

KANSAS DEER

— *resource
on the
rebound*

Keith Sexson
Bill Hlavachick
Wayne van Zwoll

HISTORY

Evolution and Distribution

Deer evolved during the Miocene period, some 15 to 20 million years ago, all members of the Cervidae family wandering over from Asia on the long-since-inundated Bering Sea land bridge. The Miocene was the age of mammals, and North America teemed with game. During the following Pleistocene period, however, great droughts and glaciation wiped out entire sub-orders of mammals. Deer survived, adapted and prospered in spite of drastic environmental changes and predation. Today there are some 30 subspecies of the whitetail and 10 of mule deer occupying North America from coast to coast, Panama to Alaska.

Two subspecies of whitetails thrive in Kansas. The Texas variety (*Odocoileus*

virginianus texanus) inhabits the western two-thirds of the state and the Kansas whitetail deer (*O. v. macrourus*) the remainder. In the western third of Kansas, whitetails share the range with Rocky Mountain mule deer (*Odocoileus hemionus*), largest of the mule deer.

Kansas: The Early Days

The pre-settlement prairies of Kansas swarmed with buffalo and antelope, even elk; but deer were not common beyond the state's eastern woodlands. Fires maintained the prairie ecosystem and reduced or eradicated woody growth. Frequent flooding and the scouring action of water restricted woody plant invasion along streamsides. While deer did play a significant role in the settlement of this state, particularly in the eastern third, they were of secondary importance. Bison provided most of the meat, hides, and bones used by Indians, explorers, trappers, and settlers.

Whitetails were originally found just about anywhere there was woody cover. The Lewis and Clark Expedition reported a large concentration of deer on the banks of the Missouri River near the present site of Kansas City in 1804, and Zebulon Pike found deer in eastcentral Kansas in 1806. Herds of mule deer were reported along the upper reaches of the Smoky, Saline, and Solomon as late as 1866. The Junction City Union of December 24, 1970 stated that "there have been thirteen deer killed in the bottom about a mile from town during the past two weeks."

Judging from these and other reports, deer were more or less common along the wooded portions of streams and in large timbered areas until about 1884. By 1890, deer had disappeared from most of western and northern Missouri and maintained a precarious existence in the southern Ozark areas. In general, deer numbers in the United States hit a low between the years 1875 and 1915. Deer were declared extirpated in Kansas in 1904.

Deer were not abundant anywhere on the Plains following the drought of the 1930s and were still considered absent from Kansas in 1933. The prolonged drought, however, allowed woody plants to become established along streams. Shelterbelts were planted and flood control structures were built. As woody vegetation thrived, so did deer.

The Kansas Fish and Game Commission and several private individuals stocked deer in various parts of the state in the late thirties and early forties. This was a minor effort compared to the extensive trapping and transplanting pro-

grams being carried out by states surrounding Kansas. During this period, deer were increasing in Missouri, Nebraska, and Colorado. By the early 1950s deer were being seen frequently in Kansas. Since then their population has not stopped growing. Estimated in 1908 to number only 500,000, deer in the U.S. now total over 19 million!

BIOLOGY

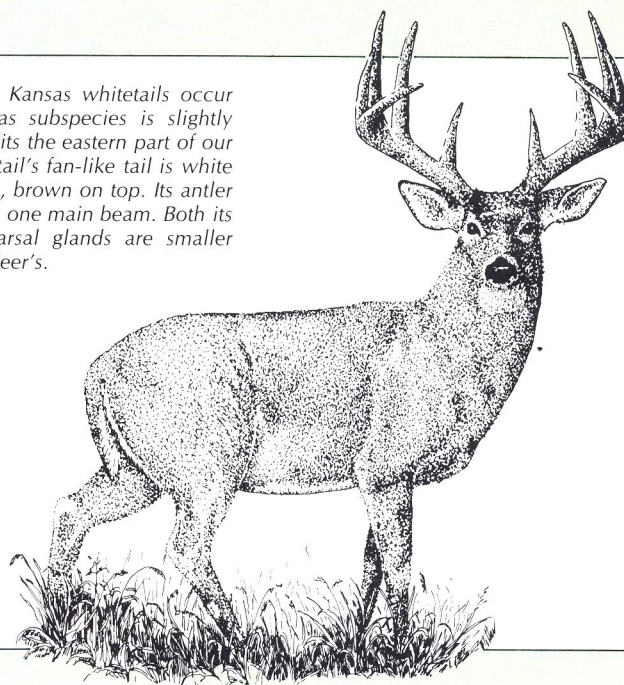
The Animal

Most hunters, as well as knowledgeable non-hunters, look on deer as being much larger than

weighed, field dressed, 378 pounds. And in 1955 a Maine hunter downed a buck that scaled 355 pounds after having been dressed and hung for three days! Mule deer can be even bigger, live weights of up to 475 pounds being recorded. These monsters are rare, though, and a Kansas buck — whitetail or mule deer — that dresses over 250 pounds is *big!*

One of the most interesting physiological characteristics of a deer is its antlers. There is a significant difference between antlers and horns. Antlers are shed annually, to grow anew every summer and harden in the fall. Horns are never shed and continue to grow throughout the animal's life. If a horn is broken off it will not grow back. Cattle, bison, sheep, goats, and antelope have horns. (The pronghorn antelope, inci-

Both Texas and Kansas whitetails occur here. The Kansas subspecies is slightly larger and inhabits the eastern part of our state. The whitetail's fan-like tail is white only underneath, brown on top. Its antler tines spring from one main beam. Both its ears and metatarsal glands are smaller than the mule deer's.



Mike Miller illustration

they really are. An adult whitetail buck will rarely stand over waist-high to the average man; the chest may be just 18-20 inches deep with the belly only 23 inches from the ground. The little Florida Key version of the whitetail is in the size range of the average collie. On the Island of Coiba off Panama, a big adult buck may weigh no more than 50 pounds!

Northern representatives of a race tend to be larger than their southern counterparts, and this holds true for both mule and whitetail deer. Whitetails from the northern U.S. and southern Canada are typically the largest, though deer from our corn belt can grow to prodigious weights. A hunter in Iowa downed a monster whitetail in 1962 that scaled 440 pounds. In 1941 a Wisconsin hunter brought in a whitetail that

dentially, is not a true antelope; it is the one horned animal that sheds a part of its horn annually. Only the outside layer is lost, after which a new layer is formed around the remaining core.)

Antlers are found on all members of the deer family, including elk, caribou, and moose. Whitetail antlers have one main beam from which the tines branch one at a time. The tines are not normally branched. Mule deer antlers do not have a main beam. The antler base forks into tines, which on large bucks may branch again. As a rule, both species have brow tines, though these are frequently absent on mule deer.

Both antlers and horns are extended growths of the frontal skull plate. The pedicel, the base from which the antler grows, is a part of this plate. Antlers are true bone, but are solid and have no

marrow. The base of the antler is called the "burr", and when shed the antler separates from the skull at the junction between the burr and pedicel. New antlers begin growth from the pedicel in April or May. At first they are tender and covered with skin and short hair known as "velvet." This velvety skin, filled with tiny blood vessels, nourishes and builds the growing bone-like material of the antler. Injury to the antler during this stage can cause deformed antlers. Initially, antler growth is slow, but by summer it is extremely rapid and may exceed one-half inch per day. In August and early September the blood supply to the antlers is cut off. They harden, and the velvet dries and sloughs or is rubbed off. Trees that have been savaged by bucks ridding their antlers of velvet are called rubs. Rubs appear as

Fawn bucks do not develop antlers their first fall. The "button buck" will only have bumps, the pedicels, from which antlers will develop the following spring.

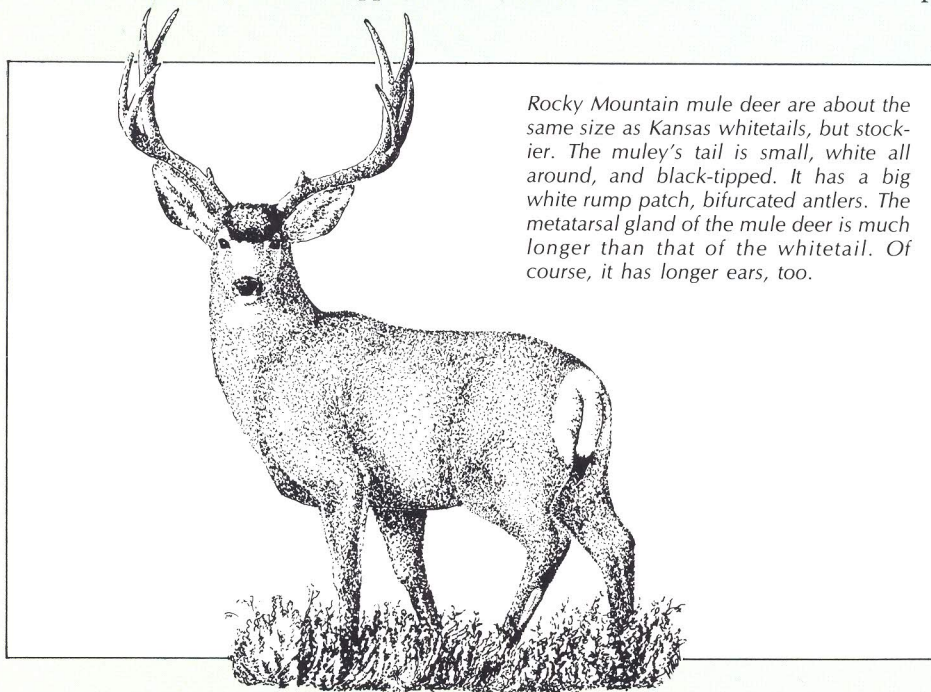
The size and shape of antlers depend on nutrition, age and heredity. Large antlers are a product of a diet containing high protein, proper amounts of fats and carbohydrates, and adequate minerals like calcium and phosphorous. Body growth of a deer is rapid from birth to two years of age, slows during the second and third years, and plateaus in the fourth year. The first 18 months of life, most of the nutritional intake is used for body growth, leaving only minimum amounts for antler development. After the deer has reached maximum body size, a greater amount of the nutritional intake can be used for antler develop-

tributes greatly to the occurrence of spike bucks.

In addition to the tail and antlers, one other physical characteristic can be used to differentiate between the mule deer and whitetails: their glands. All deer have four major external glands that secrete a different scent. These scents are part of the communication system that identifies individual animals.

The preorbitals are tear glands and serve primarily to lubricate and cleanse the eyes. The interdigital gland, located between the hoof lobes, secretes a yellow, waxy, and strong-odored substance. The scent is left on the ground or vegetation each time the deer puts its foot down. The scent helps deer track one another. The tarsal gland is a tufted, discolored patch on the inside of the hind legs. It secretes an oily substance with a strong odor of ammonia. Part of the ammonia smell comes from the habit of the deer deliberately urinating on the gland. Deer check each other by smelling and/or licking the other's hock. The metatarsal glands on the lower outside of the hind legs secrete an oily substance with a strong, musky scent. There is some question as to the role of the metatarsal.

Gland measurements for the whitetail are: preorbital $7/8$ inches long; tarsal, 3 to 4 inches wide; and metatarsal, 1 inch long. A mule deer's preorbital is about $1\ 9/16$ inches long, its tarsal 2 to $2\ 1/4$ inches wide, and its metatarsal 5 inches long.



Rocky Mountain mule deer are about the same size as Kansas whitetails, but stockier. The mule's tail is small, white all around, and black-tipped. It has a big white rump patch, bifurcated antlers. The metatarsal gland of the mule deer is much longer than that of the whitetail. Of course, it has longer ears, too.

Mike Miller illustration

early as August and are not associated with the scrapes that appear later during the rut and delineate a breeding territory. Antlers are normally shed in January, though they may be lost as early as November and as late as March. It isn't hard to find discarded antlers in the woods, though rodents quickly chew them up, presumably for their calcium content.

The cycle of antler growth and development is controlled by hormonal secretions caused by changes in the photoperiod. Hormonal imbalances result in deviations from normal antler development. Occasionally does grow antlers. These antlers are usually short, unbranched, covered with velvet, and remain for the life of the animal. This condition is caused by abnormally high levels of testosterone.

ment. For the most part, heredity determines antler shape and number of points, while nutritional levels control the size of antlers. You cannot tell the age of a deer by the number of antler points or size of its rack. Very old deer normally have more massive antlers than they did when at their breeding prime, and occasionally they develop non-typical racks, with heavy burrs, drop tines, and many points in unusual locations.

The occurrence of "spike" bucks in a deer herd concerns deer hunters and managers. Spikes are those bucks that are one and a half years old or older, but with only two hardened points protruding through the skin. Spikes do occur in Kansas, but in relatively small numbers. Where extensive studies have been done, it appears that poor nutrition con-

Reproduction

The mating season for whitetails and mule deer begins in October, with the peak of breeding occurring in mid to late November and extending as late as February. Shortening day length and reduced light intensity in the fall trigger sexual activity in bucks as well as does. The breeding season is known as the rut.

In Kansas, 50 percent of all whitetail doe fawns breed before they're a year old. Less than 10 percent of the mule deer doe fawns breed. About 95 percent of the whitetail does breed as yearlings, but only 60 to 70 percent of the mule deer yearlings breed. Adult does of both species have about the same productivity rates. The average for mature does of both species is 1.25 to 1.50 fawns per doe. Healthy females frequently have twins, and triplets are not uncommon. Does in poor health may never ovulate.

Estrus for the whitetail occurs every 28 days in the fall. Mule deer "cycle" between 22 and 28 days. The estrus period lasts about 24 hours. If the doe is not bred in her first estrus, "heat" will

recur three to four times before her breeding potential ends for the year. So most does capable of conceiving each year are bred. "Dry does" are generally yearlings or fawns that have not yet been bred. This is particularly true of yearling mule deer does, which usually breed for the first time at 16 to 18 months of age.

Mule deer and whitetails are polygamous, the males wandering extensively in pursuit of does in heat. It is during the rut that bucks become aggressive and are antagonistic toward other bucks.



Gene Brehm photo

This whitetail buck's thick neck is brought on by hormonal changes during the rut. By mid November, Kansas bucks are too busy breeding to eat.

Rutting behavior in whitetails includes urine marking of territories, rubbing and thrashing of antlers in shrubs and trees, antler fighting with other bucks, and herding of individual does. Mule deer bucks may collect small harems. Bucks of both species become sexually mature at 18 months of age. While yearling males are capable of breeding, the presence of mature bucks may limit their participation in the breeding of does.

Bucks expend large amounts of energy during the rut, actively pursuing does and taking little time to feed or rest. Body weight may decrease as much as 10 percent. The presence of active scrapes indicates that the buck has established a breeding territory. Scrapes are made when a buck paws the ground with his hooves and then urinates to impart scent to the scrape. Active scrapes are cleared of leaf litter periodically by the buck and they have a strong musky odor. Does are also more active during the rut and may urinate to signal their location and the start of estrus to the male.

Both whitetail and mule deer bucks will tend a single doe two to three days before the estrus and then accompany her for three to four days after breeding. So a buck is "out of action" for five to seven days per doe bred and is not likely to breed more than four does dur-

ing a 28-day period, servicing twelve or so each season. Bucks in captivity have bred as many as 20 does during a single rut. In Kansas, there is no shortage of bucks to breed receptive does. Most of the breeding is finished before the firearms season begins, and the harvest formula ensures that enough bucks survive the season to continue breeding in following fall.

Fawns are born in late May and June, following a gestation period of about 202 days. This period can vary from 180 to 220 days. Does that were bred later in the winter (primarily fawns) may have their young in July and August. The sex ratio of fawns at the time of birth is about 106 males for each 100 females. Fawn mortality is high. As many as half of the fawns born could be lost before the fall hunting season. Causes for these losses include predation, farm machinery accidents, starvation, fence entanglements, and roadkills.

As fawning time approaches, each pregnant doe seeks solitude. If her fawns of the previous season are still with her she will try to elude them, even striking at them with her front feet in an attempt to drive them away. The fawning site must provide privacy and sheltering cover. No special nest or bed is prepared by the doe before giving birth.

At birth, the fawn weighs six to nine pounds. Both mule deer and whitetail fawns are spotted with white, though mule deer young lack the reddish cast of the whitetail's coat. Fawns retain their mottled pelage for three to four months. During their first month, they remain hidden, the spotted coat providing excellent camouflage. They are essentially scentless for several days — an adaptation to foil predators.

Fawns are left by the doe while she forages, but she is seldom out of touch and returns to feed them. She spends her time some distance from the fawn in order to avoid attracting attention to its hiding place. Because of this separation of doe and fawn, people sometimes find the young deer and assume it has been abandoned. Rarely will a doe abandon her young. If fawns are found they should be left in their bed because the doe is probably hiding only a short distance away.

Fawns depend on their mother's milk until five weeks of age. At two to three weeks they begin to forage, and by the time they're four months old the young are weaned.

As the fawns grow older they begin to accompany the doe for longer distances and periods of time. By fall the doe and fawns are nearly always seen together, and most of the family groups remain together until the following fawning season.

Food Habits and Nutrition

Except during the summer months, agricultural crops make up 50 to 60 percent of the whitetail deer diet in Kansas. Woody plants provide 30 to 40 percent of the forage during all seasons of the year. Summer diets are composed of nearly 50 percent forbs, 30 percent woody material, and 10 to 15 percent farm crops. Grasses comprise the smallest portion of the diet.

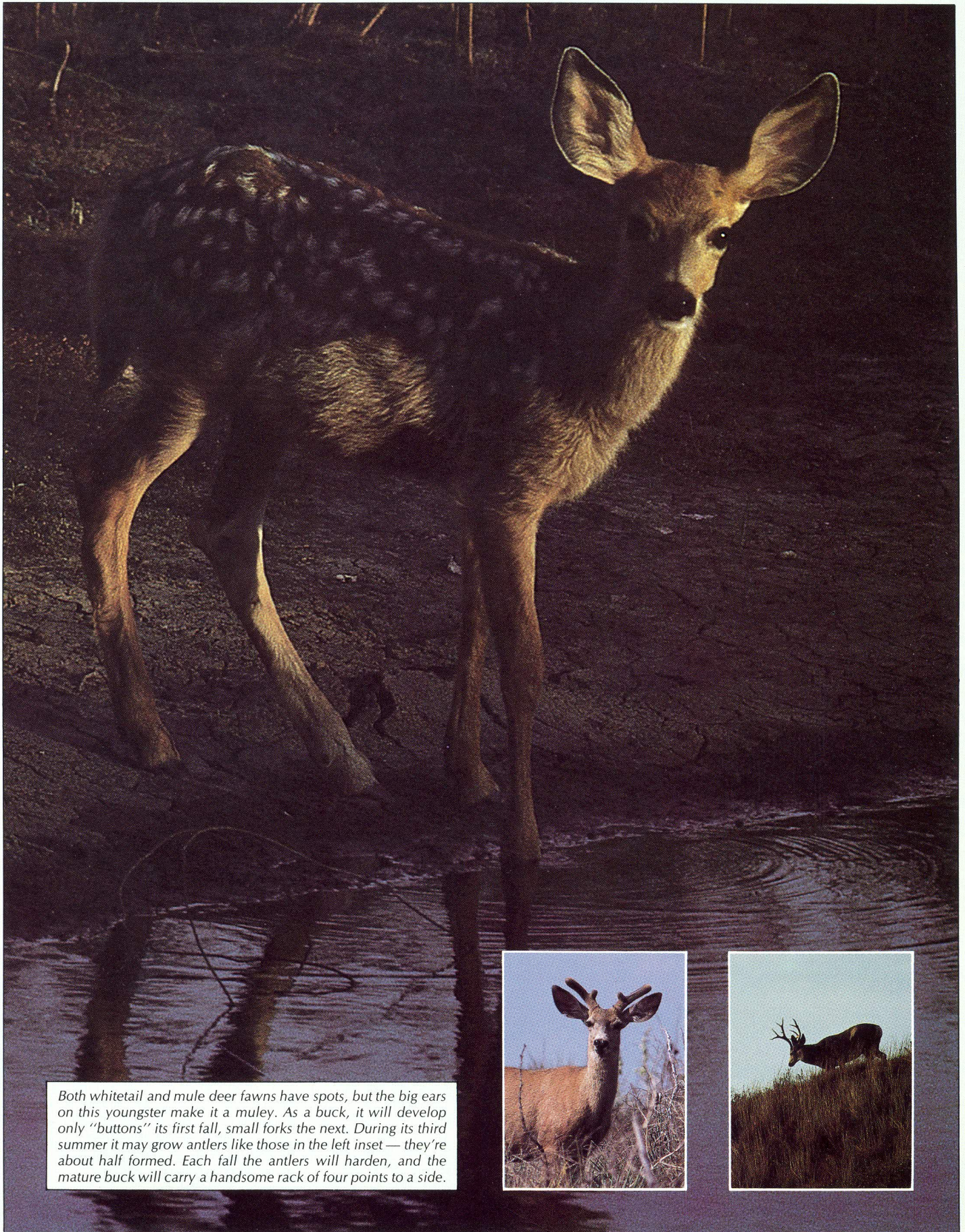
Kansas mule deer have food habits similar to the whitetail, though grasses make up a greater proportion of the mule deer diet. This may reflect the fact that mule deer inhabit the more open grassland areas as opposed to the woody drainages frequented by whitetails. Agricultural crops comprise 40 to 50 percent of the mule deer diet.

The daily forage intake for a deer is about three percent of its live weight. This intake varies with the season of the year. Food intake for mature bucks is greatest during the spring, decreases in summer, and increases again in early fall. Intake for does is greatest in the fall, prior to breeding.

Starvation of deer is not a major concern in Kansas. Starvation is rarely caused by a lack of food; rather it is the result of the available food not providing adequate nutrition and energy to sustain the deer in a healthy condition. In order to maintain good health, a deer's diet must contain the correct balance of proteins, carbohydrates, fats, minerals, and vitamins. The nutrient requirements vary with sex, age, season of the year, and environmental conditions.

The use of agricultural crops by Kansas deer can and does lead to crop damage problems. An increasing deer population generally results in more damage reports. Reducing crop damage is a primary consideration in the management of the Kansas deer herd.

Water is an essential item in the daily diet of deer. The amount needed depends on air temperature, evaporation rates, water content of the food eaten, and the physical activities of the animal. Deer have a daily water requirement of about 1½ quarts per 100 pounds body weight in summer. Deer will eat snow or lick ice if all the free water is frozen. Availability of free water can dictate whether or not favorable cover sites will be used by deer. The absence of drinking water may prevent deer from using what is otherwise prime habitat. Adequate water supplies are available in eastern Kansas in the form of rivers, ponds, lakes, and reservoirs. Water in western Kansas is more limited due to fewer water sources and lower rainfall. The increase in irrigation has provided a water source (flood and sprinkler irriga-



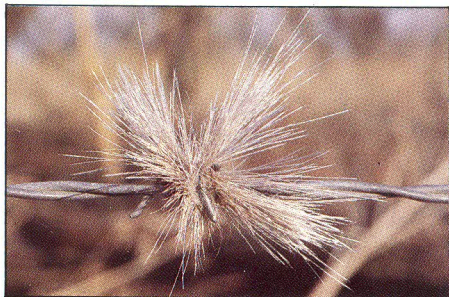
Both whitetail and mule deer fawns have spots, but the big ears on this youngster make it a muley. As a buck, it will develop only "buttons" its first fall, small forks the next. During its third summer it may grow antlers like those in the left inset — they're about half formed. Each fall the antlers will harden, and the mature buck will carry a handsome rack of four points to a side.

Gene Brehm photos

tion and tailwater pits) in areas where free water was once scarce.

Mortality

Captive female deer may live to be 23 years old, and males 16 years. The life span of a deer in the wild is about half that of a captive animal. Rarely do wild deer reach 12 years of age — whether they are hunted or not. In a hunted population, very few bucks exceed 5½ years, though a good number of does may be 8½ years old.



Gene Brehm photo

Large predators like wolves, cougars, and grizzlies once preyed on Kansas deer. Those predators are now gone, but automobiles, feral dogs, and fences kill in their stead.

The primary causes of deer mortality include legal hunter harvest, poaching, deer-vehicle accidents, predation, diseases, parasites, hunter crippling losses, and fence and farm accidents. In 1984, legal harvest removed nearly 24,000 deer and reported deer-vehicle accidents claimed 3,000 more. The actual number of deer lost to vehicle collisions could be as high as 5,000 annually. The magnitude of loss to poaching is difficult to determine but may approach the legal harvest in some areas of the state.

Deer-vehicle collisions occur most frequently where highways follow or cross woody drainages. “Deer Crossing” signs are placed at locations where there have been five or more deer-vehicle collisions in a one year period.

Predation by coyotes and free-ranging dogs is a primary cause of fawn losses. Predators do serve a useful purpose by removing sick or wounded animals.

Diseases and parasites are minor problems for deer in Kansas. While epizootic hemorrhagic disease (EHD) is the most serious disease affecting whitetail herds in the Midwest, its significance in several minor Kansas die-offs has not been fully documented. The disease can and occasionally does decimate deer herds with amazing swiftness. The EHD virus is spread by a mosquito and has its most pronounced

effects during hot, dry years from late July through October. As deer congregate around water during dry years, they run a greater risk of exposure. EHD has been found infrequently in mule deer and antelope.

The state’s veterinarians and farmers are more concerned about deer carrying leptospirosis, anaplasmosis, and brucellosis or “bangs” disease, as these affect cattle herds. Brucellosis testing proved negative on 2,000 blood samples collected during the 1981 firearms deer season. Blood serum analysis from 2,000 deer showed a very low 2.9 percent incidence of leptospirosis and a 1.4 percent occurrence of anaplasmosis. As the deer population increases, it is a good practice to test deer again, periodically. It is unlikely that deer populations in Kansas will ever pose a disease threat to the state’s livestock and dairy industry. Population levels will be maintained at a point compatible with agricultural interests.

Habitat

Kansas deer habitat is a constantly changing array of woody, grassland and agricultural vegetative communities whose ability to support deer fluctuates with season, climatic conditions, intensity of land use, cropping patterns and degree of human disturbance. Most whitetail populations are associated with permanent woody vegetation of some sort, what we generally think of as cover.



Gene Brehm photo

Though both mule deer and whitetails are considered as browsing animals, they graze effectively, too, and relish succulent plants like alfalfa.

Cover provides shelter from the elements and escape from predators — a sense of security. The degree of security provided affects the health of deer, and security requirements vary with the pressures placed on individual animals. Cover must moderate temperature and precipitation, provide physical barriers to predators, and reduce vulnerability to

hunters. As such hazards intensify, the quality and/or quantity of cover must increase or the deer will leave.

Cover can be provided by topographical features such as rock outcrops, gullies and draws, ridges, “go-back” areas grown to forbs and grasses, and even agricultural crops and their residue. Cover becomes less critical as one moves from northern climates into more temperate areas.

Whitetails prefer different cover types than muleys. In the east, whitetails are most abundant along the creeks and rivers where elm, ash, cottonwood, hackberry, willow, oak, and boxelder are common overstory vegetation. Understory vegetation is typically mulberry, sumac, coralberry or buckbrush, dogwood, plum, chokecherry, gooseberry, greenbrier, poison ivy. Grasses and forbs add to the understory diversity necessary to attract deer.

Whitetail fawning sites in alfalfa and clover fields become hazards if the young are trapped there during the mowing operation, so most east-side deer activity during all seasons is in close proximity to secure woody cover. Areas of old field succession provide bedding and fawning sites as well as a diversity of native foods. Field borders of osage orange interspersed with grasses and forbs act as travel lanes. Diversity in plant species and density, as well as canopy coverage, is the key to prime whitetail cover.

Suitable whitetail habitat in western Kansas is limited to creek borders, river bottoms and brushy draws. During the growing season, whitetails here find shelter in corn and milo fields. Even grass fencerows serve as bedding areas for the adaptable whitetails, which are more and more taking up residence in traditional mule deer habitat.

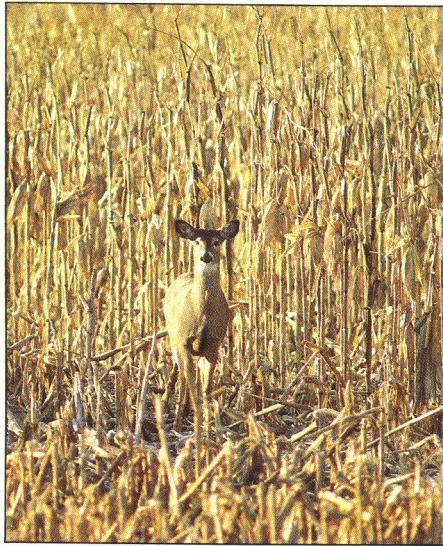
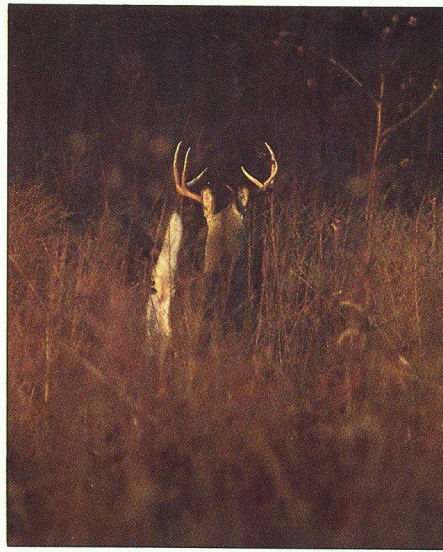
Kansas mule deer frequent the open grasslands and associated croplands of western Kansas. These animals like to be able to see, and they prefer sparse vegetation. Brushy, weedy draws that traverse pastures and croplands are favorite travel lanes and bedding sites. Cottonwood, willow, salt cedar, American elm, hackberry, and green ash are the major tree species associated with mule deer cover. Primary shrub species include rose, plum, golden currant, chokecherry, sumac, snowberry, and sagebrush. Water basins left unfarmed and allowed to grow smartweed, fireweed, ragweed, and sunflowers become islands of cover amidst a sea of agricultural crops. Untilled, ungrazed, brushy draws provide preferred mule deer fawning sites as well as escape cover. Thickets of plum, chokecherry, and sumac are among the most attractive bedding spots for mule deer.

Movement and Home Range

Deer movement in Kansas is influenced by the limited amount of deer habitat in the state and the fact that most of this habitat is thinly spread along watercourses and drainages. Movements are seasonal and dictated partly by the physiological needs of deer and changing habitat conditions. The more a given deer range provides year-round requirements, the less likely it is that migrations will occur. Deer movements peak in April and May and again in October, November, and December. Over 20 percent of the state's roadkills occur in April and May, 40 percent during the second peak in deer activity. Spring movements are related to winter herd break-up and pre-fawning activity, while the fall shuffle is in response to the rut, hunting pressure, and changing habitat conditions that force deer to move to secure wintering areas.

Following the rut — and particularly after the hunting seasons have ended — deer activity decreases and the animals tend to congregate. Herds begin forming during leaf fall and as crops are harvested. Harvest reduces deer range to a fraction of its summer expanse, as many deer live in standing corn, milo, and wheat. Herding is frequently an environmental requirement because of severe weather and reduced food supplies during the winter. Relatively long movements to wintering areas are not uncommon, particularly among mule deer. During deer season hunting influences deer movements and distribution more than any other factor. After that, food availability and secure winter cover are most important. The relative severity of any given winter strongly influences the size of winter herds and the distance traveled to habitat that meets their needs. In mild winters deer are more widely distributed and do not form large herds until stressed. "Yarding", the concentration of large numbers of whitetails in small wintering areas in northern deer range, does not occur in Kansas.

Migrations of up to 100 miles are not uncommon for mule deer in mountainous habitat. Mule deer found on the prairie don't migrate, but they do travel extensively — particularly the yearlings. This was demonstrated during a recent study conducted in a 12-county area of northwest Kansas. Game biologists and conservation officers caught, tagged, and released 67 mule deer fawns and seven whitetails. Nineteen of the mule deer were later recovered. Deer recovered as fawns remained in the vicinity of their capture site with no straight-line movements over one mile recorded.



Kansas whitetails thrive in a variety of cover types. The buck at top is headed for second-growth timber, having been jumped from a patch of weeds. Tree belts are favorite travel lanes for deer, and many, like the doe at bottom, spend their summers in cornfields!

Those recovered as yearlings moved an average of 46 miles, while adults traveled 84 miles from their tagging location.

Most of the wandering deer struck out across country rather than following a single drainage. In the study, mule deer over one year old crossed an average of 2.8 drainages. A pair of yearling females marked as fawns were recovered at the same time and location after a 68-mile movement. Another set of twin bucks were recovered as yearlings the same year but over 60 miles apart. Nebraska's firearms hunters recovered three of our marked bucks after movements of 37, 65, and 75 miles. The longest straight-line movement for mule deer was 97 miles — though a yearling whitetail doe holds the Kansas record for the longest journey. Tagged as a fawn in Sheridan County, she wandered 170 miles to the Chikaskia River in Kingman County! No significant difference has been found between the wandering tendencies of bucks and does or the distances each will travel.

A deer's home range is defined as the area traveled on an annual basis by a deer in its normal activities of food gathering, mating and fawn-rearing. The size of a home range is determined by the availability of food, water, cover. Home ranges are generally smallest in the summer and largest in the winter. Kansas deer range more widely in the western part of the state than in the east. The average home range is 320 acres but can vary from 100 acres to over 1,000, depending on the proximity of food, water and cover. In western Kansas there may be a seasonal change in home range locations from summer to winter as a result of inadequate food and cover within the summer range to sustain a wintering population. This is particularly true where deer inhabit corn fields throughout the summer and early fall.

MANAGEMENT

Deer management, in its broadest sense, includes five essential components: (1) research programs to provide knowledge and understanding of deer biology, behavior, and ecology; (2) surveys to monitor population and habitat characteristics and trends; (3) information and education to enhance public understanding and support of deer management programs; (4) enforcement of laws and regulations designed to manage deer populations; and (5) management of deer habitat. In

Kansas, harvest manipulations and habitat improvement are the most important deer activities.

Harvest Manipulation

With an increasing whitetail population and stabilized mule deer numbers, population control through hunter harvest is a prime concern of managers, administrators, landowners, and sportsmen. Several factors are considered when establishing deer harvest goals.



Gene Brehm photos

Mule deer in western Kansas may find winter pickings a bit lean, but most, like this buck, come through the snow in fine shape. Starvation is never an issue for Kansas whitetails. The doe here is a typical member of the Kansas herd — sleek, alert, and healthy.

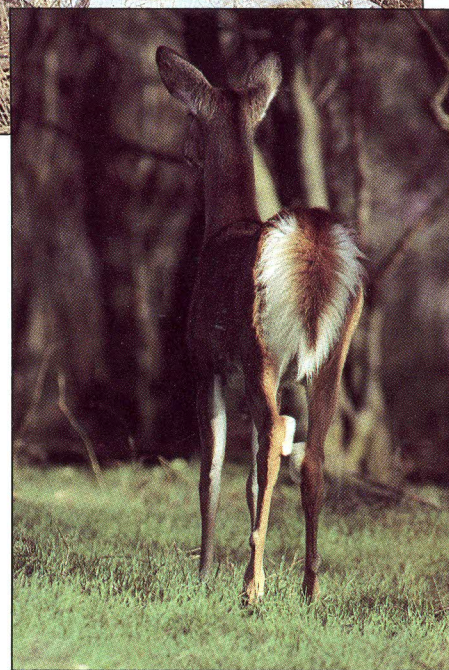
They include: (1) landowner tolerance levels for deer and hunters; (2) deer population size; (3) deer species; (4) numbers of trophy bucks; and (5) hunter densities.

Since Kansas is an agricultural state and most of the land is in private ownership, landowner tolerance for deer and crop damage by deer are important considerations in setting harvest and population goals. Field personnel from the Kansas Fish and Game Commission (KF&G) contact farmers and ranchers to determine numbers and severity of deer damage complaints; farm organizations are involved as well, and periodic landowner deer surveys are taken.

The landowner survey is a measure of change in landowner impressions and attitudes toward the deer resource. The survey was first conducted in 1964 and

has been duplicated six times in a 20-year period. Questionnaires are sent to 3,500 landowners randomly selected from ASCS county mailing lists. The most recent survey was done in the winter of 1984-85 and indicated that, from a landowner's perspective, deer numbers were increasing and that landowners would prefer to see a stabilization in population levels.

The number of deer in Kansas at any one time is impossible to know. Since we cannot monitor actual population size, it becomes necessary to obtain information that will show its trend. A



trend survey measures whether the population is increasing, decreasing, or not changing. The landowner deer survey gives us a measure of population change based on landowner opinion and deer damage complaints. Changes in the number of reported deer-vehicle ac-

cidents are also used as a population trend indicator. In 1965 there were 107 deer-vehicle accidents reported per one billion miles of vehicle travel; in 1984 there were 424 roadkilled deer per billion vehicle miles. This higher accident rate can be attributed to a productive and adaptable whitetail population that is not only increasing in size, but extending its range.

Because of the diverse nature of Kansas' deer habitat and the spotty distribution of its deer, management units were established to better formulate harvest goals for localized populations. There are now 18 management units plus three military installations. Harvest goals are set for each of these units and permit quotas are recommended that will achieve the desired harvest. Recommendations for season dates and permit quotas are based on population data, landowner and sportsman concerns, and the professional opinions of KF&G personnel. They are presented to the Fish and Game Commissioners for approval at a public meeting. Public comments are there solicited and considered by the Commission.

The issuance of deer hunting permits is currently to Kansas residents only. There is no quota on the number of archery permits that can be issued, but firearms permits are limited. The hunter is entitled to only one deer hunting permit. It can be archery or firearms but not both. Firearms hunters must apply for a permit and must select the management unit in which they wish to hunt. By state law, one-half of all authorized firearms permits must be made available to landowners or tenants who own or rent 80 acres of farm land. All applications are entered on computer and a drawing is held to select those persons who are to receive a firearms permit. Applicants who did not have a firearms permit the previous season are given first consideration in the drawing.

The types of permits issued (i.e. bucks only, any deer, antlerless only) are determined by the population goal. If population stabilization or decrease is desired, it is necessary to harvest does. This requires the issuance of "any deer" and "antlerless only" permits. If a population increase is the goal, then the does need to be protected and "bucks only" permits will comprise the bulk of the permits issued.

Maintenance of the herd at a given level requires that surplus animals be harvested, including females. If an increase is desired, then some surplus should be left for breeding stock. If herd reduction is the goal, then all of the surplus and some of the breeding stock will need to be harvested.

In 1977, the percentage of does in the

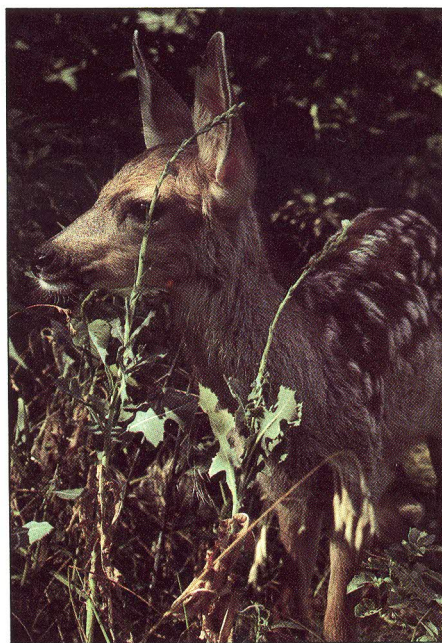
whitetail harvest was six, the lowest in 20 years of hunting. In 1984, 37 percent of the whitetail harvest was does, indicative of an attempt to stabilize the whitetail population. On the other hand, an attempt is being made now to increase mule deer numbers by protecting the does. The proportion of does in the 1981-1984 mule deer harvest was only eight percent.

In Kansas, the mule deer presents a harvest management challenge because its behavior makes it more vulnerable to hunters. The mule deer inhabits open grasslands in western Kansas and is a more trusting animal than the whitetail. Until 1979 there was no differentiation in species for harvest goals in the western Kansas deer range. Since the reopening of deer hunting in 1965, the mule deer was the primary species in the western units and there was no reason to consider harvest goals for individual species. Whitetails comprised less than five percent of the total deer harvest in the western units in those early years.

But by the mid seventies, whitetails made up about 25 percent of the western harvest. The whitetail was expanding its range into traditional mule deer country and increasing resident deer numbers. Permit quotas and harvest goals were subsequently increased, but without species differentiation. The result was that hunting pressure increased on the mule deer rather than being apportioned to both species. In 1979, "whitetail only" permits along with "either species" permits were issued. In an attempt to increase the mule deer population in eight western management units, the mule deer doe is protected by issuing "bucks only, either species" permits; and, in an attempt to stabilize the whitetail population a combination of "any whitetail" and "antlerless only whitetail" permits are being issued. This system has resulted in whitetails comprising 60 to 90 percent of the deer harvest in the traditional mule deer units.

When most Kansas deer hunters go afield, they have a vision of harvesting a "trophy" deer. To most hunters that means an antlered deer having 10 points or more. The present deer management program in Kansas is designed to provide the opportunity for a hunter to harvest a trophy buck if he directs his hunt at achieving that goal. The herd cannot be managed in a way that will place a trophy buck in the sights of every hunter, (at least not without drastically reducing the harvest and the number of hunters). Still the chances for a trophy buck in Kansas are better than in most states and, in fact, may be the best in the nation for big whitetails!

Management of trophy bucks in Kansas means allowing animals to reach 2½ years of age or older. Kansas bucks are not lacking nutritious food, so time is all they need in order to grow sizable antlers. Bucks from 3½ to 7½ years old develop the largest racks. Age data are necessary for monitoring the effects of harvest on a population's age structure. To do this, tooth envelopes are provided each firearms deer hunter and he is requested to submit to KF&G the two primary incisors from the harvested deer. By visual inspection the fawns and 1½ year old deer are sorted from the adults. A sample of the adult incisors are sectioned and microscopically "read" for age. The age is determined by counting the number of growth rings or dental cementum annuli, much like



Gene Brehm photo

This fawn is only a few weeks old. If it is a buck, it may live to be four or five, perhaps older if it is very lucky. In a hunted population, does live longer, but rarely exceed nine years of age in the wild.

counting the annual growth rings for the age of a tree.

The mule deer buck age structure for the last 13 years has averaged 70 percent yearlings, 20 percent 2½ year-old deer, and 10 percent mature (3½ years or older) animals. Whitetail bucks for the same time period averaged 60 percent yearlings, 20 percent 2½ years, and 20 percent 3½ years and older. This type of age structure provides a good balance between young deer and trophy-age bucks.

Hunters and non-hunters alike benefit from a healthy deer herd. Last year

deer provided nearly 344,000 man-days of hunting recreation for 42,000 deer hunters and untold days of enjoyment by the non-deer-hunting public. One third of those questioned in a telephone survey of 500 randomly-selected Kansas citizens said that deer were their favorite wild animal. This underscores the need for total public input when considering deer management programs.

As a consequence of increasing deer numbers, harvest goals, hunter success and hunter numbers have all increased. Numbers of bowhunters have jumped from 1,100 in 1965 to over 15,000 in 1984, and the ranks of firearms hunters have grown from 4,600 in 1965 to 30,600 in 1984. Hunters have also experienced higher and higher success rates over the last 20 years of deer hunting: Archers had 14 percent success in 1965 compared to 31 percent in 1984, while firearms success was 38 percent in 1965, 68 percent in 1984. Harvest and hunter success information is obtained from questionnaires provided each deer hunter.

As the number of permit holders increases, we are satisfying a greater proportion of the Kansas hunters who want to pursue deer. But concurrently there is the potential for a reduction in the quality of each hunting experience. The density of archery hunters has increased from three hunters per 100 square miles in 1966 to 16 in 1984; firearms hunters have increased from 8 per 100 square miles in 1968 to 41 in 1984. These figures are expected to continue upward in coming years. With increasing densities of hunters, the number of potential hunter conflicts also rises.

The definition of a "quality" hunting experience is different for each hunter. For some, a quality hunt depends solely on the environment in which the hunt takes place. For others the kill is of paramount importance. Still others feel quality is related to observing deer, especially antlered bucks. And many hunters just want solitude in the woods. KF&G has a responsibility for controlling the sport of deer hunting and must maintain some standards of "quality" for the deer hunter. Our laws and regulations are not only a tool for managing hunter harvest, but they also establish some baseline for hunter ethics and hunting quality. As hunter numbers and hunting conditions change, laws, regulations, and policies will also change in order to maintain some degree of quality and ethical behavior in the sport of deer hunting. For some, the words quality and ethics are foreign, but if deer hunting as we know it today is to survive into the 21st century, all hunters will need to examine old habits and ideas and be prepared to change them.



Gene Brehm photo

A lot of hunters don't like to shoot does, but careful cropping of females is necessary to maintain proper age and sex ratios in our deer herd. Antlerless quotas are determined for every deer management unit after biologists have assessed the need for doe harvest.

ditions is generally not advisable. The practice of supplementally feeding deer can be expensive and most often is not done until after the deer begin to show signs of malnutrition. If the artificial food differs greatly from that which the deer has been using, the microflora of the stomach are unable to process it. The deer is then likely to die. Winter food sources are beneficial when established before winter weather can create hardship for the deer population.

The key to successful deer management is to create proper habitat — as much edge and interspersed cover types as possible.

Habitat Improvement

Habitat is defined as those environmental factors a species needs to survive and reproduce in a given area. These factors include food, cover, and water. The numbers and distribution of any animal are limited by the quantity of suitable habitat. Habitat management in Kansas has two basic objectives: (1) to maintain quality habitat in its present state, and (2) to improve habitat where it has deteriorated.

Though Kansas has a great variety of deer habitats, management is directed at two main types — woodland and rangeland. Here are some of the strategies we use in each: Dense stands of mature timber where understory cover is sparse are treated by selective timber harvest or thinning. This removal of trees will open the overstory canopy, allowing sunlight to penetrate and stimulate the growth of understory vegetation (shrubs, forbs, grasses). These clearings will provide the successional stages of vegetation growth so important for deer. A number of well-scattered openings is more desirable than one large opening. The size and distribution of openings is determined by the size and shape of the timber stand to be treated.

Woodland edges are planted to a variety of plant species to maintain diversity and natural succession. Cropfield borders, when planted to woody cover or given over to advanced succession, offer good travel lanes for deer. Non-tillable draws and ravines can also be planted to shrubs, forbs, and grasses. In western Kansas, these areas provide needed mule deer fawning sites.

Grazing of woodlands by livestock is discouraged. Livestock compact the soil and trample, eat, or otherwise destroy

important understory vegetation. Fencing of woodland areas is encouraged. Brushy, ungrazed draws in western Kansas are premium mule deer cover and need to be protected from use by livestock.

Rangeland management for deer includes the establishment of grazing programs that maintain grassland vigor and quality. This benefits livestock and deer. When burning is used, selected areas of brush are protected. Maintenance of brushy draws and ravines as well as grasslands is particularly important for mule deer in western Kansas. Field corners and other waste pockets should be allowed to grow into weedy, brushy sites to create mule deer cover. Such areas include abandoned farmsteads, rainwater basins, and pivot irrigation corners. All can provide fawning sites and winter cover.

In both woodland and rangeland settings, burning is an important tool in maintaining successional stages. Controlled burns are beneficial for all wildlife if done at the right time and in the proper way. Mowing and disking can also be used to establish early successional stages and maintain desired species compositions and densities.

Besides enhancing the stands of natural foods (browse, forbs, and grasses) through woodland and rangeland management, we can plant agricultural crops near deer cover. One- to three-acre food plot plantings of corn or sorghum in an area of winter deer cover will supplement natural foods and draw the animals from great distances. Even crop residues next to wintering areas provide a good source of winter food, if those residues are not fall-plowed.

Though winter blizzards in western Kansas can cause hardship for deer, supplemental feeding under these con-

HUNTING

Deer in Kansas are managed for a number of reasons. They're pretty animals, and photogenic. People like to see deer, so we all want a few around. On the other hand, not all farmers want to feed deer, and nobody wants to hit deer with their automobile. That means we don't want too many deer. Biologists are also concerned with things like deer distribution, health, and genetics. They want a good deer herd, not just a big one or a little one.

What is a good deer herd? It's many things, but one of its characteristics is that it needs periodic cropping. That means hunting. Letting deer die of old age not only wastes these animals, but their habitat takes a beating in the process, and the herd members suffer genetically if the practice continues. In modern Kansas, there are more things that keep deer alive than there are things that kill deer. So, if the herd is to remain healthy, of good genetic character, and the size we want it to be, it must be trimmed. Management is, after all, wise manipulation of populations. It is not merely protection; nor is it only a reduction of surplus. That we have one of the healthiest herds in the nation says a lot for our management and managers.

It may seem a bit out of character for people who like to see deer and who give a lot of money each year to Kansas' deer management program to get any pleasure from shooting them, but that's what happens each fall. Sportsmen from all over the state save up vacation time

and dollars to chase the elusive big-racked buck through timber and over prairie. They do it because they like to hunt and because man evolved a hunting animal. Happily, their sport is in concert with what is best for the deer. And they willingly lay down their weapons when the season is over, knowing that controlled harvest is good, but that overkill is, like full protection, not in the best interests of the herd.

Hunting Methods

Whether you're a beginning Kansas deer hunter or a seasoned woodsman — or perhaps someone who'd just like to know a little more about deer hunting — a review of tools and techniques is in order. Let's start with techniques.

Many Kansas hunters prefer to hunt out of a tree stand, and of the methods legal, this is no doubt the most effective for whitetails. These deer travel established routes at loosely established times. Except for escape trails, such routes are visible even to a casual observer. Waiting alongside one of these trails long enough is sure to reward you with the sight of a deer. Waiting in a tree stand is better than waiting on the ground not because you have a wider field of view but because you are above the wind currents that telegraph your presence to deer.

A tree has to be special to make a good or even serviceable blind. Not only must the tree be within shot range of the trail, but it must afford you some flexibility should the deer appear from right or left, walking or moving fast. You must have clear shot lanes in both directions at several different points and distances. You can't shoot well if you're looking into the sun, so the tree must be to the sun side of the trail at the time you expect the deer to come along. Whether you opt for a platform or simply stake out in a large crotch, the blind must be easily accessible. You don't want to make a lot of commotion when you climb up or down, and since your most productive hunting hours are early and late, you'll be going up or down in the dark. Safety is important, and your blind must be stable. A safety belt is a good idea, too. Another thing you should think about is how high to go. If your feet are ten feet off the ground, you're not only above the deer's normal line of vision, but are high enough that the animal is unlikely to smell you. Thermal winds may drag your scent down, and if you don't take normal precautions to minimize your odor your scent pool may still be detectable; but remember, the less severe the shot angle, the less likely you are to miss — especially with a bow!

Deer like cover. Whitetails will travel through heavy brush or timber before they'll venture into the open, especially during the daytime. They may feed in crop fields at night, but you won't see them there during hunting hours. You can tell the purpose of deer trails by studying them. If you find a path that's heavily used, with all tracks going from heavy cover to more open areas, it is likely to be a feeding trail, used at dusk by deer moving from their beds to forage. If the tracks lead from the fields to cover, your best bet on that trail would be in the morning as the deer move to bed. Escape trails are not so plainly marked, but they play an important role. Rarely is a deer far from security cover, and it knows instantly how to get there. Escape trails aren't good ones to watch unless you're hunting a very crowded area where other hunters may push deer to you along such routes.

You hear a lot about scrapes nowadays, though deer have been making scrapes for years. A scrape is a dished area in the earth where a rutting buck has marked his territory. One buck may make several scrapes in an area. Commonly they are around the perimeter of and just inside a woodlot or shelterbelt. Most of the time they are on trails or near trails. Scrapes are made just prior to and during the rut, though they may remain visible long after. A rutting buck will visit his scrape periodically and work it. Usually this involves urinating in it, pawing it up, and perhaps raking

overhead branches with his antlers. Almost all scrapes are located under low branches, and the buck will hook his antlers in these twigs, twisting them this way and that. He'll get up on his hind legs to reach them, if need be. Often he'll rub the tip of a branch with the front of his eye, where his preorbital gland is located. This is thought to be an act of territoriality. Most scrapes also show one clear hoofprint of the buck that visited them. This hoofprint can be a great help to you, as it gives you an idea of the body size of the local buck. If you're hunting for a big set of antlers, it pays to look for big tracks — albeit there is not always a direct correlation.

The last half of November is the normal rutting season for both mule deer and whitetails in Kansas, though the peak varies with locality. While mule deer are not territorial and do not make scrapes, they go through the same physiological and psychological changes whitetails do. That is, their necks get big and they become more active, eating less and traveling more — especially during the day. They're not as cautious in the rut, either, and because Kansas' firearms deer season falls at the end of this period, a lot of big bucks are taken that would escape hunters during other times of the year. Hunting the rut is exciting because you see a lot of deer. More specifically, you see many more bucks than at other times. Whether you are after antlers or not, watching those heavy-racked males chase the does or work their scrapes or just trot down the trail a few feet from your blind is great fun.

Whether you hunt scrapes or trails, scouting is an important part of your efforts afield. If you want to see deer, you must know enough about their habits to predict where they'll be and station yourself there. It does no good to walk through the woods on opening day, hoping to find a well-used trail or fresh scrape. You won't know anything about the deer using the area or when they are likely to pass by your stand. The most successful hunters spend many days afield before they pick up their weapons. It makes them more familiar with their hunting territory as well as with the local animals. They get to know the deer individually and can tell if there's a big buck in the area. Scouting helps them make the most of their time during the hunting season, when time is at a premium.

Stand hunting is not the only way to hunt deer. In fact, it may not be the best way to hunt mule deer in Kansas. Stand hunting is effective on whitetails because they are habitual in their travels and generally frequent small areas. One or two sections of good cover is plenty of



Deer are not as tall as most people think, the average height being only about three feet at the shoulder. You'll see more deer if you look low.

Gene Brehm photo



territory for whitetails. Mule deer, on the other hand, range more widely and are less apt to stick to well-defined trails. They prefer more open country than whitetails, too, though in heavily-hunted areas they are learning the value of dense cover.

One of the most rewarding ways to hunt mule deer, and a challenging approach to whitetails, is still hunting. Still hunting is *not* remaining still. That's stand hunting. Still hunting is moving very slowly and quietly through

cover, hoping to spot a deer browsing or even bedded. Because these animals are so well camouflaged themselves, and because their senses are so keen, the odds are stacked against you when you still hunt. Many times you'll pass by deer that elect to stay hidden rather than bolt into the open, or you'll spook your quarry so far ahead that all you'll see is a white tail or rump patch. Still hunting is sneaking, and you must be very good at it if you expect to get close to a deer without giving yourself away.

Hunting season is a hazardous time for bucks like this, though more often than not they're able to elude the red-clad rifleman. Deer hunting can be a challenging sport and is a necessary part of Kansas deer management.

Another deer hunting method Kansans use is driving. Driving is best done with a sizable but not unwieldy group of sportsmen who agree to hunt cooperatively in an area. Half a dozen hunters can effectively drive a small woodlot or shelterbelt. It's best if all have at least a

rudimentary knowledge of the area and essential that one be given the job of organizing the drive. Most drives are made by half the hunters involved, while the other half act as standers, posted on the edges and far end of the cover to be driven. The best drivers hunt as if they were still hunting: slowly and quietly. Noisy drives not only ruin the atmosphere of the hunt but alert deer far in advance of the drivers that something is amiss. These deer will likely hold tight, pinpointing the exact location of each driver as he moves. Many deer slip between drivers and end up behind the line without anyone knowing about it. They can do this more easily if the drivers are making noise. A quiet drive is much more effective, as each driver is actually hunting, not just bulling through cover. Not only do the drivers have a better chance of seeing deer, but the standers are rewarded with deer that can't tolerate the suspense in the thick stuff and try to leave. All drives should be conducted in a crosswind if possible, for the benefit of both groups of hunters. If the country dictates that a drive be made parallel with prevailing breezes, the standers should always be placed downwind. Driving is an excellent way to get at deer in their bedding sites, where still hunting is often futile and stand hunting impractical.

Spotting a deer is only part of the hunt. To kill your quarry quickly and humanely you must make a good shot. That means placing your first arrow, ball, slug, or bullet in the proper place — right behind the shoulder and about a third of the way up from the lower chest line. A hit here will destroy little meat, as your projectile penetrates the rib cage to the center of the lungs. The lungs, besides being vital organs, are large ones, and much easier to locate than heart or brain. A head shot will spoil a trophy, and bullets directed to spine or shoulder will ruin much meat. Always shoot for the lungs, and try very hard to make the first shot good. Wait, if you must, for the animal to come closer or present a better target angle. Don't shoot at running deer until you've practiced considerably on moving targets. Adhere to reasonable range limitations. By making every shot a lethal one you'll not only improve your success in the woods, but you'll help reduce crippling losses that rob everyone.

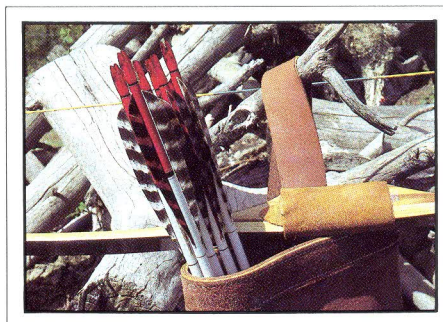
After you shoot, watch that deer and prepare to shoot again. If the animal is far away, you may not see a reaction; if close the recoil may hide it. Running deer often show no response to a bullet strike. Hits can be audible but are not always, and seldom will you see hair fly. Don't *expect* the deer to go down at the shot unless you destroy brain, spine, or

major bones. A good hit, a one-shot kill, is not necessarily an instantaneous knockout. There is no way to predict exactly what effect your shot will have, so it's best to call your shot as well as you can, shoot again if the deer gives you another chance, and check the target site for hair, even if you think you missed. Many fine animals are left in the woods by careless and ignorant shooters who failed to check after they pulled the trigger. *Always* check.

A footnote on hunting methods: It's good to think, once in a while, about why you want to hunt deer. If it's just to gather meat or to tag a big local buck before someone else does, you may try the most effective legal means you can. But you're missing something if you do. There's a lot of sport and adventure in deer hunting if you do it right. Voluntarily making things tough on yourself can put spice into what some still consider just an exercise in killing. Regardless of hunting motive, the deer benefit from controlled harvest, and biologically it matters not to the herd that you shoot your deer in an alfalfa field from the seat of a pickup. Nor do the deer care if you pull all stops to take the biggest local rack so you can brag to the unenlightened that you are the best hunter in the county. But the institution of sport hunting is imperiled today, and it isn't because we've lost biological justification for harvest. It may simply be that too many hunters have lost the mystique of the chase.

Hunting Weapons

The centerfire rifle is the tool most of us think of when we think of deer hunting. But in Kansas it's also legal to use a bow and arrow, muzzleloading rifle, shotgun, and handgun. Here are some of the requisites of each.



Wayne van Zwoll photo

bow and arrow: Archery equipment has undergone great change in recent years, and the most sophisticated bow today is hardly what you would call a primitive weapon. Nonetheless, all bows still depend on flexible limbs for

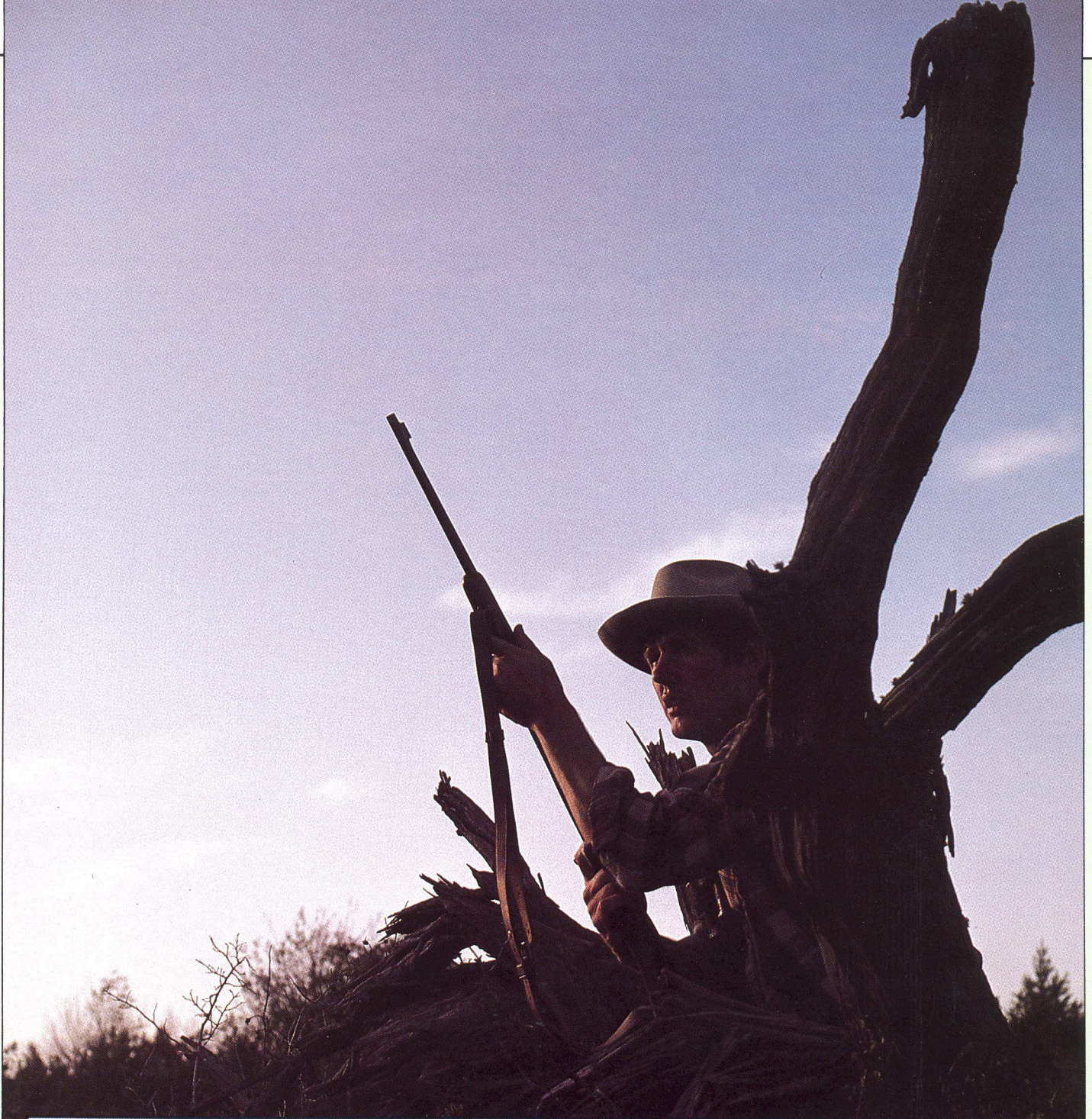
storing energy and a simple string to impart that energy to the arrow. An arrow still kills the way it did hundreds of years ago — by hemorrhage — and it is still a short-range missile.

Kansas law requires that all bows used for big game hunting draw at least 45 pounds. Whether you prefer a longbow, recurve, or compound, this weight is ample for deer hunting. What's most important is that you shoot your bow well and keep keen edges on your broadheads. To shoot well you needn't be able to skewer airborne oranges at 90 paces; just make sure you can keep all your arrows in a pie-size target at any range you'd consider shooting a deer. Many archers can shoot that well at very long range — 60 yards or even more. For most of us, though, the effective range of our arrows is closer to 30 steps. And even bowmen who can group arrows tightly at extended yardage would do well to take their shots as close as possible. The rainbow trajectory of an arrow makes accurate range estimation a must beyond 30 yards (a deer standing at 50 will be missed completely if an archer holds for 40), and the long flight time of an arrow allows the deer to move partly or completely out of the way after a shot. At close range the arrow remains an effective weapon. As long as you can estimate range well and do not shoot farther than you can be sure of a lethal hit, you will kill deer humanely.

It's important that you practice shooting a lot before the season. Use animal-face targets at unmarked distances so you'll be able to judge range and pick an aiming point automatically in the woods. Shoot uphill and down. Shoot from a tree if you'll be hunting from one. Shoot from *that* tree several times so you have a feel for the stand and know how far it is to points around it. Make sure, when you do this, that your shot lanes are clear, not only at sight-line, but along the path of your arrow's trajectory.

Keen broadheads are killing instruments. An arrow delivers very little impact shock and destroys no tissue around the wound channel of the head. The broadhead kills by cutting blood vessels and vital organs, quickly draining the deer of life. The edges — especially the rear edges — of the broadhead must be as sharp as razors to prevent elastic tissues and vessels from sliding over them. Sharp, a broadhead is a lethal, humane hunting weapon. There is no place for a dull head afield.

Because an arrow delivers no knock-out blow on impact, a deer won't always react to a hit. If it does, it may bolt, then stop and look back. Or it may simply walk away. There is no characteristic reaction to an arrow hit. When you release an arrow, assume you hit your deer



. . . how Kansas deer stack up:

Not only is Kansas hunter success among the highest in the nation, our management programs produce some truly outstanding bucks. Here are the top three deer in four categories recognized by the Boone and Crockett Club, and the number one B&C listing for each.

whitetail deer, typical

world record shot by James Jordan, Burnett County Wisconsin in 1914, score — 206 $\frac{1}{8}$

top three Kansas deer:

Dennis Finger's 1974 buck, Nemaha County — 200 $\frac{7}{8}$

Michael Young's 1973 buck, Chautauqua County — 194

Milton Wellbrock's 1968 buck, Russell County — 189

mule deer, typical

world record shot by Doug Burris, Dolores County Colorado, in 1972, score — 225 $\frac{6}{8}$

top three Kansas deer:

Fred Gilbert's 1966 buck, Rawlins County — 184 $\frac{2}{8}$

Glenn Meyers' 1984 buck, Kearny County — 182 $\frac{7}{8}$

Stan Smith's 1981 buck, Finney County — 181 $\frac{3}{8}$

whitetail deer, nontypical

world record found dead in St. Louis County Missouri in 1981, score — 333 $\frac{7}{8}$

top three Kansas deer:

John Band's 1965 buck, Republic County — 258 $\frac{6}{8}$

Theron Wilson's 1974 buck, Mitchell County — 251 $\frac{1}{8}$

Clifford Pickell's 1968 buck, Greenwood County — 249 $\frac{6}{8}$

mule deer, nontypical

world record shot by Ed Broder, Chip Lake Alberta, in 1926, score — 355 $\frac{2}{8}$

top three Kansas deer:

Lee Ordle's 1966 buck, Rooks County — 260 $\frac{6}{8}$

Thad Douthit's 1965 buck, Cheyenne County — 239 $\frac{7}{8}$

Herman Lang's 1969 buck, Finney County — 229 $\frac{7}{8}$

unless you are sure the shaft went wild. Don't move. The deer probably won't know where the shot came from and will not know what is wrong. Even a fatal arrow wound is not initially painful, and if your shot was in the lungs, where it should have been, the deer will not go far. If you approach, though, your quarry may forget about the arrow entirely and flee from you, covering a lot of ground in short order and making your tracking job that much more difficult. As a rule, it's best to wait an hour before trailing an arrow-hit deer, unless you've seen it go down.



Gene Brehm photo

muzzleloading rifles: Black powder shooters are allotted a certain number of rifle deer tags in Kansas and need not compete with centerfire riflemen in the drawing. That's been a good arrangement for the front-stuffers, and taking big game with primitive rifles is growing in popularity. The minimum legal caliber for black powder deer hunters in Kansas is 40. Probably the most popular bore size is .50. These and larger muzzleloaders are capable of taking deer cleanly with either patched round ball or conical bullet. Both flint and percussion guns may be used in Kansas, and the lock need not be exposed. Optical sights are permitted; so is Pyrodex as a propellant. Though Kansas muzzleloading regulations are quite liberal, many black powder shooters shun Pyrodex and conical bullets. Hardly anyone uses a scope. Shooting a muzzleloader, after all, is reliving the experience of early hunters. Authenticity adds to the fun.

A muzzleloader *is* fun to hunt with. It makes you concentrate on that first shot, because it is the only shot you'll have. Though front-loading rifles are quite capable of killing deer at ranges over 100 yards, accuracy and sight limitations restrict effective range to under that. The sluggish flight of the ball or bullet makes proper lead extremely critical on running deer, and the slow lock time of black powder arms mandates a smooth, uninterrupted swing. It's always best to rest a muzzleloader because the tremors in your arm have plenty of time to destroy the shot *after* you pull the trigger.



Wayne van Zwoil photo

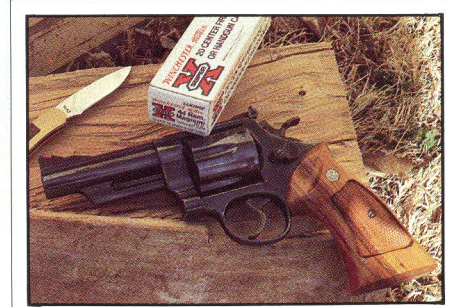
shotguns: Slugs 20 gauge and larger are the only smoothbore projectiles legal for Kansas deer; buckshot is not allowed. Because shotguns are short-range weapons and slugs don't travel nearly so far as rifle bullets, they are favored for deer hunting in heavily populated areas.

A lot of people look down their noses at shotguns, but they shouldn't. Shotguns have a lot going for them at close range. The slug is a big, heavy thing that doesn't need to expand to get the job done. Pump and autoloading shotguns are not only fast to operate but are also among the most used sporting arms in the state. The fellow who hunts deer with a shotgun probably also uses the same thing to kill pheasants and harass the local quail population. He may hunt rabbits and squirrels with it, or prairie chickens and waterfowl. He probably shoots it at a few clay birds each year, too. In short, he is familiar with it. A lot of deer rifles in Kansas don't get any use outside the first week in December.

If you own a shotgun and want to hunt deer with it, there are a few things you should keep in mind. First, a double — whether over-under or side-by-side — will probably not shoot well for you. It will likely throw slugs from each tube to different points of impact. Much better is a pump or autoloader, preferably with an open choke. A tight choke will not be harmed by the passage of slugs, as the soft lead will swage down easily. But the swaging stresses the slug and may deform it unevenly, resulting in wider groups. Almost all shotgun bores are larger than the diameter of the slug. A tighter fit would help accuracy, but thin shotgun barrels couldn't stand the pressure generated by swaging immediately in front of the chamber. Incidentally, the accuracy of rifled slugs is due to their nose-heavy design. Some spinning of the slug does occur as air is forced through the grooves in its sides, but this is not enough to cause a great deal of rotation with most slugs and is not thought to contribute significantly to accuracy. Slugs out of a pump or autoloading shotgun should group in six inches at 75 yards, and a few will do that

at 100. Changing barrels will often improve accuracy, and if you're serious about hunting deer with a smoothbore, you would do well to invest in a short, cylinder-bored barrel.

Sighting a shotgun is different than sighting a rifle. Your eye must act as the rear sight on the shotgun, and most shotguns will shoot high with slugs if you hold them the way you do when shooting at birds. It's often necessary to almost bury the bead in the receiver top to get the slug to print to point of aim. Shotguns for deer hunting are best equipped either with open sights on a slug barrel or with a ramp front and rifle receiver sight combination. Either will markedly boost your effectiveness in the woods. A low-power scope is best of all, and mounts are available to fit most repeating shotguns.



Wayne van Zwoil photo

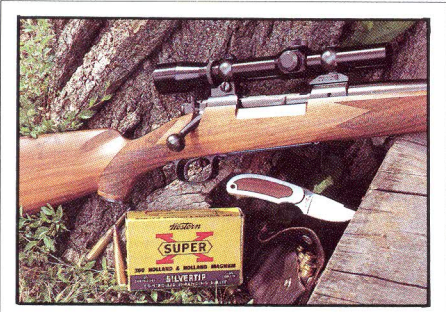
handguns: Pistols and revolvers are the most recent legal deer weapons in Kansas. There are no barrel length or ballistic stipulations, but the cartridge case must be at least 1.28 inches long and the bullet greater than .23 inches in diameter. The .30 carbine round is *not* permitted. As with rifles, only expanding bullets may be used.

Until the sport of metallic silhouette shooting entered the U.S., handguns were considered defensive weapons by most folks. The .357 Magnum had come along in 1935 and the .44 Magnum eleven years later and both had been used to take big game. Still, the development of really potent guns and loads didn't start until silhouette enthusiasts went to work. Now special break-action and bolt-action single-shot pistols are chambered for rounds as powerful as the .308 Winchester. Revolvers like the .454 Casull deliver more muzzle energy than was once thought possible out of a wheel gun. Many handgun cartridges are effective well beyond the yardages at which even practiced handgunners can hit.

Because traditional handgun cartridges like the .357, .41, and .44 Magnums are low-velocity rounds, bullet expansion is not as violent or reliable as with the faster-stepping rifle cartridges.

Some expansion of pistol bullets is desirable, of course, even if those slugs are nearly half an inch in diameter to begin with. Hollow-points with large nose cavities generally give the best upset, albeit ballistic coefficient suffers in bullets of this design. If you're using one of the traditional handgun rounds, you won't go wrong to choose jacketed hollow-point bullets of medium weight. By far the best choice is a rifle cartridge or rifle cartridge derivative in a single-shot pistol. Soft-point bullet performance at handgun ranges will be adequate, and the flatter trajectory will make long-range hits easier.

At one time, adjustable sights were a luxury feature on a handgun. Now not only are all the better open sights adjustable, but receiver sights are available and scopes are becoming more popular. Whatever sights you choose, you'll find it easier to steady them with a firm two-hand hold, preferably over a rest. You might even buy a sling and loop it over your head or forearm — anything to deaden those wobbles! Modern handguns are very accurate, and the cartridges more than a match for deer, but you must be able to bridge that accuracy and direct that power to a vital spot on your target.



Wayne van Zwoil photo

rifles: Kansas law requires that rifles used for big game be a minimum 23 caliber; that's all. So you have a lot of rifles to choose from. The best rifles, though, have some pretty specific things in common. First, they are accurate. No matter what the chambering, your rifle should be able to shoot tight groups — a minute and a half is fine. If your gun won't shoot that well, you're compromising your ability to make long shots. Even if you don't *plan* on taking long shots, you may be tempted when a buck with caribou antlers steps out of a distant shelterbelt. Better to be prepared.

The second requirement of any deer rifle is that it be sighted in — by you. You must know where the point of impact is in relation to point of aim for any distance you'd consider shooting at a deer. If you don't, rifle accuracy is of

no consequence and ballistic performance is wasted. Thirdly, the rifle must have a crisp, predictable trigger, one that will let you squeeze off carefully aimed shots without disturbing sight alignment. It needn't be particularly light, just crisp and consistent. Fourth, the rifle must have a good set of iron sights or a high-quality scope. A receiver sight is much better than an open rear blade because of the greater sight radius it affords and because more precise aim can be taken when your eye doesn't have to focus on front and rear sight both. A low-power scope is best of all.

Good deer cartridges are so plentiful now that there are almost too many of them. The .30-30, once the standard for these animals, is no longer high on the list. Many other rounds are more effective — especially in Kansas, where a long open shot is certainly a possibility. Actually, all the cartridges developed before the turn of the century have been eclipsed by racier numbers. Not that newer is always better. The .30-06 is still one of the best deer rounds ever developed, and the .300 Savage remains a fine cartridge for fans of that company's 99 rifle. The 7×57 Mauser and .257 Roberts have made recent comebacks as light-recoiling but accurate and adequate deer calibers.

Among the best cartridges for Kansas hunting, where long and short shots both may be taken, are the .243 Win., 6mm Rem., .250 Sav., .257 Roberts, .25-06 Rem., 6.5 Rem. Magnum, .270 Win., 7×57 Mauser, .280 Rem., .284 Win., .300 Sav., .308 Win., and .30-06 Springfield. Most belted magnums are unnecessarily powerful, though the 7mm Rem., and .300 Win. Magnums have reputations as all-around big-game cartridges. The Weatherby .240, .257, .270, 7mm, and .300 rounds are also superb long-range performers, as is the .300 H&H. Winchester's old .348 is a fine cartridge for the woods but lacking at long range. The same goes for the similar .358 Win. and .350 Rem. Magnum rounds. New offerings, like the .307 and .356 Win. are springing up everywhere. But with current powders and bullets, any newcomer is bound to nearly duplicate an excellent deer cartridge already on the market. Most remain only because their case design adapts them to a specific rifle. Anyway, the most important thing about a deer cartridge is not its headstamp, but its bullet.

Good deer bullets are ballistically efficient; that is, they have a good form factor, a sleek, streamlined appearance. Round-nose bullets give somewhat more reliable expansion and deeper penetration at close range, but those qualities aren't needed on light animals

like deer — at least not in the group of cartridges just listed. More important is the ability of that slug to shoot flat over long distances and accurately at any distance, so you can thread it through brush or between trees. No bullet, no matter how masculine it looks, is made to shoot *through* brush.

After you've decided on a slippery spitzer shape for your bullet, try several weights in your rifle, and several makes. Perhaps one will shoot much better than the others, and that's the one you should choose. If you stay in the middle of the weight range for the caliber, you won't go far wrong. The 150- and 165-grain bullets in 30 caliber, for example, are both fine choices, as is the 130-grain in the .270, the 140 in the 7mm. Because 24- and 25-caliber rifles are intended for varmints as well as big game, it's best to lean to the heavy end in bullet weight: 117 for the .25, say, and 100 for the .24 — depending on how fast you can or want to push your bullets.

Just about any reputable jacketed soft-point on the market will make a good deer bullet. Those that open fast will be too fragile if you hit your deer close with a lot of speed, and those that are more strongly constructed may hold together a little too well at long range if they aren't pushed fast. Your expected shot circumstances will determine what bullet is best for you. Accuracy remains a critical element.

Deer hunting is among the most fascinating of outdoor pursuits. It is a demanding sport, one that tests both your mental and physical preparedness. It is good for the Kansas deer herd, too, and is an integral part of modern deer management. If you haven't yet taken the dawn trail of a big Kansas buck, perhaps it's time you did. If you're an old hand, you're probably already scouting and practicing on the target range. Whether this will be your first season or your twentieth, good luck, friend. May your shot be true and your steaks tender. □



Gene Brehm photo