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# Corn Hybrids

## DEER TASTE THE DIFFERENCE

WHITETAILS ARE DISCRIMINATING EATERS. CHOOSING THE RIGHT HYBRID AND MANAGING IT WELL ENSURES YOUR CORN PLOTS PASS THE TASTE TEST.

By Joshua A. Delger, with Kevin L. Monteith and Dr. Jonathan A. Jenks

TES RANDLE JOLLY

As daylight begins to illuminate the countryside, a cold wind rustles through the leaves of the weedy rows of corn that you barely had time to get in the ground this past spring. The corn plants are stunted, the few small ears of corn that did grow are not even enticing to passing blackbirds, and that stud buck captured on your trail-camera months earlier is nowhere to be seen. Meanwhile, a couple hundred yards across the fence to the south, you hear the unmistakable sound of deer running through corn. Your heart rate involuntarily increases. As the sun continues to rise on that mid-October morning, the better view of the neighboring cornfield only becomes increasingly disheartening: Numerous whitetails are feeding back and forth across some of the rows already stripped by the combine a couple days prior. The corn plants there are twice as tall as those in your food plot that was intended for the deer, and the ears are comparatively huge with kernels exposed from the peeled-back husks. Just as the sun rises, a doe and her fawn exit the timber to the north and wander down a heavily used trail across your property. The trail leads directly into your corn plot, but the deer do not stop to feed. They continue southward across the road to join the other deer. Then, sure enough, that stud of a buck that you had dreamed about all summer appears in the neighboring cornfield, moves about to assess the receptiveness of each doe, then wanders



At South Dakota State University's captive deer research facility, researchers planted three corn hybrids in each of three different enclosures (hybrid location was rotated in each enclosure so each one had an equal chance to be on the "edge"). Observers then sat on elevated platforms and recorded feeding activity while deer were in the enclosures.

deeper into the cornfield until he is out of sight.

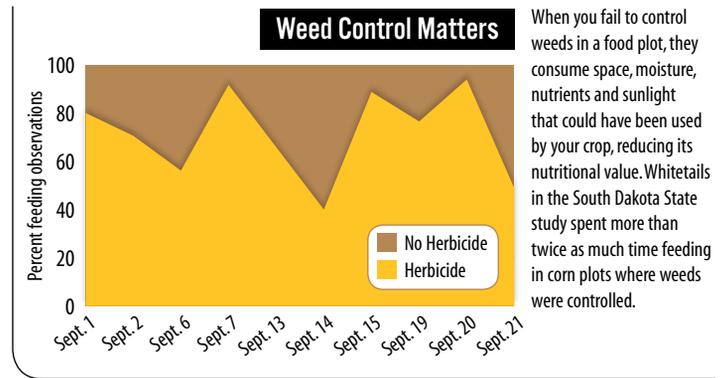
Your mind races. Why? Why in the world would deer clearly choose to feed in an agricultural field over a food plot surrounded by decent cover that was intended for their use in the first place? The frustration sets in as you call it quits for the morning, puzzled and disgusted.

This situation occurs all too often. Your neighboring farmers know exactly how to make corn grow, and for good reason. They want to produce the healthiest plants resulting in as high a yield as possible, all in an effort to gain the greatest return. In essence, this is what we want from our food plots as well, it's just that our greatest return happens to sport hooves and carry heavy bone atop its head. In the following, we will examine why deer might exhibit such preferential feeding patterns and provide you with the information necessary to achieve the greatest "return" from your corn plots next season.

### Deer Can Detect Nutritional Differences

We recently initiated a three-year study at South Dakota State University (SDSU) to determine whether differences in the nutritional characteristics among various corn hybrids and/or the husbandry practices were responsible for explaining preferential feeding patterns by white-tailed deer. Partial funding for this research was provided by the Berryman Institute and the South Dakota Agricultural Experiment Station, while the bulk of the funding came from Federal Aid to Wildlife Restoration administered by the South Dakota Department of Game, Fish and Parks. The state wanted to make the best use of food plots implemented by the U.S. Fish & Wildlife Service on public lands where deer were having a noticeable negative effect on the cornfields of local farmers. In the same sense as the example above, deer bypassed food plots provided by game managers to feed in cornfields planted by the neighboring farmers.

We implemented a two-part study to gain the most information possible. Our captive deer herd at SDSU provided the greatest tool for investigating this issue. Additional facilities were



constructed where new food plots would be accessible to our research animals. We planted three different corn hybrids in each of three food plots and gave study animals access to each plot over the course of a week while we recorded their feeding activity. This happened weekly throughout the course of the growing season. Secondly, research plots were planted cooperatively with local, private landowners in areas where plots had previously been established to feed and attract deer. Plots were implemented in the same fashion as the captive study, but the frequency of damage to corn plants was used to quantify deer use rather than direct observations of animals. This research went on to demonstrate that deer were in fact able to detect subtle differences in the nutritional quality of hybrids, and consistently fed on those with higher digestibility over the course of the study. In addition, white-tailed deer exhibited clear preference for feeding relative to husbandry practice and location within the food plot.

White-tailed deer are selective feeders, and they select among food items that will fulfill their nutritional requirements on a daily basis. But "nutrition" can mean different things. There is no such thing as a perfect plant for deer, and deer must feed on a number of different species to obtain essential nutrients. Some plants will be higher in protein, some higher in fiber, some higher in fats, while a plant such as corn is high in starch. Starch is basi-

*Continued.*



These photos were taken at one of the sites in the SDSU study, which compared deer feeding preferences among three corn hybrids planted side-by-side. An interesting thing to note is the preferred hybrid was located centrally in this plot, which means it had the least amount of edge plants available for deer to consume. The authors discovered that the ears of preferred corn hybrids during the growing season had overall higher digestibility levels for deer. **Note:** Although these photos show browsing on the entire corn plant, the study's findings on browse preference and nutritional quality were based largely on deer consuming corn ears.

cally a nonstructural carbohydrate and is easily digested by small ruminants like white-tailed deer. However, during the growing season when ears are young and actively growing, corn is also highly sought after by deer. The ears are moist and contain sugars that have not yet converted to starch (this conversion occurs during the dry-down period later in summer). Corn is not high in protein, so protein is not the specific nutrient that deer are targeting in corn.

Based on the results from our study, deer were capable of detecting small

differences in digestibility among corn hybrids and consistently sought the most digestible hybrid throughout the growing season. Digestibility is a measure of the overall soluble materials in a cell in relation to those that are insoluble. Insoluble or indigestible materials are namely the structural components making up the cell wall in plants. Notice when you eat corn that it is very soft and easy to chew compared to something like celery, which contains much higher levels of insoluble (cell wall) material. So, *it wasn't one particular nutrient that deer were choosing for in the*

*case of corn, but an overall combination of nutritional components.* The fact that deer sought the most digestible hybrids makes perfect sense from a nutritional perspective. White-tailed deer, being small ruminants, do not have the luxury to allow extensive fermentation of those less digestible components, compared with large ruminants such as bison that do. Indeed, taking expected digestibility of corn hybrids into consideration prior to planting has the potential to maximize preferential feeding by deer. Protein receives much attention from deer hunters and land managers, and rightly so, but we need to think about other vital nutrients as well.

As is the case with many folks planting food plots, the chosen hybrid planted may simply be the least expensive or whatever the local seed dealer has left over in the warehouse. In contrast, farmers typically choose hybrids that are expected to grow best on their soil and produce the highest yields. A serious food plotter will do the same. Corn is no different from other food plot plantings in that you want the bag of seed you buy to be best suited for the specific piece of ground you are planting. Different hybrids of corn are able to perform better in different environments relative to soil quality and type, latitudinal location (thus length of growing season), and moisture regime. The important thing to know here is the hybrid that performs best in your plot will be the one that produces the highest yield, and will produce the most digestible plant material (ears/kernels) for deer. Although specific nutritional information is not always readily available for corn hybrids, talking with your local corn seed dealer(s), agricultural extension agents, and neighboring farmers will point you in the right direction, and will help you choose the best hybrid for your food plot. In addition, if seed companies have test plots in your area, nutritional information is often collected from them. And remember, nutritional data will differ from site to site, and even from one end of the plot to the other. You may have to dig a little deeper for this information, but going the extra mile here could make all the difference.

### **Soil Nutrients and Weed Control**

Now the next logical topic to bring up is fertilizer and herbicide application. Although it may seem like a nuisance and you may think, “what does it mat-

ter, deer won't care." The fact is, deer in our study spent more than twice as much time feeding in portions of the food plot where weeds were controlled as in portions where weeds were allowed to grow freely. This was quite apparent to us very early on during observations. In addition, other wildlife researchers have clearly shown increased browsing pressure of ungulates, such as deer, elk, and moose, on fertilized areas compared to those that were not fertilized. Application of fertilizer and herbicide are critical steps to achieve a food plot preferred by deer. Fertilizer improves growth of vegetation, and herbicide application eliminates weeds that compete for soil nutrients, water, and sunlight. The application of fertilizer and herbicide have been obvious to farmers and gardeners for a very long time, but those of us planting food plots for wildlife sometimes skip these critical steps. There's no advantage to selecting the best corn hybrid to plant on your property if you don't properly care for those plants. Think of it in terms of growing a big buck: A buck cannot express his genetic potential if the resources (food) are not available to get him there, nor will

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## EARLY VS. LATE MATURITY: WHAT'S THE DIFFERENCE?

A major determinant of which corn hybrids are available to plant in a specific area is the maturity rate of the hybrid. Maturity rate typically refers to the length of time it takes for the plant to mature, or reach its full size. Within a given area, a later-maturing hybrid has greater potential to obtain larger yields, but runs the risk of not reaching maturity before the end of the growing season; in contrast, there is much better assurance that an earlier-maturing hybrid will reach maturity, but may yield less because it terminates growth sooner.

What we consistently saw was that earlier-maturing hybrids were most preferred by deer during the growing season. This is likely because earlier maturing hybrids grow at a faster rate, which within the plant means it is producing more digestible materials that deer want to eat rather than

insoluble structural materials. Furthermore, later-maturing hybrids generally have higher ear heights than those maturing earlier. A

study published in 1989 by D. K. Ingebrigtsen and J. B. McNich documented deer in winter plots preferring corn hybrids with higher ear heights and more of the ear being exposed outside of the husk. A hybrid with higher ear heights may be more likely to stand up to winter weather, while having less husk covering the ear allows easier feeding access by deer.

For these reasons, if you're planting corn to provide **winter nutrition** for deer, a later-maturing variety may be best, but be sure

to plant on time to ensure maturation before the end of the growing season. If you don't mind deer feeding on the ears during the **growing season**, before the ears mature, an early maturing variety is fine.



Later-maturing corn varieties may suffer less ear damage during the growing season, leaving more ears available for hunting season and winter nutrition.

### About This Article

This article was published in *Quality Whitetails* magazine, the journal of the Quality Deer Management Association (QDMA). To become a QDMA member and receive *Quality Whitetails* six times a year, use the form below.



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South Dakota State's research suggests deer prefer to feed on the edges of corn plots. You can use this knowledge to enhance deer use and huntability by creating more edge. For example, plant alternating rows of corn with another crop, like soybeans (left). In the reverse, planting large blocks of corn with less edge will delay feeding on the interior rows, leaving more corn for hunting season and winter. Interior strips can then be mowed to invite feeding and enhance visibility for hunting success (below).



a plant be able to express its genetic potential if the nutrients are not available.

Another important thing to consider is the fact that when we plant our corn plots we tend to plant them in the same location year after year. In this situation, failing to fertilize will result in reduced performance and growth over time. Most farmers rotate from corn to soybeans in their fields every other year because the beans are legumes, which are nitrogen-fixing plants. Soybeans actually put nitrogen back into the soil as they grow. This will not only produce a nice corn crop for the farmers but will reduce fertilizer costs as well. Planting corn continually in the same spot every year is going to deplete those vital nutrients without ever replacing them.

### Silage Corn Hybrids

Silage corn hybrids are engineered to produce more tons of forage per acre with less investment in ears, just as forage soybeans put more energy in leaf production than bean production. Although forage soybeans are a very good choice for deer-sized ruminants, silage corn hybrids were never intended for deer, but for cattle, a much larger ruminant. The value of a plant is dependent on the animal species in question, so keep that in mind when using agricultural products in wildlife applications.

Highest deer use of corn occurs early during ear development

and again during late season if ears are still present, and deer by and large focus on ears while feeding on field corn. In our study, 78 percent of deer feeding activity was focused on ears.

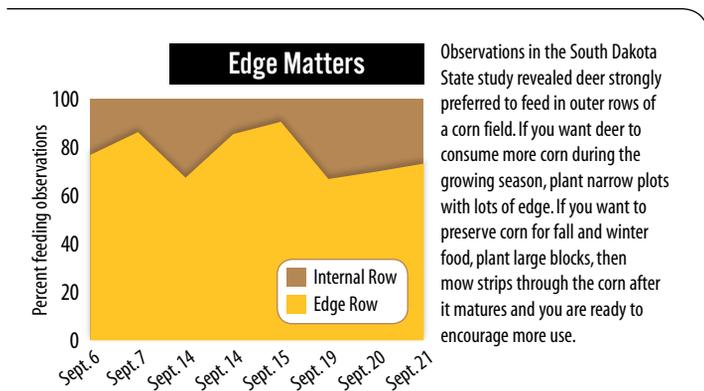
### Edge Effect

During our study, it was quickly apparent that deer preferred to feed on the outside rows of corn plots. Over the course of this particular experiment, feeding activity occurred on edge rows nearly 78 percent of the time. Edge rows comprised less than 25 percent of the corn plants available to deer, which emphasizes the significance of this finding. White-tailed deer are creatures of the edge and will tend to gravitate to these areas regardless of whether it is the edge of a woodlot, CRP field, or cornfield.

For those of you familiar with deer hunting in the agricultural regions of the Midwest, you know how critical the timing of corn harvest can be to our hunting success. When the harvest is late, the excitement level on opening day is definitely lower, knowing full well that huge refuges of cover in the form of giant cornfields are likely holding many deer, especially after the first shots begin to ring out across farm country.

SDSU graduate student Kevin Robling is currently doing radio-telemetry research on white-tailed deer in eastern South Dakota and has been quickly learning how deer use cornfields throughout the year, especially some older bucks. Deer spend up to 40 percent of their time in cornfields thanks to the combination of cover and forage, but our results suggest that given the choice, deer would rather come out and feed on the edge if possible. This may be due to differences in nutritional quality of those plants on edge rows compared to those rows toward the center of fields. Therefore, increasing the amount of edge in a corn food

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plot may maximize use and feeding on your food plot, and it may make it possible for you to more effectively hunt deer using a plot of standing corn.

A simple strategy would be to skip rows when planting corn in the spring and fill in the alternating rows with other food plot items. We would suggest planting the gaps in high-protein forage like soybeans to help compensate for the lower protein content of corn. Also, plant your rows in an east-to-west orientation to keep the corn from shading out these other food plot items. With this strategy, you create

the ideal situation both for the deer and your own hunting opportunities.

Another simple alternative would be to plant a large block of corn but then mow alternating groups of rows of corn throughout the plot at the end of the growing season as deer season approaches (check your state's hunting regulations to be sure this is a legal practice). Since the corn is planted in a large block, deer would feed less in the interior rows during the growing season, increasing the number of ears that make it to maturity and are available later in year. Strips can be mowed in

the mature stand to allow you to see into the field from a stand site, and if you time it right and have fairly clean rows afterward, you may have time to plant a late-season crop like brassicas in the rows.

Using these strategies will provide deer with the security cover they desire while at the same time giving them access to edge rows where they prefer to feed. Additionally, and probably most importantly, deer will continue to use these plots during daylight because cover is still available, but the openings and strips make it possible for you to see and hunt deer coming to the corn field.

### Conclusion

Our results suggest that white-tailed deer are capable of detecting minute differences in the nutritional quality of food items, which was evident based on the preferences for certain corn hybrids. So, get ahead of the game by thinking more critically. Select corn hybrids that are suited to your soils and climate and that fit your management goals, and then manage weeds and soil nutrients to ensure the plants perform to their potential. Your hunting success may improve, and you may be doing your neighboring farmers a favor as well.



**About the Authors:** *Joshua Delger of Wall, South Dakota, has been conducting wildlife research since 2003, obtaining his bachelor's and master's degrees in Wildlife and Fisheries Sciences from South Dakota State University. Josh is currently a resource biologist for the National Park Service at Badlands National Park.*

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*Dr. Jonathan A. Jenks is a Distinguished Professor of Wildlife and Fisheries Sciences at South Dakota State University. He has worked with white-tailed deer and other large mammals for 25 years, and has published more than 100 articles on big game ecology and management. He has been the academic advisor and has provided oversight on all research activities at SDSU's captive deer research facilities since its inception in 1997.*