WVU UPDATE
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Manage winter feeding system to meet livestock's needs

By Tom Basden
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During November, most livestock producers in West Virginia decide the number and type of livestock they plan to keep during the winter. The availability of fall pasture, the amount of stored feed, and the quality of the feed will help the farmer determine the number of livestock to retain. A winter feeding system then needs to be designed to meet the livestock's needs and to protect natural resources.

This feeding system should accomplish several objectives:

1) minimize livestock feeding in concentrated areas near water bodies during late fall, winter, and early spring when frequent snow and rain runoff occurs;
2) improve the use of pastureland;
3) reduce soil erosion;
4) maintain water quality; and
5) improve the health of the livestock.

Reducing the amount of time cattle spend close to surface waters is important because regulatory enforcement occurred this spring in West Virginia. Operations that discharged pollutants (sediment and bacteria) into surface waters were notified by Division of Environmental Protection to improve their winter feeding areas. Using temporary electric fence is a good method of keeping cattle away from surface streams. Single- or double-strand high tensile electric fencing is an economical and effective way to protect stream corridors. It is unlikely to trap debris during flooding. These fences should be located a minimum of 50 feet from surface streams and sinkhole areas to allow the riparian or sod buffers to capture the sediment, nutrients, and pathogens that escape the feeding areas during runoff.

The sod buffers that are located down slope of a feeding area should have cattle excluded during the fall to allow the grass to grow to a 6-inch height.

This thickened stand of grass will reduce sediment transport during storm runoff. The critical feeding areas that are left with no vegetation should be reseeded at recommended rates as soon as cattle are removed in the spring. Seed can be incorporated into the disturbed area by letting livestock walk it in.

A permanent feeding area needs a system to collect, store, and then apply the accumulated animal waste. A properly designed permanent feeding area will have a method (a diversion ditch or earthen berm) to restrict water flowing into the area. Using sawdust or straw on concrete pads is recommended to absorb liquids and improve footing for the livestock. A feeding area that is roofed needs a gutter and drainage system to keep water from accumulating with the animal waste. For permanent feeding areas that store manure, a nutrient management plan needs to be developed and followed to best utilize the nutrients for crop production while protecting water quality.

Rotation of feeding areas every 30 or 40 days during the winter can eliminate the need for designing and building a permanent feeding area. These temporary feeding areas maintain some vegetation and tend to recover quickly. These areas can be located on pastureland so nutrients from the manure and urine are recycled directly to the field. Locate these feeding areas so the livestock have a protected area away from winter winds. Areas with more than 50% loss of vegetative cover need to be reseeded in the spring.

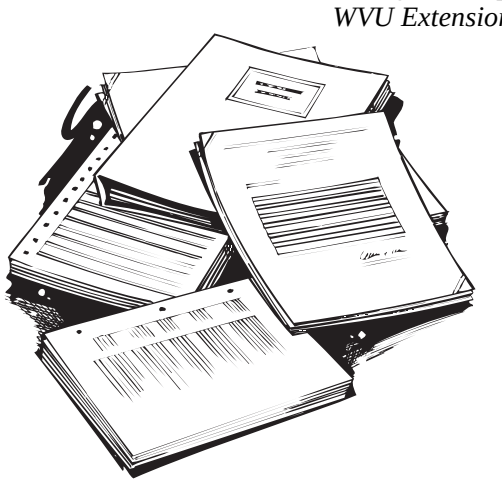
Extending the grazing season as long as possible is the best way to reduce the time that cattle spend in the feedlot. Stockpiling tall fescue during the fall and then grazing off this accumulated forage during December and January keeps the cattle on the pasture and out of the feedlot. Deferred grazing is a good addition to a winter feeding program and can be accomplished with an August application of nitrogen on tall fescue.

Waterborne bacteria can affect herd health when streams and ponds are used for livestock watering. Herds can pick up bovine leptospirosis and mastitis from this type of water source. Use streams and ponds only if no alternative watering source is available. To reduce stream or pond bank erosion, design a single access point for the cattle that is stabilized with stone.

Designing a winter feeding system that ensures the health of the livestock, returns a profit to the farm, and protects the environment is an increasing challenge to the producer. For help in putting all the parts together to manage your winter livestock feeding area successfully, contact the local USDA Natural Resources Conservation Agency district conservationist, your county Extension agent, or a certified nutrient management planner. They can evaluate your operation and assist you with modifying or redesigning your winter feeding system to meet your goals.

Planning tax management is a fall chore, too

By Tom McConnell
Farm Management Specialist, WVU Extension Service



Fall finds most farmers busy getting ready for winter. Finding a little time during all the equipment and roof repairing, cattle processing, and firewood cutting for some tax management can repay the farmer with huge rewards.

High calf prices this fall and some U.S. Department of Agriculture and state assistance programs relating to the drought recovery have drastically changed the Schedule F income returns for many farmers. They report having more farm income than in almost any year they can remember. Farmers need to consider some end-of-year tax management strategies.

This time of year provides farmers an opportunity to actually change their tax liability. Although most financial activity is over, the calves are sold, and the harvest is completed, the farm accounting year doesn't end until Dec. 31. Every farmer could complete his or her tax returns now. But the tax deadline is months away, and farmers still have an opportunity to expend cash and reduce profit.

This opportunity is possible because most farmers use cash accounting. This means that the Internal Revenue Service views the year in which a farmer receives cash or pays an expense as the tax year. This is quite an advantage for the farmer who is willing to use it. Farm managers can actually make strategic purchases that will increase expenses and then effectively reduce their profit and thus reduce their tax liability.

With careful management, a farmer can purchase next year's supplies in this tax year and reduce his tax bill. There are guidelines pertaining to prepaid farm supplies. Prepaid farm supplies are related to feed, seed, fertilizer, and similar farm supplies not used or consumed during the year. The farmer can deduct an expense for prepaid farm supplies that does not exceed 50% of other deductible farm expenses (those listed as regular expenses on the Schedule F) in the year of payment. The amount over the allowable 50% limit must be reported as an expense the next year rather than the current year.

The limit does not apply under two exceptions for farm-related taxpayers. (For Internal Revenue Services purposes, a farm-related taxpayer either makes his main home on a farm or his principal business is farming, or a family member meets either of the two conditions.)

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Planning tax management

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The first exception allows a manager to claim prepaid supplies totaling more than 50% of the farm's usual total if the business experienced a major change in operations resulting from unusual circumstances. These would include a drought, flood, fire, or some other major occurrence like a herdwide disease outbreak. The second exception allows for the farmer to exceed the 50% level in one year to the point that the prepaid total for that year and the two preceding years does not exceed the 50% level of the deductible expenses for that year and the two preceding years. This exception means that a farmer who has never claimed any prepaid supplies can claim a greater amount equal to the 50% of the total of those years.

Feed is included in the prepaid farm supplies deduction if the feed purchase meets certain guidelines. But the regulations are more strict. It's obvious that there have been many creative interpretations to this provision. The feed purchase cannot be a deposit. It does not have to be delivered, but it has to be a binding contract complete with a description including tons and price. The purchase has to be a legitimate management decision where some other benefit is derived from the purchase other than tax avoidance.

The best example is buying feed in the fall to avoid paying a higher price later or buying it ahead to be assured of getting it because of a shortage. This provision does not allow farmers to take the prepurchase option for feed if the action results in a material distortion of the farm income. The manager must relate this to customary business practices, the time of the year the purchase was made, and how the purchase relates to other years. The feed section of the prepurchase provision demands a very careful look.

The prepaid option for the Schedule F should be considered very seriously. Farmers can always take a logical look at this provision and employ some very sound fall practices that can increase expenses and never have to stand the test mentioned above. The most sensible includes spreading lime, fertilizer, and chicken litter now. Materials that are consumed onthe farm in any calendar/tax year don't apply in prepaid rules. Repairing the roof or farm tractor in the fall can help one manage taxes.

Purchasing a tractor or major piece of equipment is the "old standby" as far tax management is concerned. Farmers tend to overuse this option. Machinery constitutes a capital purchase that must be depreciated. If the property you purchase is expected to last for more than one year, you cannot deduct it in one year. Some options concerning the rate of depreciation will help the farmer reduce tax liability.

The most notable deduction farmers should consider is Section 179 of the Internal Revenue Code. This allows managers the option of deducting all or part of the cost of some qualifying property in the year it is placed in service. The list that qualifies as a 179 deduction includes tangible (not real) personal property and single-purpose agricultural and horticultural buildings. This means that machinery and equipment, agricultural fences, milk tanks, office equipment, and livestock all qualify for deductions.

Farmers who take the time now to organize their financial information have the option of reducing their tax liability. Farmers who wait until after their tax year has ended to consider their tax liability and their tax management have eliminated several of their tax management options. Farmers should always include a tax professional early in the process, too. Remember, when it comes to tax management, "A penny saved is a penny earned."

Overgrazing can hurt environment, your pocketbook

By Ed Rayburn
Forage Agronomist, WVU Extension Service

Sustainable grassland production is based on grass management, animal management, and livestock marketing. Grazing management is the foundation of grassland-based livestock production since it affects both animal and plant health and productivity.

Overgrazing can occur under continuous or rotational grazing. It can be caused by having too many animals on the farm or by not properly controlling their grazing activity. Overgrazing reduces plant leaf area, which reduces interception of sunlight and plant growth. Plants become weakened and have reduced root length, and the pasture sod weakens. The reduced root length makes the plants more susceptible to death during dry weather. The weakened sod allows weed seeds to germinate and grow. If the weeds are unpalatable or poisonous, major problems can result.

One indicator of overgrazing is that the animals run short of pasture. Under continuous grazing, overgrazed pastures are predominated by short-grass species such as bluegrass and will be less than 2-3 inches tall in the grazed areas. Palatable tall grasses such as orchardgrass are sparse or nonexistent. Soil may be visible between plants in the stand, allowing erosion to occur. Under rotational grazing, overgrazed plants do not have enough time to grow to the proper height between grazing events. The animals are turned into a paddock before the plants have restored carbohydrate reserves and grown back roots lost after the last defoliation (see table). The result is the same as under continuous grazing–tall-growing species die and short-growing species that are more subject to drought injury predominate the pasture. As the sod thins, weeds encroach into the pasture.

Another indicator is that the livestock run out of pasture, and hay needs to be fed early in the fall. Healthy pastures grow until mid-November in West Virginia. The potential grazing season lasts into November or longer when winter grazing management is implemented. If hay feeding is needed in October under normal weather conditions, the pasture probably is being overgrazed.

Overgrazing is also indicated in livestock performance and condition. Cows having inadequate pasture in the early fall do not have a chance to gain weight after the calves are weaned and may have poor body condition going into the winter. This makes them hard to winter and may reduce the health and vigor of cows and calves at calving. Also, cows in poor body condition do not cycle as soon after calving, which can result in delayed breeding. This can result in a long calving season. With good cow genetics and nutrition, 55% to 75% of the calves should come in the first 21 days of the calving season. Poor weaning weights on calves can be caused by insufficient pasture in late summer, when cows give less milk and the calves need pasture to maintain weight gain.

Overgrazing can increase soil erosion. Reduced soil depth, soil organic matter, and soil fertility hurt the land's future productivity. Soil fertility can be corrected by applying the appropriate lime and fertilizers. However, the loss of soil depth and organic matter takes years to correct. Their loss is critical in determining the soil's water-holding capacity and how well pasture plants do during dry weather.

To prevent overgrazing, match the forage supplement to the herd's requirement. This means that a buffer needs to be in the system to adjust for the fast spring growth of cool-season forages. One buffer many state producers use is to harvest hay in May and June and allow the cattle to graze the aftermath in August and September.

Another potential buffer is to plant warm-season perennial grasses such as switchgrass, which do not grow early in the season. This reduces the acreage that the livestock can use early in the season, making it easier for them to keep up with the cool-season grasses. The animals then use the warm-season grasses during the heat of the summer, and the cool-season grasses recover for fall grazing.

The grazing guidelines in the table are for rotationally grazed, cool-season forages. When using continuous grazing, manage pasture height at one-half the recommended turn-in height for rotational grazing to optimize plant health. The growth habit of some forage species, such as alfalfa, does not permit their survival under continuous grazing. When managing for legumes in the stand, it is beneficial to use rotational grazing and graze the stand close and then give adequate rest to stimulate the legumes' growth.

Proper grazing management keeps pastures healthy and productive. This ensures that the livestock using the pastures are also healthy and productive. To learn more about evaluating pasture condition and animal body condition, contact your county Extension agent.

Grazing management guidelines for rotational grazing balance forage production and use for different forage species and mixes.

Forage species or mix	Start grazing *(inches)*	Stop grazing *(inches)*	Rest interval *(weeks)*
Bluegrass-white clover	4-6	0.5-1.0	3-6
Orchardgrass-ladino clover	8-10	2.0-2.5	3-6
Tall Fescue-ladino clover	6-8	1.5-2.0	3-6
Timothy-birdsfoot trefoil	10-12	3.0-4.0	5-6
Alfalfa bromegrass	12-18	2.0-4.0	5-6
Bluegrass-nitrogen	4-6	1.0-1.5	3-6
Orchardgrass-nitrogen	9-10	3.0-4.0	3-6
Tall Fescue-nitrogen	6-8	3.0-4.0	3-6
Timothy-nitrogen	10-12	3.0-4.0	5-6

Get yard, garden ready for winter

By John Jett
Horticulture Specialist, WVU Extension Service

With the onset of winter just around the corner, now is the time to prepare your lawns, gardens, and landscapes for the months ahead.

- Remove leaves and mow lawns one last time after growth has stopped to reduce hiding areas for moles mice and reduce incidence of snow mold on turf in the early spring.

- Fertilize lawns in late November to early December with a slow-release form of nitrogen at a rate of 1 pound of nitrogen per 1,000 square feet to promote root development and early spring green-up.
- Remove garden debris and weeds to reduce incidence of disease and insects in the spring.
- If dry conditions exist, water lawns, trees, and shrubs until the ground begins to freeze to prevent winter desiccation.
- Add mulches to prevent heaving of strawberries and perennials during periods of freezing and thawing. Mulches around trees and shrubs will reduce the need for weeding in the spring, help conserve moisture, and moderate soil temperatures.
- Aerate the lawn and overseed to reduce soil compaction and thatch buildup and to improve turf density.
- Wrap plants in exposed areas or those on south or west foundations with burlap to reduce desiccation, protect tender flower buds, and support plants susceptible to snow load breakdown.
- Protect trees and shrubs from mice and rabbits by enclosing the base of these plants with hardware cloth.
- For a tree exhibiting poor growth with root feeders past the tree's dripline, fertilize at the rate of 2 to 3 pounds of nitrogen per 1,000 square feet of area under the tree.
- Store garden chemicals properly for the winter. Check product labels to see if freezing will harm the products.
- Drain hoses and sprayers and check owner's manuals for instructions on how to winterize mowers and other power equipment.
- Clean and lightly oil metal parts of hand tools and inventory those that need to be repaired or replaced.
- Secure and fill birdfeeders.

'Winterkill' more likely in severe winters

By Ken Semmens
Aquaculture Specialist, WVU Extension Service

News reports indicate we are in for a more severe winter this year. In the last issue, I discussed summerkill. This time, I would like to look at another form of oxygen depletion known as winterkill. Both conditions occur when oxygen concentrations become too low for the fish to survive. Before you become concerned for the fish in your pond, it is important to understand that winterkill is far less likely to occur than summerkill in West Virginia. It is most likely to occur during a severe winter in a shallow pond with abundant plant life or organic matter.

The winterkill process is relatively simple (see figure). Ice covers the pond and prevents oxygen exchange at the water surface. This is not a problem as long as light shines through the ice to plants in the water. More oxygen probably enters the water through photosynthesis than at the water surface, anyway. Heavy snowfall covering the pond may block sunlight and prevent plants from generating oxygen through photosynthesis. Still there is no problem unless the demand for oxygen exceeds the supply.

Without light, the plants may die and create an abundance of organic matter. The term "organic" refers to material derived from living organisms. It could be leaves, manure, hay, or–in this case–dead aquatic plants. Bacteria will take advantage of this food source and consume oxygen in the process. Oxygen levels may then become too low for the fish to survive, and there is a fish kill. Winterkill is more sinister than summerkill because the loss of fish may go unnoticed for several months. It may not be discovered until the first fishing in the spring.

The risk of winterkill can be decreased through proper pond design and management. A shoreline slope of 3:1 (3-foot run for every foot of drop) and minimum depth of 3 feet will help prevent rooted aquatic vegetation from proliferating. Some people recommend an average pond depth of at least 8 feet. The presence of color in the water caused by microscopic algae (phytoplankton) will help shade out submerged rooted vegetation while generating oxygen and providing a basis for the food chain upon which the fish rely. Reducing the nutrient flow into the pond may also be helpful. Manure, fertilizer, and other nutrients could be washed into the pond during a heavy rain.

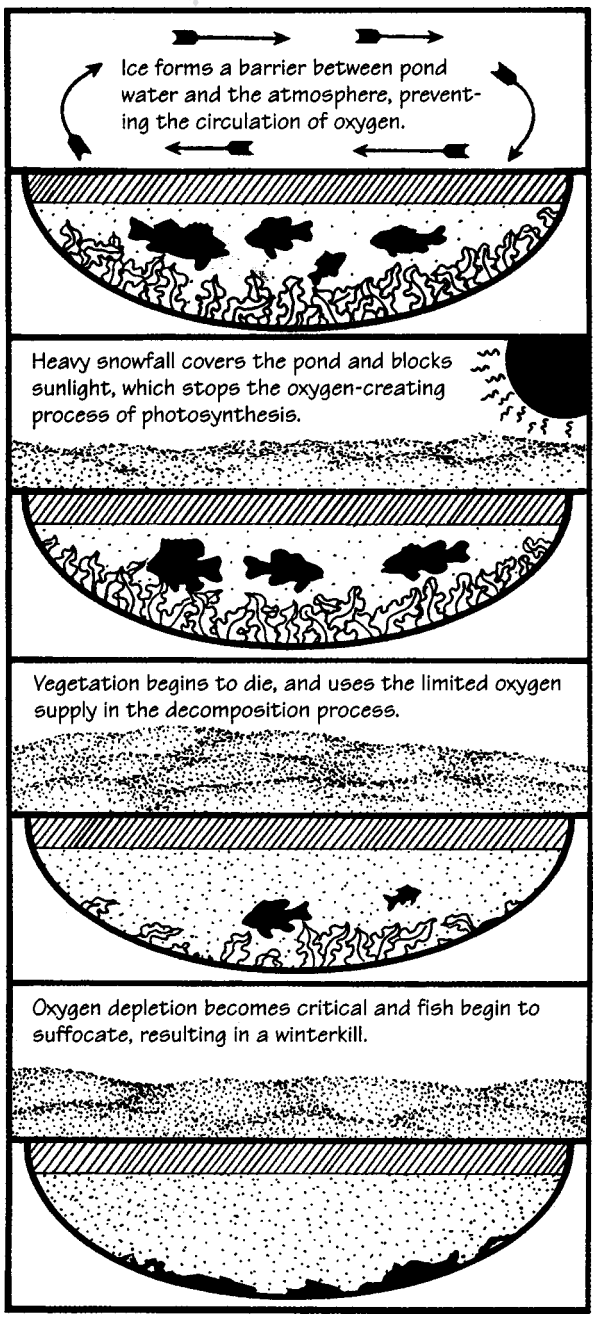
If you have experienced winterkill and wish to prevent its recurrence, there are two basic strategies: you can keep ice from covering the pond, or you can remove snow from the pond surface so light will reach plants in the water. Continuous aeration keeps the water moving and keeps a portion of the pond ice free. It will also add oxygen directly and may reduce the buildup of organic matter. It is effective against all other forms of oxygen depletion.

Many models of electric aerators are available from aquaculture supply companies. If you have access to the Internet, you will find links to these sites at the West Virginia Aquaculture Association Web site (http://www.wvaquaculture.com/).

Snow removal may be a more practical approach because it costs less. Snow accumulations of under 2 inches soon melt and do not warrant removal. Heavy snowfall accumulations should be removed as soon as possible. Removing 30 percent of the snow, especially along the shoreline areas where submerged aquatic plants are most abundant, should be adequate.

Another option is to live with winterkill. Some fish farmers in midwestern states grow bait minnows in ponds that experience winterkill. In early spring, broodstock fathead minnows are released into the ponds. Winterkill may eliminate predatoryfish, and the fertility of the system provides abundant food for the broodstock and their offspring. The minnows spawn and grow throughout the summer and can be harvested in fall or early winter.

The figure accompanying this article appears on page 36 of *Ohio Pond Management Handbook.*



Plan holiday eating for diabetics

By Carol R. Olson
Diabetes Education Specialist, WVU Extension Service

When there is diabetes in the family, holidays can be especially difficult. That's when most of us eat foods that are higher in calories, fat, and sugar than our everyday foods. Those are exactly the foods that families with diabetes try to avoid. So what can they do when treats are found everywhere?

First, make a plan. Don't skip meals. Saving up calories for a big splurge may result in taking in more carbohydrates than the diabetic can handle at one time. Instead, space meals and calories evenly throughout the day. Include extra servings of vegetables, which help fill you up without driving up the blood sugar.

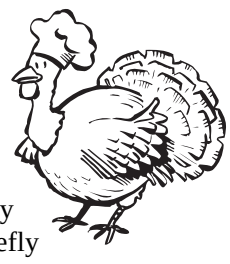
Next, include some treats in your plan. Research shows that all sugars are alike to the body. The sugar in a special Christmas candy is handled just the same as the naturally occurring sugars and starches in fruits, milk, and bread. So if you plan to indulge in a special candy or dessert, go easy on fruits, milk, and starches at the same meal.

Look for recipes designed for people with diabetes. You will find recipes for desserts that use artificial sweeteners to replace some or all of the sugar. You will also find recipes for lower fat versions of old-time favorites.

Finally, focus on the deeper meaning of holidays. Renew your acquaintance with seasonal stories or meditations. Volunteer to work with less fortunate people, which helps take the focus off of what you can't have and place it on what you are thankful to have.

Holiday Turkey Stuffing

½ cup chopped carrots
½ cup chopped celery
½ cup chopped onion
1½ cups defatted turkey broth *(or)*
1½ cups low-sodium, nonfat chicken broth
1 cup sliced raw mushrooms
Nonstick cooking spray
8-ounce package seasoned stuffing mix



Directions:

1. Wash, pare, and finely chop carrots, celery, and onion. Place in medium saucepan with broth and bring to boil. Cover, turn heat down, and simmer for 5 minutes.
2. Slice mushrooms. Heat nonstick skillet over medium heat. Remove from heat briefly and spray lightly with nonstick spray. Return to heat and add mushrooms. Sauté briefly until mushrooms are golden in color.
3. Place stuffing mix in large mixing bowl. Add mushrooms and vegetables in broth. Toss lightly with fork.
4. Spray 1½ - quart baking dish lightly with nonstick spray. Spoon stuffing into baking dish. Cover tightly with foil. Bake at 325° for 25 minutes or until thoroughly heated. Makes 8 servings.

Nutrition information:

Calories: 120	Protein: 4 g	Sodium: 387 mg
Carbohydrate: 25 g	Fat: 1 g	Exchanges: 1 Starch/Bread and 1 Vegetable

Points to remember:

1. When stuffing is cooked inside the turkey, it is more moist and flavorful, but it absorbs some of the fat from the bird.
2. Stuffing can be a source of foodborne illness, especially if placed inside the bird. Make sure all cutting boards, spoons, bowls, and hands are very clean when preparing the mixture. Never stuff the bird before you are ready to bake it. Do not pack cavity tightly because the center may stay at the "Danger Zone" temperature too long.
3. Baking stuffing separately is safer and produces a lower calorie side dish. If the stuffing is made early in the day, mix it quickly and place it in prepared baking dish. Cover tightly and refrigerate immediately. When ready to bake, remove it from refrigerator and place directly in preheated oven. Test to make sure the stuffing has heated all the way through before serving.

Genetic engineering

Part 1: Basic principles

By Rakesh S. Chandran
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For ancient man, most naturally occurring phenomena were a mystery. Today, we have answers to some of the most complicated questions.

The concept of genetic engineering, however, is widely different from that of other scientific advances because it deals with the underlying mechanisms of life itself. It is essential to thoroughly understand this science to make sound judgments about it.

A series of three articles will cover basic principles, pros and cons, and future directions of this technology. Although genetic engineering has an impact on almost all aspects of life, these articles will focus primarily on genetically engineered crops.

First, what is a genetically engineered crop? We know that genes determine the physical characteristics of plants and animals. We also know that genes reside in cells, the fundamental units of all living organisms. Genes are actually sections of genetic material known as DNA (deoxyribonucleic acid), which has coded information that eventually determines an organism's physical traits.

How is this information coded in a gene or DNA? DNA is essentially composed of long chains of units called bases, just like links of a long chain. Although there are millions of these links or bases in a single DNA strand, they are actually made up of four kinds of bases–A, T, G, C (comparable to the 26 letters of the English alphabet). The arrangement of a vast number of these four bases in a DNA molecule can be referred to as the genetic code.

The bases are arranged in a predetermined sequence that makes up the genetic code for producing a variety of proteins. Three of these bases form a code for a certain biochemical called an amino acid. Twenty amino acids, which are the building blocks of proteins, can be produced. The amino acid produced depends on the bases' sequence on the gene. The sequence of amino acids in the chain determines the nature and characteristics of these proteins. The proteins eventually determine the physical traits of the particular organism. Therefore, a slight rearrangement of the bases in a DNA molecule may alter the organism's traits or characteristics.

Throughout evolution, natural selection has caused organisms to adapt to their surroundings. These adaptations originated from a rearrangement or mutation of the bases (genetic code), often by natural causes. This is a very slow process. Through reproduction, the parents transmit genes to the offspring. Understanding this enabled us to use classical breeding techniques to improve crops and domestic animals. Classical breeding involves humans introducing new genetic material to the offspring. However, organisms are capable of reproducing only within species or between very closely related species. Therefore, classical breeding was limited to generating hybrids within a given species or between closely related ones.

Now, we can introduce genes from distantly related species into an organism's DNA. Genetically engineered crops have foreign genes. The gene introduced into the plant may have originally belonged to a totally different plant, a microbe, or even an insect or an animal.

For example, Bt corn, a genetically modified crop, contains genes belonging to a bacterium called *Baccilus thurengiensis*. By nature, this bacterium is capable of infesting the European corn borer through its chemical secretions. After the bacterial genes are introduced into Bt corn, the corn can produce *Baccilus thurengiensis* chemicals to infest the insect. When a European corn borer larva feeds on Bt corn, it ingests some of these chemicals and dies. The corn thus becomes resistant to this serious pest.

As a science, biotechnology is still in its infancy. Future research will give us a better picture of its long-term effects. It is premature to rule out the usefulness of this technology or to embrace it entirely. Part 2 of this series will discuss some of the benefits and risks of genetically engineered crops.

WVU UPDATE

The West Virginia University Extension Service and the WVU College of Agriculture, Forestry, and Consumer Sciences are pleased to offer this educational insert to the Farm Bureau NEWS as a service to West Virginians. We welcome your questions or comments.

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