

# Mule Deer Management for Montana Landowners

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## Life History

Mule deer (*Odocoileus hemionus*) fawns are born in late May and June after a gestation period of about 203 days. Fawns weigh five to 11 pounds; single fawns weigh significantly more than fawns from multiple births. Twins are the normal litter size, although yearling females usually produce singletons. While triplets are a rarity, does four years or older are more likely to have them than younger does. Does find one- to five - acre cover patches in which to deliver and raise fawns. The doe seeks a place with adequate water, cover and succulent vegetation to hide and nourish her young. Low shrubs with an overstory tree cover provide the best protection from predators. Quality fawning cover is critical. During one 12- year study, predation by coyotes accounted for 88 percent of all deaths of radio- marked fawns. In other population studies, average annual fawn losses of 75 percent have been documented. Quality fawning habitat will reduce predation. Fawns are kept hidden by the doe for the first two weeks of life or until they are mobile enough to accompany her as she moves about.

During the summer months, does use lush cover to satisfy both the high nutritional demands of their offspring and the need for escape cover. During summer, bucks form small bachelor groups, although mature bucks are more likely to remain solitary. Throughout spring and summer, bucks store fat rapidly while food is readily available. They seek bedding and loafing areas that are secure, cool and provide relief from biting insects. Because antler growth begins a month or so after shedding, bucks seek areas relatively free from biting insects, which attack the blood- rich growing antlers, and areas where disturbance by humans or other animals is unlikely to force them to retreat to dense or bushy areas, where the fragile velveted antlers might be damaged.

During early fall, increasing testosterone secretion causes the bone to harden and the antler velvet to shed, leading to the death of the antler. After this, bucks begin sparring and forming a dominance hierarchy that will determine which buck breeds does in late November and December. Mule deer bucks do not form harems but rather "tend" does to ensure that they are near when a doe is in estrous (willing and able to breed). A doe is usually receptive for only a matter of hours, but she will repeat estrous if she is not bred. Most does are bred during a two-week period.

After the rut, mule deer move to wintering areas. Bucks are less aggressive and begin to feed and rest together. Large bucks enter a period of protracted resting and hiding. About a month after the rutting season, bucks begin to drop their antlers, with old bucks shedding earlier than young bucks.

Does and fawns form larger groups and tend to use more open areas. They do this because of food availability and because larger groups are more likely to detect predators. As winter becomes more severe, mule deer stay near thermal cover. This is cover that reduces the impact of weather extremes. Older bucks still use the higher elevations, although both sexes move down to avoid deep snow. South-facing slopes

are commonly used because exposure to the sun reduces snow depth, making it easier for the deer to move about and find forage.

Mule deer lose 20 to 25 percent of their weight during winter. Males lose weight twice as fast as females. In the northern Rockies, mature bucks weigh 175 to 250 pounds in winter, while mule deer does average 150 pounds. In the southern Rockies, weights are about 20 percent less than in the north.

### **Limiting Factors**

The biggest mistake you might make when trying to determine why a mule deer herd is increasing or decreasing in size is to look for only one factor. Seldom does one factor alone determine the trend of a population. Usually, an interaction of several factors is involved. For example, predation may be a factor that causes a deer herd to decline, but snow depth, shortage of escape cover or lack of alternate prey may be additional factors that allow the predation to severely impact the herd.

Traditionally, we have considered food, water, cover and space to be the components that determine how suitable the habitat is for wildlife. While this is true, this oversimplifies the situation and does not acknowledge the importance of other factors that may enhance or reduce the value of the habitat. For example, various ways humans use the land can impact mule deer range positively or negatively. Although mule deer may become accustomed to rather high levels of human activity, they will always prefer areas with a lower level of human disturbance. This is especially true for mature bucks. When repeatedly disturbed, deer will tend to avoid even high quality habitat if they have an alternative.

### **Forage**

While other factors must not be overlooked, it is important to understand that the primary constraint on the carrying capacity of most mule deer ranges is the herd's food supply, or forage. The limitations of forage usually have their effect during winter in the Rocky Mountain states. However, summer habitat quality becomes important because the deer need to go into winter in the best condition possible.

It is essential that landowners look beyond their own property boundaries to determine food limitations. Few parcels in the West are large enough to provide a year-round range for mule deer. By looking at the entire "landscape," landowners will be better able to determine which forage needs can be best satisfied on their property and which are available on adjacent lands.

Equally important to forage quantity is forage quality. If there is plenty of forage available but it is unpalatable, indigestible or lacking nutrition, it will not sustain the deer. Deer will often eat a diet excessively composed of sagebrush because it is easy to get instead of searching for higher quality browse or pawing through snow for forbs, the small, leafy plants that grow close to the ground under or between the taller grasses. When sagebrush or juniper make up more than 30 percent of the mule deer diet, the deer's condition will deteriorate.

### **Water**

Free water, as opposed to water in vegetation, is particularly important when forage is dry. In one study, deer drank about three pounds of water for each pound of dry food

eaten. However, they drank only one- half pound of water for each pound of fresh, succulent vegetation eaten. During winter, deer use snow as a source of free water.

### **Weather**

Weather can directly affect mule deer survival rates; for example, deep snow causes starvation and malnutrition. Severe cold may cause deer to remain in sheltered areas where food is scarce rather than use colder foraging areas. When snow gets deep, deer have a tendency to form larger groups and use common pathways through the snow. This increases local mobility but tends to deplete available forage.

Weather can indirectly affect mule deer survival by increasing their vulnerability to predators. Concentrations of deer attract and hold predators in an area, while deep or crusting snow allows predators to catch deer more easily. Deer may become even more vulnerable to predation if they are in a weakened condition due to a severe winter.

### **Disease and Parasites**

Disease and parasites can also hurt a mule deer population. Sometimes disease and parasites are indicators of other problems. For example, severe gastrointestinal parasites generally occur when a herd is overcrowded and competing for forage, which results in inadequate nutrition. These gastrointestinal parasites, plus many other diseases and parasites, are density dependent. This means the parasites and diseases depend on a high density of the host animals (in this case, mule deer) for the condition to develop. During population highs, overcrowding makes it easier for parasites or disease to spread.

The following two diseases and two parasites are common among mule deer.

- Bluetongue is an infectious, non- contagious viral disease causing inflammation of mucous membranes, the nose and the gastrointestinal tract. Signs of bluetongue include a reddening of the lips, muzzle and ears. The tongue swells and is a bluish-purple color, and a discharge may form crusts around the nostrils. Bluetongue is primarily spread by a blood-sucking gnat.
- Epizootic hemorrhagic disease (EHD) is an infectious, non- contagious viral disease occurring mostly in white- tailed deer but sometimes found in mule deer. Initial signs are loss of appetite and loss of fear of humans. Hemorrhaging occurs around the eyes and mouth, and within thirty -six hours the animals become comatose and die. As with bluetongue, the virus is transmitted by a gnat.
- Liver flukes are commonly found by hunters in harvested deer because the parasite is very noticeable. Adult liver flukes are flat, gray to greenish, leaflike trematodes and are one to four inches long. Although infected mule deer suffer little or no damage, the liver may be judged inedible because of the presence of flukes.
- Nose and throat bots are spread by an adult female fly that deposits larvae in the nose of the host. The larvae migrate to the nasal passages and develop. After development, they infest the throat and nasal area. Like most other parasites, bots create an additional problem for hosts but are seldom fatal in themselves.

### **Predation**

Mule deer have always had to cope with predation. The predator-prey relationship is complex, with conditions constantly shifting the advantage one way or the other. In general, a healthy mule deer herd can easily withstand the impacts of normal predation. In the long term, heavy predation one year due to winter conditions that favor the predator will often be followed by less predation due to a lower prey population. That is to say, as the number of mule deer falls due to attacks by predators, the predators' food supply also declines, putting the predators' own lives at risk. As predator numbers fall, the remaining mule deer will have some relief. A basic principle of wildlife management is that prey numbers control predator numbers, not that predator numbers control prey numbers. More studies are showing, however, that when mule deer populations decline because of unfavorable environmental conditions, such as a drought, predation can contribute to the population decline even after the drought ends.

Evidence from recent studies in Montana's Bridger Mountains suggest that predation by both coyotes and mountain lions may be greater than previously believed and is sufficient to influence survival of males. For example, mature mule deer bucks, who have more solitary behavior and tend to occupy more rugged habitats, are more likely to be harvested by mountain lions than the bucks in the overall population. Does and young bucks seek more open areas in which to feed, and their grouping behavior provides more eyes to detect mountain lions. So, there is a comparatively high proportion of mature bucks killed by lions. There is also evidence that coyotes are not only able to capitalize on traditional fawning areas year after year, they also have the uncanny ability to take advantage of lion kills that have been covered for later use by the mountain lion.

The commonly held belief that a mountain lion will kill one deer per week will not be true in areas where coyotes locate and eat the kill, since the lion will then need to make more frequent kills.

In the Missouri River Breaks, the single most important factor affecting fawn mortality rates is predation. During a 12-year period, predation by coyotes accounted for 88 percent of all deaths of radio-marked fawns during summer and fall and 95 percent of all deaths during winter.

### **Landowner Influence on Predation**

It is important to understand that there are sometimes more, and perhaps better, solutions to mule deer predation than predator control. While harvesting predators will obviously result in less predation on mule deer, you can also benefit the mule deer population by managing your land so the deer have the ability to resist predation. Adequate nutrition levels result in healthy animals better able to escape predators.

Habitat with diverse and well-distributed cover and food keep the deer from becoming highly concentrated. A good diversity of healthy vegetation will also provide alternate prey for predators.

When you attempt to control the predators on your property in order to benefit the mule deer population, the predator control program should have clear goals that relate to an identified problem. For example, if it has been determined that coyotes are having a detrimental effect on the mule deer population, then coyote control efforts should be focused on known fawning areas immediately prior to and during fawning.

## **Nutrition**

Mule deer depend on their habitat for nourishment and successful reproduction. The quality of animals in a deer herd is a direct reflection of the quality of their habitat. If deer are competing for food, they are less able to benefit from a high-quality habitat. Remember that competition occurs only when food is in limited supply. Just because other animals are present does not mean that competition is occurring. However, when animals, both wild and domestic, seek the same scarce resource, such as a limited food supply, competition does occur and none of the animals will have the benefits of a quality habitat.

Deer are selective feeders. Whereas cattle have a broad flat muzzle that allows them to clip a large swath of grass, deer have a pointed muzzle that allows them to pick selected forage. This ability allows deer to select forbs from among grasses or to nip or strip specific buds, leaves or twigs from shrubs. In this way a deer can find and consume food that is more palatable or higher in nutrition.

Deer are ruminants. They have a four-chambered stomach through which food passes during various stages of digestion. The first chamber, the rumen, contains great quantities of bacteria and protozoa (microflora) that reduce plant materials to nutritional materials. The protozoa are very specialized. Some are able to break down one plant species while others break down other plant species. These microflora are such specialists that if a deer changes its diet drastically, the new material may not be digested until the population of appropriate microflora increases (approximately fourteen days). That is why deer artificially fed hay or corn during a severe winter may starve to death with a full stomach.

Four nutritional categories are outlined below.

## **Protein**

An advantage of ruminant digestion is that, even though the protein contained in the forage may vary throughout the year, microbial protein found in the rumen remains of good quality and digestibility. Even so, habitat that provides sufficient dietary protein in all seasons is important. Diets that contain 15 to 16 percent protein are necessary during production, growth, fattening, pregnancy and lactation. Although deer can maintain themselves on diets made up of as little as 10 percent protein, their health condition will be poor. Entering winter with sufficient fat is important because winter forage will usually contain less than 10 percent protein.

## **Vitamin Requirements**

Ruminants have no need for dietary vitamin C. Vitamin E is attained through consumption of green forage and efficient storage of the vitamin for periods when green forage is not available. Vitamin D has a precursor in the body that is activated by the sun. All B and K vitamins are synthesized within the rumen. Nutritional deficiencies encountered by mule deer can be traced to energy, nitrogen or minerals, but not to vitamins.

## **Mineral Requirements**

Minerals are necessary for the growth, development and metabolism of mule deer. Calcium, phosphorus, sodium and selenium are usually the minerals of most interest.

- Calcium is necessary for healthy bones and teeth. Calcium can be transported from the bones during times when demand exceeds intake. This may happen during early antler development or during pregnancy and lactation. However, calcium is usually found at adequate levels in the vegetation of Rocky Mountain states.
- Nutritional problems arise when high calcium levels combine with low phosphorus levels. Phosphorus intake for mule deer should be about .23 percent of the diet, while calcium should be no more than five times the phosphorus level. If this balance is not struck, a phosphorus deficiency can occur. To produce optimal antler growth, calcium should be .60 percent and phosphorus at .55 percent. Calcium in the diet at a level of .40 percent of dietary dry matter and phosphorus at .25 percent is adequate for weaned fawns. A laboratory can determine levels of these minerals in vegetation. Phosphorus is important for healthy teeth, red blood cells and reproduction. It also aids in the transport of nutrients throughout the body. If forage is deficient in phosphorus, mule deer may experience a decrease in inorganic blood phosphorus level, depletion of bone mineral, diminished weight gain and a reduction in fertility. On many mule deer ranges, phosphorus content of range vegetation may be deficient either seasonally or year-round. In some situations, supplements of phosphorus may be very important.
- Another important mineral, sodium, effects the regulation of pH and plays a role in the transmission of nerve impulses. Mule deer may use salt blocks, natural salt licks or drink brackish water when vegetation is deficient in sodium. Many types of forage are low in sodium.
- Selenium is often thought to be a supplemental mineral that will enhance antler growth in deer. However, selenium is required at very low dietary levels, and too much selenium can be toxic. On the other hand, if selenium is entirely absent from the diet, muscular dystrophy can occur. Other minerals, such as potassium, chlorine, magnesium, sulphur, iron, iodine and copper are very important but are adequately obtained by mule deer from common range plants. Trace minerals, such as cobalt, zinc and manganese, are usually present at adequate levels in plants on most mule deer ranges. Your county extension agent can tell you where forage can be sent to be tested for nutritional characteristics.

### **Water Requirements**

Water is very important to mule deer. Free water is the most important source for maintaining a favorable water balance. Mule deer get much of the water they need from vegetation, so when succulent forage is available, less free water will be used. During winter, deer use snow as a source of free water. Water requirements are greatest in late spring, summer and early fall.

Although deer often rely on water sources a mile or more from their usual food and cover sources, having free water intermixed with forage and cover reduces energy expenditure and the risk of exposure.

### **Mule Deer Habitat Requirements**

The needs of mule deer vary with conditions and seasons. The ideal mule deer habitat usually contains steep and rugged topography with brushy draws, rocky outcrops and quick access to escape routes. We also know that mule deer thrive in the badlands of the Northern Plains, where rolling hills and hidden draws provide ideal habitat. The best way to determine which components of the ideal mule deer habitat are lacking from

your property is to understand how each of the ideal habitat components are used and needed and then to apply this information to your land. It cannot be overemphasized that management of mule deer habitat requires looking beyond your own land. A landscape vision is needed to understand what is available to the deer, on and off your land, and what is lacking.

Mule deer will remain in the same area if all habitat needs are met.

However, long migrations may occur as the seasons change if an area does not meet all the habitat requirements. When the habitat meets the deer's needs, seasonal home ranges may be as small as one square mile. In general, the ideal mule deer habitat is 40 percent cover and 60 percent forage. Half of the cover should be composed of hiding cover, and the remaining half should be equally divided between thermal cover and fawn-rearing habitat. The more interspersed this habitat is, the more valuable it will be. A mosaic of plant communities and topographic conditions will be much more valuable than a habitat that has one area for cover and a separate area for forage.

### **Components of Foraging Habitat**

Mule deer diets vary according to the season; therefore, you should try to have a mixture of trees, shrubs, forbs and grasses on your land. Ideally, foraging habitat should be close to escape cover. Also keep in mind that deer will prefer foraging areas that are most attractive. In winter, south-facing slopes that are free of snow (or at least have less snow) are most attractive. In summer, cool shaded slopes or an area with a breeze to deter biting insects will be most attractive. The idea of attractiveness can also include seclusion, protection from wind or a combination of factors.

Naturally, water is an important feature, ensuring that mule deer digest their food well and achieve proper nutrition. Water should be within one-half to one mile from deer feeding areas. A number of small watering points are preferable to a few large ones. It is important to make livestock watering points available to deer even when livestock are not using them.

As noted above, mule deer diets change with the seasons.

- Spring forage includes early -greening grasses and forbs that are highly palatable, succulent and nutritionally rich. Idaho fescue, bluebunch wheatgrass, prairie clover, milkvetch and alfalfa are species important to mule deer in spring.
- During summer, forbs may make up as much as two-thirds of the mule deer diet. As grasses and forbs dry up in late summer, deer consume more shrubs. Important browse plants include serviceberry, mountain mahogany, currant, bitterbrush, willow and quaking aspen.
- During fall, forbs will be used as long as they are available and may make up 25 percent of the diet. Woody browse becomes increasingly important as mule deer put on fat stores in preparation for winter.
- Winter diets are made up of 75 percent browse species where shrubs are available. Some cured grasses are used, and forbs are sought until they are dead or covered by snow. The availability of browse species such as quaking aspen, mountain mahogany and bitterbrush can be extremely important.

It is important to note that winter deer die-offs cannot be attributed entirely to lack of food. The kinds of food available are more important. Deer can starve to death even

though they are eating the available food. Heavy use of juniper and sagebrush, for example, may accelerate their death. However, if there is nothing else to eat, these species, regardless of their long-term food value, may help the deer avoid starvation.

What we now know about mule deer indicates they cannot endure a diet composed exclusively of sagebrush for long. Sagebrush should never be more than 15 to 20 percent of the diet for extended periods. Several studies have addressed the concern that oils in sagebrush might harm the microbes in the rumen. These studies showed that sagebrush levels less than 30 percent of the diet do not significantly affect rumen bacteria. Above this level, captive deer in a study in Colorado deteriorated significantly.

Remember, mule deer will eat sagebrush excessively if it is the only forage available. Unfortunately, deer will often stay in an area and starve to death on sagebrush rather than move any extended distance to find the diverse diet they need to survive. For this reason, it is important to have other shrubs near sagebrush on your property.

### **Plant Species and Their Food Value to Mule Deer**

- Bitterbrush - Excellent Mountain
- Mahogany - Excellent
- Quaking Aspen - Excellent
- Buckwheat - Good
- Buffaloberry - Good
- Currant - Good
- Huckleberry - Good
- Red-osier Dogwood - Good
- Serviceberry - Good
- Shrubby Cinquefoil - Good
- Willow - Good
- Winterfat - Good
- Chokecherry - Fair
- Cottonwood - Fair
- Mountain Maple - Fair
- Skunkbush Sumac - Fair
- Big Sagebrush - Poor
- Ponderosa Pine - Poor
- Rocky Mountain Juniper - Poor

#### Forbs

- Alfalfa - Excellent
- Fireweed - Good



- Hawksbeard - Good
- Red clover - Good
- Vetch - Good
- Yellow Sweet Clover - Good
- Dandelion - Fair

#### Grasses and Grasslike

- Bluebunch Wheatgrass - Good
- Idaho Fescue - Good
- Needle and Thread - Fair
- Sedge - Poor

### **Components of Cover Habitat**

There are four kinds of cover habitat: escape, loafing, thermal and fawning.

#### **Escape Cover**

Escape cover is used by mule deer whenever an immediate threat is perceived. Escape cover should be interspersed throughout the habitat, providing deer with maximum security. Mule deer evolved in rugged terrain where their "stotting" or pogo-stick gait allowed an escape advantage from pursuing predators. Mule deer prefer open, broken country where they can detect danger at a great distance. A network of breaks, coulees, brushy draws, shrubby benches, wooded knobs and boulders or rock piles provide ideal opportunities for mule deer to avoid or escape predators. Mule deer do not usually escape predators through long extended runs but rather through short bursts of speed to reach the security found in rough terrain or dense vegetation. This means that mule deer prefer to always be near escape cover.

Ideally, escape cover will contain hiding cover, or scattered patches of dense vegetation 10 to 30 acres in size. These patches should be no more than one-quarter mile apart.

#### **Loafing Cover**

Loafing cover is where mule deer spend most of their time, including time spent sleeping, resting and ruminating between periods of feeding and traveling. These areas are usually chosen because of comfort attributes that vary throughout the year. For example, loafing cover will have breezy ridges for relief from insects during the summer and will also contain observation points, such as knolls or benches, that allow deer to see approaching danger. Loafing areas are close to escape cover and provide seclusion from human disturbance.

#### **Thermal Cover**

Thermal cover is very important mule deer habitat, protecting deer from cold winter temperatures and summer heat. It is provided in part by rough topography and southern exposures. Tall shrubs and small evergreen trees can break the wind and minimize radiant heat loss. Deciduous trees such as cottonwood or aspen provide overhead shade and open understories to admit cool breezes during summer. Patches

of thermal cover should be two to five acres in size. Vast areas of potential mule deer habitat are unusable if there is no thermal cover.

### **Fawning Cover**

Fawning cover contains areas of escape cover and hiding cover closely interspersed, along with water sources and high quality forage. Ideal fawning cover consists of two - to five -acre patches of low shrubs or small trees two to six feet tall with overstory tree cover. High quality riparian habitats provide the ideal lush habitat for fawning, as long as the area isn't too damp. A number of scattered fawning cover areas are necessary to prevent predators, especially coyotes, from keying in on fawns.

### **Habitat Enhancement**

Before undertaking any enhancement of mule deer habitat, it is important to determine what is provided in nearby areas. For example, it is unnecessary to develop forage on your property when ample year -round supplies are available nearby. You could undertake worthwhile habitat enhancement by looking at the habitat needs of mule deer and comparing those needs to what is available on and off your property. Also, understand the limitations of your location. If you are at a high elevation where winter snow is excessive, it would not be wise to expend effort to create winter forage. Deer in your area need to migrate to lower elevations.

In general, habitat enhancement that creates diversity or a mosaic pattern of vegetation types and ages will benefit mule deer the most. Consider the following suggestions; some of them should help you enhance the habitat on your land.

### **Tree and Brush Management**

- Young to middle- aged stands of aspen interspersed with grassy openings and conifer clumps will provide ideal foraging, loafing and thermal cover for summer, fall and early winter.
- Stimulate sprouting and regrowth of aspen by clear -cutting, bulldozing or burning five to 20 acres of larger stands of aspen. Look at the natural boundary of aspen clones and attempt to develop irregular edges rather than squares or rectangles. Consider doing this on a 20- to 30 -year cycle to provide continuous availability of this habitat type. If you have several aspen stands, develop a rotation of treatments to ensure early stages are always available.
- Selective thinning of juniper can be accomplished by bulldozing or cutting individual trees to develop a canopy of 40 percent. This will allow ground vegetation and understory to develop.
- Chain or bulldoze long irregular clearings to encourage growth of grass, forbs and shrubs within dense juniper or conifer stands or in large areas of dense sagebrush. Clearings should be approximately five to 20 acres in size, but they should maintain a width of less than 200 feet and be at least one- half mile apart.
- Implement brush control projects on small selected patches within the winter range every few years to maintain browse condition and production.

- Timber harvest operations should include practices to enhance production of forage. This includes clear-cutting patches to stimulate aspen and brush growth and creating forest openings for grass and forb production.
- Large blocks of sagebrush should be broken up by treating the sagebrush in long, irregular strips. Studies have shown that sagebrush forage, both before and after treatment, far exceeds the 62.5 pounds per acre even 200 deer per square mile would consume. Deer densities this high have not been documented for extended periods, so it is unlikely you will have too little sagebrush on your property. Treatment of the sagebrush should be directed toward encouragement of other shrubs and forbs.

### **Livestock Grazing**

- Use livestock grazing to manipulate forage over large areas. You can stimulate new growth and production of forbs by grazing grasses fully (at least 65 percent), followed by a period of two growth cycle of rest to allow forage plants to fully recover. Enhance forb (legume) production by applying fertilizer (11- 52- 0) at 100 pounds per acre. This recommended phosphorus fertilizer will favor the forb component over the grass component of the stand. Be cautious when using fertilizer because undesirable plants may also benefit.
- To enhance winter browse for mule deer, use your livestock to graze herbaceous plants in spring and early summer to allow shrubs time to grow.
- To enhance herbaceous plants for mule deer, have your sheep graze in late summer and early fall to provide a competitive advantage to grasses and forbs over shrubs.
- Moderate to light stocking of cattle will stimulate rangeland vegetation.
- Manage grazing in riparian areas to protect brush species. If cattle concentrate in riparian areas, fencing may be used to manage the riparian pasture as a separate grazing unit. Single-strand electric wire powered by a solar charger is often enough to manage cattle use of riparian units within larger, well-managed pastures.
- Avoid concentrating cattle in juniper stands during winter when deer are concentrated there.

### **Food Plots**

- Food plots may enhance mule deer nutrition if there is the equivalent of one-half acre per deer.
- Food plots should be established close to cover.
- Several scattered, smaller fields (less than 10 acres in size) are better than one large field.
- Legume plantings (clover, alfalfa) provide a high nitrogen content for spring, summer and fall foraging. Sanfoin is very attractive and nutritious.
- Cereal grains provide forage for late summer and fall until there is too much snow accumulation.

- Contact your county extension agent to determine local seed sources, planting dates and suitability. Be sure to advise your agent that you are concerned about the crop as a wildlife food source rather than maximizing harvest as an agricultural crop.
- Highly palatable and nutritious food plots can be established by mowing or flailing existing vegetation and fertilizing with 11- 52- 0 at 100 pounds per acre. Again, remember that the recommended phosphorus fertilizer will favor the forb component over the grass component of the stand. Be cautious when using fertilizer because undesirable plants may also benefit. A soil test is advisable to ensure the proper fertilizer is used.
- Consider plots of browse for winter food establishment. Drilling or broadcasting seed of mountain mahogany, antelope bitterbrush, four-wing saltbush, Gardner saltbush or winterfat can be successful if moisture and soil conditions are suitable. Seedlings are available for some species, such as silver buffaloberry, American plum, purple willow, Wood's rose, serviceberry and chokecherry.