



Better Varieties, Better Gardens

By Caitlin Stegmiller, caitlin.steg@gmail.com

Standing in the garden of my husband's family farmstead, I was frustrated. I'd heard tales of the fantastic garden the previous matriarch tended.

Eighty pepper plants! Prize winning carrots! Pickles galore! Surely this land was fertile and productive. But as I strode through the garden that first summer, picking a few measly cucumbers and peppers, I began to question these tales. I know gardeners exaggerate a little, but I had also seen the evidence of these productive plots in the endless jars of pickles and canned vegetables. Something was wrong, but what was it?

A little research and a little griping led to the conclusion; not all vegetable varieties are created equal. How do I know which variety is best? My method of blindly picking seed packets from the kiosk in the big-box grocery store was clearly not working. Luckily, NDSU Extension Horticulturist, Tom Kalb and his team of citizen scientists from across North Dakota have done the work for me.

"If you want to identify the best varieties for gardeners, it makes sense to gather the opinions of gardeners, and test the varieties in gardens." This simple theory, put forth by Kalb, is the basis of the NDSU Home Garden Variety trials program. Kalb started the program over 20 years ago in Wisconsin and has been implementing it in North Dakota since 2008. Each fall, the results from the previous season's trials are published. As gardeners across the state start planning their summer endeavors, we can look to the 2017 results for guidance.

2017 Results

Cut Flowers

Three types of cut flowers were available for trial in 2017: zinnias, cosmos and sunflowers. Bright and beautiful, zinnias were the most popular trial. Benary's Giant and Giant Dahlia varieties both earned high ratings from gardeners. Mildew resistant Benary's Giant had long, thick stems that fared well for cutting. Giant Dahlia was a beauty in the gardens. One gardener commented on how people stopped on the street to look at the gorgeous zinnias in bloom.

Cosmos varieties Double Click and Cupcake both did well in the summer's trials, though Sonata remains the top choice for cosmos



Zinnias were the most popular trial in 2017 (Photo by Don McCulley).

NDSU EXTENSION SERVICE

INSIDE THIS ISSUE

- Better Varieties 1-2
- Plant a Tree 2-3
- Gardening for Wildlife 3-5
- Garden Terms..... 5
- Cacti and Succulent6-7
- Heirloom Beans 7-8
- Ornamental Grasses9-10

in North Dakota. Gardeners tended to favor Double Click for its earlier blooms and higher production, but the Cupcake variety boasted larger, long-lasting blooms.

Gardeners were excited about the cut sunflower trials, though some were disappointed in the sunflowers' large sizes. "I thought these plants would stay small like the roadside sunflowers...they did not!" one gardener wrote. A note in the results states that growing the stalks closer together can help create smaller plants. Both varieties, ProCut Gold and Vincent's Fresh, grew well, but ProCut Gold seemed somewhat more drought tolerant.

Carrots

Growing carrots in North Dakota can be a difficult task. Hard, heavy soil can lead to some goofy looking roots. Kalb recommends Hercules Chantenay, a stout, cone shaped carrot that has done well for several years, including 2017 where it out grew and



Short and stout Chantenay carrots are well suited to North Dakota's heavy soils (Photo by Claire Knights).

out tasted the Royal Chantenay variety. Mainseason Nantes carrot varieties, Bolero and Kuroda were also popular. While the drought hindered some germination and yield levels, gardeners enjoyed growing and eating both varieties, with Kuroda having a slight advantage in raw taste.

Sweet corn

Sweet corn is a summer staple, and early maturing varieties are important for North Dakota's short growing season. In 2017, Bodacious RM was a strong sweet corn performer. Ready in 75 days, its productive stalks showed well even in the driest parts of the state. Bodacious RM earned 90% recommendation from gardeners. But this top dog will have some competition in 2018, as American Dream sweet corn will be joining the trials. This 2018 All-America Selections Edible Vegetable winner has won significant praise for its outstanding taste.

These are just a few of the highlights from the 2017 trials. For more information, a list of recommended cultivars for North Dakota, and full reports of results, visit: www.ag.ndsu.edu/homegardenvarietytrials

Kalb stresses that everyone is welcome to take part in the Home Garden Variety Trials. Each year, gardeners from over 200 sites across the state participate. It is this broad base of input that has contributed to the program's success. Of those participating in the program, 87% of gardeners reported more productive gardens and 97% will change the way they grow their garden in the future.

So, this spring, I am setting out to change the way my garden is grown. As I start to page through seed catalogs, armed with nearly a decade of research and recommendations, I am confident that someday I will have my own unbelievable garden tale.

Sources:

Kalb, Thomas. Results - Home Garden Variety Trials [PDF File], Dec. 2017, www.ag.ndsu.edu/homegardenvarietytrials/results.

Plant a Tree for the Future

By Cathy Ruebel cruebel@midco.net

Our ancestors who settled on the prairies of North Dakota knew trees were essential for food, shelter, and protection from the elements.

Planting trees was a priority, and not much has changed since then, when it comes to the value of trees in our state. Arbor Day is the first Friday of May...what a perfect time to celebrate the end of another long winter by planting a tree!

Bare root trees provide a great opportunity for landowners and home gardeners to invest in the future, but the window of opportunity is pretty short, only while the trees are in dormancy. Harvested in fall, the soil is removed from their roots and they are then stored for the winter. Bare root trees are generally smaller in girth than container-grown or balled and burlap trees. Their complete root system can be inspected for damage; circling roots can be untangled, and they generally will have less transplant shock. Bare root trees cost less and are easier to transplant. Not all nurseries will carry bare root trees. You can order stock online for delivery dates appropriate to your area. Look for sources that provide northern grown trees for best success. See a list at the end of this article for some regional nurseries that provide bare root stock.

Tips for planting bare root trees

- Pick a cultivar that is hardy to your area; USDA Zone 3 to 4 or colder for North Dakota. Consider the growth habits, resistance to pests and diseases, and flower/maturity dates of fruit. Local nurseries will have the best of what grows in your area.
- Match your tree to the location. Allow for soil type, water needs and drainage, nearby utilities, and proximity to building foundations.
- Be aware of conflicts with other plants and trees nearby. For example, cedar-apple rust, a fungal disease, needs both hosts to complete its life cycle. It can be devastating to both trees (apples or crabapples and Eastern red-cedar). Black walnut trees exude juglone, an anti-fungal substance that is toxic to other plants, shrubs and trees planted nearby.
- Consider the mature height and width of the tree. That pretty little spruce will make a lovely decorated Christmas tree just outside your window for a few years. At maturity, it can completely obstruct any view and pose a hazard to the building itself.



Fig 1 and 2 Credit Swedberg Nursery, Battle Lake, MN

- **BEFORE YOU DIG:** In North Dakota, make sure to register with North Dakota One Call. Dial 8-1-1 or register online at www.ndonecall.com. State law requires everyone, even the novice homeowner to call (or file online) at least 48 hours in advance to mark buried utilities on your property.
- It would be a good idea to have a soil test completed for your intended area. If the soil pH is too alkaline, certain tree species should not be planted because they may be susceptible to iron chlorosis.
- Have your tools and supplies on hand: a spade, hand trowel, bypass pruner, wood mulch, braces and straps, etc.
- Larger trees will need brace posts and tree straps to support the tree during strong winds. Trees over 5-6 feet and or 1 inch diameter should have additional support for the first year; use at least three posts per tree.

- Bare root stock needs to be planted immediately. If that is not possible, keep the tree in a cool dark place (but not freezing), like an unheated basement, cellar or garage. Make sure roots are covered with wet material such as burlap, shreds of newspaper or peat moss to keep them damp, but not sitting in water.

OK, it's time to get your hands dirty. The hole should be dug to the depth of the roots. The width should be at least twice or three times the roots' span. Look closely at the roots. Where the trunk of the tree flares out and the roots begin is called the "root collar." This is where the level of the soil should be after planting, no deeper!

If the subsoil is very dry, dig the hole the day before planting and fill it with water and let it seep away. If the soil is very sandy, a couple fills might be needed to rehydrate the surrounding soil.

Soak the roots in water for 3-6 hours before planting. This helps to rehydrate the tree. Prune off any damaged roots or roots that

may circle the stem; shorten any that are really long compared to the rest. Make sure the roots are covered and kept damp during the transplanting process, too!

Set the tree into the prepared hole. It helps to have someone hold the tree upright and plumb, keeping the root collar at the proper level. With some root structures, it is recommended to put a little mound of soil in the center of the hole to support the collar at the right height while allowing the roots to spread out around it. Don't bend the roots to fit the hole. Dig the hole bigger.

Gently backfill with the original soil, breaking up any clumps and working the soil around the roots. Pat the soil with your hand to firm it up; don't step on it to squeeze it down as the tender feeder roots will be damaged and the soil compacted. Make sure the root collar stays at the right height. If it's a fairly deep hole and the soil is dry, add some water halfway through the backfill so all the air pockets around the roots are eliminated, settling the soil.

Once completely backfilled, make a slight

berm around the edge of the hole to help to hold in the water so it can soak in slowly. Fill the berm with water to settle the rest of the soil. After it has seeped in, more soil may be needed due to settling, then water again.

Install your tree braces and secure the straps, making sure there is a little slack for the trees to get some wind action and the wire isn't in direct contact with the bark. Spread wood mulch 2-4 inches deep around the tree, making sure to keep the mulch a few inches away from the trunk.

For this first year, water the tree weekly or as needed, depending on soil conditions and precipitation. A moisture meter probe, available at garden centers, will help to avoid over or under watering your plants and trees. Tree watering bags can help save water by trickling it right to the root zone.

Bare root trees are easy to plant and a great investment for the future in North Dakota. You've heard the saying, "The best time to plant a tree was twenty years ago. The second best time is NOW."

Sources for bare root trees

Towner State Nursery –
North Dakota Forest Service
878 Nursery Road, Towner ND
58788-9500
(701) 537-5636
www.ag.ndsu.edu/ndfs

Cashman Nursery
3400 E Main Avenue
Bismarck, ND 58501
(701) 222-3333
www.cashman-nursery.com

Lowe's Floral
1640 4th Ave NE
Minot, ND 58703
(701)839-2000
(800) 546-4995
www.lowesfloral.com

Tim Shea's Nursery & Landscaping
3515 S. Washington St.
Grand Forks ND, 58201
701-772-3489
www.sheasnursery.com

Lincoln Oakes Nursery
3310 University Drive
Bismarck, ND 58504, US
(701) 223-8575
www.lincolnoakesnursery.com

Institute of Life
Bismarck, ND
(701) 426-7668
evenings and weekends
<http://www.letbf.com>

Baker Garden & Gift
2733 S. University Dr.
Fargo, ND 58103
701-237-6255
www.bakernursery.com

Swedburg Nursery
37499 State Highway 210
Battle Lake, MN 56515
(218) 864-5526
www.swedbergnursery.com

Gardening for Wildlife

By Lila Hlebichuk, lilahl@yahoo.com

This was an exceptionally cold winter and many of us are still grumbling about our exciting heating bills. The wildlife in the area didn't have the worry of heating bills; for them it is simply about survival. As we plan our gardens we can include elements that not only bring us joy during the gardening season but will aid the wildlife that enhance our nature experiences all year long. Deer, rabbits, squirrels and raccoons as well as other wildlife members can wreak havoc on

our gardening endeavors so the focus will be on birds, bees and butterflies.

Queen bumblebees are overwintering usually in underground nests while birds need to be equipped to handle the elements. Many birds grow additional feathers and put on extra fat reserves in the fall. Their legs and feet are covered with specialized scales allowing them to control blood flow to their extremities. They can fluff their feathers, creating warm air pockets and tuck their bills/legs into their



Fig. 1 Solidago

feathers for additional protection. Birds shiver to raise their metabolic rate and roost together in small spaces sharing body heat. Birds also cache or store seeds in the cracks in tree bark and even between wood splinters in the siding of your house. The Cornell Lab of Ornithology reports, "Chickadees can actually grow and shrink their brains! When it's time to store food in the fall, the birds need a strong mechanism for remembering their hiding spots. Neurons are added to the hippocampus region of their brain, increasing volume by about 30%. As the winter comes to a close, temperatures rise, and food becomes more readily available, their brains shrink down because the birds no longer need the super-strong memory."

You can follow the guidelines of the National Wildlife Federation for establishing a wildlife habitat which include:

- Food
- Water
- Cover
- Places to Raise Young
- Sustainable Practices

Food

Supplementing the birds with seeds and especially black oil sunflower seeds is beneficial to birds not only in the winter, but also in the spring when they are nesting and feeding their babies. However, according to Birds and Blooms, "Scientists have shown that chickadees, for example, will eat only 25% of their daily winter food from feeders. They find the other 75% in the wild." Finding food in the wild can be daunting as more and more habitat is converted to suburban lawns and exotic plantings.

Planting a pollinator garden with a focus on native plants provides pollen and nectar during the spring and summer months. Some birds including hummingbirds need protein in the form of mosquitoes, spiders, thrips and gnats in addition to nectar so using Integrated Pest Management helps our feathered friends and the environment. Unless there is a disease problem, leave garden cleanup until spring. The seed heads are an important source of food into the winter as well as critical habitat. The Guardian urges us to "Let dandelions grow: bees, beetles and birds need them." At least delay the early spring lawn mowing. The author states, "...the dandelion's peak flowering time is from late March to May, when many bees and other pollinators emerge from hibernation. Each flower consists of up to 100 florets, individually packed with nectar and pollen. This early,



Fig. 2 *Symphyotrichum*



Fig. 3 *Celastrus*

easily available source of food is a lifesaver for pollinators in spring." Beneficial plants to consider for your garden include:

- Crocus (*Crocus* spp. – early spring blooms)
- Grape hyacinth (*Muscari* spp. – early spring blooms)
- Pasqueflower (*Pulsatilla patens* – early blooms)
- Columbine – (*Aquilegia canadensis* – early blooms)
- Golden Alexander (*Zizia aurea* – early blooms)
- Black Eyed Susan (*Rudbeckia hirta* – middle to late summer blooms)
- Purple Coneflower (*Echinacea angustifolia* – middle to late summer blooms)
- Bee Balm (*Monarda fistulosa* – middle to late summer blooms)
- Goldenrod (*Solidago rigida* – fall blooms) Fig. 1
- New England Aster (*Symphyotrichum novae-angliae* – fall blooms) Fig. 2

Planting shrubs and trees with persistent berries and fruit can also be a source for food. For our area these may include:

- American Bittersweet (*Celastrus scandens* - Zone 3) Fig. 3



Fig. 4 *Arborvitae*



Fig. 5 *Aronia*



Fig. 6 *Picea*

- American Cranberry Bush (*Viburnum trilobum* - Zone 2)
- Arborvitae (*Thuja occidentalis* - Zone 3) Fig. 4
- Barberry (*Berberis* spp. - Zone 3)
- Black Chokeberry (*Aronia melanocarpa* - Zone 3) Fig. 5
- Blue Spruce (*Picea pungens* - Zone 2) Fig. 6
- Hawthorn (*Crataegus* spp. - Zone 3)
- Serviceberry (*Amelanchier* spp. - Zone 3)
- Sumac (*Rhus* spp. - Zone 3)
- Apple (*Malus* spp. – Zone 3)
- Plum (*Prunus americana* – Zone 3) Fig. 7

Water

Providing water in the warmer months with a pond or stream, if nearby, or even a bird bath is easy. In the winter it may mean

putting small containers of water by the bird feeders and changing often as they freeze. There has been some success with tank heaters or heated pet bowls. If the bowl is deep, provide a rock perch for the birds in the winter and in the summer for butterflies.

Cover

Cover in the form of evergreens, a wooded area of dense shrubs and trees and tall grasses can provide protection from the weather and predators. Cover plantings may include:

- Rocky Mountain Juniper (*Juniperus scopulorum* – Zone 3)
- Switch grass (*Panicum virgatum* – Zone 3)

Places to Raise Young

Places to raise young are also provided by some of the cover choices. In addition many herbs and perennials also provide a place to raise young.

- Rose milkweed (*Asclepias incarnata* – Zone 3) Fig. 8
- Dill (*Anethum graveolens*)
- Fennel (*Foeniculum vulgare*)

Sustainable Practices

Sustainable practices include soil and water conservation, controlling exotic species and organic practices.

- Plant and use mulches to reduce erosion



Fig. 7 *Prunus*

- Practice Integrated Pest Management
- Reduce or eliminate toxic pesticides and herbicides

Your goal may be a certified wildlife habitat, a pollinator garden or adding a native plant or two each year. Even the smallest effort can benefit our wildlife.

All photos are courtesy of Missouri Botanical Garden Plant Information.

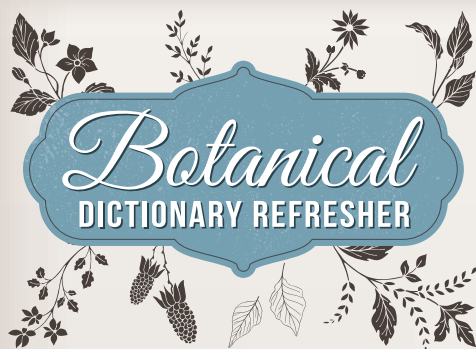
Sources:

<http://www.birdsandblooms.com/birding/birding-basics/winter-birds-myths-facts/>
<http://www.birdsleuth.org/how-do-birds-survive-winter/>
<https://www.theguardian.com/lifeandstyle/gardening-blog/2015/may/12/dandelions-pollinators-wildlife-garden>



Fig. 8 *Asclepias*

<https://www.ag.ndsu.edu/publications/lawns-gardens-trees/bee-utiful-landscapes-building-a-pollinator-garden>
<https://www.youtube.com/watch?v=P5DktQPtPAs&feature=youtu.be>
<https://www.nwf.org/Garden-for-Wildlife/Certify>
https://www.nwf.org/-/media/PDFs/Garden-for-Wildlife/Certified-Wildlife-Habitat/NWF_Garden-Certification-Checklist.ashx?l=a=en&hash=FFAA30B3AE06687A881FC4BE615DEFB0E2BACF42
<http://www.birdsandblooms.com/birding/attracting-birds/plants-and-trees-that-attract-birds/plants-attract-birds-seasons/>
<http://www.birdsandblooms.com/birding/attracting-birds/plants-and-trees-that-attract-birds/plants-attract-birds-seasons/>



By Lila Hlebichuk, lilahl@yahoo.com

All of the terms listed were mentioned in the article on Gardening for Wildlife.

Americana: From the Americas
Plum: (*Prunus americana*)

Angustifolia: Narrow leaf
Purple Coneflower (*Echinacea angustifolia*)

Aurea: Golden flower
Golden Alexander (*Zizia aurea*)

Canadensis: From Canada and North America
Columbine – (*Aquilegia canadensis*)

Fistulosa: Hollow; tube-like
Bee Balm (*Monarda fistulosa*)

Graveolens: Heavy scented
Dill (*Anethum graveolens*)

Hirta: Hairy
Black Eyed Susan (*Rudbeckia hirta*)

Incarnata: Flesh colored
Rose milkweed (*Asclepias incarnata*)

Melanocarpa: Black or dark fruit
Black Chokeberry (*Aronia melanocarpa*)

Novae-angliae: From New England (USA)
New England Aster (*Symphyotrichum novae-angliae*)

Occidentalis: From the west
Arborvitae (*Thuja occidentalis*)

Patens: Spreading
Pasqueflower (*Pulsatilla patens*)

Pungens: Sharply pointed, spiny
Blue Spruce (*Picea pungens*)

Rigida: Rigid
Goldenrod (*Solidago rigida*)

Scandens: Climbing or sprawling
American Bittersweet (*Celastrus scandens*)

Scopulorum: Grows on cliffs
Rocky Mountain Juniper (*Juniperus scopulorum*)

Trilobum: Three lobed leaves
American Cranberry Bush (*Viburnum trilobum*)

Virgatum: Twig-like, striped
Switch grass (*Panicum virgatum*)

Vulgare: Common
Fennel (*Foeniculum vulgare*)

Peace Garden Cacti and Succulent Collection

By Rachel Brag, rbinndak@gmail.com



Fig. 1

Along the 49th parallel in North Dakota and Manitoba, there is a world class collection of cacti and succulents. These exotic plants reside at the International Peace Gardens, oblivious to their splendor and vast representation of species.

The conservatory is housed in the Interpretive Center and consists of three unique rooms. The Solarium is home to many cacti and succulents. (Fig.1) The Tropical Walkway has a tinted roof which provides shade for plants that would be found growing under a canopy. (Fig.2) The Desert Garden (Fig.3) houses plants from North America, South America and Africa that require a sun filled hot environment.

The history of the collection is explained in the book, *Hens and Chicks, The Don Vitko Collection* by Kari L. Barchenger. The purpose of this article is not to repeat the information found within the pages of the book but to shed some light on the work required to display and maintain the collection consisting of over 4,000 species and containing an incredible 6,800 plants. Learning about the origin of a species results in optimum growing conditions and they can be cared for as if they were in their native environment.

I met with Johannes Olwage, lead horticulturist for the collection, and discussed the many responsibilities of carrying for a plant grouping of this magnitude. Olwage has been involved with the collection in one way or another since 2009. He has a Bachelor of Science in Biodiversity and Ecology from the University of Stellenbosch in South Africa.

The cacti and succulents enter dormancy in the fall, mainly in November. Olwage said



Fig. 2



Fig. 3



Fig. 4



Fig. 5

he can tell when they enter dormancy as the soil doesn't dry out as fast. During the growing season of May through September, the plants are watered on average every ten days. Each plant is in its own pot (Fig.4) and they are hand watered with a hose. This allows the customization of water to the plant's specific needs.

Spring is the time of year when repotting and cuttings happen. Succulents are cut and repotted approximately once per year. Cactus are the lowest maintenance and can go three

to four years between repotting. (Fig.5) Cactus flower from March to July so if you want to see the show, visit in spring to midsummer.

Pests can be a problem to control, especially in a year around: warm climate. Spider mites thrive in the dry air but are not a huge problem on the cacti. Mealy bugs are dealt with by using a 10% alcohol solution, which can penetrate the their waxy coating causing them to dry out and die. Root mealy bugs can't be seen but a root drench which is systemic is used. Thrips, white flies and



Fig. 6



Fig. 7



Fig. 8

aphids are also pests that Olwage has had to deal with and control. When I asked him how aphids access the plants in a closed environment, Olwage responded that in spring when the temperature reaches 80 degrees, the louvers open and the aphids enter the conservatory.

Olwage said that the rarest plant in the collection is *Mammillaria herrerae*. *Mammillaria herrerae* belongs to the Cactaceae family and is a small round cacti

that resembles a golf ball. Its natural habitat is hot deserts, is threatened by habitat loss and considered critically endangered. The oldest plant in the collection is *Echinocereus grusonii* (Golden Barrel cactus) at about 60 years old. The tallest cactus is *Cereus peruvianus* at 25 feet tall. Although there are many unique specimens, the beauty of the way they are displayed and arranged is just as stunning. (Fig.6 & 7) The outdoor patio (Fig.8) area has larger potted succulent and plant

combinations that will inspire you to incorporate succulents into your own patio containers.

Olwage is thankful for the help he and others have received from Master Gardeners who have volunteered time at the conservatory and the Peace Gardens. I encourage you to spend a day or two to view this impressive collection on our northern border.



Exploring the History of North Dakota Heirloom Beans

By Martha Willand, marthawilland@hotmail.com

Agriculture has a way of sharing our history: it shows us how knowledge has transferred through technology and practices across a landscape; it helps us better understand the economies and trade systems of bygone civilizations; and it gives us insight into the cultural/religious values of a community and its farmers. In North Dakota, an intriguing tale of history can be learned by following the humble path of its heirloom beans.

Three Sisters

All beans originate from Central and South America and have been cultivated for over 7,000 years. As people migrated to North America, beans and the agricultural practice of "Three Sisters" plantings eventually spread across the continent. Three Sisters agriculture consists of growing winter squash, maize (corn) and beans together in what is commonly referred to as 'companion planting' or 'intercropping' in modern terminology. These staple crops enhance one another and increase productivity by being planted in close proximity. Maize provides structure for the climbing beans, the nitrogen-fixing beans help fertilize the corn and the squash, and the trailing squash spreads along the ground helping to outcompete

weeds and retain moisture. This common trio has been adopted by numerous Native American agricultural tribes throughout the continent for hundreds if not thousands of years. The wealth of agricultural information from Native Americans assisted the first colonists with farming techniques in the New World and led to the bounty of harvest celebrated at the first Thanksgiving.

2009 Native American \$1 Coin

The significance of Three Sisters agriculture was recognized on the reverse side of the Sacagawea federal coin.

The First Farmers of North Dakota

The Mandan, Arikara and Hidatsa were successful farmers growing corn, squash, beans and sunflowers along the fertile river bottoms of the Missouri, Heart and Knife Rivers. Gardens were primarily owned and



Wikipedia Creative Commons
Image: <https://commons.wikimedia.org/wiki/File:2009NativeAmericanRev.jpg>

Bean Type	Bush or Pole	Exposure	Planting Method	Planting Depth	Plant Spacing	Days to Maturity	Size at Maturity
Arikara Yellow	Bush	Full Sun	Direct Sow	1"	2" apart; rows 3-4' apart	80-85	1' H
Hidatsa Shield	Pole	Full Sun	Direct Sow	1"	3" apart; rows 2.5-3' apart	90	8-9' H
Hidatsa Red	Bush with runners	Full Sun	Direct Sow	1"	6" apart; rows 3-4' apart	80-90	3' H

kept by the women of the tribe. The women developed superb beans that were adapted to the short growing season with limited rainfall. In late summer, the dried pods were threshed and the legumes were stored in food caches that would preserve the beans throughout the long winter. The best beans were saved for seeds for future crops.

Beans were not only important food sources for the Mandan, Arikara and Hidatsa, but they were valuable tools of commerce. Nomadic tribes such as the Cheyenne, Sioux, Plains Apache, Comanches and Arapahos often traded horses, hides, furs, buckskin clothing and dried meats for the produce grown by the most northern farmers on the Plains. When fur trappers arrived, horticultural yields were traded for metal knives, kettles, axes, arrowheads and garden hoes. It was trade that eventually landed the beans from North Dakota into the hands of a president and founding father in Virginia in 1807.

From the Corps of Discovery to Monticello

One of the central goals of the Corps of Discovery was to learn about the botanical diversity found on new lands acquired through the Louisiana Purchase. In the fall of 1804, Lewis and Clark were dispatched on this mission heading north along the Missouri River. The Mandan, Arikara and Hidatsa were among the first Native Americans the group encountered, and they found the people so kind and hospitable that they set up their winter camp on the opposing bluffs of the Missouri River near current Washburn, North Dakota. During the brutal winter, the crew bartered ribbons, mirrors and beads with the tribes as their food supplies dwindled. When even their tools for trade diminished, their blacksmith began constructing hoes, axes and tomahawks for corn, beans and squash. The yields from the local farmers and willingness to trade with the expedition was of considerable importance as some believe that they would not have been successful if it weren't for the local tribes' aid.

Along the expedition, Meriwether Lewis collected seeds from the journey, including seed varieties from the Mandan, Arikara and Hidatsa. Seeds were later shared with botany and garden enthusiast president Thomas Jefferson in 1807. At his home in Monticello, Jefferson recorded his garden triumphs and failures in a nearly scientific manner over a 58-year period in his now published Garden Book. One of the notable winners from North Dakota was the Arikara

yellow bean. Jefferson noted that it "is one of the most excellent that we have had." The beans are still grown at Monticello today, and one can purchase beans grown and harvested from the presidential gardens.

North Dakota Heirloom Beans

In North America there are over 4,000 different varieties of beans. In North Dakota, most of the heirlooms are varieties of the *Phaseolus vulgaris* genus, the most widely cultivated genre of beans in the world. Three of the historic beans found within the state include the Arikara yellow bean, the Hidatsa shield bean and the Hidatsa red bean.

Arikara Yellow Bean

Although primarily used as a dry bean, it can also be harvested at about 45 days, and eaten as a snap bean as Thomas Jefferson preferred. Commercially introduced by the Oscar H. Will Seed Company in 1880s, the bean was collected by Mr. Will in the vicinity of Fort Berthold. The early maturing, compact bush-type bean produces yellow beans with a dark ring around the eye. The bean is drought tolerant and has been reported to have moderate resistance to white mold.

Hidatsa Shield

The most famous of the Hidatsa beans was cultivated by settlers and new farmers arriving to the area in the 19th century. Collaboration between Hidatsa tribesman Son-of-a-Star and Oscar H. Will Seed Company in the 1880s led to the breeding of the bean into what is now known as the Great Northern bean, one of the most popular white beans on earth. This productive climber is commonly eaten dried but can be gathered as snap beans before the beans fill the pods. Collect the pods frequently to encourage continued production, and to avoid large and stringy beans. These beans are reported to also do well in containers.

Hidatsa Red

This prolific producer dates back nearly 2,000 years. One of five beans grown by the Hidatsa along the Missouri River, the rose-colored beans are smaller than kidney beans but of similar flavor. This half-runner bean produces over 100 bean pods per plant and is primarily used as a dried bean. Introduced to the American market in 1915, the bean fell out of popularity until recently. Rediscovered by the slow food movement, chefs and gardeners, the bean is again gaining traction. The bushy plants can climb to three feet if given a pole or trellis. Harvest the beans once the pods have dried on the vine.

Dried beans are great sources of protein, fiber, folate, copper, magnesium, potassium and iron, while containing little to no fat. Research has indicated that a diet including dried beans can also lower the risk for heart disease, obesity and some cancers. So why not try going some heirloom beans in your garden this year? They are easy to grow, they are good for you and you can be part of their legendary story.



Ornamental Grasses Take Root In North Dakota

By Laura Kourajian lkourajian@yahoo.com

Growing grass in North Dakota has come a long way from the sweeping swaths of fescues and bluegrasses that covered backyards like a fitted sheet. In the 1970s, landscape architects on the east coast of the United States embraced ornamental grasses that were growing in popularity across Europe. This trend was led by Karl Foerster feather reed grass, *Calamagrostis x acutiflora* (Fig. 1). With its upright vertical form, clumping habit and feathery flowers, it is named after Karl Foerster, a German nurseryman. He reportedly discovered this plant in the Hamburg Botanical Garden in the 1930s and introduced it into commerce in 1950.

Karl Foerster feather reed grass is still a staple in many landscapes and gardens in North Dakota, where it has proven hardy and provides interest during our winters. However, new varieties of ornamental grasses are coming on strong. There are sedges (*Carex* spp.), tufted hair grass (*Deschampsia cespitosa*), Chinese silver grass (*Miscanthus* spp.), blue oat grass (*Helictotrichon sempervirens*), switch grasses (*Panicum* spp.), fountain grasses (*Pennisetum* spp.) and bluestems (*Andropogon gerardii* and *Schizachyrium scoparium*). Fescue (*Festuca* spp.) is still around and also comes in an ornamental form, a low growing clumping blue grass “Elijah Blue.”

Annual grasses can fill open spots in gardens, add color and often serve the “thriller” role in containers, while perennial grasses are growing in popularity in North Dakota landscapes. “Once they’re established, they’re very low maintenance and very drought tolerant,” said Esther McGinnis, NDSU Extension horticulturist. “They engage all the senses; they sway in the wind, they have motion, they make a sound.” (That special rustling sound made by the grass as it sways is called “susurration,” McGinnis said.)

There are two types of grasses: warm season and cool season. Warm season grasses are those that typically grow best when temperatures are between 80-95 degrees F and do most of their growing in the summer, and bloom in summer. Cool

season grasses grow during spring and fall, when temperatures are cooler, and go dormant during the heat of summer. They bloom in spring.

Alan Zuk, associate professor in the Department of Plant Sciences at NDSU, conducted a three-year study of tall warm season grasses starting in 2010. The study followed 15 native and ornamental grasses in exposed sites on the campus at NDSU in Fargo in the eastern part of the state, and at the Northern Great Plains Research Laboratory south of Mandan in the western part of the state. The study showed big bluestem (species) (*Andropogon gerardii*), the big bluestem cultivar “Pawnee” and silver banner grass (*Miscanthus sacchariflorus*) survived all three years at both locations. Those that didn’t survive included giant miscanthus (*Miscanthus x giganteus*), Chinese silver grass (*Miscanthus sinensis*) and hardy pampas grass (*Saccharum ravennae*). That’s good information for the backyard gardener, as well as North Dakota nurseries, to know.

Other things to keep in mind when choosing an ornamental grass, McGinnis said, are the mature height and width of the grass to ensure a planting location where it won’t get crowded or crowd out other desirable plants. Ornamental grasses should be planted in full sun, though there are a few grasses that can take partial shade, she said. And consider that grasses may have winter interest potential as many are sturdy enough to stand over the snow season. An increasing number of the newer cultivars don’t lodge, McGinnis noted. Lodging happens when the grass falls over, lying flat against the ground. If a grass is subject to lodging, cut it back in the fall. If it doesn’t lodge, leave it standing and it will provide golden winter interest in the landscape. Ornamental grasses with red coloring are starting to turn landscapers’ heads, though “anecdotally we don’t think they’re hardy enough for North Dakota,” McGinnis said.

Another consideration for landscapers: Is it well behaved or invasive? “There are some that are invasive. I’ve seen blue lyme grass take over a flower bed,” said McGinnis. Other grasses that are considered invasive include ribbon grass (*Phalaris arundinacea*, Fig. 2)



Fig. 1 *Calamagrostis x acutiflora*



Fig. 2 *Phalaris arundinacea*

and the silver banner grass that did best in Zuk’s study. The latter grass is very hardy in North Dakota, but will require a gardener’s diligence to keep it in check.

Grasses that are worth a try in North Dakota landscapes include:

- Big Bluestem (*Andropogon gerardii*, Fig. 3), also called turkey foot because the panicle resembles a turkey foot.
- Little Bluestem (*Schizachyrium*



Fig. 3 Winter Big Bluestem



Fig. 4 Carex pensylvanica Pine



Fig. 5 Carex muskingumensis

scoparium). Blue Heaven is one type that is selected in the wild in Minnesota and propagated through tissue culture.

- Sedges (*Carex* spp.): There are about 2,000 species within that genus, and about 80 of them are native to North Dakota. Two of them – *Carex pensylvanica* (a good ground cover in dry shade, Fig. 4) and *Carex muskingumensis* (palm sedge, Fig. 5), with its interesting seed head) may matter in North Dakota, McGinnis noted.
- *Deschampsia cespitosa*, generally called tufted hair grass, is good for ground cover and can take partial shade unlike many ornamental grasses.
- *Miscanthus 'Purpurascens'* (Fig. 6) is often called flame or purple flame and has feathery white plumes.
- *Helictotrichon sempervirens* is commonly called blue oat grass. It has silvery shimmery blades and is easier to keep alive than the fescues, McGinnis said. It does well in sandy soil.
- *Panicum virgatum* (Fig. 7), also known as switchgrass. There are only a couple that are hardy enough to call North Dakota home. Northwind has proven itself, though it may be harder to get established, said McGinnis.

Resources:

Zuk, A. J., Q. Zhang, T. Helms, and H. Hatterman-Valenti. 2016. Cold Hardiness and the Effects of a Low-Input Regime on 15 Tall, Warm-Season, Native and Ornamental Grasses in the Upper Midwestern United States. *HortTechnology*. 26(6):735-741.

McGinnis, Esther, 2015, Ornamental Grasses for North Dakota, presentation to nursery growers conference.



Fig. 6 Winter Flame



Fig. 7 Panicum

NDSU does not discriminate in its programs and activities on the basis of age, color, gender expression/identity, genetic information, marital status, national origin, participation in lawful off-campus activity, physical or mental disability, pregnancy, public assistance status, race, religion, sex, sexual orientation, spousal relationship to current employee, or veteran status, as applicable. Direct inquiries to:

Vice Provost for Title IX/ADA Coordinator, Old Main 201, NDSU Main Campus, 701-231-7708, ndsuoaaa@ndsuo.edu.



Have a story idea?

Email Rachel Brag, rbinndak@gmail.com or contact one of our writers directly.