

# UNL Extension: Acreage Insights

## Acreage eNews-September 2013

<http://acreage.unl.edu>

### Fall Vegetable Gardens

By [John Fech](#), UNL Extension Horticulture Educator



Fortunately, for acreage owners who purchased their properties after the spring planting season, as well as those whose spring blew by before they noticed it was time to plant a veggie garden, fall is prime time for a select few species. Fall gardens are planted in late summer when it is still relatively warm and in the midst of warm season crop harvest. Though this season of the year may not seem to be a desirable time for planting, there are many reasons why fall should be considered as a viable option.

1. Fall gardens are harvested after warm season species (squash, eggplant, tomato, etc.) wane and allow for fresh veggies to appear on dinner tables for an additional time period.
2. Fall garden crops mature when cool weather favors crispness, sweet flavors and other desirable quality characteristics.
3. Most fall veggie crops require a relatively small space and can be planted in an area formerly used for an earlier crop.
4. Seeds germinate quickly in the warm late summer soil, while weed seed germination is usually lower than in spring.
5. Most fall veggies are ready to harvest in 4-9 weeks after seeding.
6. Just like spring and summer vegetables, fall veggies are nutritious and low in calories.

If starting a fall garden in late summer, choose from beets, carrots, cucumber, radish and turnip. Early fall plantings can include spinach, Swiss chard, lettuce, mustard and if the first fall frost holds off a week or two- a late planting of snap beans. Sure, veggies planted on Labor Day may not yield a full season of harvest, but the ancillary benefits of working the earth such as exercise, the opportunity to teach kids about science and eating nutritious foods instead of chips can be yours if you plant a fall garden.

Especially where earlier vegetable crops have been grown, revitalizing the soil is necessary before attempting to plant fall veggies. After removing the remnants of the previous plants, a light application of a balanced fertilizer such as 10-10-10 will help to provide for the nutritional

needs of the fall plants. A 1-2 inch layer of a quality compost may be substituted for fertilizer, as well as provide necessary organic matter to boot.

Other suggestions for getting fall crops off to a good start include:

- Pre-germinating seed by soaking it overnight before planting. On average, a 30 to 45% reduction in the required germination time can be realized through this process.
- Prepare a shallow, firm seed bed. Deep plowing can result in a loose soil and though seeds will eventually germinate, time is precious when planting in fall.
- Plant seed slightly deeper than for spring planting to offset warm winds and hot sun rays.
- Plant following a rain if possible, or irrigate enough to create a moist soil.
- Sow seeds “thickly” in the row. Use 1.5 times as many as the package label calls for.
- After planting, press soil firmly over and around the seed.
- After plants are 2 inches tall, thin the stand to avoid seedling competition.
- Cultivate lightly and gingerly to remove weeds and protect new seedlings.
- Apply an inch of dried grass clippings around the seedlings to hold in moisture and shade the roots of the new veggie plants.
- Be watchful for developing insects and disease problems and take appropriate steps to ensure the vigor of the developing fall veggie plants.

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### **Time to Seed Turfgrasses**

By [Nicole Stoner](#) and [Sarah Browning](#), UNL Horticulture Extension Educators



The best time to seed cool season grasses, such as Kentucky bluegrass and tall fescue, is between August 15th and September 15th, so it's time to get started! And getting your seeding done as early as possible is really important, because each week of delay in seeding now, translates into 2 to 4 additional weeks required for the grass to mature.

Kentucky bluegrass can be seeded successfully as late as early October, but it is critical to seed tall fescue no later than mid-September. Tall fescue seedlings take a longer time to develop cold hardiness, so get your seeding done early.

Fall is, in fact, the best time of year for seeding lawns due to a combination of factors. First, there's less weed pressure than in spring, and often late summer weather is less problematic during the soil preparation phase. Plus, the extended period of cool weather, usually with good rainfall, that occurs from September through late November is ideal for growth of cool season turfgrasses.

### **Getting Started**

*Total Renovation.* If you need to renovate the entire lawn, start by killing the remaining grass with glyphosate (RoundUp), then wait for 10-14 days for the herbicide to take effect. Next, mow the dead grass short, and move on to soil preparation.

*Overseeding.* If you just need to fill in thinned areas, and still have more than 50% good turf then overseeding is the answer. Skip the RoundUp, but mow the existing grass fairly short to make soil preparation easier.

*Soil Preparation.* Prepare the seedbed through aerification. Make at least 3 passes over the lawn. You need to produce lots of bare soil, so the seed can make contact with it. Watering the lawn area a day or two before aeration, will make your efforts more successful.

*Fertilization.* Nebraska soils are rarely low in phosphorus, but turfgrass seedlings do benefit from a starter fertilizer high in phosphorus at seeding. Once the area is prepared, apply a starter fertilizer totaling 1 to 1.5 lbs Phosphorus/1,000 sq.ft. Phosphorus is the second number in the fertilizer ratio, as in this example 16-22-8. This product contains 22% phosphorus, so would require approximately 4.5 lbs. of product to provide 1 lb. phosphorus/1,000 sq. ft.

### **Spreading Seed**

After preparing the area, use a drop spreader to apply the seed. Rotary spreaders are great for fertilizing, but not so good for seeding. The seed is too light to be spread uniformly by a rotary spreader, so purchase, rent or borrow a drop seeder. Divide the seed in half; apply the first half as you walk north to south, and the second half going east to west. This helps ensure even distribution.

Rake the seed slightly afterwards to ensure good seed to soil contact. The full seeding rate for turf-type tall fescue is 8-10 lbs./1,000 sq.ft., and 3-4 lbs. for Kentucky bluegrass. When seeding into an existing lawn, the seeding rate can be cut in half.

### **Watering & Mowing**

Irrigate the seeded area 2 to 4 times a day during the first two weeks, depending on temperatures. Keep the top 1/2 to 1 inch of soil moist as the seedlings germinate. Taper off your watering schedule as the seedlings develop. As they approach mowing height, reduce the number of irrigations to 2 to 3 per week, but water more deeply with each application to encourage deep root development.

Begin mowing as soon as possible. Mowing encourages tiller development, and helps new plantings thicken up quicker. It also keeps weeds under control while the new seedlings become established. Just be sure to sharpen your mower blade.

As we move into fall, be sure to keep raking your leaves. If you don't have the time or cannot rake the leaves, you can mulch them into the turf by mowing over them with your lawnmower. Leaves that stay on the surface of the turf, can smother the grass.

### **Dormant Seeding**

If fall turfgrass seeding isn't possible for you, then consider dormant seeding. With this method, the area is prepared in fall but the seed is not distributed until after the growing season has ended. Plan to spread the seed anytime from mid- to late November through March. Watch for more information on dormant seeding in November.

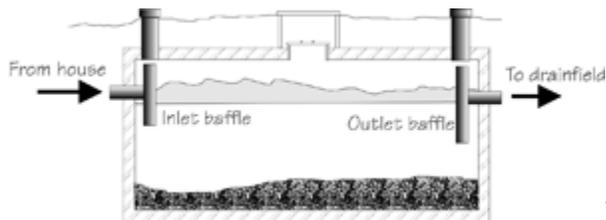
For more information on lawn seeding, check out the following publication.

[Establishing Lawns From Seed](#), UNL Turfgrass iNfo

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### **Maintaining A Septic System Tank**

By [Sharon Skipton](#), UNL Extension Water Quality Educator, and Jan Hygnstrom, UNL Extension Project Manager



Most acreage residents rely on their own private systems for wastewater treatment and disposal. For most, it will be a septic tank used in combination with a traditional drainfield.

In a septic tank/drainfield system, wastewater flows from the household wastewater plumbing into an underground septic tank. There, waste components naturally separate, with heavier solids settling to the bottom forming sludge, and lighter solids floating to the top, forming scum. Bacteria begin to treat wastewater by partially decomposing the solids. The liquid (effluent) flows through the outlet to the subsurface drainfield, also called a soil absorption field, leach field, soil treatment area, or laterals. A system will have a header, drop box, or distribution box between the septic tank and the drainfield to distribute effluent evenly between the drainfield trenches. The drainfield usually consists of a series of underground parallel trenches. For older systems, each trench contains a distribution pipe embedded in gravel or rock. Most systems installed since the late 1990s use plastic chambers set in trenches without gravel. The effluent flows through the distribution pipes or chambers where it moves through holes in the pipe or chambers down into the soil. The soil filters out remaining small solids and pathogens (disease-causing microorganisms). Also, bacteria and other microorganisms in the soil treat pathogens and other contaminants in the effluent. Water, carrying dissolved substances such as nitrate, slowly moves down to groundwater.

Proper maintenance of a septic tank and drainfield is critical to keep the system functioning properly. This protects human health and the environment. In addition, it delays the need to repair or replace a system, thereby saving money.



The septic tank will require more maintenance than the drainfield. One of the most important things you can do to keep the system functioning properly is to have the septic tank pumped regularly. Scum and/or sludge can build up, reducing the effective tank volume, resulting in wastewater moving through the tank more rapidly with less treatment. In addition, solids can be carried to the drainfield if the tank is not pumped regularly. This will clog the drainfield and not allow wastewater to be treated. Only a Nebraska certified pumper, professional engineer or registered environmental health specialist may legally pump a septic tank.

Conserving water to reduce the amount of wastewater that needs to be treated and distributing water flow to the septic tank over an extended period of time will extend the life of a system. Wastewater should remain in the septic tank long enough, at least 24 hours, for heavy solids to settle out, forming sludge, and light solids to float to the top, forming scum. Except for the period immediately after pumping, a septic tank should contain wastewater to its full capacity at all times. A tank that is only partially full means it has a crack or some sort of leak. As a gallon of wastewater flows into the tank from the house, a gallon of effluent flows out of the tank into the drainfield. If wastewater moves in and out of the tank too rapidly, due to constant flow for extended periods, or heavy water flow at any given time, solids remain suspended in the wastewater. This means they may move with the effluent out of the tank and into the drainfield. One important tip is to wash one or two loads of laundry a day, rather than three or more loads in one day. Also, check for and repair leaky faucets, toilets, and other leaks in the plumbing system.

Manage what is flushed down the toilet or drain to reduce the amount of solids in wastewater. More solids in wastewater will require more frequent septic tank pumping. Follow these tips:

- Do not flush cigarettes, diapers, feminine hygiene products, paper toweling, facial tissue, or “wipes.” They may not break down readily and will contribute to the scum or sludge layers. Dispose of these items with other solid waste.
- Do not overuse the garbage disposal. It grinds up food products that settle out in the tank, adding considerably to the sludge buildup and the amount of organic matter that needs treatment.

- Do not put grease or oils down the drain. Grease and oils from cooking, frying, and skin lotions increase the scum layer in the septic tank.
- Use liquid detergents instead of powdered detergents. Powdered detergents have “fillers” in them that add to the sludge layer.
- Use toilet tissue that breaks down rapidly. Test by placing a tissue sample in a jar of water, covering the jar opening, and shaking vigorously. The toilet paper should fall apart rapidly when the jar is shaken.
- Install a filter on the washing machine water discharge line to trap lint. Clean according to manufacturer’s directions.

The septic system is not the best way to dispose of some materials. While a septic tank and drainfield system can adequately treat many pathogens in wastewater, it cannot effectively treat all hazardous materials. Keep potentially hazardous materials including pesticides, paints and thinners, solvents, and excess medication, out of wastewater.

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**Phragmites – Control NOW for Best Results**  
**By Brent Meyer, Lancaster County Weed Control Superintendent**



Now is the best time to control Phragmites, *Phragmites australis*. As the days get cooler and the nights longer we begin to think the weed season is behind us. Not so in the case of some of our more invasive plants. Phragmites is just beginning to flower (head out) around the area making it the perfect time to apply herbicides for control. The plant is at the stage where it will be taking down carbohydrates into its rhizome’s to survive the winter, thus it will take along the herbicide into the rhizome’s and get you will get the most effective control possible.

**What to look for?**

Phragmites is a deep rooted perennial grass that will grow 6 – 15 feet tall and likes to grow in wetlands, around lagoons, near streams, creeks or in any area that may be wet for a period of time. Wetland areas typically occupied by cattails are great places to look for phragmites. The seed heads are typically dark in color when they first appear and then turn lighter as the plant matures and sets seed. This is one of the most aggressive noxious weeds in Nebraska and early detection and control are very important. If you think you have a pretty growing grass around a

wetland and you're not sure what it is, contact our office for help in identification. If left, it will only get worse and more expensive to control.



### **When and How to Control?**

The best time to get control is when the patch is new and there are just a few scattered plants. Once it gets established it will form a dense circular patch that is very easy to spot, but control will become much more difficult and expensive. Research and field data results show that herbicide control with Imazapyr (Arsenal or Habitat) or Glyphosate (Rodeo) have proven to be the most effective.

### **Three Ways to Spread**

Phragmites will spread by seeds blown by the wind or moved by water. By underground rhizomes that if broken or cut and moved will start a new plant and also by stolons that run across the top of the ground and root down and send up new plants every few inches. Stolons can grow as much as 30 feet in one year.



### **Why Should I Be Concerned?**

Phragmites left untreated will create a monoculture and crowd out all other vegetation. It will eliminate natural refuge and feeding grounds for invertebrates, fish, waterfowl and limit recreation values for birdwatchers, walkers, naturalists, boaters and hunters. The tender-dry

vegetation left in the fall creates the potential for fast-spreading fire that can threaten surrounding areas including homes and buildings.

Controlled burn of phragmites Phragmites left uncontrolled will grow so dense that it will eventually choke off rivers and streams and create flooding in low lying areas.

### **What Should I Do If I Find Phragmites & How Can I Learn More?**

Contact the [Lancaster Weed Control office](#) at 402-441-7817 and we will help develop a control plan for your situation. Or visit ua on the web, and click on the [Landowners Guide for Controlling Phragmites](#).

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UGA5178029 Management of Tree Squirrels

By [Stephen Vantassel](#), UNL Extension Wildlife Damage Management Project Manager

Squirrels can cause significant damage to human interests as they prepare for winter. Learn what works and what should be avoided in dealing with them. This webinar will review the biology, damage and its identification, and control methods for handling conflicts with gray, fox, flying, and red squirrels. Learn about habitat modification, exclusion, repellents, frightening devices, shooting, and trapping.

<https://learn.extension.org/events/1180>

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### **Let's "APP"le Up for 2013 AppleJack Festival!**

[Kimmel Education and Research Center](#) is preparing to "APP"le Up" for this year's AppleJack Festival in Nebraska City to be held on September 21 – 22. The University of Nebraska-Lincoln's extension educators and staff will host a variety of free educational activities during

the two-day celebration.



**“I’m farming and I grow it”** is a familiar phrase used by our featured guest Greg Peterson, one of the Peterson Farm Bros. Learn about the Peterson family farm and what they do to help feed the world. The Peterson Brothers’ parodies have millions of online viewers. Their “Life of a Farmer” video series spotlights agriculture with a new perspective. Greg Peterson will perform each day.

Greg Peterson is a 2013 graduate from Kansas State University where he majored in Agricultural Communications and Journalism. He grew up on a diversified family farm near Assaria, KS with his parents, 2 brothers, and sister. He has always enjoyed working on the farm and being an advocate for agriculture. In June of 2012, Greg and his brothers released a video on YouTube entitled, "I'm Farming and I Grow It." It quickly went viral, receiving over 8 million views. Since then Greg and his brothers have released 2 more videos and have now eclipsed 25 million total views on YouTube. The videos have given Greg many opportunities around the country to talk about agriculture and he is passionate about the future of the industry.

**“Lights! Camera! Action!”** Join a live viewing audience and participate in videotaping as we launch and shape information segments for future educational pieces. We welcome questions about agriculture, food, leadership, youth, health, extension and more.

**“APP”le Up** by learning about mobile apps from the Institute of Agriculture and Natural Resources, bringing information to your fingertips. Whether at the grocery store or out in the field, learn why UNL’s newest apps can provide you information you need; when and where you need it.

Middle school and high school students and their parents might like to learn about the 29 degree programs and 2 professional programs offered by the UNL College of Agricultural Sciences and Natural Resources. Sue Ellen Pegg, CASNR recruitment coordinator will assist in matching students’ interests and career goals.

Free educational activities and programs will be available to the public.

- A focus on energy and biofuels will be provided by John Hay, Extension Educator with the Biosystems Engineering Department.
- Marion Ellis, UNL professor of entomology and apiculture specialist, and Erin Ingram, UNL graduate student will be buzzing with knowledge about bees.

- The Department of Natural Resources will display an interactive flood model, demonstrating the effect of development and other factors about flooding.
- Wajira Ratnayake, Research and Outreach Food Scientist and Lucia Miceli Garcia, graduate student will explain how an apple cookie became the result of research at UNL.
- JoLeisa Cramer, a graduate student in Natural Resources will help us examine the skulls and learn about a few mammals of Nebraska.
- The UNL Horticulture Club will plant fun with seeds and information. Several activities will be “hands-on” where you can ask questions, touch, and learn about the environment surrounding you.
- For a tasty treat, the UNL Food Science & Technology Club will be selling UNL Dairy Store ice cream outside in their mobile trailer.

The UNL Kimmel Education and Research Center represents a unique public-private partnership between the Kimmel Orchard and Vineyard Educational Foundation, Inc. and the University of Nebraska. It is located at 5985 G Road, Nebraska City, Nebraska, next to the historic Apple Barn at Kimmel Orchard and Vineyard, northwest of Nebraska City.

“APP”le Up with Kimmel Education and Research Center and plant the seeds of innovation in community, leaders & entrepreneurs, local foods, youth, and health & wellness. Join the Kimmel team during this AppleJack event and let’s creatively grow together!

Check our blog at [KimmelTV.org](http://KimmelTV.org) for more information on this upcoming event, or contact [Deb Heidzig](#) at Kimmel Education and Research Center, 5985 G Road, Nebraska City, NE 68410 by phone 402-873-3166.

### Insects and Diseases in the Late Summer Garden

By [Nicole Stoner](#), UNL Extension Horticulture Educator



It is at this time of the year when we can really appreciate the beauty of our landscapes. As long as they are staying hydrated, many of our plants are in full bloom. Good maintenance of your perennial garden in fall, will enhance it's beauty and vigor next year.

One of my favorites would be all the plants in the Aster family. However, there is a disease to watch out for, and when possible, minimize this fall.

**Aster Yellows** is a virus-like disease, technically called a phytoplasma, that affects a wide range of plants including those in the Aster family. Plants included in the Aster family include asters, coneflower, chrysanthemums, Sunflowers and marigolds.

The most common symptom of Aster yellows is a yellowed appearance to the plants and stunted growth. You may also see the flowers become infected, which will show up as a green flower instead of the color it should be, flower heads coming up out of the main flower head, and distorted flowers.

Aster yellows is spread by leafhoppers. A leafhopper is a tiny insect that jumps from plant to plant feeding on the plant. When the leafhopper feeds on one infected plant it then spreads the disease to other uninfected plants.

There is no cure for Aster yellows. The best practice for infected plants is to remove them from your garden as soon as you notice the problem. This reduces its spread to other plants. Trying to control the leafhoppers is not a recommended practice because the virus can be spread before the insect is affected by any insecticides.

**Hollyhock Rust** has been very prevalent this year. Hollyhock is that beautiful tall flower that blooms with large trumpet-shaped flowers on the top half of the stem. The flowers are large and papery, and are found in many different colors. Rust is a fungus that affects this particular host.

Rust symptoms are seen as yellow to orange spots on the upper leaf surface followed by red to brown pustules on the lower leaf surface. This disease is spread by wind and splashing water, which includes rain and a sprinkler.

The best way to control rust is through sanitation, meaning removal of infected plants and leaves in fall to minimize overwintering of the disease. You should also check your plants often to look for the rust pustules and remove any leaves with rust on them during the growing season.

**Aphids** are being seen now on many of our plants. Aphids are the tiny green insects on the underside of leaves, and are commonly called greenbugs due to their color. To identify aphids, look closely for two cornicles sticking out of the abdomen, like two tailpipes.

Aphids cause a speckling yellow appearance to the leaves of your trees and shrubs. Their piercing-sucking mouthparts damage leaves as they suck the juices out of the tissue.

A strong spray of water can knock aphids off your plants with no damage to the beneficial insects, and the aphids will die from this technique. If chemicals are necessary, it is best to use a chemical containing bifenthrin or permethrin and/or a soil drench using imidacloprid.

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## The Many Uses of Compost

By [Sarah Browning](#), UNL Extension Horticulture Educator



Compost is usually screened to removed large pieces. A simple screen can be made using 1/2-inch mesh hardware cloth and attaching it to a wooden frame. Place the screen over a wheelbarrow or other container and sift the compost into it

Compost can be used in several ways: 1) a component in soil mixtures for containers or raised beds, 2) a soil amendment for ground beds, or as a 3) topdress fertilizer, 4) mulch, or 5) in compost tea. No matter how you use it, compost provides many benefits for plants.

### Compost Mulch

When used as mulch, compost creates a protective layer over plant roots that reduces soil temperature, reduces soil moisture loss and suppresses weed growth. It can be applied as mulch to flower beds, vegetable gardens, landscape beds, or lawns, but be sure to screen the finished compost first.

A simple screen can be made using 1/2-inch mesh hardware cloth and attaching it to a wooden frame, like an old window with the glass removed or an old screen door. Place the screen over a wheelbarrow or other container and sift the compost into it. The large pieces left behind can go back into your next compost pile. When mulching around trees and shrubs, screening may not be necessary, since this is really a matter of aesthetics and your personal taste.

Prepare an area for mulching by clearing away existing grass or weeds, making sure to remove the roots of tough perennial weeds. Cover the garden or bed area with screened compost to a depth of one to two inches.

### Topdress Your Lawn with Compost

When used as a topdressing, a light layer of compost is broadcast over an existing lawn to promote improved soil structure, add organic matter and nutrients, and promote increased decomposition of thatch. Apply a topdressing of compost in September or after the first spring mowing, but not during the middle of summer.

When applying compost on a lawn, be sure the compost is very dry, and finely ground or sifted so there is less chance of smothering the lawn with large pieces of organic material. To finely screen compost, use a ¼-inch mesh hardware cloth instead of the ½-inch mesh used for compost mulch. To apply ½-inch of compost over your entire lawn, you will need approximately ¾ cubic yard per 1,000 sq.ft. (A 30-gallon garbage can holds about 4 cubic feet of compost.)

One way to incorporate the compost is to aerate the sod, then apply a ¼ to ½-inch layer of fine compost. Afterwards, either aerate again, or use a rake to distribute compost into the corings. Water the lawn well.

### **Soil Amendment with Compost**

When starting a new garden or landscape, soil amendment is recommended before planting. It is so much easier to add compost before anything is plant, than after.

When new homes are constructed the existing topsoil is often stripped away, removed, and not returned, so new homeowners are left with subsoil to establish a new lawn and landscape. Soil amendment with compost, worked into the underlying subsoil layer, before the final lawn or landscape is planted gives new homeowners much better soil for years to come. It's definitely worth the extra expense and labor.

To amend bare soil, cover the area with 1 to 2 inches of compost and incorporate it by tilling the upper six inches of the soil. One cubic yard of compost will cover 325 sq.ft. at a depth of 1 inch.

### **Using Compost in Potting Mixes**

Compost is an excellent component for creating soil mixes, which can be used in containers or to fill raised beds. Compost is excellent for container growing mixes, because it stores moisture effectively and provides a variety of nutrients not typically supplied in commercial fertilizers or soil-free potting mixes. To create your own soil mixture, blend screened compost with topsoil, peat moss, or commercial potting mixtures.

However, make sure the compost does not make up more than 50% of the potting mixture's total volume. Research has shown that decreasing plant growth is found when plants are grown in potting mixes made up of more than 50% compost.

### **Compost Tea**

An old fashioned way of providing liquid fertilizer for plants is to brew compost tea. Similar to manure tea, compost tea gives plants a good dose of nutrients. Compost tea works especially well for providing nutrients to new transplants and seedlings.

To make compost tea fill a burlap sack or an old pillow case with finished compost and secure the open end. Place the bag in a tub, barrel, or watering can filled with water. Agitate for a few minutes and then let it steep for a few days. Nutrients will leach out of the compost and the mixture will become tea-colored.

Spray or pour compost tea on and around plants. Use the bag of compost for several batches. Afterwards, simply empty the bag's contents onto the garden.

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### **Beta-agonists: What Are They and Should I Be Concerned?**

By [Lindsay Chichester](#), UNL Extension Livestock Educator, [Heather DePra](#), UNL Extension Educator, and [Galen Erickson](#), Nebraska Cattle Industry Professor of Animal Science



Beta-agonists are approved feed additives and are deemed safe by the U.S. Food and Drug Administration (FDA), where they act to enhance lean muscle gain, increase growth rate, and increase feed efficiency. There are differences between specific beta-agonists, but those approved by the FDA include ractopamine (brand names include Optaflexx and Paylean) and zilpaterol (brand name Zilmax). They are used in the U.S. swine and beef production since receiving FDA approval in 1999 and 2003, respectively. Additionally, beta-agonists have been approved for use in more than 24 countries (including the U.S., Canada, and Australia); and some countries have restrictions on specific types of beta-agonists. Approval for use in turkeys followed, but beta-agonists are not used as extensively in the turkey industry as in the swine and cattle industries. Beta-agonists re-focus the energy spent on feed conversion, and instead of adding mainly fat to the animal at the end of the finishing period, beta-agonists signal the animal to also continue to add additional lean muscle 20-40 days prior to harvest.

The beta-agonist binds to receptors in a muscle cell where it initiates an increase in protein synthesis, resulting in an increase in muscle fiber size. Beta-agonists are different than hormone implants in that the effects occur at a cellular level and do not affect the hormone status of the animal; whereas an implant, made of natural and synthetic hormones, does affect the hormone status of the animal to promote growth.

Interestingly, beta-agonists have been used and studied in human medicine long before they entered the animal production industries. In human medicine, beta-agonists are inhaled directly into lungs of asthma patients to relax smooth muscles that are constricting airways; they are

routinely used on smooth muscle tissue through direct entry into the cardiopulmonary system; and pregnant women who are in premature labor have beta-agonists injected into their blood via IVs, to relax the smooth muscle tissue of the uterus, preventing premature births.

It is estimated that 60-80% of U.S. fed cattle are raised with a beta-agonist; either Zilmax (also known as zilpaterol hydrochloride, made by Merck Animal Health) or Optaflexx (also known as ractopamine hydrochloride, made by Elanco Animal Health). Zilmax has a three-day withdrawal period and is not intended for use in breeding animals, equine animals, or veal calves. With the addition of beta-agonists in an animal's diet, there have been no reports of foodborne illness or human side effects reported. Beta-agonists have a very short half-life, meaning the animal's organs break them down, metabolize and excrete them quickly in the feces and urine; ultimately resulting in no beta-agonists stored in the animal's tissues (i.e. meat).

On August 7, 2013, Tyson Fresh Meats announced that as of September 6, it would no longer accept (temporarily at this point) cattle fed the beta-agonist Zilmax. Tyson Foods said the decision was based on animal mobility and welfare concerns, not food safety. It is unknown what the true cause of the mobility concerns are from, but animal health experts suggested Zilmax could be a possible cause. This decision was based off of observations that animals were arriving at harvest facilities showing signs of difficulty in walking or moving. The decision came quickly and without direct science and research to prove these claims; there is currently no scientific evidence that supports that beta-agonists may be causing cattle mobility issues. Further, no indications of lameness and mobility problems have been reported in controlled feedlot cattle studies prior to these claims where tens-of-thousands of cattle were involved in direct research. Days after Tyson's announcement, Cargill posted a statement on their website announcing they too will stop purchasing cattle fed Zilmax in North America until the Merck research study is complete. At this time, the other packers, National Beef and JBS, have decided not to follow suit and are still accepting animals fed Zilmax.

Merck (the maker of Zilmax) has since taken proactive steps and announced it will temporarily suspend Zilmax sales in the U.S. and Canada during a product study period. During this period their plan is to establish valid study protocols, identify feeders and packers to participate in the audit, and create a third-party verification team to oversee the process and validate the results.

Merck indicated that animal health and well-being are the first and foremost priority. The benefits and safety of the product are well documented in a 30+ year history of research, development, and rigorous testing of the Zilmax product. In addition, worldwide regulatory agencies have reviewed the extensive data and found that when used according to the label, it is safe. Merck also stressed they have a strict policy to "vigorously pursue all reported adverse events, whether or not they are deemed related to the product." Merck also announced they would re-certify all feedlot operators using Zilmax, to ensure the drug was being used properly. In addition, a "scientific audit" will be conducted to determine the potential causes of lameness and other mobility issues in the cattle Tyson based their decision on.

Merck's animal health unit said it would require cattle feeders using Zilmax to undergo more training as part of a 'Five-step Approach to Ensuring Responsible Beef.' The five steps include:

1. Recertify every feeder, nutritionist, or veterinarian that feeds Zilmax to cattle, with special attention to feed mixing and determining which cattle are good candidates for beta-agonist use.
2. Within 30 days, reach out to packers and suppliers to initiate a scientific audit, focusing on feeding Zilmax. Cattle will be tracked from the feedlot to the packing plant to determine potential causes of lameness and other mobility concerns during feeding, transportation, off-loading, and staging at the packing facility.
3. Based on the findings, Merck will enforce appropriate management practices to include overall nutrition and feeding objectives, animal handling, low-stress environments, and transportation.
4. Within 30 days, Merck will form a health advisory board. The group will be made of small, medium, and large feeders, packers, cow-calf operators, and animal health and nutrition experts. These people will be responsible for reviewing available data and recommend any needed management practices.
5. Merck will share all findings.

Tyson's website indicates they process about 132,000 cattle a week, which is approximately 26% of the U.S. beef market; while Cargill indicates they are approximately 21% of the U.S. beef market processing about 174,000 cattle a week. Cattle feeders who sold to Tyson and/or Cargill now have three options, they can continue to feed Zilmax and market to other packers, switch to a different beta-agonist (Optaflexx in this case), or stop feeding Zilmax altogether. Optaflexx research indicates that carcass weight increases are not as significant as compared to the response from Zilmax, with six to eight pounds less per carcass.

Market analysis reports indicate that the use of beta-agonists account for up to a 1.5-2% increase in meat production; which equates to approximately 24-33 additional pounds of beef, and six to seven additional pounds of pork. If you estimate that half of the 24 million head of beef cattle harvested annually produce an additional 30 pounds of meat. This would be an additional 360 million pounds of lean beef a year! This becomes a staggering number to ponder, especially as we continue to face drought, decreasing cattle inventory numbers, increasing grain prices, as well as increases in the price for red meat at a retail level. With an estimated 700 million pigs receiving a beta-agonist each producing six additional pounds, an additional 4 billion pounds of pork would be produced annually! While the use of technology in the cattle and pork feeding industry is making great strides, concerns have surfaced about the possibility of less tonnage of beef being produced in the coming months. It will be hard to tell immediately, as other beta agonists are available to cattle feeders. Industry reports have indicated fed-cattle futures and boxed-beef prices have moved higher, with shorter beef supplies anticipated.

The goal is to ensure that the animal's well-being is considered first and foremost. Animal health companies, feedlots, and the packing industry are working in conjunction with scientists, researchers, and cattle industry representatives to determine the cause of the mobility and lameness concerns (these allegations will be proved through sound science and research), and to address this problem if one is found to exist. In this case, animal mobility has become an animal care concern and the beef industry is being proactive by temporarily halting sales of Zilmax to complete further research. Stay tuned as all research results will be made available!

## Resources:

- [http://www.fao.org/fileadmin/user\\_upload/agns/pdf/Ractopamine\\_info\\_sheet\\_Codex-JECFA\\_rev\\_26April2012\\_2.pdf](http://www.fao.org/fileadmin/user_upload/agns/pdf/Ractopamine_info_sheet_Codex-JECFA_rev_26April2012_2.pdf)
- <http://factsaboutbeef.com/2013/05/21/beta-agonists-and-cattle-how-targeted-use-results-in-leaner-beef/>
- <http://factsaboutbeef.com/category/expert-opinion/>
- <http://www.merck-animal-health-usa.com/products/Zilmax/overview.aspx>
- <http://www.reuters.com/article/2013/08/14/us-usa-merck-zilmax-idUSBRE97C0PN20130814>
- <http://beefmagazine.com/processors/tyson-s-zilmax-policy-continues-jitter-industry>
- <http://www.dailylivestockreport.com/documents/DLR%208-19-2013.pdf>
- <http://www.cattlenetwork.com/e-newsletters/drovers-daily/Merck-strengthens-its-commitment-to-responsible-beef--219956141.html>
- <http://www.cattlenetwork.com/e-newsletters/drovers-daily/Will-beef-production-plummet-with-Zilmax-suspension-220269141.html>
- [http://beefmagazine.com/blog/industry-keeps-its-cool-amid-zilmax-ban-angus-defects?NL=BEEF-02&Issue=BEEF-02\\_20130819\\_BEEF-02\\_421&YM\\_RID=1\\_chichester%40hotmail.com&YM\\_MID=1416929&sfvc4enews=42](http://beefmagazine.com/blog/industry-keeps-its-cool-amid-zilmax-ban-angus-defects?NL=BEEF-02&Issue=BEEF-02_20130819_BEEF-02_421&YM_RID=1_chichester%40hotmail.com&YM_MID=1416929&sfvc4enews=42)
- <http://www.meatingplace.com/Industry/News/Details/44111>
- <http://www.cattlenetwork.com/e-newsletters/drovers-daily/NCBA-comments-on-Mercks-plan-to-ensure-responsible-beef-219446491.html>
- [http://beefmagazine.com/animal-welfare/tyson-says-it-won-t-buy-zilmax-fed-cattle-after-sept-6?NL=BEEF-02&Issue=BEEF-02\\_20130813\\_BEEF-02\\_334&YM\\_RID=1\\_chichester%40hotmail.com&YM\\_MID=1415561&sfvc4enews=42](http://beefmagazine.com/animal-welfare/tyson-says-it-won-t-buy-zilmax-fed-cattle-after-sept-6?NL=BEEF-02&Issue=BEEF-02_20130813_BEEF-02_334&YM_RID=1_chichester%40hotmail.com&YM_MID=1415561&sfvc4enews=42)
- <http://www.cattlenetwork.com/e-newsletters/drovers-daily/Tyson-says-it-will-stop-buying-cattle-fed-beta-agonist-218853311.html>
- [http://www.merck-animal-health-usa.com/binaries/Zilmax\\_FAQ\\_tcm96-112316.pdf](http://www.merck-animal-health-usa.com/binaries/Zilmax_FAQ_tcm96-112316.pdf)
- <http://sheboygan.uwex.edu/files/2010/08/Beta-Agonists-Factsheet.pdf>