



PHEASANT ECOLOGY

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A 6 part series as seen in the
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PHEASANT ECOLOGY: PART 1

By Travis Runia

Nesting & Brood-Rearing Season

- With nearly six months until friends and family gather to partake in the traditional opening day hunt, pheasants are one of the last things sportsmen are thinking about during spring. However, the nesting and brood-rearing season of May and June represent one of the most critical times for pheasant populations.

Pheasants are short lived birds with annual survival averaging only 50%. During severe winters such as 2009-2010, survival can be much lower in areas containing marginal or inadequate winter habitat. With such low survival, how do pheasants sustain such high populations each fall? Of all upland game birds, pheasants exhibit one of the highest reproductive potentials, thus enabling them to bounce back after severe losses in short time periods when provided adequate nesting habitat. Despite this, pheasants still rely on quality nesting and brood rearing habitat to recruit new birds to the fall population.

The nesting season begins in late April as hens seek out attractive nesting cover usually consisting of undisturbed grasslands such as lands

enrolled in the Conservation Reserve Program (CRP). Most hens initiate their first nest during the first half of May, but this can be delayed by unseasonably cold or wet weather. Males have spent the past month establishing and maintaining territories across the landscape. Crowing and wing flapping behavior aimed at attracting females peaks in April but continues through June to serve re-nesting hens.

After courtship, hens lay one egg per day until a full clutch of 10-12 eggs is reached. During the next 23 days, hens will spend 23 hours per day incubating the eggs and leaving for only short intervals for limited amounts of food and water. Egg laying and incubation is extremely energy demanding, and during this incubation period food intake is low.

Hens can lose 75% of their body fat and 10% of their body weight in just one month! If not challenging enough, only about 25% of nests are successful in large blocks of undisturbed grasslands and success has been documented much lower in linear and fragmented habitats



Pheasant nest with a full clutch of 12 eggs. This nest was probably from an initial nesting attempt.

which are generally smaller in size and are more vulnerable to mammalian predators.

Fortunately, pheasants almost always re-nest and may initiate up to 4 nests in a single season if previous nests are destroyed. Because of the energy demands of producing and incubating eggs, clutch size and egg size decrease for each subsequent nesting attempt. If a third nesting attempt is initiated, the clutch size could be as low as 5 or 6 eggs. Even with low success of each individual nest, 70% of hens may pull off one successful nest through multiple nesting attempts.



Hatching a successful clutch is only half the battle to recruit pheasants to the fall population. Pheasant chicks are precocial, meaning they hatch with eyes open and are able to leave the nest and feed themselves within one day of hatching. However, it has been documented that 1 and 2 day old chicks exposed to 43 degree temperatures die after 30 minutes of exposure. Susceptibility to the cold quickly decreases with age, and by 11 days of age the chicks can fully regulate their body temperature. Cold snaps in June can greatly decrease chick survival.

As stated earlier, pheasants are attracted to undisturbed grasslands for nesting sites, such as land enrolled in CRP. But does this same habitat provide for the needs of pheasant chicks? This depends on the structure and composition of the grassland. Ideal brood-rearing habitat provides abundant insects, aerial concealment, and allows movement at ground level by small pheasant chicks. The average grass field which has not been disturbed recently and lacks diversity does not meet these criteria. Can you imagine a tennis ball sized pheasant chick navigating through thick seven foot tall grass that your Labrador struggles to get through in the fall!



Typical habitat used by pheasant broods during early late spring and early summer. Notice how the pheasant chicks are foraging for insects around the alfalfa plants.

Pheasant chicks primarily eat insects during the first 1-2 weeks of life because they are high in protein. Protein functions as building blocks to form muscle tissue and feathers which allows for rapid chick growth. Without plentiful insects, growth rates and survival of chicks can be greatly reduced. Hen pheasants will often move her brood great distances to find suitable brooding habitat such as “weedy” areas. Broadleaf plants act like insect factories, while also providing aerial concealment without impeding chick movement at ground level. Aerial concealment protects chicks from aerial predators and provides shade during those hot summer days. Even when good habitat is available, it is not uncommon for 1/3 of the chicks to die with predators, extreme weather,

and farm machinery representing the highest mortality factors.

South Dakota is fortunate to have an abundance of high quality nesting and brood-rearing habitat which allows pheasants to reach their high reproductive potential. As you head to the field each year, remember that what pheasants were doing in May and June has a huge influence on what you will see each fall.

In the next part of this 6 part series, we will discuss how pheasant chicks handle the extreme heat of July and August. Additionally, we will see how molting strategies differ among hens and roosters.



This newly planted grass field is composed of large amounts of broad leafed plants such as wildflowers, alfalfa, and naturally occurring weeds. Pheasant broods will find this field rich with insects and the open understory will allow ample movement by small pheasant chicks.



Well established grass field with no broad-leaved plants. This represents poor habitat for pheasant broods because few insects are produced and movement by chicks at ground level would be difficult.

PHEASANT ECOLOGY: PART 2

By Travis Runia

Summer Season

In part 1 of this 6 part series, we learned what pheasants were up to during May and June. We discovered how pheasants can overcome low annual survival by exhibiting high reproductive potential through large clutch sizes and multiple re-nesting attempts if previous nests are destroyed.

May is the peak egg laying month while June is the peak of hatch for pheasant nests. Hens have invested vast amounts of energy into egg production and brood rearing responsibilities by the end of June. Their body weight and condition plummet during this time because food intake can not keep up with the energy demanding responsibilities of motherhood. Newly hatched chicks are targeting insects for most of their diet during June because a protein rich diet is needed to grow feathers and tissue. Roosters spent most of May and June displaying to attract hens, but this activity peaked in April and is nearly complete by early July.

Now the dog days of summer are here. Nearly all hens are done nesting and those who had successful nests continue to lead their broods to areas with succulent forbs where chicks can forage on insects. The roosters' breeding responsibilities are nearly complete until next spring. One may think July and August should be a cake walk for pheasants with the most energy demanding time of the year behind them. This is true for roosters, but hens have their most challenging days ahead in July and August. Chicks are not out of the woods either. Many will be killed



By mid-summer many native wildflowers are blooming. Hen pheasants will lead broods to these insect rich habitats.

by predators or farm machinery and the remaining chicks need to gorge on insects and seeds to gain weight before fall. As we all know, winter can come awfully early in South Dakota.

So why can roosters lazily coast through July and August without a care in the world, while hens struggle to survive? Summer responsibilities for roosters are quite simple. Finish the molt that was started in late June and start preparing for winter by gaining weight. Roosters have been losing weight for 5 months and may weigh 15% less than they did during mid-winter. Since courtship and breeding responsibilities dwindle by July, roosters can take advantage of

abundant food resources and replace all their feathers and gain modest weight in July. Rate of weight gain increases in August as energy is no longer needed to grow replacement feathers. July and August are quite relaxing for rooster pheasants in South Dakota.

As roosters are taking advantage of rich food resources to molt and gain weight, most hens are attending to broods and beginning their molt in July. Hens molt after egg laying and incubation because completing all three at the same time would be too energy demanding. While roosters can focus all efforts on molting and gaining weight, hens have energy demanding brood rearing duties.



Image © Matt Grunig - SD GFP

Another example of a well managed grassland containing many wildflowers. This habitat provides excellent cover and food for pheasants during mid-summer

Hens must lead broods to habitats rich with insects and keep them out of harms way by keeping an eye out for predators. She has already lost 20% of her body weight since April and brood rearing and molting activities in July could cost her another 10% of her body weight. She can not take in enough energy to cover these highly energy demanding tasks.

Hen pheasants are in their poorest physical condition in August during most years and could weigh 30% less than before egg laying began. Only during years of extreme winter weather would a hen pheasant be lighter in March than in August. They must reverse the trend of losing weight as death occurs when 40% of her body weight is lost. August is a critical time for hens as their stressed bodies are more vulnerable to disease and parasites. Hen survival during August can be lower than during winter.

There are several factors that affect just how stressed (loss of body weight and body fat) hens become in August, and not all factors are obvious. This is important since survival is highly dependant on how stressed hens become during late summer. First, when the hen was hatched the previous year influences her condition going into winter and ultimately the next spring and summer. If a hen was raised from a

late hatching nest due to weather or predation of early nests, she will be lighter going into winter than early hatched hens. This hen will be lighter and in poorer condition than early hatched hens during the following August.

How many eggs a hen lays during spring can influence her body weight by late summer. Cold and wet weather can delay nesting, but egg production is based on length of day. Hens begin producing eggs whether the weather is ideal for nesting or not. Eggs produced during inclement weather are “dumped” in nests of other birds (other pheasants, grouse, ducks, and etc.) or even on the ground. Hens forced to re-nest due to predated nests also produce more eggs. Obviously, hens that produce fewer eggs during spring will be in better condition by late summer.

Additionally, the previous winter can influence hen condition during spring and summer. As more body fat is used to keep warm during winter, less is in reserve for egg production during spring. Areas with better winter cover yield heavier hens in spring which can influence egg production and hen survival during summer. Who thought winter habitat was so important to pheasants during spring and summer!

Besides these factors, pheasants are also stressed by extreme summer heat. As long as temperatures stay under 102°F, pheasants can stay cool by limiting activities to morning

and evening and by utilizing shade during mid day. As temperatures rise above this critical value, pheasants must pant similar to a dog to stay cool. This behavior, called gular fluttering requires additional energy (which produces heat) but the process removes more heat than it produces. As you can see, these heat stress days can require energy at a time when pheasants do not have a lot to spare.

July and August is also a critical time for chicks. They are tasked with gorging on insects and seeds to grow tissue and feathers while avoiding predation. Half of pheasant chicks will not survive until fall due to predation or farm machinery. While adults molt once during summer, chicks actually molt twice. By early July, chicks have replaced their down with hen-like flight feathers. In early August, chicks begin a post juvenile molt to replace their juvenile feathers with their adult plumage. By 17 or 18 weeks of age, pheasant “chicks” resemble adults in plumage.

In the next issue we will see how pheasants start preparing for South Dakota’s long winter by bulking up on waste grains. Roosters have been gaining weight for 2 months while hens need to recover from nesting, brood rearing, and molting activities... and quickly!



Image © Travis Kunia - SD GFP

Pheasants will take refuge in the shade of shrubs or trees during extreme summer heat.

PHEASANT ECOLOGY: PART 3

September & October

In part 2 of this 6 part series, we examined the details of pheasant ecology during July and August. Reproductive responsibilities for roosters are nearly complete by early July. By late July, they have replaced all of their feathers and even managed to gain weight for the first time in 5 months. This trend continues into August as these are easy times for South Dakota roosters.

Conversely, we saw hens reach their worst body condition of the year in August. Egg laying, incubating, and brood rearing responsibilities have been extremely energy demanding and decreased the amount of time she could spend foraging. These energy demanding activities also caused her to delay her molt until July when more energy could be allocated to growing new feathers. Chicks have seen their own challenges as predation and other factors have taken their toll. Those that have survived to late August have been targeting protein rich insects for food to grow tissue and feathers. In August, chicks begin replacing their juvenile feathers with adult feathers which carry on their demand for protein rich insects.

By September and October, the heat of summer has faded along with the struggles that went with it for pheasants. Temperatures have moderated and are well within a pheasant's thermoneutral zone. In other words, pheasants do not need to use more energy to stay warm or keep cool when the air temperature is between 40°

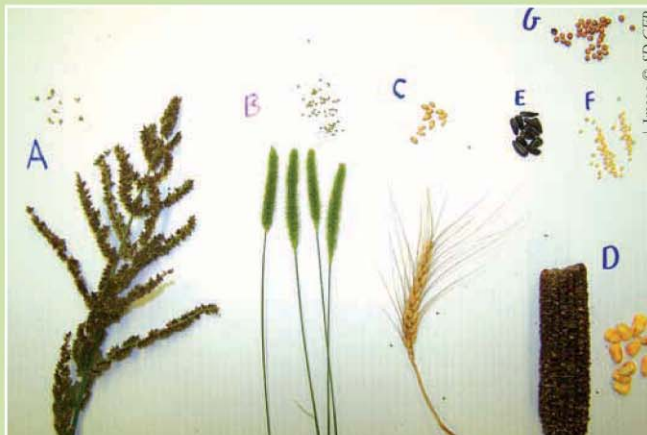
and 104° F. Along with the comfortable temperatures and long days of early autumn, abundant food is available through waste grains, weed seeds, and insects. This is good news for pheasants, especially hens which are in their worst body condition of the year coming into September and may weigh 25% less than they did last April.

Although abundant food resources become available during early fall, diet still varies considerably between cocks, hens, and chicks. Before we discuss why this variation in diet occurs, let us consider the differences in nutritional content of the available food resources.

Corn and wheat are the primary waste grains available to pheasants during fall. One could assume these two waste grains would be equally nutritious to pheasants, but that is not the case. Corn contains 23% more metabolizable energy than wheat, but wheat contains 60% more protein than corn. Most weed seeds are highly nutritious with protein levels similar or higher than wheat and metabolizable energy similar to corn. Foxtail grass, an abundant annual grass which frequents farm fields and disturbed areas is highly nutritious, abundant, and highly utilized by pheasants in autumn. Sunflowers, millet, and milo are also

locally important food sources. Soybeans, although abundant and high in energy and protein, contain digestive inhibitors which render them nearly worthless as food for birds. Research has revealed that birds lose weight and become malnourished when fed soybeans. Protein rich insects remain available through early fall until the first hard frost.

The completion of wheat harvest in August coincides nicely with the period when



Common waste grains and seeds eaten by pheasants during fall; A) Barnyard Grass B) Yellow and/or Green Foxtail C) Wheat D) Corn E) Sunflower F) Millet G) Milo/Grain Sorghum

hen pheasants need protein and energy to recover from the demanding tasks of motherhood. Remember, hens are in their worst condition of the year in early September and still have to molt and regrow their feathers. Fortunately, chicks start leaving the hen at 10 weeks of age so by September most broods are on their own. After nesting and brood rearing responsibilities have caused hen pheasant weight to decline by 25%, September provides prime conditions to make up these losses before winter. Hens now have time to concentrate solely on feeding for the first time in five months.

Since wheat and weed seeds are abundant and a good source of protein and energy, hen pheasants target these food sources in September and October. Insects provide the highest protein content and are targeted as well. By mid-October the amount of wheat available to pheasants has declined due to tillage or germination. Wheat seeds also deteriorate quickly when wet. Fortunately, hens finish their molt in October so her protein demand will decrease at the same time as wheat and insect resources decline. As corn harvest gets underway in October, the hen will consume mostly corn and weed seeds by late October. Corn provides more energy than the hen needs in October so she will gain modest weight for the first time in six months.

Pheasant chicks are experiencing life on their own for the first time in September. Although they still weigh less than their adult counterparts, chicks will consume just as much food as adults. Pheasant chicks still need a diet rich in protein to continue their molt and grow to adult size. Chicks will consume 2-3 times more insects and weed seeds and less waste grains than adults to meet their



Image © SD GFP

This harvested wheat field has abundant foxtail grass growing in it. During fall, this field would provide nutritious waste grain and foxtail grass seeds to foraging pheasants.

protein demand. By October, most chicks have reached adult size, but they are consuming more food than adults as the final stages of their molt require additional energy and protein. You may notice that hunter harvested birds in October are in various stages of molting. Late hatched roosters are even hard to distinguish from hens. The age (in weeks) of hatch-year roosters in the bag can be aged by the length of their outer three flight feathers.

Adult roosters have had it easy since they finished their molt in July and this continues in September and October. Remember, they were able to molt earlier because they did not have any energy draining motherhood responsibilities like the hens. Roosters began bulking up for winter in July, and their weight increase continues into early fall. Insects represent a smaller portion of an adult roosters' diet than hens or chicks. Roosters only need protein for body maintenance and this can

easily be supplied through weed seeds, wheat and corn. The rooster's diet mirrors what is available, but corn is preferred when corn and wheat are both available. Roosters continue to store fat reserves as winter is right around the corner.

In the next issue, we will examine how pheasants handle the first blasts of old man winter. As fall turns to winter, pheasants will need to change their behavior to conserve energy and stay warm and change their feeding habits as snow covers the once abundant food sources.



Image © Adam Oswald - YD GFP

PHEASANT ECOLOGY: PART 4

by Travis Runia

November & December

- In part 3 of this 6 part series, we examined pheasant ecology during September and October. These were lazy times as long days, comfortable temperatures, and abundant food made life easy for South Dakota ring-necks. As a result, pheasants gained weight during this time period which is necessary to prepare for a cold South Dakota winter.

As fall transitions to winter, the “vacation” pheasants took in September and October will inevitably come to an end. In South Dakota, its not if winter will return, it’s when and how severe! The length of daylight is 3 hours shorter in December than in September and the average low temperature is 35 degrees cooler than in October. These dramatic changes in weather mean pheasants will need to change their behavior if they expect to survive a South Dakota winter. Fortunately, although not native, pheasants are quite adapted to the changing conditions and survival can be high especially where prime habitat exists.

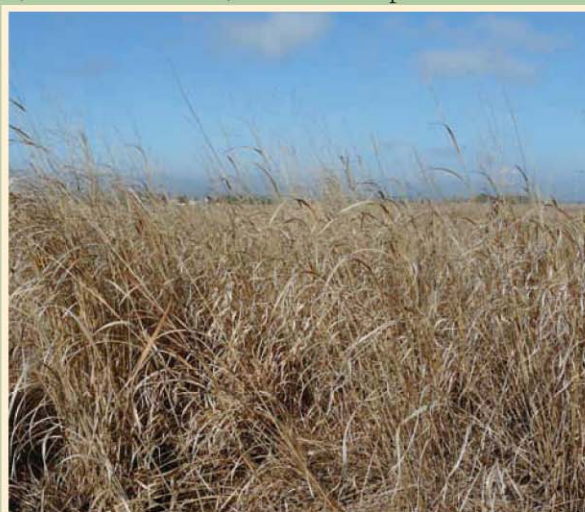
In South Dakota, we are fortunate to have good winter habitat well distributed across the landscape. As the first signs of winter arrive, pheasants begin seeking out heavy winter habitat which will provide insulating cover during cold winter days and nights. Pheasants may have to travel great distances if heavy winter cover is not located in close proximity. Movements to winter habitat of

up to 10 miles have been documented for pheasants, but most pheasants in South Dakota likely only need to travel several miles or less to find high quality winter habitat such as cattail sloughs, shelterbelts or thick warm-season grass stands.

Even though pheasants seek out insulating winter habitat, they must still increase their energy intake if they hope to stay warm and store energy. This is because temperatures are now dropping below a pheasant’s thermo neutral zone, or the temperature at

which a pheasant does not need to use additional energy to stay warm. Unlike September and October when pheasants could simply fluff up their feathers to stay warm, additional energy is now needed to stay warm. In fact, pheasants require 1/3 more energy in December than in October just to stay warm. Pheasants need to consume enough food to continue to store energy as fat and gain weight before the coldest winter months of January and February while also using more energy to stay warm.

In addition to needing 1/3 more energy just to stay warm, pheasants have 3 fewer hours to forage in December than they did in September. This means pheasants are now consuming 20% more food in 25% less time and enduring colder nights that are 25% longer! Even through these struggles, pheasants still manage to gain weight by storing energy in the form of fat during both November and December. Of course, this would not be possible without a change in feeding behavior.



Thick stands of warm season grasses provide excellent thermal insulation when temperatures fall below a pheasant's thermoneutral zone.



Waste grain from harvested corn fields provide much of a pheasants diet during winter.

During fall, pheasants feed leisurely throughout the day as there was plenty of time to consume the required amount of food. By November and December, most pheasants are feeding before sunrise and many will even feed after sunset. This shift in behavior enables pheasants to eat more food during fewer hours of day light. Pheasants actually consume twice as much food now as they did during summer. This can be challenging especially when snow blankets the waste grain, primarily corn, which pheasants rely on during winter. It is not uncommon for pheasants to forage for most of the day when snow makes finding food difficult.

Food plots such as standing corn or sorghum can ease these winter woes by providing abundant food above the blanket of snow. Pheasants utilizing food plots typically exhibit increased winter survival because exposure to predators is lower than birds feeding for longer periods of time in open fields.

By November and December, a pheasant's diet has shifted primarily to corn in areas where it is available. Weed seeds are now less abundant, and much of the once available wheat seeds have been plowed under or sprouted during fall. Corn is packed with energy, which is what pheasants need to metabolize to stay warm during the winter months. When pheasants are fortunate enough to gather more corn than they need to use to stay warm, the rest is quickly stored as fat reserves. In fact, hen pheasants increase their body weight by 25% during the two months of November and December with most of the weight increase in the form of fat. Fat represents the densest form in which energy can be stored by birds.

These fat reserves are necessary as severe winter storms can prevent pheasants from foraging for days at a time. During harsh South Dakota blizzards, pheasants hunker down in thick cover and simply wait for the storm to pass. Pheasants rely on their fat reserves to generate body heat during days when they cannot forage. When pheasants emerge after a severe

early winter storm, they are bit hungry, but they were in no danger of starving to death. Pheasants could easily endure 3 days without food during early winter.

Although food becomes more difficult to find after the first blanket of snow covers the once exposed waster grains, pheasants are rarely in danger of starving to death. Even during the most brutal winters, most pheasant mortality is due to predation and exposure to the elements. Predation increases sharply when pheasants must forage for long periods of time in open snow covered fields. We have all seen how visible pheasants are against a back drop of snow, and this increased visibility likely leaves pheasants more vulnerable to predators.

In this issue we learned how pheasants easily adapt to the changing seasons in November and December. Pheasants were in excellent body condition and body fat provided stored energy they use to keep warm during early winter blizzards. But how will pheasants handle the extreme winter weather of January and February? With the threat of heavy snow and brutally cold temperatures, be sure to check out the next issue to learn how pheasants handle the most challenging weather conditions of the year.



Cattail sloughs provide good winter cover for pheasants, especially before winter blizzards fill them with snow.



Quality woody cover such as shelterbelts with at least eight rows of low growing shrubs and conifer trees provide shelter to pheasants during winter storms. Pheasants using this shelterbelt will have a steady food source as this food plot was established adjacently.

PHEASANT ECOLOGY: PART 5

by Travis Runia

January & February

In part 4 of this 6 part series, we learned how pheasants change their behavior as the first taste of winter hits South Dakota in November and December. Birds begin to seek out heavy winter cover such as cattail sloughs and shelterbelts for protection from colder temperatures and the seasons first blast of winter weather.

By December, pheasants are using more energy to stay warm and need to increase food consumption by 1/3 compared to October to generate the extra body heat. Pheasants easily overcome the challenging weather conditions of early winter and survival is typically high, especially where high quality habitat exists. But how do pheasants handle the heart of winter during January and February?

By January and February, the coldest temperatures of the year have arrived and brutal winter storms are the norm on the South Dakota prairies. The average high temperature is in the low 20s and low temperatures commonly dip well below zero. People avoid outdoor activity as the bone-chilling temperatures and winds can penetrate even the thickest winter clothing. While people are eating hot soup and staying toasty

warm in the comfort of their homes, pheasants must adapt to the changing conditions if they hope to survive a severe South Dakota winter.

As snow blankets South Dakota's landscape, large flocks of pheasants are often observed foraging throughout the day in harvested grain fields. While the snow does make finding food challenging, starvation is not the primary threat to pheasants during most South Dakota winters. The primary threat to pheasants is freezing to death during extreme winter weather events such as blizzards. A pheasant's body can only produce so much body heat through physiological processes. If body heat is lost at a greater rate than it is produced, the internal temperature declines from its normal 108°F and a pheasant will freeze to death.

At this point you may be wondering at what temperature does a pheasant freeze to death? This is not a simple question as multiple factors affect the rate at which a pheasant loses body heat. Pheasants could likely survive any low temperature possible in South



While it will take a few years of growth before this shelterbelt will provide ideal habitat for pheasants during winter, the 12 rows of low growing trees and shrubs are a good example of a well designed tree planting.

Photo courtesy of Pheasants Forever.



This narrow shelterbelt may have provided protection to pheasants during 1 or 2 early winter storms. If pheasants used this snow-filled shelterbelt during a brutal winter storm in January or February, they could easily die of exposure.

cattail sloughs, and tall warm season grasses such as switchgrass.

While high quality winter habitat assures pheasants have protection from dangerous winter storms, how do pheasants find enough food to survive the winter when snow covers the landscape? As January brings the coldest temperatures of the year, the amount of energy a pheasant needs to stay warm peaks, and the amount of energy in the form of food needed to stay warm may surprise you. In January, a pheasant must consume daily amounts of food equivalent to two small hamburgers or three candy bars to stay warm and maintain its body weight! This would equate to nearly 300 kernels of corn, the most abundant food in a pheasant's crop during winter. But what happens when severe winter weather prevents feeding for 2-3 days?

Fortunately, pheasants have been preparing for winter by storing energy in the form of fat during fall and early winter which provides a useful reserve when weather prevents feeding for a day or so. Pheasants can easily go 3 days without feeding by using energy stored as fat to stay warm. Once severe winter weather passes, pheasants emerge from thick cover a bit hungry, but well-conditioned pheasants were in little risk of starvation.

But how do pheasants keep from starving to death when deep snow covers their food source for months at a time? A pheasant surely can not find 300 kernels of corn with two feet

of snow covering the ground. Every day that a pheasant can not find enough food to generate the same amount of body heat that it is losing, fat reserves must be used to make up the difference. During years with multiple winter storms that prevent feeding for many days, fat reserves which can make up 13% of a pheasant's weight in early January can be quickly utilized. When fat reserves are exhausted and a pheasant can not find enough food to generate body heat, the bird has no choice but to catabolize its own muscle tissue to generate heat.

While this is not an ideal situation for a pheasant, it is better than the alternative of starvation. In captivity, rooster pheasants have been found to survive 19 days without food and hens 16 during January. While these birds cannot expend energy searching for food and wild birds likely would survive fewer days without food, this does demonstrate how resilient pheasants can be in response to food shortages. In fact, a pheasant can lose 40% of its body weight before it succumbs to starvation. Hens are more likely to starve to death than roosters as they entered winter in poorer condition because nesting, brood rearing, and molting activities of summer and early fall were extremely energy demanding. Hens that have laid more eggs due to predated nests or had late hatching clutches also enter winter in worse

body condition and will have an elevated chance of starvation during severe winters. Last year's chicks also enter winter with lighter body weights and less fat reserves than adults, which will likely leave them more vulnerable to starvation during severe winters.

One way landowners and wildlife managers



This poorly located food plot is nearly completely covered in snow and the area does not provide quality winter habitat for pheasants. Food plots should ideally be placed adjacent to high quality woody cover.

help boost pheasant winter survival is by providing food plots of unharvested grain, typically consisting of corn, milo, sorghum or millet. Even small food plots provide hundreds of bushels of readily available grain for pheasants to eat throughout the winter. Ideal food plots are placed adjacent to high quality winter cover so birds have protection from winter weather and available food in close proximity. While availability to food plots nearly eliminates the risk of pheasant starvation, predation is also decreased because birds do not have to forage in open fields for days at a time where they are vulnerable to predators. Birds utilizing food plots are also likely in better body condition come spring which could result in higher reproductive effort, although this has never been investigated with wild pheasants.

By late February, most South Dakotans are ready for a break from freezing temperatures and snow storms! Pheasants are no different as they are in their poorest body condition of the year during severe winters. The longer old man winter persists, the more vulnerable pheasants are to starvation. Fortunately, spring usually arrives just in time as pheasants rarely starve to death in South Dakota. During mild winters, pheasant survival can be very high and their body condition can be similar to December when 13% of their body weight was fat. While spring may come as a pleasant relief, March and April can be the deadliest months of the year for pheasants.

Be sure to check out the sixth and final article of this series to see why spring can be so dangerous for South Dakota ring-necks.

Photo courtesy of Pheasants Forever.



Without this milo food plot, these pheasants would have to work a lot harder for their next meal.

PHEASANT ECOLOGY: PART 6

by Travis Runia

March & April

In part 5 of this 6 part series, we learned how pheasants dealt with the heart of a South Dakota winter during January and February. Pheasants sought out heavy cover such as cattail sloughs and wide shelterbelts to keep from freezing to death. While finding food becomes challenging with feet of snow on the ground, pheasants rarely starve to death and most mortality is attributed to exposure to the elements and predation. Although it seems logical that spring should bring better times for ring-necks, spring does bring its own set of challenges.

As winter transitions to spring, wintering flocks of pheasants begin to disperse from the heavy cover that provided protection throughout the winter. This is a dangerous time for pheasants as their vulnerability to predation increases as they venture into unfamiliar and more open habitats. For both hens and roosters, mortality can be high during the March and April dispersal period. In fact, during years with mild winters when winter survival is high, survival is certainly lower during March and April than the period of December through February! However, heavy winter snow pack can flatten grasslands which may lead to decreased survival of dispersing pheasants after harsh winters.

Although it is not unusual for winter weather to linger into March, the average daytime temperature has finally climbed above the freezing point. Finding food becomes easy as the blanket of snow that covered the landscape during the last 3 months or more has finally melted. Because temperatures have moderated and food is easily accessible, pheasants can now gather more food than they need and

are able to gain weight. During average or mild winters, pheasants may gain weight in January and February, but during brutal winters that is not the case. This weight gain by cocks and hens is timely since the energy demanding breeding season is right around the corner.

By early March, the lengthening days stimulate cock pheasants to begin preparing for the breeding season. The enlarging wattle is the first visual sign of sexual development on male pheasants. Also by early March, the testes enlarge and roosters in wintering flocks become less tolerant of each other. Roosters begin dispersing from wintering locations in March, but timing of dispersal can be delayed during cold springs. During a normal year, most roosters have dispersed from wintering ar-

reas by late March and nearly all have dispersed by mid April. On average, roosters disperse about 2 miles from their wintering area, although movements of 10 miles are not unheard of. Dispersal distances tend to be longer following harsh winters, probably because birds had to move farther to find high quality winter cover.

Dispersal does not occur at random as roosters seek out landscapes with idle grasslands and woody cover which function as escape cover from preda-



This "dump nest" was likely abandoned by the host, a hen pheasant. Scenes like this, although extreme, are more common early in the nesting season. How many eggs can you count?

Photo © Lawrence D. Ig. U.S. Geological Survey, Jamestown, ND.

tors. Roosters compete for breeding territories which encompass favorable habitat by fighting and sparring in aggressive face off behavior. The size of a breeding territory varies from only a couple of acres to well over 100 acres with the average likely falling half way between. Territories tend to be smaller in areas of high rooster density.

In addition to defending territories from other males, roosters begin gathering harems of hens by crowing loudly and beating their wings wildly in early April. Harem size varies from only a couple hens to as many as 20. Roosters have no problem breeding this many hens. In fact, in captivity roosters have been found to service 50 hens without a problem. Because defending territories and assembling harems is now a priority, it's no wonder roosters do not continue to gain weight in April.

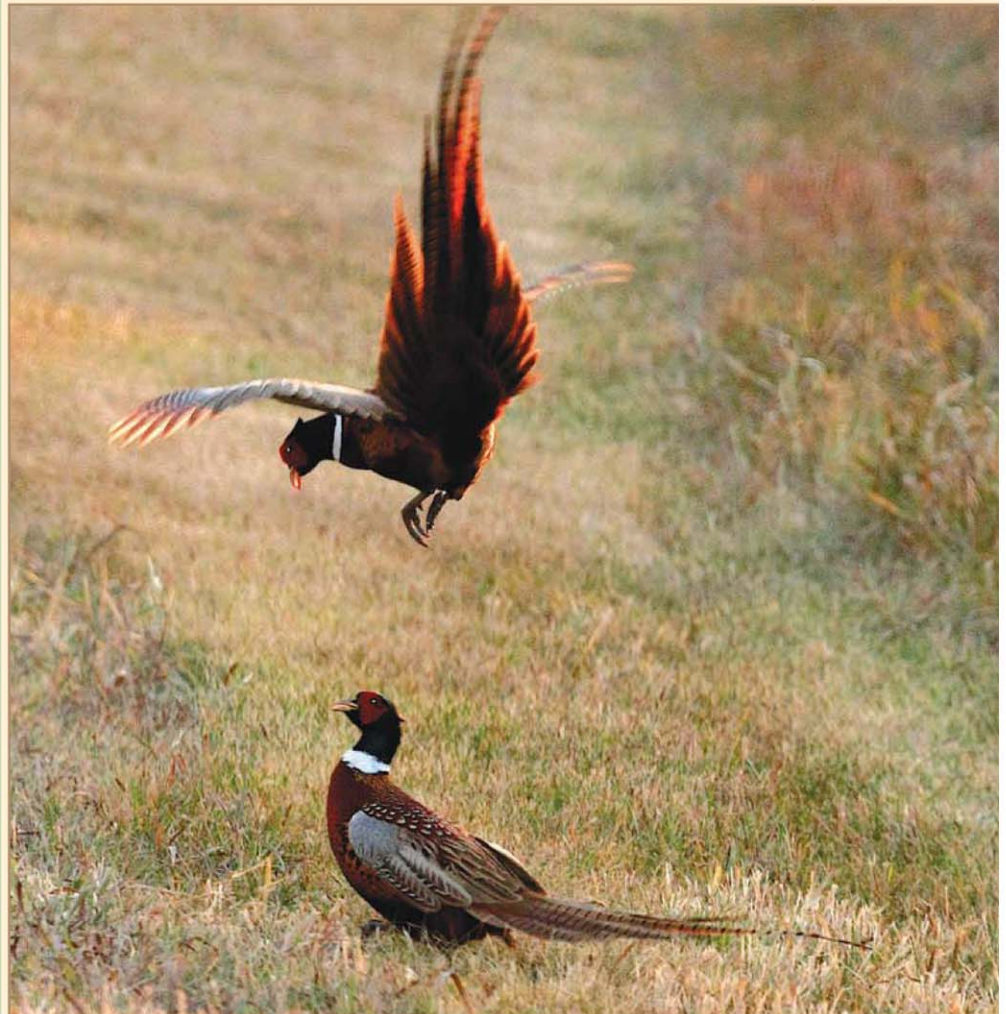
Sexual development in hens lags about 30 days behind that of roosters as ovaries begin to enlarge in late March. This is advantageous as this allows hens to dedicate all of their energy to gaining weight in March and April before the stressful and energy demanding nesting and brood-rearing season arrives in May and June (see part 1 of this series). Not only are hens gaining weight by storing extra food as fat, they are targeting specific foods in preparation for the nesting season. Despite the fact that waste grains such as corn are high in energy, they lack sufficient amounts of protein and calcium which are crucial for egg production. Although protein intake peaks later in May and June as more insects become available, its intake is elevated during March and April. Hen pheasants maximize their calcium intake by selecting foods such as snails, egg shell fragments, and calcareous grit. During this time of year, hens actually consume six times as much calcium as roosters. If hens can not consume enough calcium for egg shell production, they will resort to extracting calcium from their own bones!

Hen pheasants initiate their first nest as early as mid April, but most nests are initiated in May. After a hen mates with a rooster, she can lay viable eggs for weeks so she only mates once before initiating her first nest. Some hen pheasants begin laying eggs before they are "ready" to initiate their own nest. Many of the first eggs produced in April are "dumped" at random, laid in the nest of another pheasant, or laid in the nest of another bird such as a sharp-tailed grouse or duck. Under extreme cases of nest parasitism, the nest is likely abandoned by the host hen. Similar behavior occurs in other upland nesting birds, but pheasants seem quite proficient at this peculiar behavior.

As we have learned from this six part series, pheasants rely on a variety

of habitats throughout their annual life cycle. During spring and summer, grasslands, particularly managed grasslands such as land enrolled in the Conservation Reserve Program are critically important for nesting and brood rearing activities. During winter, quality woody cover and large cattail sloughs provide shelter from brutal winter storms which can otherwise cause substantial mortality in pheasants. Food plots provide an easy meal while providing concealment from predators, the other main cause of pheasant winter mortality. Considering these habitat needs, it's no coincidence why pheasants flourish in South Dakota. As long as a mosaic of these critical habitats are maintained, South Dakota will be home to world class pheasant populations.

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