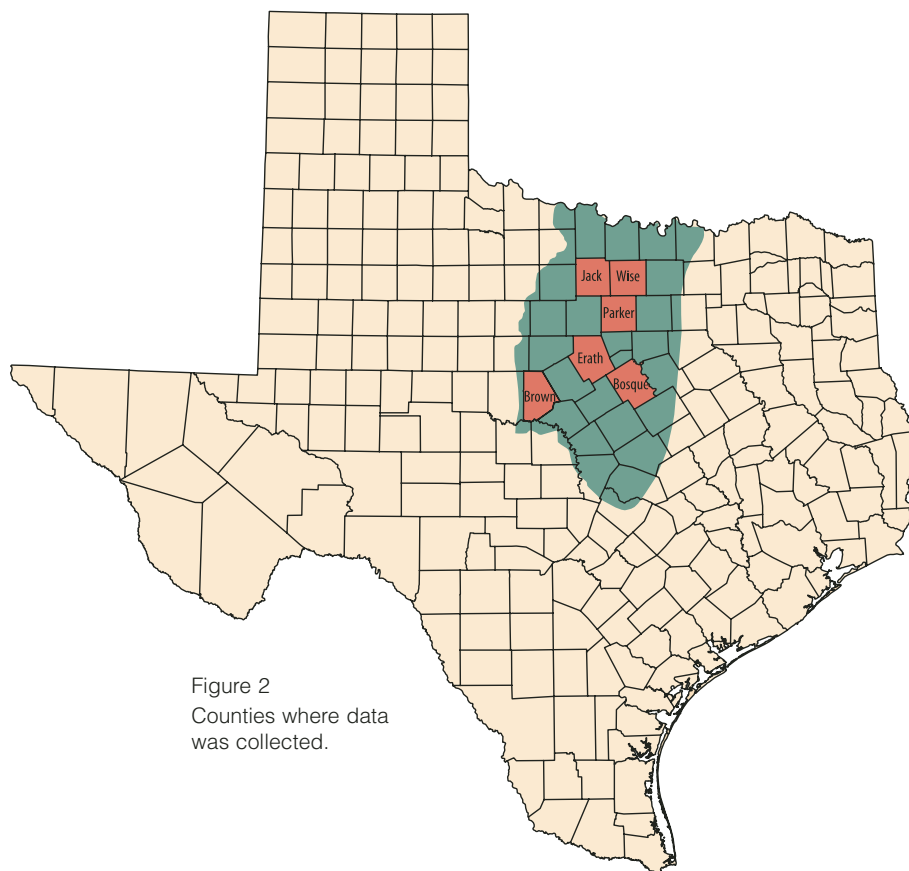


Figure 2  
Counties where data  
was collected.

high and low fences, different livestock densities and grazing systems, excellent to poor range conditions, different classes of livestock, presence or absence of agricultural forage crops and supplemental feeding programs and different densities of white-tailed deer. This study differed from many previous works describing deer foods in that data was collected over such a broad geographic area and wide variation of land uses.

Deer diets and available food sources were studied from Spring 1996 to Winter 1998. Deer diets were described by examining rumens (stomachs) from deer collected on each ranch. Available sources of food were described by conducting vegetation surveys. Study ranches were visited during May, August, November and February to represent spring, summer, fall and winter seasonal components of deer diets. Drought conditions prevailed during much of 1996 but rainfall increased during 1997. Consequently, plant growth and relative availability of food resources differed between years and between sites during the study. This situation may have confounded attempts to describe the average deer diet in the Cross Timbers and Prairies Region. However “average” rainfall years in this part of Texas are relatively rare, actually allowing comparison of diet composition between wet and dry years.

Available food resources were estimated by conducting vegetation surveys on each site during the spring, summer, fall and winter. A plant list was developed of all plant species identified on study sites (Appendix A). An availability factor was developed for each species based on the results of the vegetation surveys. A food resource’s availability factor in simple terms describes how often a species was identified during vegetation surveys for each season.

A minimum of 5 white-tailed deer, primarily does, were collected during feeding hours following sundown on each site for two years during May, August, November and February

(238 total deer). A sample of rumen contents for each deer was collected and washed through a graded series of sieves and stored in 10% formaldehyde. Plant fragments were studied and identified to genus or species where possible by general leaf shape and other external characteristics. Identification of fragments was based on a plant reference slide collection prepared at the beginning of the study for each site. Identification of browse (tender growth and leaves of woody plants) and forbs (broad-leafed weeds) was based on epidermal and morphological characteristics of leaves and stems. Monocots (grasses or grass-like plants) were identified by the size, shape, absence or presence of hairs and specialized epidermal cells.

Food items were identified to the lowest taxonomic category possible, usually to at least forage class (browse, grass, forbs, mast, agricultural forage crop or commercial feed). Remaining fragments were categorized to a nonspecific forage class labeled “unidentified”. Fragments that could not be identified to any forage class were labeled “unidentified plant material”. A photographic guide of woody plants, forbs and grasses found in deer rumens during the study is provided in Appendix B.

Seasonal preference ratings were developed for each plant species identified in rumens. In common terms, the preference value (preference) refers to the degree a deer will actively seek out a food item when other possible foods are available, in other words, what the deer likes to eat. The importance value (importance) quantifies the volume of a particular plant species in the deer diet. Plants with a high importance value make up a higher percentage of the seasonal or annual diet. An analogy often used to explain this concept is the relationship between sirloin steak and hamburger. Many people would prefer to eat sirloin steak, but hamburger meat is often more important because it makes up more of the total diet.

## OVERALL USE OF FORAGE CLASSES

A knowledge of deer use of food items by general forage class is as important as knowing the specific plant species eaten by deer. The forage classes identified during this study are defined below.

**Browse** refers to the growing soft portion (stems and leaves) of perennial woody plants. Trees, shrubs, vines and plants typically referred to as “brush” fall into this category.

**Forbs** are plants that are often called “weeds” by farmers, ranchers and those maintaining urban lawns. They are herbaceous (non-woody), normally broad-leafed, flowering plants. Forbs include all flowering herbaceous plants that are not grasses.

**Mast** is the fruit of the plants defined as browse species. Mast includes things such as oak acorns, mesquite beans, prickly pear fruits, berries, etc. As a group, mast is seasonally important in deer diets and was therefore reported as a separate forage class in this study.

**Grasses** (and grass-like plants) include herbaceous species of grass, sedge and rush families.

**Planted agricultural forage and grain crops** include forage items that are planted for farming, grazing or specifically for wildlife in the form of food plots. Cool season crops typically include clover, vetch, wheat, oats and ryegrass. Common warm season crops include peas and other legume varieties, milo and millet.

**Commercial feeds** include sacked feed used as either a true supplement or a deer hunting attractant. The most common sacked supplement is a “deer pellet” formulated by various manufacturers and distributed with free-choice feeders. The most common deer hunting attractant is whole corn distributed with timed deer feeders during the hunting season.

Data collected during the study indicated the average annual diet of white-tailed deer in the Cross Timbers and Prairies Region of Texas consisted of 36% browse, 20% forbs, 20% mast, 12% grasses, 7% planted agricultural forage and grain crops and 5% commercial feed. (Figure 3)

**Annual Food Habits of White-tailed Deer in the Cross Timbers and Prairies of Texas by Forage Class 1996-1998**

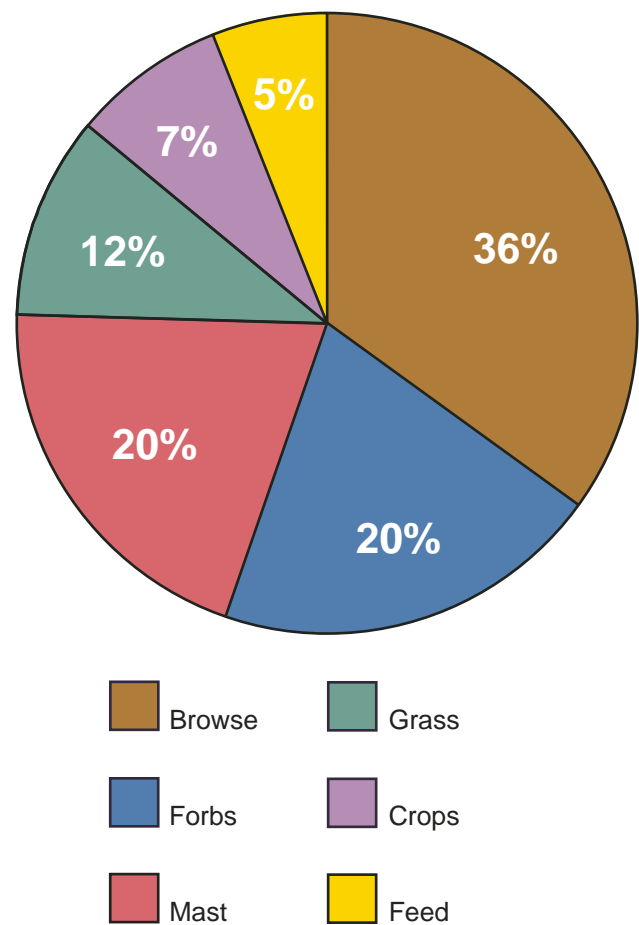


Figure 3

# DEER DIETS IN THE CROSS TIMBER AND PRAIRIES REGION OF TEXAS (BY SEASON)

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## Spring

During the extremely dry spring of 1996, 14 browse species composed 50% of the 1996 diet of white-tailed deer in the Cross Timbers and Prairies Region of Texas (Table 1). Important browse species during spring 1996 included oak species, common greenbriar, cedar elm and skunkbush. Forbs made up 17% of the spring diet with mat euphorbia, yellow woodsorrel, wild onion and western ragweed being most common in the diet. Grasses composed 13% of the diet with Texas wintergrass, dichanthelium, grass sandbur, Texas grama and little bluestem identified most frequently. Dichanthelium had the highest preference ranking. Oak acorn mast composed 12% of the 1996 spring diet and had the highest preference ranking of all food items consumed by deer that season. Other important mast items included berries from skunkbush and bumelia. Planted agricultural forage and grain crops (8% of the diet) were not planted on all ranches but heavily used where available.

The spring of 1997, by contrast, was wetter than normal. Browse made up 30% of the deer diet during this season. Twenty browse plants were identified in the deer diet including oaks, cedar elm, Texas redbud, skunkbush, bumelia and common greenbriar which had the highest preference ranking (Table 2). Twenty-nine forb species made up 36% of the diet. This was a 19% increase in forb use compared to 1996. High use plants included yellow dalea, prairie bishop's-weed, rain-lily, Texas vervain, common chickweed and stork's bill. The most important grasses recorded were sideoats grama, Texas grama, Texas wintergrass and little bluestem. Grasses accounted for only 8% of the diet. Mast, primarily from skunkbush and bumelia, was readily available during spring

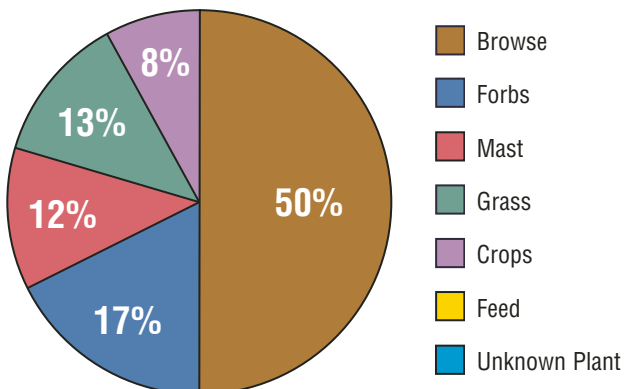
1997 and made up 13% of the diet. Supplemental foods in the form of commercial deer pellets and planted agricultural forage and grain crops made up 7% of overall diets but were not available on all sites.

Sixty-one native plants were identified in the spring 1996 and 1997 diets of deer in the Cross Timbers and Prairies Region of Texas. These species accounted for 93% of the spring diet. The most highly selected spring food item for both years was oak acorns. However, oak browse was the most important staple food item during both springs along with skunkbush, common greenbriar and cedar elm browse. Mat euphorbia, deciduous yaupon browse, skunkbush berries, wild onions, chickweed, yellow dalea, rain-lily and Texas vervain were other species with high preference ranking. There was also a preference for agricultural forage crops where available. At sites where free choice commercial pelleted feed was available, it did not receive either a high importance or preference rank in deer diets.

The most important management message to be drawn by comparing these two years is the relationship between use of browse and forbs. The big shift between these classes (20% reduction in browse use, 19% increase in forb use) was a direct result of a greater availability of forbs during a wet spring. This illustrates that forbs, while not as dependable as browse, are more highly preferred as a forage class. Wetter springs mean more available forbs which results in an elevated nutritional plane for white-tailed deer. Good nutrition during the spring is critical to management objectives such as increased antler development and fawn survival later in the summer.

**SPRING 1996** (Table 1)

FORAGE CLASS and SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Deciduous holly	<i>Ilex decidua</i>	2.64	1.00	2.64
Oak	<i>Quercus</i> spp.	10.87	5.00	2.17
Common greenbriar	<i>Smilax bona-nox</i>	8.00	4.00	2.00
Skunkbush	<i>Rhus aromatica</i>	9.64	5.00	1.93
Cedar elm	<i>Ulmus crassifolia</i>	4.69	3.00	1.56
Mistletoe	<i>Phoradendron tomentosum</i>	1.44	1.00	1.44
Gray dogwood	<i>Cornus drummondii</i>	1.30	1.00	1.30
Texas Ash	<i>Fraxinus texensis</i>	0.95	1.00	0.95
Bumelia	<i>Bumelia lanuginosa</i>	3.22	4.00	0.81
Western soapberry	<i>Sapindus saponaria</i>	0.74	1.00	0.74
Elbowbush	<i>Forestiera pubescens</i>	1.60	3.00	0.53
Mesquite	<i>Prosopis glandulosa</i>	1.05	2.00	0.53
Sugar hackberry	<i>Celtis laevigata</i>	0.37	1.00	0.37
Agarito	<i>Berberis trifoliolata</i>	0.25	1.00	0.25
<b>FORBS</b>				
Mat euphorbia	<i>Chamaesyce prostrata</i>	4.17	1.00	4.17
Wild onion	<i>Allium canadense</i>	2.55	1.00	2.55
Yellow woodsorrel	<i>Oxalis dillenii</i>	3.67	2.00	1.83
Partridge pea	<i>Chamaecrista fasciculata</i>	1.81	1.00	1.81
Western ragweed	<i>Ambrosia psilostachya</i>	3.31	2.00	1.65
Texas thistle	<i>Cirsium texanum</i>	1.54	1.00	1.54
Twoleaf senna	<i>Senna roemeriana</i>	1.13	1.00	1.13
<b>MAST</b>				
Acorns	<i>Quercus</i> spp.	7.93	1.00	7.93
Skunkbush berries	<i>Rhus aromatica</i>	2.63	1.00	2.63
Bumelia berries	<i>Bumelia lanuginosa</i>	0.75	1.00	0.75
<b>GRASS</b>				
Dichanthelium	<i>Dichanthelium oligosanthes</i>	3.83	3.00	1.28
Texas grama	<i>Bouteloua rigidiseta</i>	2.77	3.00	0.92
Sandburggrass	<i>Cenchrus incertus</i>	1.75	2.00	0.88
Texas wintergrass	<i>Stipa leucotricha</i>	4.06	5.00	0.81
Little bluestem	<i>Schizachyrium scoparium</i>	1.08	3.00	0.36
Threeawn spp.	<i>Aristida</i> spp.	1.06	3.00	0.35
Curlymesquite	<i>Hilaria belangeri</i>	0.94	4.00	0.23
Sideoats grama	<i>Bouteloua curtipendula</i>	0.50	3.00	0.17
<b>CROPS</b>				
Wheat/Oats		6.20	1.00	6.20

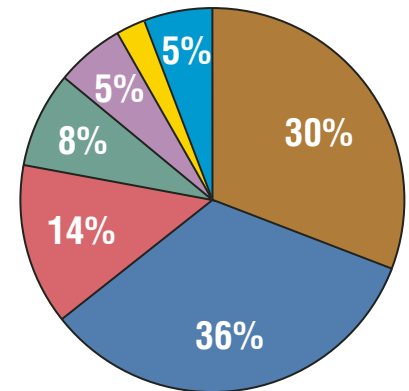


TEN MOST PREFERRED	TEN MOST IMPORTANT
• Acorns	• Oak
• Wheat/Oats	• Skunkbush
• Mat euphorbia	• Acorns
• Deciduous holly	• Common greenbriar
• Skunkbush berries	• Wheat/Oats
• Wild onion	• Cedar elm
• Oak	• Mat euphorbia
• Common greenbriar	• Texas wintergrass
• Skunkbush	• Dichanthelium
• Yellow woodsorrel	• Yellow woodsorrel



**SPRING 1997** (Table 2)

FORAGE CLASS AND SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Oak	<i>Quercus</i> spp.	5.76	5.00	1.15
Cedar elm	<i>Ulmus crassifolia</i>	3.17	3.00	1.06
Texas redbud	<i>Cercis canadensis</i> var. <i>texensis</i>	1.05	1.00	1.05
Skunkbush	<i>Rhus aromatica</i>	4.94	5.00	0.99
Gray dogwood	<i>Cornus drummondii</i>	0.93	1.00	0.93
Common greenbriar	<i>Smilax bona-nox</i>	3.56	4.00	0.89
Deciduous holly	<i>Ilex decidua</i>	0.72	1.00	0.72
Coralberry	<i>Symphoricarpos orbiculatus</i>	0.68	1.00	0.68
Flameleaf sumac	<i>Rhus lanceolata</i>	0.68	1.00	0.68
Sugar hackberry	<i>Celtis laevigata</i>	0.63	1.00	0.63
Texas Ash	<i>Fraxinus texensis</i>	0.57	1.00	0.57
Mistletoe	<i>Phoradendron tomentosum</i>	0.55	1.00	0.55
Mexican buckeye	<i>Ungnadia speciosa</i>	0.46	1.00	0.46
Elbowbush	<i>Forestiera pubescens</i>	1.24	3.00	0.41
Lotebush	<i>Ziziphus obtusifolia</i>	0.37	1.00	0.37
Bumelia	<i>Bumelia lanuginosa</i>	1.39	4.00	0.35
Agarito	<i>Berberis trifoliolata</i>	0.20	1.00	0.20
Yucca	<i>Yucca</i> spp.	0.16	1.00	0.16
Ashe juniper	<i>Juniperus ashei</i>	0.60	4.00	0.15
Poison ivy	<i>Rhus toxicodendron</i>	0.12	4.00	0.03
<b>FORBS</b>				
Common chickweed	<i>Stellaria media</i>	2.98	1.00	2.98
Yellow dalea	<i>Dalea aurea</i>	2.54	1.00	2.54
Rain-lily	<i>Cooperia pedunculata</i>	2.41	1.00	2.41
Texas vervain	<i>Verbena halei</i>	2.26	1.00	2.26
Prairie bishop's-weed	<i>Bifora americana</i>	2.24	1.00	2.24
Stork's bill	<i>Erodium texanum</i>	2.11	1.00	2.11
Venus' looking-glass	<i>Triodanis perfoliata</i>	1.97	1.00	1.97
Western spiderwort	<i>Tradescantia occidentalis</i>	1.87	1.00	1.87
Lespedeza	<i>Lespedeza repens</i>	1.72	1.00	1.72
Prairie fleabane	<i>Erigeron strigosus</i>	1.62	1.00	1.62
Mat euphorbia	<i>Chamaesyce prostrata</i>	1.51	1.00	1.51
Illinois bundleflower	<i>Desmanthus illinoensis</i>	2.74	2.00	1.37
Zexmenia	<i>Zemenan hispida</i>	1.28	1.00	1.28
Deer vetch	<i>Lotus purshianus</i>	2.35	2.00	1.17
Snoutbean	<i>Rhynchosia</i> spp.	1.96	2.00	0.98
Prairie verbena	<i>Verbena bipinnatifida</i>	0.94	1.00	0.94
Beggar's tick	<i>Torilis arvensis</i>	1.80	2.00	0.90
Western ragweed	<i>Ambrosia psilostachya</i>	2.94	4.00	0.74
Wild onion	<i>Allium canadense</i>	1.37	2.00	0.68
Goldenwave coreopsis	<i>Coreopsis wrightii</i>	0.62	1.00	0.62
Partridge pea	<i>Chamaecrista fasciculata</i>	1.12	2.00	0.56
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>	0.81	2.00	0.40
Yellow woodsorrel	<i>Oxalis dillenii</i>	0.33	1.00	0.33
Wild carrot	<i>Daucus pusillus</i>	0.65	2.00	0.33
Catnip noseburn	<i>Tragia ramosa</i>	0.64	2.00	0.32
Twoleaf senna	<i>Senna roemeriana</i>	0.57	2.00	0.28
Texas thistle	<i>Cirsium texanum</i>	0.28	1.00	0.28
Texas queen's-delight	<i>Stillingia texana</i>	0.26	1.00	0.26
Plantain	<i>Plantago</i> spp.	0.28	2.00	0.14
<b>MAST</b>				
Acorns	<i>Quercus</i> spp.	3.67	1.00	3.67
Elbowbush berries	<i>Forestiera pubescens</i>	1.72	1.00	1.72
Skunkbush berries	<i>Rhus aromatica</i>	3.76	4.00	0.94
Mesquite beans	<i>Prosopis glandulosa</i>	0.74	2.00	0.37
Bumelia berries	<i>Bumelia lanuginosa</i>	0.72	3.00	0.24
<b>GRASS</b>				
Sideoats grama	<i>Bouteloua curtipendula</i>	2.16	2.00	1.08
Green sprangletop	<i>Leptochloa dubia</i>	0.57	1.00	0.57
Silver bluestem	<i>Bothriochloa saccharoides</i>	0.70	2.00	0.35
Texas grama	<i>Bouteloua rigidisetata</i>	0.57	2.00	0.28
Curlymesquite	<i>Hilaria belangeri</i>	0.28	1.00	0.28
Little bluestem	<i>Schizachyrium scoparium</i>	0.51	2.00	0.25
Dichanthelium	<i>Dichanthelium oligosanthes</i>	0.47	2.00	0.23
Texas wintergrass	<i>Stipa leucotricha</i>	1.86	3.00	0.62
<b>CROPS</b>				
Wheat/Oats		3.53	1.00	3.53
<b>FEED</b>				
Pelleted feed		1.35	3.00	0.45



- Browse
- Forbs
- Mast
- Grass
- Crops
- Feed
- Unknown Plant

- TEN MOST PREFERRED**
- Acorns
  - Wheat/Oats
  - Common chickweed
  - Yellow dalea
  - Rain-lily
  - Texas vervain
  - Prairie bishop's-weed
  - Stork's bill
  - Venus' looking-glass
  - Western spiderwort

- TEN MOST IMPORTANT**
- Oak
  - Skunkbush
  - Skunkbush berries
  - Acorns
  - Common greenbriar
  - Wheat/Oats
  - Cedar elm
  - Common chickweed
  - Western ragweed
  - Illinois bundleflower

## Summer

The summer diet of deer during the droughty summer of 1996 was similar to that of the spring with the same browse species making up 46% of the diet (Table 3). Mistletoe was the most preferred browse species followed by skunkbush, oak, common greenbriar and cedar elm. Skunkbush browse had the highest importance rank followed by oak, common greenbriar, mistletoe and cedar elm. Grass became more important in the diet and increased to 21% of the diet with dichanthelium, Canada wildrye, little bluestem, hairy grama, sideoats grama and Texas grama having high to moderate preference ranks. Mast comprised 17% of the diet and included mesquite beans, prickly pear fruits and, to a lesser extent, western soapberry berries and oak acorns. Forbs made up 13% of the diet with mat euphorbia, goldenwave coreopsis, lespedeza, catnip noseburn, deer vetch, partridge pea and snoutbean having high importance ranks. Highly preferred forbs during the dry summer included lespedeza, deer vetch, partridge pea, snoutbean and Venus' looking-glass. An additional 3% of the diet consisted of agricultural forage and grain crops and pelleted feed.

Rainfall was much more abundant over North Texas during the summer of 1997 and forb consumption increased accordingly, making up 43% of the deer diet (Table 4). Forb species with the highest preference ranking were Hill Country wild mercury, deer vetch, mat euphorbia, tall bush clover and lespedeza. Browse (29%) and mast (14%) remained at levels similar to summer 1996 with use of mesquite beans and prickly pear fruit as common mast in the diet. Grasses (11%) used were dichanthelium and sideoats grama. Planted agricultural forage and grain crops were 2% of diets.

Ninety-eight percent of the summer diet of white-tailed deer in the Cross Timbers and Prairies Region of Texas consisted of 62 species

of native plants. The relationship between available moisture and utilization of forage classes is even more evident when comparing summer deer diets in wet and dry years. Forbs were once again highly preferred, but browse remained the staple forage class. In addition, browse resources can become scarce during late summer in dry years as evidenced by a doubling in the percentage of grass in the deer diet. Deer are ruminants like cattle, but unlike cattle, their digestive system is not equipped to efficiently use grass as a forage class. Grasses should not be a more significant forage class than forbs in any season of the year under normal or wetter than normal conditions. Good nutrition during the summer is also important for improved adult body condition, increased fawn weaning weights and, to a lesser degree, antler development among bucks. Fawn survival can also be enhanced from a higher nutritional plane among does and increased fawning cover.

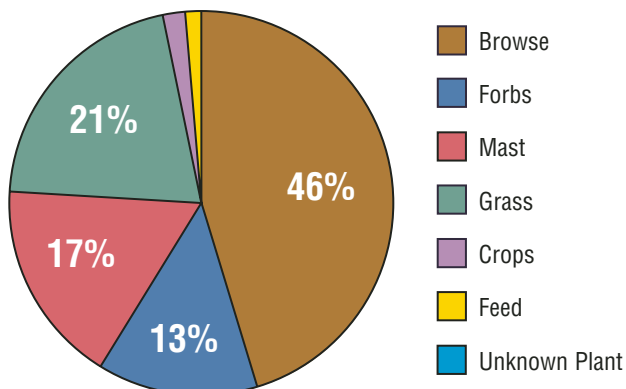


Jim Dillard

During the droughty summer of 1996, browse species made up 46% of the white-tailed deer diet. With increased rainfall during the summer of 1997, forb consumption increased to 43% and browse use decreased to 29%.

**SUMMER 1996** (Table 3)

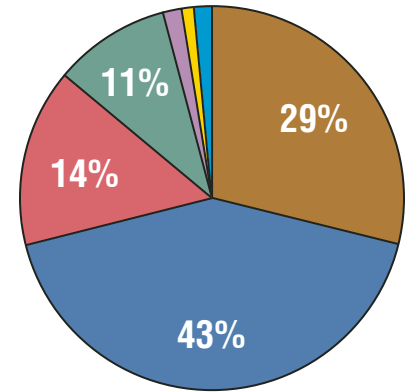
FORAGE CLASS and SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Mistletoe	<i>Phoradendron tomentosum</i>	3.68	1.00	3.68
Skunkbush	<i>Rhus aromatica</i>	10.99	5.00	2.20
Oak	<i>Quercus</i> spp.	10.47	5.00	2.09
Common greenbriar	<i>Smilax bona-nox</i>	4.97	4.00	1.24
Cedar elm	<i>Ulmus crassifolia</i>	3.55	3.00	1.18
Coralberry	<i>Symphoricarpos orbiculatus</i>	1.07	1.00	1.07
Yucca	<i>Yucca</i> spp.	0.94	1.00	0.94
Deciduous holly	<i>Ilex decidua</i>	0.85	1.00	0.85
Agarito	<i>Berberis trifoliolata</i>	0.71	1.00	0.71
Elbowbush	<i>Forestiera pubescens</i>	1.81	3.00	0.60
Ashe juniper	<i>Juniperus ashei</i>	2.01	4.00	0.50
Mesquite	<i>Prosopis glandulosa</i>	0.81	2.00	0.41
Bumelia	<i>Bumelia lanuginosa</i>	1.39	4.00	0.35
Sugar hackberry	<i>Celtis laevigata</i>	0.29	1.00	0.29
<b>FORBS</b>				
Lespedeza	<i>Lespedeza repens</i>	2.67	1.00	2.67
Deer vetch	<i>Lotus purshianus</i>	2.30	1.00	2.30
Partridge pea	<i>Chamaecrista fasciculata</i>	1.94	1.00	1.94
Snoutbean	<i>Rhynchosia</i> spp.	1.60	1.00	1.60
Venus' looking-glass	<i>Triodanis perfoliata</i>	1.15	1.00	1.15
Goldenwave coreopsis	<i>Coreopsis wrightii</i>	0.98	1.00	0.98
Mat euphorbia	<i>Chamaesyce prostrata</i>	2.85	3.00	0.95
Eryngo	<i>Eryngo leavenworthii</i>	0.86	1.00	0.86
Prairie verbena	<i>Verbena bipinnatifida</i>	0.84	1.00	0.84
Yellow woodsorrel	<i>Oxalis dillenii</i>	1.47	2.00	0.73
Plaintain	<i>Plantago</i> spp.	1.37	2.00	0.69
Prairie bishop's-weed	<i>Bifora americana</i>	0.66	1.00	0.66
Catnip noseburn	<i>Tragia ramosa</i>	1.21	3.00	0.40
Texas queen's-delight	<i>Stillingia texana</i>	0.54	2.00	0.27
<b>MAST</b>				
Mesquite beans	<i>Prosopis glandulosa</i>	7.40	2.00	3.70
Prickly pear fruit	<i>Opuntia lindheimeri</i>	5.77	2.00	2.88
Acorns	<i>Quercus</i> spp.	0.59	1.00	0.59
Western soapberry berries	<i>Sapindus saponaria</i>	0.40	1.00	0.40
<b>GRASS</b>				
Dichanthelium	<i>Dichanthelium oligosanthos</i>	6.87	3.00	2.29
Canada wildrye	<i>Elymus canadensis</i>	1.68	1.00	1.68
Hairy grama	<i>Bouteloua hirsuta</i>	1.14	1.00	1.14
Sideoats grama	<i>Bouteloua curtipendula</i>	2.11	2.00	1.06
Texas grama	<i>Bouteloua rigidiseta</i>	1.22	2.00	0.61
Little bluestem	<i>Schizachyrium scoparium</i>	1.58	3.00	0.53
<b>CROPS</b>				
Lab Lab		1.71	1.00	1.71
<b>FEED</b>				
Pelleted feed		1.36	3.00	0.45



TEN MOST PREFERRED	TEN MOST IMPORTANT
• Mesquite beans	• Skunkbush
• Mistletoe	• Oak
• Prickly pear fruit	• Mesquite beans
• Lespedeza	• Dichanthelium
• Deer vetch	• Prickly pear fruit
• Dichanthelium	• Common greenbriar
• Skunkbush	• Mistletoe
• Oak	• Cedar elm
• Partridge pea	• Mat euphorbia
• Lab Lab	• Lespedeza

**SUMMER 1997** (Table 4)

FORAGE CLASS AND SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Oak	<i>Quercus</i> spp.	6.43	5.00	1.29
Skunkbush	<i>Rhus aromatica</i>	6.04	5.00	1.21
Flameleaf sumac	<i>Rhus lanceolata</i>	1.08	1.00	1.08
Mistletoe	<i>Phoradendron tomentosum</i>	0.94	1.00	0.94
Deciduous holly	<i>Ilex decidua</i>	0.83	1.00	0.83
Common greenbriar	<i>Smilax bona-nox</i>	3.02	4.00	0.75
Cedar elm	<i>Ulmus crassifolia</i>	2.13	3.00	0.71
Texas Redbud	<i>Cercis canadensis</i> var. <i>texensis</i>	0.67	1.00	0.67
Lotebush	<i>Ziziphus obtusifolia</i>	0.50	1.00	0.50
Sugar hackberry	<i>Celtis laevigata</i>	0.41	1.00	0.41
Gray Dogwood	<i>Cornus drummondii</i>	0.39	1.00	0.39
Mexican Buckeye	<i>Ungnadia speciosa</i>	0.39	1.00	0.39
Elbowbush	<i>Forestiera pubescens</i>	1.05	3.00	0.35
Poison ivy	<i>Rhus toxicodendron</i>	1.28	4.00	0.32
Ashe juniper	<i>Juniperus ashei</i>	1.23	4.00	0.31
Texas Ash	<i>Fraxinus texensis</i>	0.28	1.00	0.28
Coraberry	<i>Symphoricarpos orbiculatus</i>	0.28	1.00	0.28
Bumelia	<i>Bumelia lanuginosa</i>	0.85	4.00	0.21
Yucca	<i>Yucca</i> spp.	0.16	1.00	0.16
Agarito	<i>Berberis trifoliolata</i>	0.16	1.00	0.16
<b>FORBS</b>				
Hill Country wild mercury	<i>Argythamnia aפורoides</i>	3.31	1.00	3.31
Deer vetch	<i>Lotus purshianus</i>	3.23	1.00	3.23
Mat euphorbia	<i>Chamaesyce prostrata</i>	2.96	1.00	2.96
Tall bush clover	<i>Lespedeza stuevei</i>	1.95	1.00	1.95
Lespedeza	<i>Lespedeza repens</i>	1.91	1.00	1.91
Yellow dalea	<i>Dalea aurea</i>	1.78	1.00	1.78
Beggar's tick	<i>Torilis arvensis</i>	1.68	1.00	1.68
Stork's bill	<i>Erodium texanum</i>	1.64	1.00	1.64
Croton	<i>Croton</i> spp.	2.98	2.00	1.49
Prairie fleabane	<i>Erigeron strigosus</i>	1.48	1.00	1.48
Partridge pea	<i>Chamaecrista fasciculata</i>	2.80	2.00	1.40
Snoutbean	<i>Rhynchosia</i> sp.	2.78	2.00	1.39
Zexmenia	<i>Zemenan hispida</i>	1.33	1.00	1.33
Illinois bundleflower	<i>Desmanthus illinoensis</i>	2.15	2.00	1.08
Wild carrot	<i>Daucus pusillus</i>	1.01	1.00	1.01
Yellow woodsorrel	<i>Oxalis dillenii</i>	2.59	3.00	0.86
Prairie verbena	<i>Verbena bipinnatifida</i>	0.83	1.00	0.83
Venus' looking-glass	<i>Triodanis perfoliata</i>	0.83	1.00	0.83
Twoleaf senna	<i>Senna roemeriana</i>	1.55	2.00	0.78
Texas thistle	<i>Cirsium texanum</i>	0.78	1.00	0.78
Western ragweed	<i>Ambrosia psilostachya</i>	2.77	4.00	0.69
Goldenwave coreopsis	<i>Coreopsis wrightii</i>	0.62	1.00	0.62
Prairie bishop's-weed	<i>Bifora americana</i>	0.59	1.00	0.59
Texas vervain	<i>Verbena halei</i>	0.59	1.00	0.59
Plantain	<i>Plantago</i> spp.	1.04	2.00	0.52
Wild lettuce	<i>Lactuca ludoviciana</i>	0.50	1.00	0.50
Catnip noseburn	<i>Tragia ramosa</i>	1.22	3.00	0.41
Texas queen's-delight	<i>Stillingia texana</i>	0.39	1.00	0.39
Common chickweed	<i>Stellaria media</i>	0.59	2.00	0.29
<b>MAST</b>				
Mesquite beans	<i>Prosopis glandulosa</i>	4.45	2.00	2.23
Prickly pear fruit	<i>Opuntia lindheimeri</i>	4.98	3.00	1.66
Acorns	<i>Quercus</i> spp.	1.23	1.00	1.23
<b>GRASS</b>				
Sideoats grama	<i>Bouteloua curtipendula</i>	1.99	2.00	1.00
Dichanthelium	<i>Dichanthelium oligosanthes</i>	2.38	3.00	0.79
Texas grama	<i>Bouteloua rigidisetata</i>	0.88	2.00	0.44
Canada wildrye	<i>Elymus canadensis</i>	0.39	1.00	0.39
Little bluestem	<i>Schizachyrium scoparium</i>	0.48	3.00	0.16
Green sprangletop	<i>Leptochloa dubia</i>	0.16	1.00	0.16
Silver bluestem	<i>Bothriochloa saccharoides</i>	0.46	3.00	0.15
Hairy grama	<i>Bouteloua hirsuta</i>	0.16	2.00	0.08
<b>CROPS</b>				
Lab Lab		1.00	1.00	1.00
<b>FEED</b>				
Pelleted feed		1.04	3.00	0.35



- TEN MOST PREFERRED**
- Hill Country wild mercury
  - Deer vetch
  - Mat euphorbia
  - Mesquite beans
  - Tall bush clover
  - Lespedeza
  - Yellow dalea
  - Beggar's tick
  - Prickly pear fruit
  - Stork's bill

- TEN MOST IMPORTANT**
- Oak
  - Skunkbush
  - Prickly pear fruit
  - Mesquite beans
  - Hill Country wild mercury
  - Deer vetch
  - Common greenbriar
  - Croton
  - Mat euphorbia
  - Partridge pea



## Fall

Browse still made up 38% of the deer diet in fall of 1996 (Table 5). High use species included oaks, common greenbriar, Ashe juniper, deciduous yaupon and mistletoe. One browse species, Ashe juniper, had heavy use on some study sites. This primarily occurred on study sites that were in very poor range conditions with low availability and diversity of other woody browse species. Mast use increased to 26% as oak acorns became available. Oak acorns had the highest importance and preference ranks. Prickly pear fruit continued to be used but decreased in overall importance compared to summer. Grasses composed 11% of the diet with dichanthelium and rescuegrass having the highest use. Forbs made up 10% of the diet and important species included mat euphorbia, catnip noseburn and yellow woodsorrel. Supplemental food use, primarily corn from deer feeders and planted agricultural forage crops, increased, making up 15% of the diet. Commercial pelleted feed did not appear in significant amounts in diets as it was not available on all sites.

Browse utilization was similar in fall 1997 (Table 6) and made up 32% of the diet. Highly preferred browse species included oaks,

coralberry, prairie flameleaf sumac, mistletoe and deciduous yaupon. Mast use was also similar to 1996 comprising 32% of diet and consisting primarily of oak acorns. Forbs, at 7% of diets, included tall bush clover, lespedeza, mat euphorbia, snoutbean and catnip noseburn. Preferred forbs included tall bush clover, lespedeza, mat euphorbia, snoutbean and Hill Country wild mercury. Grasses composed only 4% of the diet with use of dichanthelium, rescuegrass, sideoats grama and Texas grama. Overall use of corn from deer feeders and planted agricultural grain and forage crops was relatively high at 25%, indicating deer were attracted to and used these items in their diets when they were available.

Forty-six native plants were identified in the fall diet of deer in the Cross Timbers and Prairies Region of Texas accounting for 81% of the overall diet. Important browse species were oaks, skunkbush, cedar elm, common greenbriar, deciduous yaupon and coralberry. Only 7 forbs received substantial use during the fall including mat euphorbia, tall bush clover and lespedeza. Oak acorns were important food items in fall deer diets both years and grasses were less important than during other seasons.

Acorns, like all mast, are only available to deer seasonally. Even though oak mast is highly used and preferred seasonally, it does not replace habitat that lacks a diversity of browse and forbs. “Deer corn” did not show up in the diet in quantity until fall when many hunters began filling feeders. Although abundant food resources during the fall do not contribute substantially to antler growth and development, large acorn crops do help improve adult body condition going into winter. These large acorn crops often frustrate hunters who choose to hunt over feeders or food plots. It is difficult to attract deer away from this highly preferred natural food source.



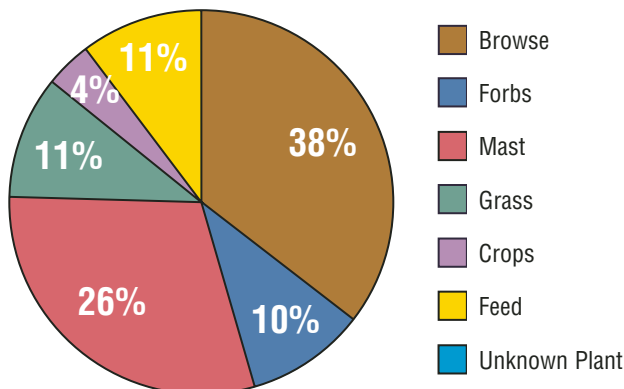
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During the fall of 1996, forbs made up 10% of the white-tailed deer diet and in the fall of 1997, forbs made up 7% of the diet.



FALL 1996 (Table 5)

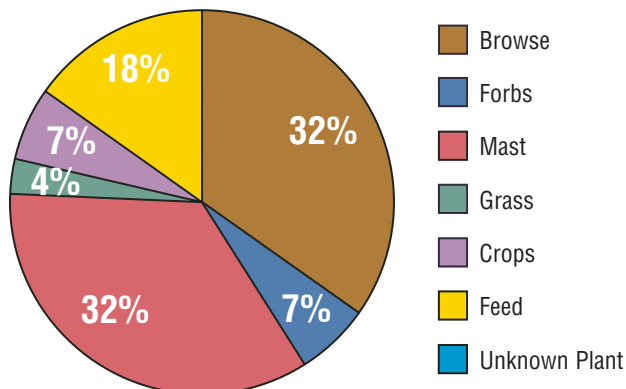
FORAGE CLASS and SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Mistletoe	<i>Phoradendron tomentosum</i>	4.03	1.00	4.03
Deciduous holly	<i>Ilex decidua</i>	2.76	1.00	2.76
Oak	<i>Quercus</i> spp.	9.70	5.00	1.94
Sugar hackberry	<i>Celtis laevigata</i>	1.75	1.00	1.75
Cedar elm	<i>Ulmus crassifolia</i>	4.56	3.00	1.52
Gray dogwood	<i>Cornus drummondii</i>	1.35	1.00	1.35
Common greenbriar	<i>Smilax bona-nox</i>	4.42	4.00	1.11
Skunkbush	<i>Rhus aromatica</i>	4.78	5.00	0.96
Texas Ash	<i>Fraxinus texensis</i>	0.92	1.00	0.92
Coralberry	<i>Symphoricarpos orbiculatus</i>	1.52	2.00	0.76
Ashe juniper	<i>Juniperus ashei</i>	2.48	4.00	0.62
Bumelia	<i>Bumelia lanuginosa</i>	2.10	4.00	0.52
Elbowbush	<i>Forestiera pubescens</i>	1.36	3.00	0.45
Agarito	<i>Berberis trifoliolata</i>	0.23	1.00	0.23
<b>FORBS</b>				
Mat euphorbia	<i>Chamaesyce prostrata</i>	2.66	1.00	2.66
Common chickweed	<i>Stellaria media</i>	1.45	1.00	1.45
Deer vetch	<i>Lotus purshianus</i>	1.11	1.00	1.11
Yellow woodsorrel	<i>Oxalis dillenii</i>	1.98	2.00	0.99
Lespedeza	<i>Lespedeza repens</i>	0.91	1.00	0.91
Prairie bishop's-weed	<i>Bifora americana</i>	0.86	1.00	0.86
Prairie verbena	<i>Verbena bipinnatifida</i>	0.81	1.00	0.81
Partridge pea	<i>Chamaecrista fasciculata</i>	0.69	1.00	0.69
Eryngo	<i>Eryngo leavenworthii</i>	0.66	1.00	0.66
Venus' looking-glass	<i>Triodanis perfoliata</i>	0.64	1.00	0.64
Catnip noseburn	<i>Tragia ramosa</i>	1.67	3.00	0.56
Plantain	<i>Plantago</i> spp.	0.91	2.00	0.46
Texas queen's-delight	<i>Stillingia texana</i>	0.59	2.00	0.29
<b>MAST</b>				
Acorns	<i>Quercus</i> spp.	15.49	1.00	15.49
Prickly pear fruit	<i>Opuntia lindheimeri</i>	2.67	2.00	1.34
<b>GRASS</b>				
Rescuegrass	<i>Bromus unioloides</i>	1.76	1.00	1.76
Panicum	<i>Panicum</i> spp.	0.91	1.00	0.91
Dichanthelium	<i>Dichanthelium oligosanthes</i>	2.37	3.00	0.79
Curlymesquite	<i>Hilaria belangeri</i>	1.36	2.00	0.68
Texas grama	<i>Bouteloua rigidisetata</i>	0.58	1.00	0.58
Sideoats grama	<i>Bouteloua curtipendula</i>	0.69	2.00	0.34
Little bluestem	<i>Schizachyrium scoparium</i>	0.70	3.00	0.23
<b>CROPS</b>				
Wheat/Oats		3.69	1.00	3.69
Lab Lab		0.73	1.00	0.73
<b>FEED</b>				
Corn		8.79	1.00	8.79
Pelleted feed		0.70	3.00	0.23



TEN MOST PREFERRED	TEN MOST IMPORTANT
• Acorns	• Acorns
• Corn	• Oak
• Mistletoe	• Corn
• Wheat/Oats	• Skunkbush
• Deciduous holly	• Cedar elm
• Mat euphorbia	• Common greenbriar
• Oak	• Mistletoe
• Rescuegrass	• Wheat/Oats
• Sugar hackberry	• Deciduous holly
• Cedar elm	• Prickly pear fruit

FALL 1997 (Table 6)

FORAGE CLASS and SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Coralberry	<i>Symphoricarpos orbiculatus</i>	2.39	1.00	2.39
Oak	<i>Quercus</i> spp.	8.41	5.00	1.68
Flameleaf sumac	<i>Rhus lanceolata</i>	1.67	1.00	1.67
Mistletoe	<i>Phoradendron tomentosum</i>	1.48	1.00	1.48
Skunkbush	<i>Rhus aromatica</i>	5.95	5.00	1.19
Deciduous holly	<i>Ilex decidua</i>	1.00	1.00	1.00
Cedar elm	<i>Ulmus crassifolia</i>	2.95	3.00	0.98
Common greenbriar	<i>Smilax bona-nox</i>	3.86	4.00	0.97
Sugar hackberry	<i>Celtis laevigata</i>	0.92	1.00	0.92
Ashe juniper	<i>Juniperus ashei</i>	2.93	4.00	0.73
Texas redbud	<i>Cercis canadensis</i> var. <i>texensis</i>	0.68	1.00	0.68
Gray dogwood	<i>Cornus drummondii</i>	0.62	1.00	0.62
Texas ash	<i>Fraxinus texensis</i>	0.54	1.00	0.54
Elbowbush	<i>Forestiera pubescens</i>	1.31	3.00	0.44
Poison ivy	<i>Rhus toxicodendron</i>	1.54	4.00	0.39
Bumelia	<i>Bumelia lanuginosa</i>	1.50	4.00	0.37
Yucca	<i>Yucca</i> spp.	0.24	1.00	0.24
Agarito	<i>Berberis trifoliolata</i>	0.24	1.00	0.24
<b>FORBS</b>				
Tall bush clover	<i>Lespedeza stuevei</i>	2.10	1.00	2.10
Lespedeza	<i>Lespedeza repens</i>	1.87	1.00	1.87
Mat euphorbia	<i>Chamaesyce prostrata</i>	1.18	1.00	1.18
Snoutbean	<i>Rhynchosia</i> spp.	1.10	1.00	1.10
Hill Country wild mercury	<i>Argythamnia aפורoides</i>	1.06	1.00	1.06
Common chickweed	<i>Stellaria media</i>	0.91	1.00	0.91
Deer vetch	<i>Lotus purshianus</i>	0.87	1.00	0.87
Stork's bill	<i>Erodium texanum</i>	0.68	1.00	0.68
Wild lettuce	<i>Lactuca ludoviciana</i>	0.42	1.00	0.42
Catnip noseburn	<i>Tragia ramosa</i>	1.08	3.00	0.36
Croton	<i>Croton</i> spp.	0.68	2.00	0.34
Yellow woodsorrel	<i>Oxali dillenii</i>	0.63	2.00	0.32
Beggar's tick	<i>Torilis arvensis</i>	0.42	2.00	0.21
<b>MAST</b>				
Acorns	<i>Quercus</i> spp.	20.18	1.00	20.18
Prickly pear fruit	<i>Opuntia lindheimeri</i>	1.99	1.00	1.99
<b>GRASS</b>				
Dichanthelium	<i>Dichanthelium oligosanthes</i>	1.48	3.00	0.49
Curlymesquite	<i>Hilaria belangeri</i>	0.91	2.00	0.46
Rescuegrass	<i>Bromus unioloides</i>	0.72	2.00	0.36
Sideoats grama	<i>Bouteloua curtipendula</i>	0.62	2.00	0.31
Texas grama	<i>Bouteloua rigidiseta</i>	0.24	1.00	0.24
Silver bluestem	<i>Bothriochloa saccharoides</i>	0.42	3.00	0.14
Little bluestem	<i>Schizachyrium scoparium</i>	0.24	4.00	0.06
<b>CROPS</b>				
Wheat/Oats		5.49	1.00	5.49
Lab Lab		0.54	1.00	0.54
<b>FEED</b>				
Corn		12.73	1.00	12.73
Pelleted feed		1.51	3.00	0.50



TEN MOST PREFERRED	TEN MOST IMPORTANT
• Acorns	• Acorns
• Corn	• Corn
• Wheat/Oats	• Oak
• Coralberry	• Skunkbush
• Tall bush clover	• Wheat/Oats
• Prickly pear fruit	• Common greenbriar
• Lespedeza	• Cedar elm
• Oak	• Ashe juniper
• Flameleaf sumac	• Coralberry
• Mistletoe	• Tall bush clover

## Winter

In winter 1997, browse made up 32% of the deer diet with oaks, skunkbush and common greenbriar receiving the most use (Table 7). Oak mast use continued to be substantial in diets at 25%. Supplemental feed, primarily corn and pelleted feed, and planted agricultural forage and grain crops received high use (18% of deer diets). Forbs contributed 13% to deer diets with continued use of species important in the fall. Grasses accounted for 12% of the diet in this season.

Browse was also the most significant component (27%) of deer diets during the winter of 1998. Oak, common greenbriar, deciduous yaupon and mistletoe had the highest preference values (Table 8). Supplemental feed (corn) and planted agricultural forage and grain crops received their highest use at 23% of the diet. Oak acorn mast use (18%) was also high. Important forbs identified were croton, western ragweed and mat euphorbia. Overall this forage class made up 17% of deer diets. Grass use increased to 14% with green sprangletop, Texas wintergrass and dichanthelium being used most often.

Only thirty-six native plant species were identified in the winter diets of white-tailed deer in the Cross Timbers and Prairies Region. These species accounted for 80% of the winter diet.

The balance of the annual diet was commercial feed or planted agricultural and forage crops. Fourteen browse species accounted for 62% to 68% of the winter diet. Mistletoe and oak were preferred browse species and mat euphorbia was the most preferred forb. Acorns were highly preferred mast items. Planted agricultural and forage crops and commercial feed also exhibited high preference rankings.

Winter months often result in periods of nutritional stress for white-tailed deer in the Cross Timbers and Prairies Region. The availability of evergreen browse species throughout much of the region is limited, particularly where sandstone soils are the primary parent material. In some areas, and in some years, availability of winter food resources can become a limiting factor to white-tailed deer populations. Wet, mild winters generally provide more food resources in the form of more abundant forbs and cool-season grasses. Better nutrition during the winter can lead to adults maintaining better body condition. Conversely, poor nutrition can result in higher mortality among bucks stressed from the breeding season. White-tailed deer that come out of winter in good physical condition are better able to make use of forage during spring green up, resulting in increased potential for antler development and fawn survival rates later in the year.

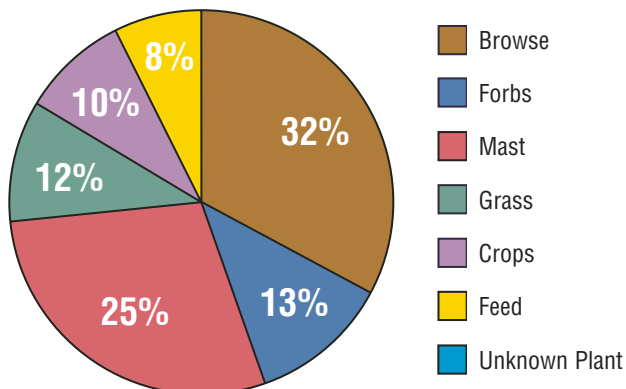
During the winter of 1998, grass use increased to 14% with green sprangletop, Texas wintergrass, and dichanthelium being used most often.



Jim Dillard

**WINTER 1997** (Table 7)

FORAGE CLASS and SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Mistletoe	<i>Phoradendron tomentosum</i>	3.12	1.00	3.12
Oak	<i>Quercus</i> spp.	13.33	5.00	2.67
Deciduous holly	<i>Ilex decidua</i>	2.10	1.00	2.10
Common greenbriar	<i>Smilax bona-nox</i>	7.08	4.00	1.77
Cedar elm	<i>Ulmus crassifolia</i>	3.36	3.00	1.12
Sugar hackberry	<i>Celtis laevigata</i>	1.06	1.00	1.06
Skunkbush	<i>Rhus aromatica</i>	3.85	5.00	0.77
Ashe juniper	<i>Juniperus ashei</i>	2.94	4.00	0.74
Elbowbush	<i>Forestiera pubescens</i>	1.94	3.00	0.65
Agarito	<i>Berberis trifoliolata</i>	0.45	1.00	0.45
Bumelia	<i>Bumelia lanuginosa</i>	1.60	4.00	0.40
Yucca	<i>Yucca</i> spp.	0.33	1.00	0.33
Lotebush	<i>Ziziphus obtusifolia</i>	0.30	1.00	0.30
Poison ivy	<i>Rhus toxicodendron</i>	0.59	4.00	0.15
<b>FORBS</b>				
Mat euphorbia	<i>Chamaesyce prostrata</i>	2.84	1.00	2.84
Wild carrot	<i>Daucus pusillus</i>	2.19	2.00	1.10
Yellow woodsorrel	<i>Oxalis dillenii</i>	1.99	2.00	1.00
Stork's bill	<i>Erodium texanum</i>	0.91	1.00	0.91
Prairie bishop's-weed	<i>Bifora americana</i>	0.69	1.00	0.69
Evax	<i>Evax</i> sp.	0.56	1.00	0.56
Plantain	<i>Plantago</i> spp.	0.91	2.00	0.45
<b>MAST</b>				
Acorns	<i>Quercus</i> spp.	17.34	1.00	17.34
<b>GRASS</b>				
Texas wintergrass	<i>Stipa leucotricha</i>	3.05	3.00	1.02
Dichanthelium	<i>Dichanthelium oligosanthos</i>	1.93	2.00	0.96
Sideoats grama	<i>Bouteloua curtipendula</i>	0.64	1.00	0.64
Rescuegrass	<i>Bromus unioloides</i>	1.25	2.00	0.62
Little bluestem	<i>Schizachyrium scoparium</i>	0.56	2.00	0.28
Texas grama	<i>Bouteloua rigidisetata</i>	0.27	1.00	0.27
<b>CROPS</b>				
Oats/Wheat		7.09	1.00	7.09
<b>FEED</b>				
Corn		8.02	1.00	8.02
Pelleted feed		1.63	3.00	0.54

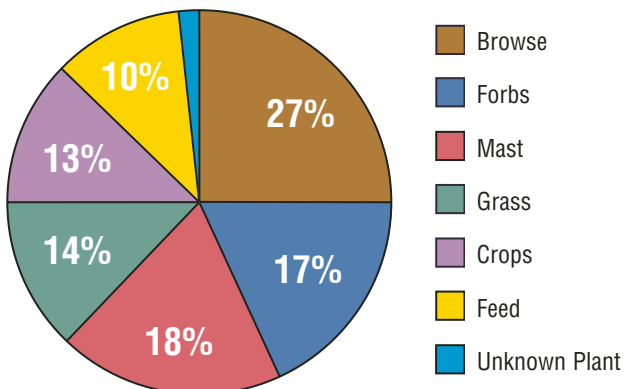


TEN MOST PREFERRED	TEN MOST IMPORTANT
<ul style="list-style-type: none"> <li>● Acorns</li> <li>● Corn</li> <li>● Wheat/Oats</li> <li>● Mistletoe</li> <li>● Mat euphorbia</li> <li>● Oak</li> <li>● Deciduous holly</li> <li>● Common greenbriar</li> <li>● Cedar elm</li> <li>● Wild carrot</li> </ul>	<ul style="list-style-type: none"> <li>● Acorns</li> <li>● Oak</li> <li>● Corn</li> <li>● Wheat/Oats</li> <li>● Common greenbriar</li> <li>● Skunkbush</li> <li>● Cedar elm</li> <li>● Mistletoe</li> <li>● Texas wintergrass</li> <li>● Ashe juniper</li> </ul>



**WINTER 1998** (Table 8)

FORAGE CLASS and SPECIES	SCIENTIFIC NAME	IMPORTANCE VALUE	AVAILABILITY FACTOR	PREFERENCE
<b>BROWSE</b>				
Mistletoe	<i>Phoradendron tomentosum</i>	2.84	1.00	2.84
Oak	<i>Quercus</i> spp.	12.42	5.00	2.48
Common greenbriar	<i>Smilax bona-nox</i>	6.11	4.00	1.53
Deciduous holly	<i>Ilex decidua</i>	1.46	1.00	1.46
Cedar elm	<i>Ulmus crassifolia</i>	2.99	3.00	1.00
Skunkbush	<i>Rhus aromatica</i>	4.58	5.00	0.92
Sugar hackberry	<i>Celtis laevigata</i>	0.85	1.00	0.85
Ashe juniper	<i>Juniperus ashei</i>	2.77	4.00	0.69
Elbowbush	<i>Forestiera pubescens</i>	1.58	3.00	0.53
Bumelia	<i>Bumelia lanuginosa</i>	1.18	4.00	0.29
Yucca	<i>Yucca</i> spp.	0.25	1.00	0.25
Agarito	<i>Berberis trifoliolata</i>	0.25	1.00	0.25
Poison ivy	<i>Rhus toxicodendron</i>	0.45	4.00	0.11
<b>FORBS</b>				
Mat euphorbia	<i>Chamaesyce prostrata</i>	2.66	1.00	2.66
Wild onion	<i>Allium canadense</i>	1.96	1.00	1.96
Western ragweed	<i>Ambrosia psilostachya</i>	3.72	2.00	1.86
Croton	<i>Croton</i> spp.	1.45	1.00	1.45
Yellow woodsorrel	<i>Oxalis dillenii</i>	1.96	2.00	0.98
Common chickweed	<i>Stellaria media</i>	0.98	1.00	0.98
Wild carrot	<i>Daucus pusillus</i>	1.76	2.00	0.88
Prairie bishop's-weed	<i>Bifora americana</i>	0.53	1.00	0.53
Plantain	<i>Plantago</i> spp.	0.73	2.00	0.36
<b>MAST</b>				
Acorns	<i>Quercus</i> spp.	13.21	1.00	13.21
<b>GRASS</b>				
Texas wintergrass	<i>Stipa leucotricha</i>	4.60	3.00	1.53
Green sprangletop	<i>Leptochloa dubia</i>	2.52	2.00	1.26
Plains lovegrass	<i>Eragrostis intermedia</i>	1.17	1.00	1.17
Dichanthelium	<i>Dichanthelium oligosanthes</i>	2.06	2.00	1.03
Sideoats grama	<i>Bouteloua curtipendula</i>	0.73	1.00	0.73
Rescuegrass	<i>Bromus unioloides</i>	1.26	2.00	0.63
Texas grama	<i>Bouteloua rigidiseta</i>	0.33	1.00	0.33
Little bluestem	<i>Schizachyrium scoparium</i>	0.57	2.00	0.28
Threeawn	<i>Artistida</i> spp.	0.25	1.00	0.25
<b>CROPS</b>				
Wheat/Oats		6.25	1.00	6.25
<b>FEED</b>				
Corn		5.84	1.00	5.84
Pelleted feed		2.18	3.00	0.73



TEN MOST PREFERRED	TEN MOST IMPORTANT
• Acorns	• Acorns
• Wheat/Oats	• Oak
• Corn	• Wheat/Oats
• Mistletoe	• Common greenbriar
• Mat euphorbia	• Corn
• Oak	• Texas wintergrass
• Wild onion	• Skunkbush
• Western ragweed	• Western ragweed
• Common greenbriar	• Cedar elm
• Texas wintergrass	• Mistletoe

## Management Implications

Several plant species, plant complexes and plant groups emerged as being very important to deer in the Cross Timbers and Prairies Region. The importance of browse in the diets of deer in the Cross Timbers and Prairies Region, even in high rainfall years and on ranches that provide supplemental food sources, dictates that managing for browse diversity and abundance should be a primary goal of any deer management program. Some of the most important browse species included oaks, sumac-poison ivy complex, elbowbush and common greenbriar. A mixture of these browse species in reasonable abundance and availability is an important component of good white-tailed deer habitat in the Cross Timbers and Prairies Region. Plant communities on individual ranches will vary with general soil type, but a diverse mix of these species in a growth form available to deer should indicate above average deer habitat potential.

Appropriate management of grazing pressure by both livestock and wildlife is key to achieving and maintaining browse diversity and abundance goals. Management strategies will most likely include rotation grazing of cattle at a light to moderate stocking rate and an adequate harvest of deer according to a population based harvest recommendation. Other tools that may be used include management of noxious brush species and prescribed burning.

Forbs are also an important component of deer diets. This study indicated that deer preferred and heavily used forbs during spring and summer when weather conditions and/or land management practices promoted their occurrence. Good grazing management can reduce competition for forbs. Native grasslands and brushlands, managed with a combination of rotation cattle grazing at an appropriate stocking rate and properly timed prescribed burning, can produce an abundance of diverse forbs when the weather cooperates. Other management techniques such as fallow disking or brush management that disturbs the soil and sets back

plant succession may also be appropriate for promoting forb production. Mast is an important seasonal component of the diet. Important mast species included mesquite beans and prickly pear fruit in summer and oak acorns in fall. Mast from other species, such as bumelia and skunkbush, are also important in some seasons. Since many of these species are also important browse species, management techniques that promote diverse browse communities should also be beneficial to important mast producers.

Food supplements, planted agricultural forage and grain crops, pelleted feeds and attractants (feeder corn) that were available on study sites were found in deer rumens. Availability of planted crops and pelleted feed were restricted to sites classified as being in excellent range condition. Seasonal use of commercial feed (pellets and corn) on sites where both were available ranged from 1% to 17.4%. However, the highest seasons for utilization were fall and winter (hunting season). Additionally, pelleted feed and corn from feeders were pooled in the analysis. Utilization of planted agricultural forage and grain crops was tracked separately and use peaked in winter (18.4% of diet) and summer (10.3%). Overall utilization of feeders and planted agricultural forage and grain crops presumably would have been higher if available on a year-round basis on range sites rated as being in poor to fair condition.

The planting of agricultural forage crops or providing supplementation for white-tailed deer should be closely evaluated early in the deer management planning process. The long-term results may be difficult to evaluate and costs may outweigh benefits. The results of this study indicate that naturally occurring native foods are much more important to deer than supplemental foods. The overwhelming importance of natural food sources indicates that proper management of native plants should be given precedence over supplemental food in the planning and execution of any deer management program in the Cross Timbers and Prairies Region.



Jim Dillard

The results of this study indicate that native plants are the most important component in white-tailed deer diets in the Cross Timbers and Prairies Region of Texas.

## CONCLUSION

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Habitat for white-tailed deer and other wildlife species found in the Cross Timbers and Prairies Region of Texas is located primarily on private property. Thus, it is incumbent for landowners to properly manage that habitat to produce and sustain populations of this important game species. Management of white-tailed deer and their habitat can be accomplished in conjunction with other agricultural enterprises with planning, concessions and adjustments to land use and application of proper management practices. A basic understanding of the habitat requirements of white-tailed deer, including food habits as presented in this publication, must preclude short-term management ventures

directed toward this species. It is the land and those who manage it that will ultimately determine the future for white-tailed deer in this increasingly fragmented ecological region of Texas.

The Cross Timbers and Prairies Region of Texas is truly at a crossroads at the beginning of the 21st Century. Without the application of sound population, harvest and habitat management techniques and strategies by dedicated and informed landowners, the quality and quantity of future populations of this “king of deer” may be in jeopardy.

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## APPENDIX A: PLANT LIST

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List of plants identified during this study. Nomenclature follows Correll and Johnson (1970).

### FAMILY NAME *Scientific name*

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### COMMON FAMILY NAME Common name

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#### ACANTHACEAE

*Dyschoriste linearis*  
*Justicia americana*  
*Ruellia humilis*  
*Ruellia nudiflora*

#### ACANTHUS FAMILY

snake-herb  
American water-willow  
low wild-petunia  
common wildpetunia

#### ALISMACEAE

*Echinodorus rostratus*

#### WATER-PLANTAIN FAMILY

burhead

#### AMARANTHACEAE

*Froelichia gracilis*

#### AMARANTH FAMILY

slender snake-cotton

#### AMARYLLIDACEAE

*Cooperia pedunculata*

#### AMARYLLIS FAMILY

rain-lily

#### ANACARDIACEAE

*Rhus glabra*  
*Rhus lanceolata*  
*Rhus toxicodendron*  
*Rhus aromatica*

#### SUMAC FAMILY

smooth sumac  
flameleaf sumac  
poison ivy  
skunkbush

#### APIACEAE (UMBELLIFERAE)

*Bifora americana*  
*Daucus pusillus*  
*Eryngium leavenworthii*  
*Torilis arvensis*

#### CARROT FAMILY

prairie bishop's-weed  
wild carrot  
eryngo  
beggar's tick

#### APOCYNACEAE

*Amsonia ciliata*

#### DOGBANE FAMILY

blue star

#### AQUIFOLIACEAE

*Ilex decidua*  
*Ilex vomitoria*

#### HOLLY FAMILY

deciduous holly  
yaupon

#### ASCLEPIADACEAE

*Asclepias asperula*  
*Asclepias viridis*  
*Matelea* spp.

#### MILKWEED FAMILY

antelope horns  
green milkweed  
milkvine

#### ASTERACEAE (COMPOSITAE)

*Achillea millefolium*  
*Amblyolepis setigera*  
*Ambrosia psilostachya*

#### COMPOSITE FAMILY

yarrow  
huisache daisy  
western ragweed

<i>Ambrosia trifida</i>	giant ragweed
<i>Amphiachyris dracunculoides</i>	broomweed
<i>Aphanostephus skirrhobasis</i>	lazy daisy
<i>Aster ericoides</i>	heath aster
<i>Aster pratensis</i>	aster
<i>Baccharis neglecta</i>	Roosevelt weed
<i>Centaurea melitensis</i>	yellow star-thistle
<i>Chrysopsis canescens</i>	gray goldenaster
<i>Cirsium texanum</i>	Texas thistle
<i>Coreopsis wrightii</i>	goldenwave coreopsis
<i>Echinacea angustifolia</i>	coneflower
<i>Eclipta prostrata</i>	yerba de tago
<i>Engelmannia pinnatifida</i>	Engelmann daisy
<i>Erigeron strigosus</i>	prairie fleabane
<i>Evax</i> sp.	evax, rabbit-tobacco
<i>Gaillardia pulchella</i>	Indian blanket
<i>Grindelia</i> sp.	gumweed
<i>Gutierrezia</i> sp.	broom snakeweed
<i>Helenium amarum</i>	bitterweed
<i>Helianthus annuus</i>	common sunflower
<i>Helianthus maximiliani</i>	maximilian sunflower
<i>Hymenoxys</i> spp.	bitterweed
<i>Lactuca ludoviciana</i>	wild lettuce
<i>Liatris punctata</i>	blazing star
<i>Lindheimera texana</i>	Texas daisy
<i>Palafoxia callosa</i>	palafoxia
<i>Pyrrhopappus</i> sp.	false-dandelion
<i>Ratibida columnaris</i>	Mexican hat
<i>Rudbeckia amplexicaulis</i> ( <i>Dracopis amplexicaulis</i> )	clasping coneflower
<i>Rudbeckia hirta</i>	black-eyed Susan
<i>Simsia calva</i>	bush sunflower
<i>Solidago radula</i>	goldenrod
<i>Sonchus</i> sp.	sow thistle
<i>Thelesperma filifolium</i>	slender greenthread
<i>Vernonia lindheimeri</i>	silverleaf ironweed
<i>Verbesina virginica</i>	frostweed
<i>Xanthium strumarium</i>	cocklebur
<i>Xanthisma texanum</i>	sleepy daisy
<i>Zexmenia hispida</i>	zexmenia
<b>BERBERIDACEAE</b>	<b>BARBERRY FAMILY</b>
<i>Berberis trifoliolata</i>	agarito
<b>BORAGINACEAE</b>	<b>BORAGE FAMILY</b>
<i>Heliotropium tenellum</i>	pasture heliotrope
<b>BRASSICACEAE (CRUCIFERAE)</b>	<b>MUSTARD FAMILY</b>
<i>Draba</i> sp.	whitlow-wort

<i>Lepidium</i> spp.	pepperweed
<i>Lesquerella densiflora</i>	bladderpod
<b>CACTACEAE</b>	<b>CACTUS FAMILY</b>
<i>Coryphantha</i> sp.	nipple cactus
<i>Opuntia leptocaulis</i>	tasajillo, pencil cactus
<i>Opuntia lindheimeri</i>	prickly pear
<b>CAMPANULACEAE</b>	<b>BELLFLOWER FAMILY</b>
<i>Triodanis perfoliata</i>	Venus' looking-glass
<b>CAPRIFOLIACEAE</b>	<b>HONEYSUCKLE FAMILY</b>
<i>Lonicera albiflora</i>	white honeysuckle
<i>Symphoricarpos orbiculatus</i>	coralberry
<i>Viburnum rufidulum</i>	rusty blackhaw
<b>CARYOPHYLLACEAE</b>	<b>PINK FAMILY</b>
<i>Stellaria media</i>	common chickweed
<b>COMMELINACEAE</b>	<b>SPIDERWORT FAMILY</b>
<i>Commelina erecta</i>	common dayflower
<i>Tradescantia occidentalis</i>	western spiderwort
<i>Tradescantia ohiensis</i>	Ohio spiderwort
<b>CONVOLVULACEAE</b>	<b>MORNING-GLORY FAMILY</b>
<i>Convolvulus equitans</i>	common bindweed
<i>Evolvulus nuttallianus</i>	blue evolvulus
<i>Evolvulus sericeus</i>	silky evolvulus
<i>Ipomoea trichocarpa</i>	common morning-glory
<i>Ipomoea lindheimeri</i>	blue morning-glory
<b>CORNACEAE</b>	<b>DOGWOOD FAMILY</b>
<i>Cornus drummondii</i>	gray dogwood
<b>CRASSULACEAE</b>	<b>ORPINE FAMILY</b>
<i>Sedum nuttallianum</i>	yellow stonecrop
<b>CUPRESSACEAE</b>	<b>CYPRESS FAMILY</b>
<i>Juniperus ashei</i>	ashe juniper
<i>Juniperus virginiana</i>	eastern red cedar
<b>CYPERACEAE</b>	<b>SEDGE FAMILY</b>
<i>Carex</i> spp.	sedge
<i>Cyperus</i> spp.	umbrellasedge
<i>Scirpus pendulus</i>	bulrush
<b>EBENACEAE</b>	<b>EBONY FAMILY</b>
<i>Diospyros texana</i>	Texas persimmon
<b>EQUISETACEAE</b>	<b>HORSETAIL FAMILY</b>
<i>Equisetum</i> spp.	horsetail
<b>EUPHORBIACEAE</b>	<b>SPURGE FAMILY</b>
<i>Acalypha monococca</i>	oneseed copperleaf

*Argythamnia aphoroides*  
*Chamaesyce prostrata*  
*Cnidoscolus texanus*  
*Croton lindheimerianus*  
*Croton monanthogynus*  
*Euphorbia bicolor*  
*Euphorbia dentata*  
*Euphorbia spathulata*  
*Phyllanthus polygonoides*  
*Stillingia texana*  
*Tragia ramosa*

Hill Country wild mercury  
mat euphorbia  
Texas bull-nettle  
Lindheimer croton  
oneseed croton  
snow-on-the-prairie  
toothed spurge  
wartly spurge  
knotweed leaf-flower  
Texas queen's-delight  
catnip (common) noseburn

#### FABACEAE (LEGUMINOSAE)

*Acacia roemeriana*  
*Acacia hirta*  
*Astragalus crassicaarpus*  
*Astragalus* sp.  
*Cercis canadensis* var. *texensis*  
*Chamaecrista fasciculata*  
*Dalea aurea*  
*Dalea enneandra*  
*Dalea helleri*  
*Dalea tenuis*  
*Desmanthus illinoensis*  
*Desmanthus velutinus*  
*Desmodium paniculatum*  
*Eysenhardtia texana*  
*Galactia volubilis*  
*Gleditsia triacanthos*  
*Indigofera miniata* var. *leptosepala*  
*Lespedeza repens*  
*Lespedeza stuevei*  
*Lotus purshianus*  
*Lupinus texensis*  
*Medicago* spp.  
*Mimosa biuncifera*  
*Neptunia lutea*  
*Pedimelum latestipulatum*  
*Prosopis glandulosa*  
*Rhynchosia* sp.  
*Schrankia roemeriana*  
*Senna roemeriana*

#### PEA FAMILY

Roemer acacia  
fern acacia  
groundplum  
milkvetch  
Texas redbud  
partridge pea  
yellow dalea  
bigtop dalea  
thickspike prairie-clover  
purple prairie-clover  
Illinois bundleflower  
velvet bundleflower  
tall tickseed  
Texas kidneywood  
downy milkpea  
honey locust  
scarlet pea  
lespedeza  
tall bush clover  
deervetch  
Texas bluebonnet  
burclover  
catclaw mimosa  
yellowpuff  
scurf pea  
mesquite  
snoutbean  
sensitivebriar  
twoleaf senna

#### FAGACEAE

*Quercus buckleyi* (*Q. texana*)  
*Quercus fusiformis*  
*Quercus marilandica*

#### BEECH FAMILY

Texas oak  
plateau live oak  
blackjack oak



<i>Quercus sinuata</i> var. <i>breviloba</i>	shin oak
<i>Quercus stellata</i>	post oak
<b>GERANIACEAE</b>	<b>GERANIUM FAMILY</b>
<i>Erodium texanum</i>	stork's bill
<b>HALORAGACEAE</b>	<b>WATER-MILFOIL FAMILY</b>
<i>Myriophyllum</i> sp.	water-milfoil
<b>HYDROPHYLLACEAE</b>	<b>WATERLEAF FAMILY</b>
<i>Phacelia congesta</i>	bluecurls
<b>JUNCACEAE</b>	<b>RUSH FAMILY</b>
<i>Juncus texanus</i>	Texas rush
<b>LAMIACEAE (LABIATAE)</b>	<b>MINT FAMILY</b>
<i>Marrubium vulgare</i>	common horehound
<i>Salvia texana</i>	Texas sage
<i>Scutellaria drummondii</i>	annual skullcap
<b>LILIACEAE</b>	<b>LILY FAMILY</b>
<i>Allium drummondii</i>	Drummond wild garlic
<i>Allium canadense</i>	wild onion
<i>Smilax bona-nox</i>	common greenbriar
<i>Yucca constricta</i>	yucca
<b>LINACEAE</b>	<b>FLAX FAMILY</b>
<i>Linum</i> sp.	flax
<b>MALVACEAE</b>	<b>MALLOW FAMILY</b>
<i>Abutilon fruticosum</i>	Indian mallow
<i>Callirhoe involucrata</i>	wine cup
<i>Sida abutilifolia</i>	creeping yellow sida
<b>MENISPERMACEAE</b>	<b>MOONSEED FAMILY</b>
<i>Cocculus carolinus</i>	Carolina snailseed
<b>MORACEAE</b>	<b>MULBERRY FAMILY</b>
<i>Morus microphylla</i>	Texas mulberry
<b>NYCTAGINACEAE</b>	<b>FOUR O'CLOCK FAMILY</b>
<i>Mirabilis</i> sp.	four o'clock
<b>OLEACEAE</b>	<b>OLIVE FAMILY</b>
<i>Forestiera pubescens</i>	elbowbush
<i>Fraxinus texensis</i>	Texas ash
<b>ONAGRACEAE</b>	<b>EVENING PRIMROSE FAMILY</b>
<i>Oenothera speciosa</i>	pink evening-primrose
<b>ORCHIDACEAE</b>	<b>ORCHID FAMILY</b>
<i>Spiranthes cernua</i>	ladies'-tresses
<b>OXALIDACEAE</b>	<b>WOOD-SORREL FAMILY</b>
<i>Oxalis dillenii</i>	yellow woodsorrel
<i>Oxalis drummondii</i>	woodsorrell

PAPAVERACEAE

*Argemone albiflora*

PASSIFLORACEAE

*Passiflora lutea*

PLANTAGINACEAE

*Plantago* spp.

POACEAE (GRAMINEAE)

*Andropogon gerardii*

*Andropogon glomeratus*

*Aristida oligantha*

*Aristida wrightii*

*Bothriochloa ischaemum*

*Bothriochloa saccharoides*

*Bouteloua curtipendula*

*Bouteloua hirsuta*

*Bouteloua rigidiseta*

*Bromus japonicus*

*Bromus unioloides*

*Buchloe dactyloides*

*Cenchrus incertus*

*Chasmanthium latifolium*

*Chloris cucullata*

*Cynodon dactylon*

*Dichanthelium lanuginosum*

*Dichanthelium oligosanthes*

*Elymus canadensis*

*Elymus virginicus*

*Eragrostis curvula*

*Eragrostis intermedia*

*Eragrostis secundiflora*

*Erioneuron pilosum*

*Hilaria belangeri*

*Hordeum pusillum*

*Leptochloa dubia*

*Leptoloma cognatum (Digitaria cognata)*

*Panicum capillare*

*Panicum coloratum*

*Panicum hallii*

*Panicum obtusum*

*Panicum virgatum*

*Paspalum pubiflorum*

*Schizachyrium scoparium*

*Sorghastrum nutans*

*Sorghum halepense*

*Sporobolus asper*

POPPY FAMILY

white pricklypoppy

PASSIONFLOWER FAMILY

yellow passionflower

PLANTAIN FAMILY

plantain

GRASS FAMILY

big bluestem

bushy bluestem

oldfield threeawn

purple threeawn

King Ranch bluestem

silver bluestem

sideoats grama

hairy grama

Texas grama

Japanese brome

rescuegrass

buffalograss

sandburgrass

creek oats

hooded windmillgrass

bermudagrass

panicgrass

dichanthelium

Canada wildrye

Virginia wildrye

weeping lovegrass

plains lovegrass

red lovegrass

hairy tridens

curlymesquite

little barley

green sprangletop

fall witchgrass

common witchgrass

kleingrass

hall panicum

vine-mesquite

switchgrass

hairyseed paspalum

little bluestem

Indiangrass

Johnsongrass

tall dropseed

<i>Sporobolus cryptandrus</i>	sand dropseed
<i>Stipa leucotricha</i>	Texas wintergrass
<i>Tridens albescens</i>	white tridens
<i>Tridens muticus</i>	slim tridens
<i>Tridens texanus</i>	Texas tridens
<b>POLEMONIACEAE</b>	<b>PHLOX FAMILY</b>
<i>Phlox drummondii</i>	Drummond wild phlox
<b>POLYGALACEAE</b>	<b>MILKWORT FAMILY</b>
<i>Polygala alba</i>	white milkwort
<i>Polygala lindheimeri</i>	Lindheimer milkwort
<b>POLYGONACEAE</b>	<b>KNOTWEED FAMILY</b>
<i>Polygonum</i> spp.	smartweed
<b>POLYPODIACEAE</b>	<b>TRUE FERN FAMILY</b>
<i>Cheilanthes lindheimeri</i>	Lindheimer lipfern
<i>Woodsia obtusa</i>	common woodsia
<b>RANUNCULACEAE</b>	<b>CROWFOOT FAMILY</b>
<i>Anemone heterophylla</i>	wind-flower
<i>Clematis pitcheri</i>	purple leather flower
<b>RHAMNACEAE</b>	<b>BUCKTHORN FAMILY</b>
<i>Rhamnus caroliniana</i>	Carolina buckthorn
<i>Ziziphus obtusifolia</i>	lotebush
<b>ROSACEAE</b>	<b>ROSE FAMILY</b>
<i>Crataegus</i> sp.	hawthorn
<i>Geum canadense</i>	white avens
<i>Prunus mexicana</i>	Mexican plum
<i>Rubus trivialis</i>	southern dewberry
<b>RUBIACEAE</b>	<b>MADDER FAMILY</b>
<i>Cephalanthus occidentalis</i>	buttonbush
<i>Hedyotis crassifolia</i>	annual bluets
<b>RUTACEAE</b>	<b>CITRUS FAMILY</b>
<i>Zanthoxylum hirsutum</i>	tickle tongue
<b>SALICACEAE</b>	<b>WILLOW FAMILY</b>
<i>Populus deltoides</i>	eastern cottonwood
<i>Salix nigra</i>	black willow
<b>SAPINDACEAE</b>	<b>SOAPBERRY FAMILY</b>
<i>Sapindus saponaria</i>	western soapberry
<i>Ungnadia speciosa</i>	Mexican buckeye
<b>SAPOTACEAE</b>	<b>SAPODILLA FAMILY</b>
<i>Bumelia lanuginosa</i>	bumelia
<b>SCROPHULARIACEAE</b>	<b>FIGWORT FAMILY</b>

<i>Agalinis heterophylla</i>	prairie agalinis
<i>Castilleja indivisa</i>	Indian paintbrush
<i>Linaria texana</i>	Texas toadflax
<i>Veronica peregrina</i>	wandering veronica
<b>SOLANACEAE</b>	<b>TOMATO FAMILY</b>
<i>Solanum dimidiatum</i>	western horsenettle
<i>Solanum elaeagnifolium</i>	silverleaf nightshade
<i>Solanum rostratum</i>	buffalo-bur
<b>TYPHACEAE</b>	<b>CAT-TAIL FAMILY</b>
<i>Typha domingensis</i>	cat-tail
<b>ULMACEAE</b>	<b>ELM FAMILY</b>
<i>Celtis laevigata</i>	sugar hackberry
<i>Celtis reticulata</i>	netleaf hackberry
<i>Ulmus americana</i>	American elm
<i>Ulmus crassifolia</i>	cedar elm
<b>VERBENACEAE</b>	<b>VERVAIN FAMILY</b>
<i>Aloysia gratissima</i>	whitebrush, bee-brush
<i>Lantana horrida</i>	lantana
<i>Phyla nodiflora</i>	fogfruit
<i>Verbena bipinnatifida</i>	prairie verbena
<i>Verbena canescens</i>	gray vervain
<i>Verbena halei</i>	Texas vervain
<b>VIOLACEAE</b>	<b>VIOLET FAMILY</b>
<i>Viola rafinesquii</i>	wild pansy
<b>VISCACEAE</b>	<b>MISTLETOE FAMILY</b>
<i>Phoradendron tomentosum</i>	mistletoe
<b>VITACEAE</b>	<b>GRAPE FAMILY</b>
<i>Ampelopsis cordata</i>	heartleaf ampelopsis
<i>Parthenocissus quinquefolia</i>	Virginia creeper
<i>Vitis mustangensis</i>	mustang grape
<b>UMBELLIFERAE</b>	<b>PARSLEY FAMILY</b>
<i>Bifora americana</i>	prairie bishop's weed
<i>Hydrocotyle umbellata</i>	water pennywort
<i>Daucus pusillus</i>	wild carrot
<i>Torillis arvensis</i>	beggar's tick
<i>Eryngo leavenworthii</i>	eryngo
<i>Polytaenia texana</i>	prairie parsnip
<i>Spermolepis inermis</i>	smooth scaleseed



## APPENDIX B: NATIVE FOOD PLANTS

### Woody Plants

Common Name: **Agarito**

Scientific Name: *Berberis trifoliolata*

Agarito is an evergreen shrub with holly-like spiny leaves. The three blade-like leaflets are blue-gray above and green below. Leaves are 2 to 4 inches long and prickly. Fruits are red berries produced from cup-shaped yellow flowers. The young leaves may be browsed by deer but generally it is not a preferred species. It does provide cover for wildlife throughout the year and is one of the few brush species in the Cross Timbers and Prairies Region that is nondeciduous. It is found primarily in the western and southern portions of the region.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



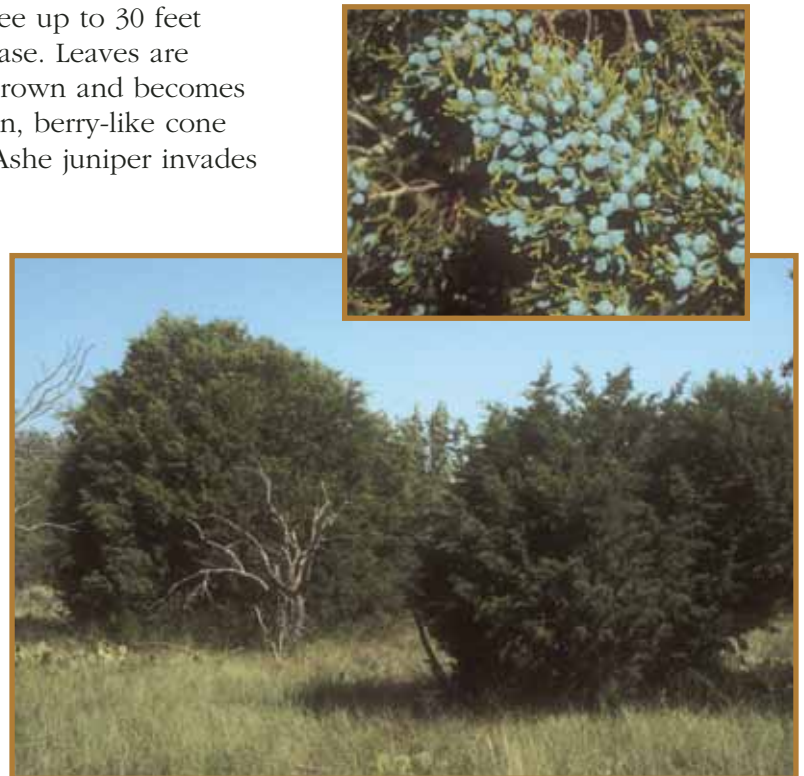
Common Names: **Ashe juniper**, Blueberry juniper, Mountain cedar

Scientific Name: *Juniperus ashei*

Ashe juniper is an evergreen shrub or small tree up to 30 feet with several trunks extending from near the base. Leaves are scale-like and aromatic. Bark is ashy gray to brown and becomes shreddy on mature trees. Fruit is a bluish-green, berry-like cone that develops during August thru September. Ashe juniper invades open rangelands and the understory of post oak woodlands in the Cross Timbers and Prairies Region and increases with overgrazing by livestock and lack of fire. It does not resprout when cut. Thickets or “cedar brakes” form on hillsides and rocky areas forming closed canopies with little understory vegetation. It is a least preferred browse plant for deer. Berries are eaten by a wide variety of songbirds and mammals. Ashe juniper provides cover for white-tailed deer and other wildlife species.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Name: **Blackjack oak**

Scientific Name: *Quercus marilandica*

Blackjack oak is a small, shrubby oak or tall tree with dense branches extending to near the base. Leaves are characteristically 3-lobed with a club-shaped appearance and veins extending past the margin of the 3 to 7 inch leaves. Blackjack oak is in the red oak group with acorns ripening in 2 years. The acorn is enclosed 1/3 to 2/3 by the cup and during most years provides considerable mast for deer, turkey and other wildlife species in the region. This species is a major component of upland woodlands in sandy and gravelly soil regions of the Cross Timbers and Prairies Region and a cornerstone species for the region. It provides a significant portion of habitat for wildlife for food and cover and is a preferred browse species for deer. Blackjack oak is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**



Common Names: **Bumelia**, Chittum, Gum elastic

Scientific Name: *Bumelia lanuginosa*

Bumelia is a shrub or tree up to 45 feet or more and is found throughout most of the Cross Timbers and Prairies Region. Thorns occur along its zigzag stems and on branch tips. Oblong, wedge shaped leaves are leathery, dark green above, and 1 to 3 inches long. Leaves are clustered on short lateral spurs. Its fruits are black berries which are eaten by many wildlife species and are a mast species used by white-tailed deer in the Cross Timbers and Prairies Region. Bumelia grows as individual trees or in dense thickets or mottes. It is a moderately preferred browse species for deer in the Cross Timbers and Prairies Region and receives limited use if other preferred species are available. It provides good wildlife cover and is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**





Common Name: **Cedar elm**

Scientific Name: *Ulmus crassifolia*

Cedar elm is an important plant for white-tailed deer in the Cross Timbers and Prairies Region and is considered a preferred browse species. Young trees may be heavily browsed and often have a hedged appearance. This elm flowers in late summer and produces a seed 1/4 to 1/2 inch long that is oval with a central seed. Leaves are 1 to 2 inches long, rough and with doubly serrate margins. Twigs are brown, often with corky wings on young trees. Mature trees with no foliage below 4 feet provide no browse for deer. Livestock use of cedar elm may reduce available browse for deer during the summer and fall. Cedar elm is deciduous and may grow to 90 feet. Leaves begin to turn brown and yellow during early fall.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Names: **Common greenbriar**, Saw greenbriar

Scientific Name: *Smilax bona-nox*

Common greenbriar is a stout, spiny vine that grows in low thickets or climbs with tendrils onto surrounding brush or trees. Leaf shape is variable, often with large basal lobes and the margins may be spiny. Although deciduous, leaves often remain green well into late fall and provide browse for an extended period of time. Common greenbriar sprouts from an underground tuber which is also spiny. Stem nodes and internodes are also set with spines. It is a preferred browse plant for deer in the Cross Timbers and Prairies Region and is readily eaten by deer and livestock, particularly during early growth stages. Its fruits are black berries that are eaten by many songbird species. Common greenbriar provide escape cover for deer, songbirds and other wildlife.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Names: **Coralberry**, Snowberry, Indian current, Buck brush

Scientific Name: *Symphoricarpos orbiculatus*

Coralberry is a thicket-forming shrub that spreads by stolons. It grows commonly in the shady understory or along woodland edges, extending into prairies. This low growing shrub is browsed by white-tailed deer and is a preferred species. Its fruit is an axillary cluster of coral to pink colored berry-like drupes which are eaten by a wide variety of wildlife species, including white-tailed deer. Its small leaves are oval to ovate and arranged opposite on the stems. Coralberry leaves turn red during the fall and are deciduous. Coralberry provides good ground cover for deer, small game and songbirds.

Seasons of Use: Summer, Fall

Forage Class: **Browse**



Common Names: **Elbowbush**

Scientific Name: *Forestiera pubescens*

Elbowbush is a spreading shrub with drooping vine-like limbs. Leaves are small, dull green and lightly serrated on the margins. Plants often form dense growths and occupy the understory of brush lines and woodland edges. The fruit is a small cluster of blue-black drupes. Flowers appear before the leaves during early spring. It is a moderately preferred browse species in the Cross Timbers and Prairies Region and the fruit provides mast for white-tailed deer. It provides good escape cover for a variety of wildlife species. Its leaves appear during early spring and may receive browsing use before other species leaf out. It is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**



Common Names: **Flameleaf sumac,**

Prairie flameleaf sumac

Scientific Name: *Rhus lanceolata*

Flameleaf sumac is a slender branched shrub or small tree to 30 feet whose leaves turn bright red during the fall. Leaves are 5 to 9 inches long, odd-pinnately compound with 13 to 19 lanceolate leaflets that are 1 to 3 1/2 inches long and 1/4 to 1/2 inch wide. The fruit is a panicle of red drupes which are eaten by a wide variety of wildlife. Deer browse the leaves, and depending on the availability of other preferred species, use of this plant may be significant. Flameleaf sumac increases on the landscape following fire or mechanical disturbances and is deciduous.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Browse**





Common Names: **Gray dogwood**, Rough-leaf dogwood

Scientific Name: *Cornus drummondii*

Gray dogwood is an irregularly branched shrub or small spreading tree. Flowers bloom during the summer and are yellowish-white and very odiferous. Fruits ripen during the fall as small white drupes which are eaten by a wide variety of wildlife species. Leaves are 1 to 5 inches long and 1 to 1 1/2 inches wide with conspicuous veins, particularly on the underside. Leaf veins arch toward the leaf tip. Leaves are dark green above and paler below and twigs are reddish. It is a preferred browse species for deer where it occurs in the Cross Timbers and Prairies Region. It is deciduous during the winter months but provides important food and cover throughout much of the year.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Browse**



Common Names: **Honey mesquite**, Mesquite

Scientific Name: *Prosopis glandulosa*

Honey mesquite is a thorny shrub or small tree with an open crown and crooked, drooping branches. Leaves are bipinnately compound with 12 to 20 leaflets. The tap root system is deep and regrowth of plants will occur from subterranean root buds when the top portion of the plant is cut. Honey mesquite has invaded many range sites in the Cross Timbers and Prairies Region and colonizes overgrazed grasslands and openings. Lack of naturally occurring fire has also contributed to its spread. The fruit grows in clusters of legumes or bean-like pods and is eaten by white-tailed deer and other wildlife species as mast. Undigested seeds pass through the digestive tracts of animals and are easily spread. Honey mesquite is a least preferred browse plant for white-tailed deer and is deciduous.

Seasons of Use: Spring, Summer

Forage Classes: **Browse** and **Mast**



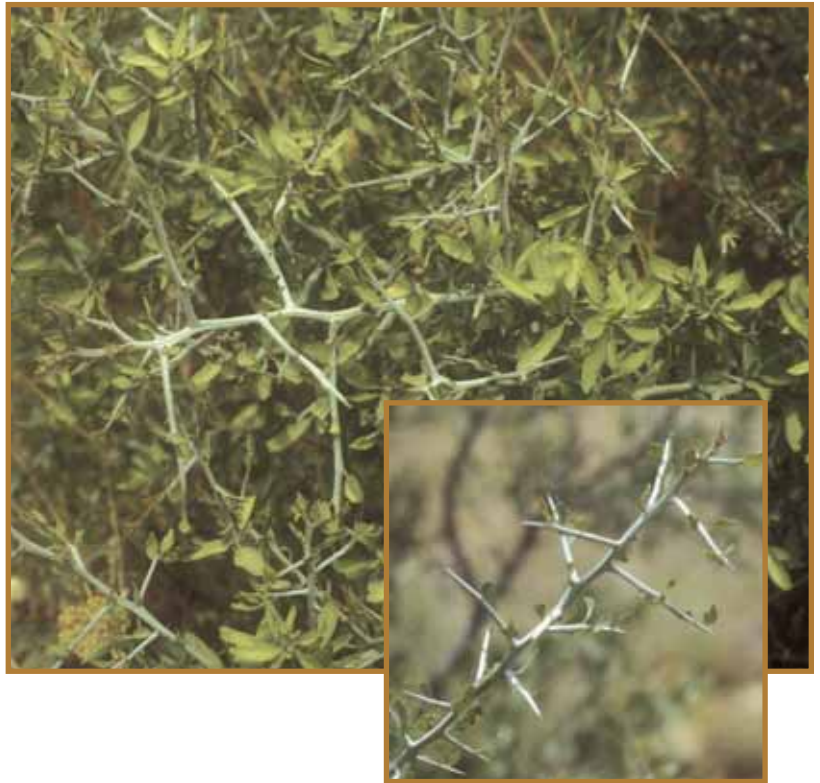


Common Name: **Lotebush**

Scientific Name: *Ziziphus obtusifolia*

Lotebush is a stiffly branched shrub with grayish green leaves and twigs with stout grooved spines. Stems end in a strait thorny tip. Leaves are small, round or oblong. The fruits are black drupes with woody stones that are eaten by a variety of wildlife species. Lotebush is found primarily in the West Cross Timbers subregion on sandy or rocky ground and is considered a low preference browse plant for white-tailed deer. Lotebush provides good cover for bobwhite quail, songbirds and small mammals. Lotebush is deciduous.

Seasons of Use: Spring, Summer, Winter  
Forage Class: **Browse**



Common Name: **Mexican buckeye**

Scientific Name: *Ungnadia speciosa*

Mexican buckeye is a shrub or small tree with spreading upright branches. Leaves 5 to 12 inches long with 5 to 7 leaflets. The fruit is a green 3-celled, 3-seeded capsule that turns brown at maturity. Seeds are shiny black, 1/2 inch in diameter and poisonous. Rose-colored flowers bloom prior to leaf growth in the Spring. Mexican buckeye grows on limestone outcrops, ridges and bluffs in the Cross Timbers and Prairies Region. It is a low preference browse plant for white-tailed deer and is deciduous.

Seasons of Use: Spring, Summer  
Forage Class: **Browse**



Common Name: **Mistletoe**

Scientific Name: *Phoradendron tomentosum*

Mistletoe is a perennial hemiparasitic plant (parasitic but also produces some of its own food) with leathery yellow-green leaves that grow on tree branches, primarily on elm, hackberry, mesquite and other deciduous trees in the Cross Timbers and Prairies Region. It is spread by birds through their droppings and by wiping their beaks and feet on branches. The sticky fruit is a drupe that is eaten by many bird species. Deer browse the leaves when it is within their reach and highly prefer it. It is nondeciduous but often succumbs to cold temperatures.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Name: **Plateau live oak**

Scientific Name: *Quercus fusiformis*

Plateau live oak is an evergreen tree found throughout the Cross Timbers and Prairies Region, most commonly on limestone based soils and outcrops. Leaves are dark green above and paler below, often with toothed margins. Acorns on this species extend from the cup more than 1/2 their length. It may grow as a small shrub or a tree of 30 to 60 feet, often in mottes. This species is moderately preferred by deer and may provide an important source of winter browse when other deciduous species are dormant. Acorns are readily eaten by deer and other wildlife species when they are available during early fall. Plateau live oak is susceptible to oak wilt. Many trees in the central and western portions of the Cross Timbers and Prairies Region have succumbed to the fungus. Plateau live oak also provides important concealment and escape cover for deer throughout the year.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**





Common Name: **Poison ivy**

Scientific Name: *Rhus toxicodendron*

Poison ivy is a small erect shrub or climbing woody-stemmed vine. Growth form varies depending on the location. Commonly found in the understory of post oak woods, along streams, or in other shady areas. Vines with aerial rootlets often climb high onto trees. Dull green leaves have 3 leaflets that are deeply lobed and sharply toothed. Fruits are a cluster of dull white drupes. It has a low preference as browse for white-tailed deer in the Cross Timbers and Prairies Region. It is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Names: **Possumhaw**, Winterberry, Deciduous holly, Deciduous yaupon

Scientific Name: *Ilex decidua*

Possumhaw is a shrub with a spreading, open crown, best identified during winter months by bright red-orange fruits 1/2 to 1/3 inch in diameter that persist on limbs after leaf drop. Fruits are poisonous. Small oblong leaves 2 to 3 inches long with long tapering base and rounded serrations on leaf margins. Often found growing along ravines, disturbed areas and woodland margins. A preferred deer browse plant where it grows and it is deciduous. The fruits are eaten by many bird species.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Name: **Post oak**

Scientific Name: *Quercus stellata*

Post oak is a cornerstone species of the Cross Timbers and Prairies Region and is a significant component of wildlife habitat in the region. Height ranges up to 75 feet but most trees are considerably shorter with stout limbs and a dense rounded appearance. Leaves are typically 4 to 7 inches long with 5 deep lobes, the middle lobes giving a square appearance and cross-like shape to the leathery green leaves. Post oak is in the white oak group and acorns mature the first season. Acorns are set in their cup 1/3 to 1/2 their length. Post oak is a preferred browse species for deer. Browse lines often occur where deer or livestock numbers are high. Use of cool season prescribed fire enhances growth of Post oak within the browsing zone of deer. Post oak is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**



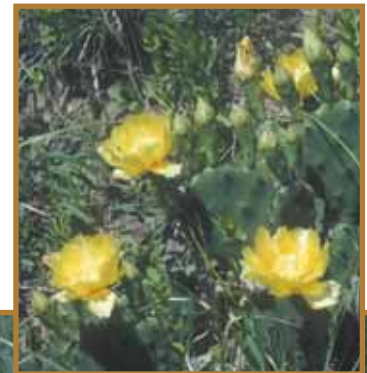
Common Name: **Prickly pear**

Scientific Name: *Opuntia lindheimeri*

Prickly pear is a mat or clump forming perennial cactus with jointed flat stems with 1 to 2 inch long stiff white to gray spines. Fruits, called tunas, are 1 1/4 to 3 inches long and red to dark purple. Flowers are yellow. Pads measure 7 to 12 inches long and 6 to 8 inches broad. Prickly pear increases on overgrazed rangelands and spreads where pads touch the ground and by seeds. Fire is effective for prickly pear control. Prickly pear is a low preference browse plant for white-tailed deer in the Cross Timbers and Prairies Region. Fruits are eaten as mast and it is nondeciduous. Dense stands of prickly pear in combination with native bunchgrass provide cover for ground nesting birds such as bobwhite quail.

Seasons of Use: Summer, Fall

Forage Classes: **Browse** and **Mast**





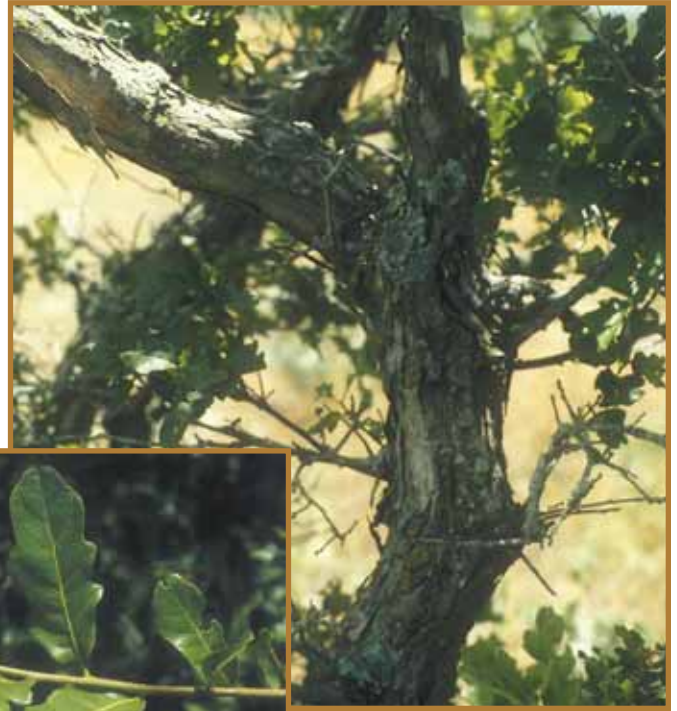
Common Names: **Shin oak**, White shin oak

Scientific Name: *Quercus sinuata* var. *breviloba*

Shin oak is a small shrub or multi-trunked tree in the white oak group. May grow to 20 feet, often forming thickets. Found commonly growing on limestone outcrops, ridges and hillsides. Leaves are 1 to 4 inches and shallowly lobed. Acorns are cylindrical with wide, blunt apex. Can also be identified by thin, gray and flaking bark. Shin oak is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**



Common Name: **Skunkbush**, Fragrant sumac,  
Aromatic sumac

Scientific Name: *Rhus aromatica*

Skunkbush is a low-growing, thicketforming shrub. Height is variable in the Cross Timbers and Prairies Region, averaging 3 to 4 inches. Leaves are 3/4 to 2 inches long and 3-lobed with the terminal lobe larger than the others. Leaves turn bright red during the fall and are odiferous when crushed. The fruits are red drupes that appear in August thru September and are eaten by a wide variety of songbirds and as mast by white-tailed deer. Skunkbush is a preferred browse plant for white-tailed deer and provides good cover for wildlife.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Classes: **Browse** and **Mast**





Common Name: **Sugar hackberry**

Scientific Name: *Celtis laevigata*

Sugar hackberry is small to medium size tree with warty-like bark. Leaves are light green, ovate or lancolate and pointed near the tip and with three conspicuous veins from the base on the underside of the leaf. The fruit is a red-brown drupe with thin flesh that is heavily used by wildlife for food. This is a highly preferred deer browse plant for deer in the Cross Timbers and Prairies Region and receives considerable use where available, often being severely hedged due to prolonged use throughout the year. Continuous browsing may result in death of small plants due to defoliation. It is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**



Common Name: **Texas ash**

Scientific Name: *Fraxinus texensis*

Texas ash is a small tree but may grow to 50 feet tall and 2 to 3 feet in diameter. Their 5 to 8 inch long compound leaves have 5 to 7 olive-green leaflets 1 to 3 inches long and 3/4 to 2 inches wide. Limbs are straight and lightly branched. Seeds are clusters of samaras with slightly winged sides. The bark has a net-like appearance. Texas ash grows primarily on limestone slopes and hillsides in portions of the Cross Timbers and Prairies Region and is moderately used as browse for deer but grows out of the reach of deer when mature. The seeds are eaten by a variety of songbirds and small mammals. Texas ash is deciduous.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Browse**



Common Names: **Texas oak**, Texas red oak, Spanish oak

Scientific Name: *Quercus buckleyi* or *Quercus texana*

Texas oak is in the red oak group and its presence in the Cross Timbers and Prairies Region is conspicuously obvious during the fall when leaf color changes occur. It is commonly found growing on limestone based soils on uplands and along limestone ridges, escarpments, and hillsides in the Cross Timbers. Leaves are 2 1/2 to 5 1/2 inches long, 2 to 3 1/2 inches wide, and deeply cut with 3 to 7 (usually 5) lobes. Its acorn cup encloses 1/3 to 1/2 the acorn. During the fall and winter, its acorns are eaten by a wide variety of wildlife species, including deer and turkeys. Texas oak is deciduous.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse** and **Mast**



Common Name: **Texas redbud**

Scientific Name: *Cercis canadensis* var. *texensis*

Texas redbud is a small thornless tree that grows up to 40 feet and is found more commonly on limestone soils or outcrops. It is a conspicuous tree during the early spring with bright rose-purple flowers appearing on bare branches before leaves appear. Leaves are 2 to 6 inches long and broadly round or ovate. Seeds are in reddish-brown bean-like pods or legumes. Texas redbud is a moderately preferred browse plant for white-tailed deer in the Cross Timbers and Prairies Region and is deciduous.

Seasons of Use: Spring, Fall

Forage Class: **Browse**





Common Name: **Western soapberry**

Scientific Name: *Sapindus saponaria*

Western soapberry is a tree with an open, rounded top that may grow to 50 feet. Leaves are yellowish-green, lanceolate, compound and with 10 to 18 leaflets. Leaves have soft pubescence beneath. The fruit is a yellowish, translucent berry containing soap-like properties. Western soapberry is a moderately preferred browse species for deer and is found primarily along streams, moist bottomlands and disturbed areas in the Cross Timbers and Prairies Region. Western soapberry fruits are eaten by deer as mast. It is deciduous.

Seasons of Use: Spring, Summer

Forage Class: **Browse** and **Mast**



Common Name: **Yucca**

Scientific Name: *Yucca* spp.

Several species of yucca are found in the Cross Timbers and Prairies Region. Yuccas have long, linear leaf blades extending from basal clusters or elevated stems. Leaves are yellowish to pale green. Leaf margins vary from curly fibers, twisted or with horn-like smooth edges. Flowers are on elevated stalk and fruit is a capsule containing numerous seed. The leaves and flowers of yuccas are occasionally browsed by white-tailed deer in the Cross Timbers and Prairies Region but they are considered low preference browse plants. Yuccas are evergreen.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Browse**

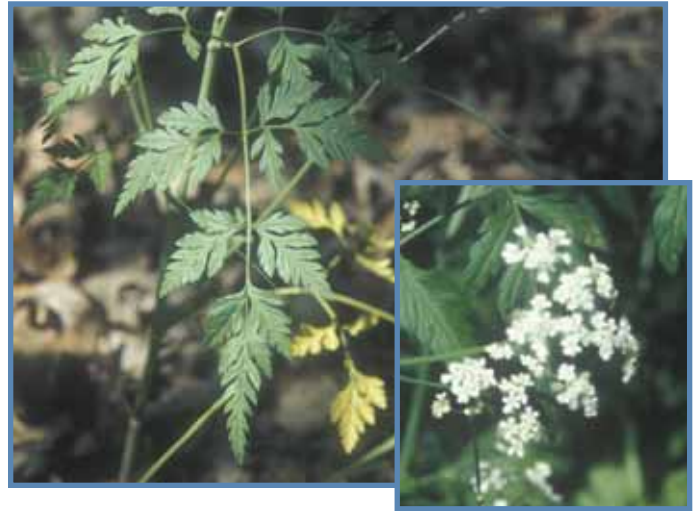


## Forbs

Common Names: **Beggar's tick**, Hedge parsley  
Scientific Name: *Torilis arvensis*

Beggar's tick is a non-native plant from the Mediterranean region. The plant is 6 to 18 inches and open with many branched stems. Leaves are 2 to 5 inches long and deeply incised. Flowers are in white compound umbels that produce numerous seeds with hook-like bristles that easily attach to clothing. Beggar's tick commonly grows in moist, shady habitats and disturbed sites.

Seasons of Use: Spring, Summer, Fall  
Forage Class: **Forb**  
Bloom: April to July (Annual)



Common Names: **Catnip noseburn**,  
Common noseburn  
Scientific Name: *Tragia ramosa*

Catnip noseburn is a small erect, trailing, or twining plant with stinging hairs on the leaves. Leaves are linear-lancolate and twice as long as wide. Found commonly on sandy soils in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall  
Forage Class: **Forb**  
Bloom: April to October (Perennial)



Common Names: **Common chickweed**, Tenpetal,  
Chickweed starwort  
Scientific Name: *Stellaria media*

Common chickweed, a non-native low growing species, with ascending or trailing stems. Leaves are 3/4 to 1 1/4 inches long, upper leaves being sessile on the stem. White flowers are solitary with 5 deeply cut petals, making them appear as 10 individual petals. Grows on moist disturbed sites including lawns in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall, Winter  
Forage Class: **Forb**  
Bloom: February to April (Annual)





Common Names: **Deer vetch**, Deer pea vetch,  
Pursh's deer vetch

Scientific Name: *Lotus purshianus*

Deer vetch is an erect plant to 3 feet. Leaves with 3 leaflets or reduced to one on the upper part of the stem. Flowers are solitaire in the leaf axils with white, rosy or lavender-pink petals. Deer vetch grows in sandy soils in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Forb**

Bloom: May to July (Annual)



Common Names: **Eryngo**, Leavenworth's eryngo

Scientific Name: *Eryngium leavenworthii*

Eryngo is a tall erect, prickly plant with single or multiple stems or branches. Leaves are 1 to 2 inches long, purplish, and deeply cut with 3 to 5 spiny lobes and tips. Flowers are distinct with 1 to 1 1/4 inch bright reddish-purple heads set in spiny bracts and composed of numerous small flowers. This is an attractive late summer and early fall plant in the Cross Timbers and Prairies Region and grows in clayey fields and prairies.

Seasons of Use: Summer, Fall

Forage Class: **Forb**

Bloom: July to October (Annual)



Common Names: **Evax**, Rabbit tobacco

Scientific Name: *Evax* sp.

Evax are very small erect plants with white to gray wool-like pubescence on the leaves. Flowers are clustered in the leaf axils and without ray flowers. Evax grows on sandy open woods, prairies and fields throughout the Cross Timbers and Prairies Region.

Season of Use: Winter

Forage Class: **Forb**

Bloom: April to June (Perennial)





Common Names: **Goldenwave coreopsis**, Coreopsis,  
Golden wave, Rock coreopsis

Scientific Name: *Coreopsis wrightii*

Goldenwave coreopsis is an erect plant averaging 1 to 1 1/2 feet tall with considerable branching and narrow, linear stems and leaves. Flowers are 1/2 to 1 inch in diameter, yellow and rusty-red at the base of 3-toothed ray flowers. It grows primarily on calcareous soils. Rank and extensive growths of Goldenwave coreopsis during late Spring on rangelands and open woodlands in the Cross Timbers and Prairies Region is often symptomatic of overgrazing by livestock.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: April to June (Annual)



Common Names: **Hill Country wild mercury**,  
Shrubby ditaxis

Scientific Name: *Argythamnia aphoroides*

Hill Country wild mercury has several unbranched erect to ascending stems and is densely villous (shaggy). Leaves are elliptical to ovate with prominent veins below. Flowers are longer than the leaves.

Seasons of Use: Summer, Fall

Forage Class: **Forb**

Bloom: March to April (Annual)



Common Names: **Illinois bundleflower**,  
Prairie mimosa

Scientific Name: *Desmanthus illinoensis*

Illinois bundleflower is a semi-woody plant 1 to 3 feet tall with spreading stems. Leaves are fern-like in appearance, 1 1/2 inches long with 6 to 14 pairs of pinnae and each pinnae has 20 to 30 leaflets. Flowers are white to yellowish in ball-like clusters. Seeds grow in green swirled cluster of pods that turn brown to black when mature. Grows throughout the Cross Timbers and Prairies Region, usually along ditch-es, stream-sides or other low places in clayey soils.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: May to June (Perennial)



Common Names: **Lespedeza**, Creeping bush clover,  
Creeping lespedeza

Scientific Name: *Lespedeza repens*

Lespedeza is a recumbent or prostrate growing plant with long, freely-branched spreading stems up to 3 feet. Leaves are pinnately compound with 3 leaflets. Flowers are purple and do not fully open. This lespedeza species grows in sandy soils and in woodlands in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Forb**

Bloom: May to September (Perennial)



Common Names: **Lindheimer croton**,  
Three seeded croton

Scientific Name: *Croton lindheimerianus*

Lindheimer croton is a tall erect plant with branched stems and considerable pubescence on the grayish-green thick leaves. Flowers are not showy and produce three capsule seeds. Found growing on sandy soils and disturbed sites in the West Cross Timbers subregion.

Seasons of Use: Summer, Fall, Winter

Forage Class: **Forb**

Bloom: July to October (Annual)



Common Names: **Mat euphorbia**, Prostrate euphorbia,  
Ground spurge

Scientific Name: *Chamaesyce prostrata*

Mat euphorbia grows flat and spreading on the ground. Leaves are small, elliptical and may fold up at night or during bad weather. Stems are redish and ooze a milky latex sap when broken. Mat euphorbia grows on clay soils, stream banks and on disturbed sites. Growth often occurs rapidly after rainfall.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Forb**

Bloom: June to October (Annual)





Common Names: **Oneseed croton**, Dove weed  
Scientific Name: *Croton monanthogynus*

Oneseed croton is a erect plant 18 to 20 inches with widely branched stems. Leaves are light green and pubescent. Flowers are not showy and produce a single capsule seed. Oneseed croton grows on a wide range of calcareous soils and on disturbed or overgrazed areas.

Seasons of Use: Summer, Fall, Winter.

Forage Class: **Forb**

Bloom: June to November (Annual)



Common Names: **Partridge pea**, Prairie senna  
Scientific Name: *Chamaecrista fasciculata*

Partridge pea is an erect plant with one to several stems growing 1 to 3 feet. Flowers have 5 yellow incurved petals with a reddish spot near the base. Leaves are 1 1/2 inches long with 5 to 10 pairs of leaflets, each 1/2 to 5/8 inch long. Partridge pea grows best in sandy soils and may be stimulated by fire.

Seasons of Use: Spring, Summer and Fall

Forage Class: **Forb**

Bloom: May to October (Annual)



Common Names: **Plantain**, Plantago, Ribwort  
Scientific Name: *Plantago* spp.

Several species of Plantain are found in the Cross Timbers and Prairies Region. These species typically have linear basal leaves and an erect stem, terminating in a flowering spike. Leaves are usually pubescent with wooly or cottony hairs. Plantains grows in sandy or gravelly stream bottoms, roadsides and fields in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Forb**

Bloom: April to June (Annuals and Perennials)



Common Names: **Prairie bishop's-weed,**  
Prairie-bishop

Scientific Name: *Bifora americana*

Prairie bishop's-weed is a slender, low, erect and branching plant 6 to 24 inches tall with slender, 2 inch thread-like leaves. Flowers are white and grow in compound inflorescence of umbels set in bracts. Prairie bishop's-weed grows on limestone or calcareous soils in open prairies and rangelands in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Forb**

Bloom: April to June (Annual)



Common Names: **Prairie fleabane,** Fleabane daisy

Scientific Name: *Erigeron strigosus*

Prairie fleabane is a tall erect plant 1 to 3 feet with branched stems with terminal flowers. Daisy-like ray flowers are white with yellow disk flowers. Leaves are linear and entire or slightly toothed. Prairie fleabane appears early in the spring in prairies, open woods, pastures and roadsides.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: April to June (Annual)



Common Names: **Prairie verbena,** Dakota vervain,  
Sweet-William

Scientific Name: *Verbena bipinnatifida*

Prairie verbena grows 4 to 12 inches high with reclining stems up to 2 feet long with ascending tips, often growing in mat-like colonies. Purple, pink or lavender trumpet-shaped 5 petaled flowers grow in dense terminal clusters on stems. Leaves are 1 to 2 1/2 inches long, hairy, deeply cut and lobed or toothed. Stems may root at the nodes on ground contact. Grows on a variety of soils throughout the Cross Timbers and Prairies Region in fields, prairies and open woodlands

Seasons of Use: Spring, Summer, Fall

Forage Class: **Forb**

Bloom: March to October (Perennial)





Common Names: **Rain-lily**, White rain-lily,  
Prairie rain-lily, Giant rain-lily

Scientific Name: *Cooperia pedunculata*

Rain-lily grows from a bulb in spring or summer following rain. Leaves are linear and grass-like. The flower is white and tubular 1 to 1 1/2 inches long and divided into 6 petal-like lobes. Rain-lily grows in rocky or sandy soils, prairies, roadsides and open woodlands in the Cross Timbers and Prairies Region. The photograph is of *Cooperia drummondii*, a fall-bloom species that appears following late summer and early fall rains throughout the Cross Timbers and Prairies Region.

Season of Use: Spring

Forage Class: **Forb**

Bloom: April to July (Perennial)



Common Name: **Silverleaf nightshade**

Scientific Name: *Solanum elaeagnifolium*

Silverleaf nightshade is an erect, bushy plant 1 to 2 1/2 feet with creeping roots. Stems may be prickly. Leaves are linear and 1 1/2 to 6 inches long with a wavy margin and light gray to silvery-green color due to dense hairs on their surface. Flowers are light-blue to violet-purple and star shaped. The fruit is a berry that turns dull yellow when mature. Grows on a variety of soils and disturbed sites throughout the Cross Timbers and Prairies Region.

Season of Use: Spring

Forage Class: **Forb**

Bloom: May to October (Perennial)



Common Name: **Snoutbean**

Scientific Name: *Rhynchosia* sp.

Snoutbeans are trailing or twining plants with tuberous roots. Leaves have 3 leaflets with resin droplets beneath. Flowers are on spike-like racemes with yellow or orangish petals, sometimes tinged with brown or red. Snoutbeans grow in sandy woodlands in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Forb**

Bloom: May to September (Perennials)



Common Names: **Stork's bill**, Texas filaree

Scientific Name: *Erodium texanum*

Stork's bill grows semi-erect to prostrate from 6 to 18 inches, often lying flat and branched from the base. Leaves are 3/4 to 1 1/2 inches long with shallow wrinkled margins and lobes. Flowers are reddish-purple with 5 petals that open in the mornings and fall off later in the day. The seed is 1/3 inch long with a 3 inch long tail or awn which coils or uncoils depending on moisture. Grows in rocky or sandy calcareous soils.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Forb**

Bloom: February to April (Annual to Biennial)



Common Names: **Tall bush clover**, Bush clover

Scientific Name: *Lespedeza stuevei*

Tall bush clover is a tall erect plant 1 to 4 feet tall with spreading or arched stems growing from a woody base. Leaves are trifoliate with elliptical leaflets 1/2 to 1 inch long. Flowers are lavender-pink to rose-purple and grow from leaf axils. It grows in sandy open woods.

Seasons of Use: Summer, Fall

Forage Class: **Forb**

Bloom: Late May to September (Perennial)



Common Names: **Texas queen's-delight**,  
Queen's delight, Texas stillingia

Scientific Name: *Stillingia texana*

Texas queen's-delight is an erect or reclining plant 6 to 18 inches tall with multiple stems growing from a large woody tap root. The linear leaves are 1 to 2 1/2 inches long and 1/8 to 3/16 inch wide with fine serrations. Flowers are on yellowish-green spikes with male parts above the female. Seeds are in 3-seeded pods at the base of the spike. Texas queen's-Delight grows on gravelly, rocky, limestone soils in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Forb**

Bloom: April to September (Perennial)





Common Name: **Texas thistle**

Scientific Name: *Cirsium texanum*

Texas thistle is a tall prickly-leaved plant growing 2 to 5 feet tall from a single stem that is much branched near the top. Leaves are dark green above and whitish beneath with 3 to 9 spiny-toothed lobes on each side of the leaf blade. Flowers are pink to rose-purple. Plant grows from a deep tap root.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: April to July (Perennial)



Common Name: **Texas Vervain**, Slender vervain

Scientific Name: *Verbena halei*

Texas vervain is a slender, erect plant 6 to 18 inches rising from a woody base with one to several branching stems in its upper half. Mid-stem leaves are 1 to 3 inches and deeply incised, becoming linear on the ends of flowering stems. Numerous small purple-blue tube-like flowers are on 2 to 7 inches panicle-like spikes.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: April to October (Perennial)



Common Name: **Twoleaf senna**

Scientific Name: *Senna roemeriana*

Twoleaf senna is an erect plant with one or more stems 1 to 2 feet high arising from a woody root system. The stems and leaves are gray-green with each leaf having a pair of leaflets 1 to 2 inches long. Flowers are yellow with 5 petals in clusters of 2 to 6 near the top of the plant. Grows in clay soils and limestone outcrop areas.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: April to October (Perennial)





Common Names: **Venus' looking glass,**  
Hen-and-chickens

Scientific Name: *Triodanis perfoliata*

Venus' looking glass is a small slender plant growing from 6 to 19 inches high with unbranched stems. Leaves have shallow, rounded-toothed margins and clasp around the stem in bracts. Flowers have 5 deeply lobed blue-purple to purple petals and may be in clusters on terminal spikes.

Venus' looking glass is easily overlooked and grows in sandy soil areas of the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Summer, Fall

Forage Class: **Forb**

Bloom: April to May (Annual)



Common Names: **Western ragweed,**  
Perennial ragweed

Scientific Name: *Ambrosia psilostachya*

Western ragweed grows in thick colonies spreading by rhizomes and seeds on disturbed and overgrazed rangelands. Height ranges from 10 to 30 inches. Leaves are 1 1/4 to 4 3/4 inches deeply narrow-lobed to linear with short stiff hairs. It is wind pollinated during late summer and early fall and produces seed eaten by bobwhite quail and other ground feeding birds and small mammals. It is widespread in the Cross Timbers and Prairies Region and grows on a wide variety of soils.

Seasons of Use: Spring, Summer, Winter

Forage Class: **Forb**

Bloom: August to November (Perennial)



Common Names: **Western spiderwort,**  
Prairie spiderwort

Scientific Name: *Tradescantia occidentalis*

Western spiderwort is a succulent-like erect plant 12 to 30 inches with few-branched stems. Leaves are long and linear 6 to 12 inches, very narrow, and smooth. Flowers have 3 equal size blue, white or rose colored petals and bright gold anthers. Grows throughout much of the Cross Timbers and Prairies Region in sandy, gravelly soils in woodlands and prairies.

Season of Use: Spring

Forage Class: **Forb**

Bloom: April to June (Perennial)



Common Names: **Wild carrot**,  
Rattlesnake weed, Seed ticks  
Scientific Name: *Daucus pusillus*

Wild carrot is an erect single stemmed plant 1 to 3 feet tall, often branching in the upper part. Leaves are pinnately divided and up to 7 inches long. Flowers are in a white compound umbel and seeds have bristles that stick to objects that touch the seed and become attached and transported. The root has the characteristic carrot odor.

Seasons of Use: Winter, Spring, Summer

Forage Class: **Forb**

Bloom: April to June (Annual)



Common Names: **Wild lettuce**, Prickly lettuce  
Scientific Name: *Lactuca ludoviciana*

Wild lettuce is tall upright plant, often growing 6 to 9 feet. Leaves are oblong to lanceolate, coarsely toothed, deeply lobed and with prickly margins. Sap is milky to brownish. Flowers have yellow petals. Wild lettuce grows in sandy soils.

Season of Use: Summer

Forage Class: **Forb**

Bloom: May to August (Biennial)



Common Names: **Wild onion**, Canada onion  
Scientific Name: *Allium canadense*

Wild onion has 6 to 18 inches flowering stalks with clusters of white to pink flowers and bulblets which fall to the ground to reproduce the plant. Plants grow from bulbs and have typical onion odor. It grows on sandy or clay soils.

Seasons of Use: Spring

Forage Class: **Forb**

Bloom: March to May (Perennial)





Common Name: **Yellow dalea**

Scientific Name: *Dalea aurea*

Yellow dalea is an upright plant, usually with multiple branched stems arising from a woody taproot. Yellow flowers are in dense terminal cone-like spikes, covered with fine silvery pubescence. Leaves are pinnately compound with 5 to 7 leaflets. Yellow daleas grow in a variety of limestone soils.

Season of Use: Spring

Forage Class: **Forb**

Bloom: June to July (Perennial)



Common Names: **Yellow woodsorrel**, Dillen's oxalis,  
Gray-green woodsorrel, Sheep-showers

Scientific Name: *Oxalis dillenii*

Yellow woodsorrel grows from a slender tap root in a compact tuft, clump or creeping mass up to 6 inches high. Leaves have three lobes, resembling those of clover, that may close during the heat of the day. Flowers are yellow with 5 petals. It is a common plant that grows in sandy, clayey and disturbed sites.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Forb**

Bloom: March to October (Perennial)



Common Names: **Zexmenia**, Orange zexmenia,  
Hairy zexmenia, Orange daisy

Scientific Name: *Zemenan hispida*

Zexmenia is a small shrubby plant to 3 feet in clumps growing from a woody base. Leaves and stems are rough with stiff hairs. Leaves are lanceolate and pointed on both ends with few teeth on the margins. Yellow-orange flowers grow on long stems above the foliage. Grows in calcareous soils.

Seasons of Use: Spring, Summer

Forage Class: **Forb**

Bloom: April to November (Perennial)





## Grasses

Common Name: **Canada wildrye**

Scientific Name: *Elymus canadensis*

Canada wildrye is a cool-season native grass most often found on moist sites and shaded areas. The grass normally stands from 39 to 59 inches and can be identified by its spear-like leaves. After the seed head appears, it droops or curves downward. Growth starts in the fall and continues slowly throughout the winter. It is adapted to medium-textured soils and matures in late spring or early summer. Use by other wildlife species is not reported.

Seasons of use: Spring, Summer

Forage Class: Grass (Perennial)



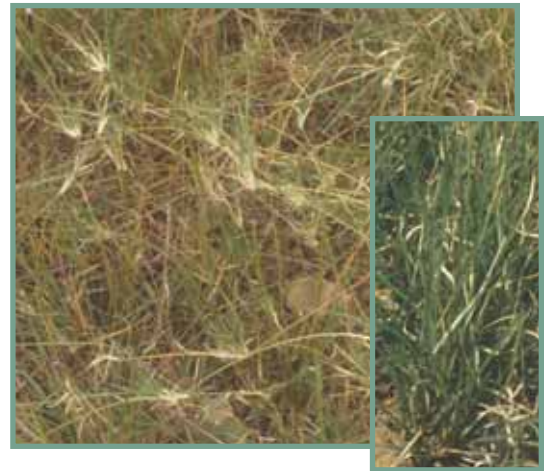
Common Name: **Curlymesquite**

Scientific Name: *Hilaria belangeri*

Curlymesquite is a native, warm season grass standing 5 to 10 inches. It grows on rocky slopes, dry hillsides and brushy areas. Seeds set primarily during August to October but can be produced from March to November. Curlymesquite is sometimes mistaken for buffalograss. It should ideally occur in association with other perennial grasses. A pure stand is often indicative of overgrazing. It survives drought better than many of our other native grasses. It is used by both deer and livestock in the Cross Timbers and Prairies Region.

Seasons of Use: Spring, Fall

Forage Class: Grass (Perennial)



Common Name: **Dichanthelium**

Scientific Name: *Dichanthelium oligosanthos*

Dichanthelium is a relatively short cool-season native grass. The grass flowers April to June and again if moisture is available during the fall. Seed heads in the spring have an open branching pattern. Seed heads in the summer or fall generally have very few seeds. The grass is most often found on loam or clay loam soils. While often thought of as a woodland grass, it can also be found in both open and brushy areas. Dichanthelium was formerly classified among the panicum grasses. Seeds of these grasses are important food sources for ground feeding song and game birds. The foliage is also eaten by jackrabbits and cottontails.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: Grass (Perennial)



Common Name: **Green sprangletop**

Scientific Name: *Leptochloa dubia*

Green sprangletop is a native warm-season grass found primarily in rocky or sandy soils in the Cross Timbers and Prairies Region. The common name is derived from the spreading seed head and dark green coloration. It grows in mixed stands with other native perennial grasses. The grass stands 12 to 40 inches and growth normally begins in April.

Seasons of use: Spring, Summer, Winter

Forage Class: **Grass** (Perennial)



Common Name: **Hairy grama**

Scientific Name: *Bouteloua hirsuta*

Hairy grama is a native warm-season grass that stands from 6 to 15 inches tall. It can be found on open well-drained sites and in woodland openings. It is adapted to a wide range of soil types. Its increase on tallgrass prairie range sites can be indicative of overgrazing. Hairy grama is always found in mixed stands with other grasses. Like the other grama grasses, hairy grama seeds have been used by wild turkey, songbirds and small mammals.

Seasons of use: Spring, Summer

Forage Class: **Grass** (Perennial)



Common Name: **Little bluestem**

Scientific Name: *Schizachyrium scoparium*

Little bluestem is one of the “indicator” plants of native tallgrass prairies. It is a native warm season grass 24 to 60 inches with a root system that may reach 5 to 8 feet. Little bluestem can be found in woodland openings, rocky slopes and other well managed sites in the Cross Timbers and Prairies Region. It provides excellent forage for livestock and has been harvested for hay in the Great Plains ever since stock farming began in the area. Wild turkey, songbirds and small mammals are known to eat the seeds.

Seasons of use: Spring, Summer, Fall, Winter

Forage Class: **Grass** (Perennial)





Common Name: **Panicum**

Scientific Name: *Panicum* spp.

Grasses of the *Panicum* genus found in the Cross Timbers and Prairies Region include Common witchgrass, Switchgrass, Vine-mesquite, Witchgrass and Hall panicum. This genus includes species that are both cool-season and warm-season, native and introduced and annual as well as perennial. Seeds from this genus are often an important seed source for upland game birds, songbirds and small mammals. This grass was only identified to genus during the Cross Timbers and Prairies Region food habits study and was only recorded during one collection period.

Season of use: Fall

Forage Class: **Grass** (Annuals or Perennials)



Common Name: **Plains lovegrass**

Scientific Name: *Eragrostis intermedia*

Plains lovegrass is a warm-season native grass found on dry, sandy, rocky or clay sites in the Cross Timbers and Prairies Region. Growth starts in the spring and flowers from June to November, growing to a height of 20 to 30 inches. Most often it occurs in mixed stands with other grass species. The grass is also thought to provide a seed source for some birds and small mammals.

Season of Use: Winter

Forage Class: **Grass** (Perennial)



Common Name: **Rescuegrass**

Scientific Name: *Bromus unioloides*

Rescuegrass is a common introduced short-lived, cool-season annual. It grows on disturbed sites and various soils. Growth starts in the fall, continues through the winter and matures in late spring. Thought to be one of the most palatable of range grasses for livestock, it rarely provides this forage in quantity. Seeds are used as a food source for other wildlife species. Overgrazing will reduce both forage and seed production.

Seasons of use: Fall, Winter

Forage Class: **Grass** (Annual)





Common Names: **Sandburgrass**, Sandbur, Grassbur

Scientific Name: *Genchrus incertus*

Sandburgrass is a perennial grass species that flowers the first year. Stems are partly decumbent and up to 4 inches long. Spines have stiff downward pointing barbs. Occurs on sandy or gravelly sites or disturbed areas throughout the Cross Timbers and Prairies Region. Use of sandburgrass was recorded in only one season during the study.

Season of Use: Spring

Forage Class: **Grass** (Perennial)



Common Name: **Sideoats grama**

Scientific Name: *Bouteloua curtipendula*

Sideoats grama is a native warm-season mid-grass found throughout the Cross Timbers and Prairies Region in many soil types and soil depths. It grows on thin, rocky soils as well as deeper, more productive sites. The state grass of Texas, it is the most widely distributed of the grama grasses. The common name reflects the arrangement of seeds on one side of the panicle. It has some resistance to livestock grazing pressure but will decrease if continually grazed to a height of 2 to 3 inches during the growing season. In mixed prairie stands it can provide some fawning cover as well as nesting habitat, cover and a seed source for other wildlife species.

Seasons of Use: Spring, Summer, Fall, Winter

Forage Class: **Grass** (Perennial)



Common Name: **Silver bluestem**

Scientific Name: *Bothriochloa saccharoides*

Silver bluestem is a native warm-season grass 20 to 30 inches. It is normally restricted to well-drained sites but can occur on sandy and clayey soils. This grass is only lightly used by livestock after maturity and is a prolific seed producer. It is considered an invader or increaser and its dominance in a stand usually indicates overgrazing. Songbirds and mammals eat the seed.

Seasons of use: Spring, Summer, Fall

Forage Class: **Grass** (Perennial)



Common Name: **Texas grama**

Scientific Name: *Bouteloua rigidisetata*

Texas grama is a native warm-season grass 6 to 20 inches. It can be found in grasslands, woods openings and other areas, often on tight clay soil sites. Wildlife users of the seed include wild turkey, songbirds and small mammals.

Seasons of use: Spring, Summer, Fall, Winter

Forage Class: **Grass** (Perennial)



Common Name: **Texas wintergrass**

Scientific Name: *Stipa leucotricha*

Texas wintergrass is a cool-season native grass that begins growth in late fall and matures in the spring. The sharp-based seeds have long, bent and twisted awns resulting in the common name “speargrass”. It is found on sandy or clay soils in areas of moderate disturbance. Texas wintergrass also increases on heavily grazed rangelands. Seed are also eaten by songbirds and small mammals.

Season of Use: Winter

Forage Class: **Grass** (Perennial)



Common Name: **Threeawn**

Scientific Name: *Aristida* spp.

Threeawn grasses, or species of the genus *Aristida*, found in the Cross Timbers and Prairies Region include Oldfield and Purple threeawn. Grass of this genus identified during the food habits study was not classified to species. Oldfield threeawn is an annual 5 to 10 inches. Oldfield threeawn is most commonly found on sandy soils but can grow on tight clay soils. Purple threeawn is a perennial that grows 10 to 25 inches on both sandy and clayey soils and can be found in solid stands. They are increasers that can be indicative of over-grazing by livestock if they occur in pure stands. Not known to be a significant food source for other wildlife, the genus was only identified in one collection period.

Season of use: Winter

Forage Class: **Grass** (Annuals or Perennials)

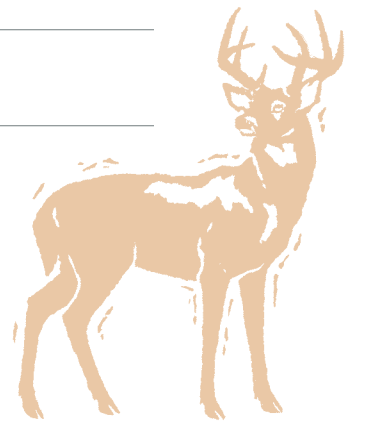








Handwriting practice lines consisting of 20 horizontal lines. The first line is a solid blue line. The remaining lines are pairs of solid blue lines with a dashed blue line in the center of each pair, providing a guide for letter height and placement.





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