

Planting Natives in Northeast Kansas

Gardening with Native Plants



K-STATE

Research and Extension

Douglas County



PLANTING NATIVES IN NORTHEAST KANSAS

GARDENING WITH NATIVE PLANTS

Sharon Ashworth, K-State Research and Extension - Douglas County
Kim Bellemere, Grassland Heritage Foundation
Joanna Will, Kansas Rural Center

Visit The Companion Website – Native Kansas

A companion website includes a link to this document as well as pictures, interviews with property owners, plant lists, and many other resources to help you with your native planting project. Go to: plantnativeks.org

Acknowledgements



This project/program has been funded by a grant from the Douglas County Heritage Conservation Council. However, the content is solely the responsibility of the authors and does not necessarily represent the official views of the Douglas County Heritage Conservation Council.

The authors also thank Jennifer Delisle who reviewed and commented on drafts of this publication.

Design and printing: Minuteman Press, Lawrence, Kansas

Photographs

Cover by Jennifer Moody

We are grateful to the photographers who graciously contributed their work. The copyright for all photographs is retained by the photographers. None of the photographs may be reproduced without permission from the photographer.

Recommended Citation

K. Bellemere, S. Ashworth, and J. Will. 2020. "Gardening with Native Plants" in *Planting Natives in Northeast Kansas*. 20 pp. Lawrence, KS.

Additional Copies

A copy of this guide may be downloaded free of charge at: plantnativeks.org

FOREWORD

Planting Natives in Northeast Kansas is a unique collaborative effort between K-State Research and Extension - Douglas County (KSRE), the Grassland Heritage Foundation (GHF), and the Kansas Rural Center (KRC) to pull together information on and resources for integrating native plants into your landscape, whether it be in your backyard or back 40 acres. Interest in native plants is growing. Evidence for this appeal includes increasing numbers of native plant sales and selection of natives at garden centers, a flourishing industry of native plant nurseries and seed suppliers, and a swelling demand for information from the public. In recent years, calls to our respective organizations for help and advice on planting native plants, creating pollinator habitats, or restoring prairie have multiplied. This publication is specifically designed for those in the northeast corner of Kansas who wish to plant natives but do not know where or how to start. While the plants, timelines, and resources mentioned in this guide are specific to northeast Kansas, the general principles and methods for planting natives apply not only to the entire state of Kansas but to the whole of the grassland biome in the United States.

For more than a century, KSRE has brought horticultural and agricultural science to landowners. Increasingly, backyard gardeners call or visit the County Extension office for information on native plants, particularly those that attract pollinators. Larger property owners seek advice on converting extensive lawns into pretty meadows or turning old pastures and cropland into prairie habitat. GHF works to preserve tallgrass prairie in eastern Kansas through education, stewardship, and land protection. Founded in the 1980s in an effort to preserve prairie in Johnson County, KS, today the organization owns and manages multiple prairie properties and has educated thousands of Kansans about the prairie ecosystem. KRC has long been an advocate for sustainable farming and responsible land use. Founded in 1979, KRC works to promote a farm and food system that is ecologically sound, economically viable, and socially just.

This guide for planting native plants compliments many existing resources, including prairie restoration guides available from other mid-western states such as the *Tallgrass Prairie Center's Guide to Prairie Restoration* (Iowa), *Reconstructing a Tallgrass Prairie: A Seeding Guide for Missouri*, and *A Guide to Prairie and Wetland Restoration in Eastern Nebraska*. In Kansas, publications on planting natives are available from Kansas State University, the Kansas Department of Wildlife, Parks and Tourism's Habitat First program, and the Kansas Biological Survey. The Xerces Society's publication *Pollinator Meadows from Seed* is also an excellent resource.

The number and variety of resources available are such that landowners may feel overwhelmed by the process of converting their gardens, lawns, and fields to a landscape filled with natives. In this guide, landowners will find plant recom-

mendations and resources specifically for northeast Kansas. The guide is designed to put necessary information all in one place – instructions, plant lists, plant and seed providers, available financial and planning assistance, reference gardens and prairies, and tips and advice from local landowners who have experience. There is also a companion website with pictures and up-to-date information.

No matter your goal, no matter the size of your property, there is a section of this guide designed for you, including:

- 3 backyard gardeners
- 3 property owners wanting to convert old pastures and cropland to prairie vegetation
- 3 do it yourself landscapers
- 3 professional landscapers
- 3 landscape architects desiring to enhance the sustainability and diversity of corporate landscapes
- 3 suburban property owners wishing to convert traditional lawns
- 3 schools wishing to install native gardens for education and beauty
- 3 farmers wanting to enhance crop production and water retention

Choose from one of five publications specific to your goals.

Gardening with Native Plants

For those wishing to tuck some native plants into existing gardens or plant a small front yard or backyard native garden.

Landscaping with Native Plants

For those wishing to replace cool-season lawns, create large native gardens, or establish native wildflower meadows up to an acre in size.

Reconstructing Prairie

For those wishing to reconstruct prairie on old fields, pastures, or cropland.

Establishing Native Cropland Borders and Buffers

For those wishing to plant native forbs and grasses to border croplands in the agricultural landscape.

Restoring Prairie Remnants

For those wishing to restore or enhance degraded, remnant prairies.

Appendices: plant lists, assistance for landowners, places to see prairies and native plantings, and additional resources.

Adding native plants to your landscape, regardless of size, will enhance its beauty, its ability to support native wildlife, and its resiliency.

Thank you.

TABLE OF CONTENTS

GARDENING WITH NATIVE PLANTS

Page 1 Introduction

Page 3 Planting Natives in Your Garden or Yard

Decide on Your Garden Goals, *pg. 3*

Site Assessment – Get to Know Your Yard, *pg. 3*

Designing Your Garden, *pg. 5*

Simple Design Suggestions, *pg. 5*

Other Considerations, *pg. 6*

Preparing to Plant and Planting Your Garden, *pg. 7*

Weed and Grass Removal Methods, *pg. 7*

Planting, *pg. 9*

Page 10 Maintaining a Native Plant Garden

Use a Light Touch, *pg. 10*

Fall Clean Up, *pg. 10*

Spring Maintenance, *pg. 11*

Page 11 Advice from People Who Have Done It

Page 12 Resources

Page 13 Glossary

Page 14 References

Page 15 Appendix A: Sources for Information on Rain Gardens

Page 16 Appendix B: Recommended Plants for Native Gardens and Landscapes

Page 18 Appendix C: Natives and Nativars

Page 19 Appendix D: Sources for Regionally Grown Native Plants and Seeds

INTRODUCTION

Native plants are those that occur naturally in a specific region and, in North America, existed in that region prior to European settlement. Kansas has a variety of ecosystems including wetlands, forests, and stream corridors but historically, most of Kansas was prairie and most of our native plants are prairie plants.

Preserving our remaining prairies, woodlands, and other native ecosystems is important but as hard as we may try, we'll never be able to restore or replace all that we've lost. Gardening with native plants is an important way to help ensure that some of the most important parts of those ecosystems remain – and native plants are beautiful and can be easy to grow!



Caterpillar on Penstemon cobeia. (Photo: K. Bellemere)

NATIVE PLANTS SUPPORT WILDLIFE

When we think of wildlife in our gardens, we often think of birds eating flower seeds or butterflies nectaring on flowers. While both examples are important, the interaction between plants and wildlife in our gardens is broader and much more complex. Plants form the base of the food web, meaning that animals either depend on plants for food or eat the animals that eat the plants. For example, the larvae of many native insects rely on native plants for food. These insects must eat the plants with which they co-evolved because they can't digest the chemicals in non-native plants. If we want to support native insects we must tolerate some munched leaves and stripped stems.

Insect resistant plants may sound like a gardener's ideal, but our native birds absolutely need those insects. According to Douglas Tallamy, author of *Bringing Nature Home*, 96% of North American bird species feed insects to their newly hatched chicks – including birds we don't think of as insect-eaters like hummingbirds, owls, and hawks.

A great example is the Carolina chickadee. This bird can be found in wooded areas southeast Kansas and is a close relative to the black-capped chickadee, a common woodland bird in northeast Kansas. Chickadees are common birds at feeders in winter, so we think of them as primarily seed eaters. How-

The Buzz About (Native) Bees

Bees – they're all the same, right? They make honey, live in colonies, and sting you if you get close.

Not exactly. When we think of bees, many of us think of honeybees (introduced to North America by European colonists) but North America is home to about 3600 species of native bees, part of the 20,000 that exist worldwide. Those bee species are incredibly diverse. Bees in the *Bombus* (bumblebee) genus are our largest bees but some are smaller than a grain of rice. Some mimic wasps or flies. Some have bright yellow stripes and others are a brilliant metallic green. Most are also solitary and don't live in communal groups or hives and they don't make honey. They do pollinate our flowers and crops, however. Wild native bees are critical pollinators of crops like tomatoes, berries, and squash and possibly contribute to the production of over \$3 billion worth of crops each

year. Over 85% of plants on the planet require pollination in order to produce fruits and seeds, many of which are critical food for birds and other wildlife.

Unfortunately, populations of many native bee species are in decline. Habitat fragmentation and loss, pesticide use, and even climate change are all risk factors impacting bee species. Luckily, you can help. By planting native plants, you can provide the food and shelter native bees need to survive. It's also important to reduce or eliminate the use of pesticides (insecticides, fungicides, and herbicides) in your gardens and yard. The Xerces Society has great information about native bees and their conservation. Check out their website at www.xerces.org to see what else you can do to help conserve these important and fascinating creatures.

ever, about 80-90% of their summer diet is animals – mostly insects and spiders. The diet of their newly hatched chicks is almost exclusively animal based. Chicks need the protein and other nutrients found in insects – and they are ravenous! In the two-weeks between when a clutch of chicks hatches and when they fledge (leave the nest) they will eat over 5,000 caterpillars, all of which are foraged by their parents. Without native plants to feed the caterpillars, there won't be enough food for the chicks. Fewer native plants leads to fewer insects which means fewer birds. And not just birds are impacted; many reptiles and mammals eat insects as well, or they eat the animals that eat the insects.

The monarch butterfly provides us with another great example of the relationship between insects and plants. Adult monarch butterflies eat the nectar of a variety of plants including goldenrod, asters, and sunflowers. The needs of the caterpillars, however, are much more specific. Monarch caterpillars, or larvae, can only eat plants in the milkweed family. As a caterpillar ingests the milkweed leaves, it takes in chemicals called cardenolides which are toxic to most other animals. Those toxic chemicals persist in the animal's tissues even after its metamorphosis into a butterfly, making it unpalatable to predators. Milkweeds then act as both a food source for the caterpillar and as a means of defense for the adult butterfly. There are 18-19 species of milkweed in Kansas, about eleven of which can be found in the eastern third of the state. This gives gardeners a variety of plants to choose from for their home gardens.

NATIVE PLANTS SUPPORT WILDLIFE CORRIDORS

Because so much of our native prairies and woodlands are gone, having been converted to crops, invaded by non-native plants, or buried under towns, it can be difficult for plants and animals to migrate or move through our region. Planting natives in our home and commercial landscapes provides wildlife with additional food and shelter as they follow their migratory routes and gives them a place to go when food sources run low in other areas.

One example comes from the Ogg Road Prairie, located within Shawnee Mission Park in Johnson County, Kansas. Ogg Road is home to the blue sage bee, a specialist that relies on the blue sage plant (*Salvia azurea*) for food. Blue sage grows in abundance in Ogg Rd. Prairie, but the park is surrounded by suburban yards with typical landscaping. If the surrounding yards do not contain blue sage, the prairie becomes an island from which the bee can never migrate. If anything were to happen to the blue sage in that prairie, the bee would be wiped out. Even if the blue sage remains, it can only support a limited population of bees. But if the surrounding landowners were to plant blue sage in their yards, they would provide new food sources as well as a pathway for the bees to move and find food and mates.

NATIVE GARDENS ARE HARDY

A native garden is not maintenance free, but a well-planned garden can be easier to care for and require less water, fertilizer, and time than a typical garden – providing you use the right plants for your space. Natives, by definition, evolved right here, even below your feet, so they are adapted to our climate. There's no need to try to recreate the weather conditions of their far-away homeland. Everything they need is right here.

If you don't have the space, money, or energy to start a new native plant garden from scratch, that's just fine. Some native plants are easily incorporated into traditional gardens. An Ohio spiderwort or wild columbine can look beautiful planted next to your heirloom roses or pink peonies. Just keep in mind that flower gardens can do more than just make humans happy, they are important resources for insects and birds and may help replace some of the food and shelter that we've eliminated from the wild.

Climate-Conscious Gardening

Climate change is upon us. It's a big and complicated issue, and it can be a little intimidating to think about. None the less, it's up to all of us to find ways to reduce our carbon footprint and help the wildlife around us. Changing how we garden is an easy way to do that. Some simple things you can do in your yard and garden include:

Plant natives – the more diverse, the better!

Native plants provide food and shelter for insects and wildlife, those that already live in your neighborhood and those that may need new food sources if the plants in their current ranges are unavailable.

Use less water and fewer chemicals.

As the climate changes, we'll see differences in the amount and timing of rainfall in many regions. Fortunately, native plants generally don't need fertilizer or extra water. Do you have a big, thirsty, green lawn? Consider installing a prairie meadow in its place. Refer to the section of this guide titled *Landscaping with Native Plants* for more information.

Reduce the use of gas-powered yard tools.

Lawn mowers, leaf blowers, and other motorized tools can have big carbon footprints. If you're able, get out the old-school tools like rakes and rotary lawn mowers. They're also healthier for you to use.

To learn about the predicted impacts of climate change go to the National Climate Assessment at <https://nca2014.globalchange.gov/>.

PLANTING NATIVES IN YOUR GARDEN OR YARD

Starting a native plant garden is just like starting any other garden. First, decide on your goals or what you want to accomplish. Second, assess your site. Third, create a design - it can be as simple or as complex as you like. Finally, purchase your plants and put them in the ground. Gardening with native plants isn't any more difficult or complicated than gardening with the plants you are accustomed to using. You just need to adjust your expectations and be willing to experiment.

DECIDE ON YOUR GARDEN GOALS

Plant the garden that best suits your needs. Do you want to plant a new bed of natives or incorporate natives into an existing bed? Do you want to attract more pollinators to your yard? Are you focused solely on plants that benefit birds? Maybe the most important consideration is how hard you want to work. Are you okay with a little wildness or do you like to keep things formal?

Native plant gardens run the style gamut – they can be a bit wild or they can be a little more formal and manicured. Whatever your goals, remember that some natives are more well-behaved than others and the more formal the garden, the more work it will take to maintain it. Consult the publications listed under *Resources* below, or see our recommended plant lists in Appendix B. Whatever your goals, pick those plants that best meet your needs, enjoy the process, and if a plant just doesn't work, give it to a friend and try something new.

SITE ASSESSMENT – GET TO KNOW YOUR YARD

Spend some time in your yard and watch what happens and when. Does it get full sun? Does your house block the wind in some parts but not others? If you've already started a flowerbed or garden, odds are you already know a lot about your yard's microclimate but spend a little time surveying and see if you can learn anything new. Native plants are hardy, but not every plant works in every situation and assessing your yard beforehand sets you up for success. A good site assessment allows for proper purchasing and placement of native plants, saving you money and time. When surveying your yard, try to answer the following questions.

How much sun does my yard get?

Most of our Kansas native plants are adapted to full sun. Full sun equates to at least six hours of sun per day, preferably eight. Native plants that can grow in a bit of shade are found in the moister, forested areas along our rivers and streams. There are fewer plants adapted to dry, shady areas. Don't despair if you've got shade, we provide some recommendations and can borrow a few suggestions from Missouri, our more wooded neighbor to the east.

Formal Native Plantings Open to the Public

LAWRENCE

- Free State High School - demonstration prairie planting
- Prairie Park Nature Center - garden in front of building
- Lied Center on KU's West Campus roundabout at entrance
- University of Kansas Native Medicinal Garden
- Monarch Watch - Foley Hall, KU West Campus

MANHATTAN

- Kansas State University Gardens

OVERLAND PARK

- Blue Valley School District
Wilderness Science Center Garden
- Overland Park Arboretum and Botanical Gardens

TOPEKA

- Shawnee County Extension
Native Plant Garden at Cedar Crest
- Children's Discovery Center
- Kansas Museum of History Native Plant Garden

Watch your property over the course of the day during various periods of the growing season and note which areas have more than six hours of sun and which are under varying degrees of shade. If you have a significant slope to your property, a south facing slope will be hotter and drier than a north facing slope. Afternoon sun will be more intense than morning sun. A plant listed for partial shade might do fine with a few hours of morning sun but suffer when blasted by the afternoon sun.

What kind of soil do I have?

Not every native plant can grow in every soil type so it's important to know the general characteristics of the soil in your yard. Soil structure is the relative amounts of sand, silt, and clay particles that make up soil. The amount of each constituent, plus the amount of organic matter in your soil, will determine how well it holds water and nutrients. A sandy soil will drain water and dry out quickly while a clay soil will remain wet for a longer time and puddle unless water is added slowly. Organic matter helps soil retain more water and nutrients.

A quick and easy way to assess your soil is by feeling it with your hands. Moisten a sample and rub it between your fingers. The larger bits of sand are easy to feel. If your sample is mostly coarse feeling and of a light color it is a sandy soil. Silt will feel smooth between your fingers and be a darker color. Clay will feel sticky when wet. If you can mold your soil sample and have it keep its shape, you have a great deal of clay in your soil.

While testing soil for nutrient availability is critical for successful vegetable, fruit, and cut flower gardening (and lawns), it is not critical for native plants. One of the many benefits of native plants is that they do not require fertilizers. Native plants are adapted to native soil nutrient levels and adding fertilizers, compost, or other nutrients will only give non-native plants a competitive edge. Adding nitrogen will only help the weeds. Adding organic matter to your native perennial beds can help with moisture retention, but too much could cause your plants to flop over or get too big too fast.

How often will I have to water my plants?

If your yard varies topographically (has low spots and high spots), you should identify areas that tend to hold water or that may be susceptible to quick drying. Follow the instructions in *Testing Soil Drainage* to assess the water holding capacity of various locations in your yard. If you have a low spot on your property that collects water or where water slowly drains consider using plants that are a bit more tolerant of damp conditions such as cardinal flower, blue verbena, and swamp milkweed (see list of recommended plants in Appendix B and on the website). If the area is really wet, you might consider installing a rain garden. You can find excellent plans

Testing Soil Drainage

Dig a hole six inches wide and one foot deep. Fill the hole with water and let it drain. When the water has drained completely, fill the hole with water again and this time keep track of how long it takes for the water to drain from the hole.

If the water drains completely within three hours or less, your soil drains rapidly, probably due to high sand content. If water is still standing in the hole after eight hours, your soil is draining slowly. This type of drainage problem is often due to excessive clay in the soil. If the water drains within four to six hours, this is good moisture retention for most plants.

Why is this information important? 1) You may be able to amend your soil by adding organic matter to soil that is high in clay or sand, improving its structure to benefit a plant's ability to obtain water; 2) If you are not able to amend your soil, you can choose plants that may tolerate the existing soil conditions if not ideal.

Native Gardens vs. Butterfly Gardens What's the Difference?

Native gardens are primarily made up of native plants, regardless of whether pollinators use them for food.

Butterfly/pollinator gardens contain plants that butterflies, or other pollinators, can use for food - either as host plants for the caterpillars (larvae) or as nectar plants for the adults. The plants may or may not be native to your area.

All Kansas native butterfly species use a native plant as either a host plant for their larvae or for nectaring, so you can create a successful pollinator garden using mostly native plants. That said, think beyond just planting for pollinators. Almost every native plant is probably a host for some insect and as we know, insects are great food for birds and other wildlife. Plant a variety of natives and feed the neighborhood!

and plant lists for rain gardens online. See Appendix A for a list of resources.

Keep in mind that green lawns and many non-native flowers require more water than plants adapted to our area. By planting natives, you are planting a resilient landscape. However, you will need to water your new transplants to help them get established, particularly through their first summer.

What is in my yard and do I want to keep it?

Part of assessing your yard is simply inventorying what you have and deciding what you want to keep. You do not have to start from scratch and take out everything that isn't native. Do you love those hydrangeas that are just like your grandmother's? Keep them! Do you have bearded irises that are the perfect shade of yellow? Keep those too. Those plants probably don't provide a lot of advantages for insects and other wildlife, but they help keep you happy and native gardening becomes a chore if you don't love what's in your garden.

When you're ready to design your garden, instead of starting over from scratch think about the things you really want to keep then find native plants that you can incorporate into your current design. There may be a little trial and error because many traditional landscaping plants require fertilizer and other inputs that natives don't need. If they're planted too close together, the natives may not respond well. Eventually however, you'll find a balance that works and makes you happy. While you should keep the things you love, the more natives you have, the more impact you'll make on insects and other wildlife. Also, native gardening can be a little addictive. Once you see insects, birds, and other wildlife returning to your yard, it's a good bet you'll want to add more natives and see who else comes to visit.

DESIGNING YOUR GARDEN

Now that you've assessed your site, it's time to think about what to plant and where. Creating a landscape design for your native garden is an important way to ensure that your garden looks intentional and deliberate. Occasionally, new native plant gardeners will choose plants that are large and weedy-looking or they throw a handful of seed in a flower bed and hope for the best. Because native gardening is a new concept to many people, some neighbors might think you're growing a weed patch and ask you to mow it down.

Instead of running afoul of your neighbors take some time to think about what you want to plant and why. You might also want to educate yourself about city ordinances relating to lawn and garden maintenance. After that, look around your neighborhood to see what the gardening norms are in your area. Your garden shouldn't look like everyone else's, but native gardens do not need to be overly wild looking either. Again, many native plants work well in combination with conventional garden varieties. By creating something gorgeous that won't antagonize your neighbors, you'll become an ambassador for native gardening, and you might even convince others to give it a try.

Simple Design Suggestions

The good news is that creating a garden design using native plants isn't any more difficult than creating a design with the types of plants we're used to seeing in home gardens. You just need to make a few adjustments for plants that might have some wilder tendencies and be willing to make changes if things don't work the way you planned. To help make your garden look deliberate and well-planned, landscape designer Ann Simpson suggests three simple design tips:

Edge Your Garden

Consider using rocks, fencing, or some other type of edging to contain the chaos of a native planting. Unless the garden is seen from all sides, use mostly shorter species in the front and taller in the back. This makes the transition from turf (or paving) to garden more gradual and it gives the bed a tidier and more intentional look.

Create A Focal Point

The addition of a focal point, such as a boulder or a birdbath, gives the eye a place to land and helps to bring order to a varied planting. Other possibilities might be a sculpture, a birdhouse, a bench, or even a fountain.

Middle Right: Consider using rocks, fencing, or some other type of edging to contain the chaos of a native planting. (Photo: S. Ashworth)

Bottom Right: Create a focal point. Here a bird bath is nestled in among native spiderwort and hydrangea. (Photo: Ursula Kuhn)



Above: Garden with native and conventional flowers. This bed includes the non-native Autumn Joy stonecrop (on the left) along with native gayfeather, goldenrod, verbena and little bluestem. The cone flowers are a native. (Photo: S. Ashworth)



Include Multiple Textures

A variety of textures is key to any successful garden. Use blousy or airy plants next to structural ones like trees; narrow-leaved near broad-leaved; and don't forget to include grasses for good contrast and movement in the garden. Consider planting shrubs as they bring considerable mass into the new garden right away. It's easy to assume that pollinators and other insects prefer wildflowers, but many native trees and shrubs are great host and nectar plants for insects as well.

Other Considerations

4 A diverse planting with many types of plants is visually interesting and better for wildlife. Birds, bees, butterflies, and other wildlife utilize plants in different ways. By including a variety of plants, you'll attract and benefit more wildlife than you would with a simple garden of two or three species.

4 Try to have something blooming throughout the season – visually it's more interesting and the blooms provide nectar sources for pollinators all season long.

4 Leave room for natives to grow and be patient while they establish. Some natives take two or three years to bloom. Once they're established, natives can grow quickly and reseed prolifically. If you are adding native plants to an existing flower garden, stick with the more well-behaved plants, plants that don't get tall and floppy or aggressive. We have provided recommendations for natives in more formal gardens in Appendix B.

4 Don't over mulch! Many gardeners have been taught to space plants far apart with a heavy layer of mulch between. That may appease our need for order and formality, but it



Add texture using grasses or sedges. Sedges are grass-like plants that also supply interesting textures to a garden bed. Note the large stone in the background which serves as a natural focal point. (Photo: K. Bellemere)

doesn't look natural and it will feel strange in a native plant garden. It also just creates more space for weeds to grow. Instead, space plants a little more closely (still leaving room for them to grow) and consider planting groundcovers or low-growing plants beneath taller ones. Use mulch sparingly and never put it against plant stems. With time, your new native plants will grow and fill in the empty spaces, possibly eliminating the need for mulch altogether.

4 Be flexible and if something just doesn't work, replace it. Most of the plants grown by beginning native gardeners aren't rare or precious. It's okay to make mistakes and change things. If you do have an uncommon plant that you just can't keep, find a native plant enthusiast to take it.

4 If you've opted for a less formal garden, post a sign indicating yours is a pollinator/butterfly garden, pocket prairie, or whatever you want to call it. A sign will help your neighbors understand what you're doing and maybe give you a chance to talk to them about the importance of native gardens. Inexpensive signs can be purchased from a variety of organizations. Try www.prairiemoon.com or www.victorygardentomorrow.com.

4 Consider certifying your garden as a monarch waystation or other wildlife habitat. Again, it will alert your neighbors to what you're trying to accomplish and may provide a way for you to talk about the benefits of native gardening. Some programs also allow you to provide information about the plants in your yard and record observations about the insects or animals you see there. The data is then used to help further understand the impact that native gardens have on pollinator and wildlife populations. Some great certification programs include the Monarch Waystation program from Monarch Watch and the Certified Wildlife Habitat program from the National Wildlife Foundation. Some cities and counties offer certification programs as well.



A sign will help your neighbors understand what you're doing and maybe give you a chance to talk to them about the importance of native gardens. (Photo: S. Ashworth)

Many great books and other resources are available to help gardeners create fantastic garden designs. Several organizations, including the Missouri Prairie Foundation and Monarch Watch, have sample garden designs online that you can download and take with you to the plant nursery. Check out our list of helpful publications under *Resources*.

PREPARING TO PLANT AND PLANTING YOUR GARDEN

If you're incorporating native plants into an existing flower bed, you don't have to do much to prepare the bed. Just remember that adding fertilizer, compost, or other nutrients isn't necessary. Simply remove any weeds or invading grass before planting your potted plants.

If you're starting a bed from scratch, the first steps will depend on what exists in the area. If the bed is very weedy or grassy, you will need to either remove the existing vegetation or smother it before planting. A few different ways to remove vegetation are listed below. The method you choose should depend on the size of your garden bed and when you want to start planting. Potted natives can be planted in the spring or fall. If you are going to plant native seeds, most will require some stratification in order to germinate. Follow instructions on the seed packet for when to plant.

Weed and Grass Removal Methods

Black Plastic Sheeting - Occultation

Covering your existing vegetation with thick black plastic will prevent photosynthesis and kill the plants. This is very effective for annual weeds and lawn grasses but not as effective for perennial weeds (these weeds store enough energy in rhizomes to recover once you remove the plastic) or the annual seeds buried in the seed bank.

Mow your lawn as short as possible in the area of the new bed and cover with thick black plastic (at least 1.25 mm, or 4 to 6 mil, thick) and pin down the edges. Leave in place for at least 4 to 6 weeks during the summer. Remove the dead vegetation once the plastic is peeled back but don't till as it may bring more weed seeds to the surface. Plant your native transplants in the late summer or fall immediately following treatment.



Covering your existing vegetation with thick black plastic will prevent photosynthesis and kill the plants. (Photo: S. Ashworth)



Covering your existing vegetation with thick, clear, UV-stable plastic will not prevent photosynthesis but will raise the soil temperatures enough to kill existing plants and some of the weed seeds in the seed bank. (Photo: Tom Buller)

Clear Plastic Sheeting - Solarization

Covering your existing vegetation with thick, clear, UV-stable plastic will not prevent photosynthesis but will raise the soil temperature enough to kill existing plants and some of the weed seeds in the seed bank. This method is more effective for perennial weeds than black plastic.

Mow your lawn as short as possible and water so that the soil is moist for at least the top foot. Cover with thick clear plastic (at least 1.25 mm thick, like that found for high tunnels and greenhouses) and pin down the edges. Sealing the edges as much as possible is important for this technique as it aids in elevating the temperatures by trapping moisture. Leave in place for at least 4 to 6 weeks during the summer. Remove the dead vegetation once the plastic is peeled back but don't till as it may bring more weed seeds to the surface. Plant your native transplants in the late summer or fall immediately following treatment.



Mow and cover your existing vegetation with corrugated cardboard or several layers of newspaper and top that with at least three inches of mulch. (Photo: S. Ashworth)

Heavy Mulch

Mow and cover your existing vegetation with corrugated cardboard or several layers of newspaper and top that with at least 3 inches of mulch. Leave in place for at least 2 months over the summer. Remove the dead vegetation once the mulch is raked away. You can plant your native transplants in the late summer or fall immediately following treatment.

Another option is to plant directly into the mulch rather than removing mulch and dead vegetation. This is done by creating layers of mulch and compost (sometimes called lasagna gardening or sheet mulching) that smother the existing vegetation and provide a clean base for planting. Start with cardboard or several layers of newspaper as above and then alternate layers of nitrogen-rich materials (compost, grass clippings, plant clippings) with carbon-rich materials (leaves, hay), each layer one to three inches deep. Water each layer as you place it down and keep the whole thing moist through the summer to encourage decomposition. You can place a layer of wood chips on top to discourage weeds and help retain moisture. Plant directly into the layers in the fall or leave it until spring and plant then.

Herbicides

Glyphosate is a non-selective herbicide that will kill grasses and forbs (wildflowers). You may choose to use this herbicide following any of the treatments outlined above to kill subsequent weed germination. You also may choose to use herbicides for the initial treatment of the existing vegetation.

It is important to apply glyphosate while the plants are actively growing. If you want to kill a fescue lawn with some cool-season weeds (see glossary for explanation of cool-season and warm-season plants), apply glyphosate in the spring after mowing the area as low as possible. Remove the dead vegetation by raking or lightly tilling and wait at least a week before planting (make sure you read the label on your product as it will specify the amount of time you must wait to plant after application).



If you are working with a relatively weed free lawn, you can use a sod cutter and then plant directly into the ground. (Photo: S. Ashworth)

Mechanical Turf Removal

If you are working with a relatively weed free lawn, you can remove the sod using a sod cutter and then plant directly into the bare ground. Water the lawn 24 hours in advance to loosen the soil before cutting. Sod removal can be done in the fall or spring followed by planting transplants.



Planting

After preparing the bed, all you need do is plant. Planting natives is just like planting anything else. For small transplants, simply dig a hole slightly larger than the pot the plant came in. Put the plant in the hole, making sure the crown (top) of the root mass is at ground level and loosening the roots if they are excessively dense and tightly woven. Back fill the hole making sure that there aren't any voids or large air holes. Water it thoroughly to remove any trapped air.

Water your new transplants deeply about once a week for the first month and thereafter during dry spells the first summer (or fall). After that, you shouldn't have to water except during extremely dry conditions. Native plants are best installed in the spring or fall, although you can plant them in the summer. Just remember to water them more frequently than you would normally and don't expect them to grow as quickly.

Nativars are simply cultivars of a native species.

Examples include coneflowers with orange petals or double blooms as pictured below.

*The true native, *Echinacea pallida*, is pictured inset below.*
(Photos: Jennifer Moody)



Neonicotinoids

Neonicotinoids (neonics) are a class of commonly used systemic pesticides that have been shown to harm native pollinators, especially bees. The pesticide is frequently applied to nursery plants as a powder or spray. It is taken up and distributed to all parts of the plant potentially including the pollen, nectar, and even the seeds. Because native plants are important food sources for native insects, neonic-laden plants are traps for insects that feed on them. Always ask about neonics before making a purchase and if the nursery personnel can't guarantee you're your plants are not treated with neonics, don't risk it. The Xerces Society (www.xerces.org) has extensive information about neonics and a list of the brand names of neonic-containing products.

Native vs. Nativar/Cultivar

A cultivar is a plant with a wild ancestor that has been selectively bred for specific characteristics like unusual color, height, or double blooms. Most plants found at nurseries and garden centers are cultivars of plants that exist somewhere in the wild. Nativars are simply cultivars of a native species. Examples might be a black-eyed Susan with orange petals or wild columbine with double blooms. To identify a nativar, look for a second descriptive name on the tag, usually in quotations. For example, *Echinacea purpurea* 'Avalanche'. Many garden centers stock nativars of common prairie species.

Scientists are studying whether nativars are as beneficial to insects as true natives; we're learning more all the time. It can be difficult for most gardeners to stay on top of all the research or to know exactly how a particular nativar is utilized by insects. A recent study conducted by Douglas Tallamy looked at shrub and tree nativars and found that insects utilized those with altered leaf colors less frequently than the natural color. At the same time other research into wildflower cultivars found that some produce more nectar and bloom longer than their wild ancestors, so insects may utilize them more frequently.

No matter how much research is occurring now, we still have a lot to learn and since new cultivars are created every season, it simply isn't possible to study them all to determine if they are beneficial to insects. With that in mind, we recommend using true natives whenever possible. If a truly native plant can't be found, look for nativars in which the flower and plant color are similar to the native parent. Nativars with double blooms might not produce pollen or nectar, making them less beneficial to bees, butterflies, or hummingbirds. Plants with distinctly different foliage might contain chemical compounds that native insects can't digest.

The pollinators in your yard will tell you if a nativar isn't working for them. If you don't see any insects using the plant for food or shelter, then it probably isn't a good fit and you should consider replacing it. Remember, native plant gardening is a process and involves some experimentation. Spend time in your garden and watch what happens.

Where To Get Natives

First, where not to get your plants: Do not dig plants or collect seeds from the wild or on private property without permission. Some native plants are rare and taking them from public or private land could further impair wild populations. Most garden centers stock natives of well-known native plants and true natives are becoming more common. To identify a native, look for a second descriptive name on the tag, usually in quotations. For example, *Echinacea purpurea* 'Avalanche'.

Nurseries that specialize in native plants are becoming more common. A quick internet search should turn up a few and you can find a list of regional providers in Appendix D. If you can't find any in your area, search for native plant sales. Several non-profit organizations host them including the Douglas County Extension Master Gardeners (DCEMG) and the Grassland Heritage Foundation (GHF). Watch the DCEMG and GHF Facebook pages and websites in late winter for dates and locations. The Kaw Valley Native Plant Coalition (based in Lawrence) and Deep Roots, Kansas City also publish lists of native plant sales and native plant nurseries in Lawrence, Topeka, and the KC metro region.

Choosing Healthy Plants

The healthiest plants at the garden center aren't always the ones with the most foliage or the biggest blooms. The healthiest native plants are the ones with the healthiest roots. When choosing plants, look for foliage that is consistent in color (no yellowing or brown spots), check for insects and insect damage, and don't worry if you don't see any flowers developing yet. After assessing the foliage, look at the roots if you can. Healthy roots are usually off-white and plump, not shriveled or dry. Depending on the age of the plant, there should also be a lot of roots, but not so many that you can barely see the soil. If a plant is young or you're shopping early in the growing season, the plant may not have had time to develop much of a root system. It may still grow well for you. If you plant it directly into the ground, watch it closely and water it for a little longer than you would if the root system was more developed. Alternatively, you can repot it and leave it in the larger pot through the summer then plant it in your garden in the fall when the root stock will have developed more fully. Just remember to water plants in pots more frequently in the summer as they can dry out quickly.

A Few Words About Munched Milkweed

One of the most important reasons to plant natives is that they provide food for insects and other wildlife. That means the foliage and even the flowers of some of your plants will be eaten. It seems obvious but reading about it in a gardening manual and seeing it in YOUR garden are entirely different things.

Don't be alarmed when the milkweed is munched, or the sunflowers are stripped. Instead, find a good guidebook on native insects and other wildlife and try to figure out what creatures are feasting in your garden. You may even find animals you've never seen in your yard before like lizards, birds, or even a snake or two.

MAINTAINING A NATIVE PLANT GARDEN

USE A LIGHT TOUCH

Now that your garden is planted, what should you do to maintain it? The most important thing to remember when tending native gardens is not to do too much. One of the benefits of growing natives is that once they're established, they won't need a lot of watering, fertilizing, or other maintenance.

You will need to water your transplants to help them get established, particularly through their first summer. When you water, water enough to thoroughly wet the soil several inches down – at least to the depth of the root tips. Watering thoroughly once a week is better for the plant than shallow, frequent watering.

Mulch more formal gardens, although not heavily, and do not place mulch against plant stems as that will encourage rot. Most native bees also nest in the ground and a heavy layer of mulch will eliminate potential nest sites.

Pull weeds as they get large. Many native plant gardeners do something called "chop and drop" which means to cut or pull weeds then leave them to compost in place. They will look a little untidy for a few days but will eventually dry out and add themselves to the mulch and, eventually, the soil.

After the first year, watering shouldn't be necessary during the growing season except during extremely dry periods. The biggest task will be to divide plants that become too large or numerous.

FALL CLEANUP

Many gardeners have been taught to clean up or "winterize" their gardens in the fall. This includes replacing mulch, cutting back dead foliage and deadheading spent flowers. Native gardens flip that idea on its head by requiring that we do as little as possible. In fact, doing nothing is better than doing too much!

In native gardens, many butterflies (including their caterpillars) and other beneficial insects overwinter in leaf litter. Some native bees lay their eggs in flower stems. Birds rely on the seeds of native flowers. By cleaning out the dead matter in a native garden, we're cleaning out many of the pollinators and other wildlife that live there. Additionally, most of North America's native bees nest or lay their eggs in the ground. By applying a heavy mulch in the fall, we cover the entrance to their burrows and make it difficult for them to emerge in the spring. If it's just too hard to stay out of the garden in the fall, here are a few things you can do:



Beehole in stem of beebalm plant. (Photo: Patti Ragsdale, Happy Apple's Farm)

- Collect seeds from plants you want to propagate. Good information about seed collecting can be found in the *Landscaping with Native Plants* chapter.
- Divide and transplant spring blooming plants.
- If you mulch your garden, apply the last mulch by August then leave it alone until the spring. Leave a few areas of bare ground for late nesting bees.

SPRING MAINTENANCE

While gardeners shouldn't do too much to prep the garden for winter, we also shouldn't be in a hurry to clean it up in the spring. Wait to clean out the old plant material until nighttime temperatures are consistently in the 40s, you see bees buzzing around local fruit trees or, if you want to be really careful, wait until it's time to plant your tomatoes. By then most of our spring-active insects should be out of dormancy and won't be swept away with the leaves. If you must be out in the garden, you can remove the dead stalks from last year's growth, bundle and put them in an out of the way place until the insects have a chance to emerge. For more specific information on timing spring cleanup, check out the Xerces Society spring cleanup guide at <https://www.xerces.org/blog/dont-spring-into-garden-cleanup-too-soon>.

Native plant gardening is satisfying, fun, and a great way to enjoy being outside. It will also bring new wildlife to your yard. We encourage you to get out there and start building your native garden as soon as you can – and don't forget to enjoy the process. Birds, bees and other wildlife will thank you.

ADVICE FROM PEOPLE WHO HAVE DONE IT

ROXIE MCGEE

Roxie spent years at the KU Native Medicinal Plant Garden for the Douglas County Extension Master Gardeners. She is intimately familiar with growing — sometimes coaxing, sometimes beating back — many of our local natives in a formal but harsh setting. The native garden just east of the Douglas County airport is full sun and full wind. Roxie's advice:

- Native plants may not bloom the entire growing season, so think about leaf texture when designing your garden. Think about other senses like smell and touch in addition to color.
- Go ahead and try something, if it doesn't grow just move on to something else.
- Overwintering seeds in milk jugs works well for growing your own transplants.

- Adding organic matter to your beds may result in plants that are too happy, and therefore too big for your space.
- Think of tall grasses as shade for some of the smaller forbs that need a break from the sun, like coral bells or columbine.
- If some of your plants tend to get too tall, feel free to whack them back by one-third by July 4th, especially the asters and blue sage.
- Plants that will grow most anywhere under a variety of conditions: rose verbena, black-eyed Susan, coreopsis.
- Good filler plants (good while you wait for plants that are more difficult to establish): native iris, native grasses, sweet flag, white prairie clover, gayfeather, sedges, pasque flower.

BOOKS ON NATIVE GARDENING

A New Garden Ethic: Cultivating Defiant Compassion for an Uncertain Future by Benjamin Vogt
Attracting Native Pollinators: The Xerces Society Guide to Conserving North American Bees and Butterflies, The Xerces Society
Gardening with Prairie Plants by Sally Wasowski
Planting in a Post-Wild World: Designing Plant Communities for Resilient Landscapes by Thomas Rainer and Claudia West
The Humane Gardener by Nancy Lawson
The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden by Douglas Tallamy and Rick Darke

HELPFUL ORGANIZATIONS

Douglas County Extension Master Gardeners: <https://www.douglas.k-state.edu/lawn-garden/index.html>
Grassland Heritage Foundation: <https://www.grasslandheritage.org/>
Jayhawk Audubon Society: <https://www.jayhawkaudubon.org>
Kansas Rural Center: <https://kansasruralcenter.org/>
Monarch Watch: <https://monarchwatch.org/>

INSECT IDENTIFICATION GUIDEBOOKS

A Photographic Field Guide to the Butterflies in the Kansas City Region by Betsy Betros
Bees: An Identification and Native Plant Forage Guide by Heather Holm
Pollinators of Native Plants: Attract, Observe and Identify Pollinators and Beneficial Insects with Native Plants by Heather Holm

MISCELLANEOUS INFORMATION / NEONICOTINOIDS

Kansas Native Plant Society resource lists: <https://www.kansasnativeplantsociety.org/resources.php>
KSU Research and Extension, select publications: <https://hnr.k-state.edu/extension/publications/>
North American Plant Atlas: <http://bonap.net/napa>
Xerces Society information on neonicotinoids and pollinators: <https://www.xerces.org/pesticides/understanding-neonicotinoids>

PLANT IDENTIFICATION WEBSITES

Kansas Wildflowers and Grasses: <https://www.kswildflower.org/>
Missouri Botanical Garden: <http://www.missouribotanicalgarden.org/plantfinder/plantfindersearch.aspx>

PLANT LISTS

Grassland Heritage Foundation Top 20 Plants for New Native Plant Gardeners: <https://www.grasslandheritage.org/>
Johnson County Master Gardeners, KSRE, Native Plants: <https://www.johnson.k-state.edu/docs/crops-livestock/native-grass-seed/Native%20Plants%20-%20EMG.pdf>
Missouri Prairie Foundation Grow Native Lists: <https://grownative.org/native-plant-info/grow-native-top-ten-native-plant-lists/>
The Xerces Society Pollinator Friendly Plants: <https://xerces.org/pollinator-conservation/pollinator-friendly-plant-lists>

PLANT IDENTIFICATION BOOKS

Field Guide to the Common Grasses of Oklahoma, Kansas, and Nebraska by Iralee Barnard
Kansas Wildflowers and Weeds by J. Haddock, C. Freeman, and J. Bare
Native Plants of the Midwest by Alan Branham
Trees, Shrubs, and Woody Vines in Kansas (Revised and Expanded) by Michael John Haddock and Craig C. Freeman
Wildflowers and Grasses of Kansas by Mike Haddock

COOL-SEASON PLANT

A plant that thrives in the spring and fall, going dormant during the summer heat. Cool-season plants green-up in the spring earlier than warm-season plants.

FORB

A broad-leaved, flowering plant. Not a grass or sedge.

INVASIVE PLANT

A plant that is both non-native and able to establish itself on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems. Examples in northeast Kansas include bush honeysuckle (*Lonicera maackii*) and crown vetch (*Securigera varia*).

NATIVARS(CULTIVARS)

A cultivar is a named variety of plant, like the distinction among apples. All apples are the same species but include varieties such as gala, cortland, red delicious, granny smith, and many, many others. Cultivars have been selectively bred for certain characteristics like color, height, or disease resistance.

A native plant that has been manipulated by selective breeding or crossbreeding to highlight a desirable trait is called a nativar. One example is the white “purple” coneflower - a selectively bred *Echinacea purpurea* that has a white flower head. You can also get red, yellow, and orange “purple” cone-flowers. Nativars will have a varietal name in addition to the species name. For example, *Echinacea purpurea* ‘Avalanche’ is one variety of white coneflower. Look for the variety name to distinguish between natives and nativars.

NATIVE PLANT

Common examples of plants native to northeast Kansas include pale purple coneflower (*Echinacea pallida*), prairie blazing star (*Liatris pycnostachya*), and stiff goldenrod (*Oligoneuron rigidum*).

“A plant that is a part of the balance of nature that has developed over hundreds or thousands of years in a particular region or ecosystem. Note: The word native should always be used with a geographic qualifier (that is, native to New England [for example]). Only plants found in this country before European settlement are considered to be native to the United States.” —*Natural Resources Conservation Service*

NATURALIZED PLANT

A non-native plant that does not need human help to reproduce and maintain itself over time. Yellow foxtail (*Setaria pumila*) and dandelion (*Taraxacum officinale*) are examples.

NON-NATIVE PLANT

A plant introduced with human help (intentionally or accidentally) to a new place or new type of habitat where it was not previously found. Examples of plants commonly found in our region that are not native to northeast Kansas include butterfly bush (*Buddleia* spp.), lilac (*Syringa* spp.) and cosmos (*Cosmos sulphureus*). Purple coneflower (*Echinacea purpurea*) is native to Kansas but not the northeastern part of Kansas. Not all non-native plants are invasive or otherwise problematic.

NOXIOUS WEED

The term “noxious weed” is a legal term and plants declared noxious weeds vary from state to state. In Kansas, noxious weeds include Sericea lespedeza (*Lespedeza cuneata*) and field bindweed (*Convolvulus arvensis*).

From the federal Noxious Weed Act: any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind which is of foreign origin, is new to or not widely prevalent in the U.S., and can directly or indirectly injure crops, other useful plants, livestock, poultry or other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or the public health. For more information refer to the USDA noxious weed list for Kansas.

WARM-SEASON PLANT

A plant that thrives during the warmest parts of the growing season. Warm-season plants green-up in late spring after cool-season plants have already started growing. Most of our native grasses and forbs are warm-season plants.

REFERENCES

CLIMATE CHANGE

350.org. *Climate Science Basics*. <https://350.org/science/>.

National Wildlife Federation. *Gardening for Climate Change*. <https://www.nwf.org/Our-Work/Environmental-Threats/Climate-Change/Greenhouse-Gases/Gardening-for-Climate-Change>

U.S. Global Change Research Program. *2014 National Climate Assessment*. <https://nca2014.globalchange.gov/>.

GENERAL

Branhagen, Alan. *Native Plants of the Midwest: a Comprehensive Guide to the Best 500 Species for the Garden*. 440 pp. Portland, OR: Timber Press, 2016.

Haddock, Michael. *Kansas Wildflowers and Grasses*. kswildflower.org/index.php.

Lady Bird Johnson Wildflower Center. *A Guide to Native Plant Gardening*. www.wildflower.org/learn/guide-native-plant-gardening.

Rainer, Thomas and Claudia West. *Planting in a Post-Wild World: Designing Plant Communities for Resilient Landscapes*. 272 pp. Portland, OR: Timber Press, 2016.

Shaw Nature Reserve. *Landscaping with Native Plants, A Gardener's Guide for Missouri*. St. Louis, MO: Missouri Botanical Garden, 2011.

Tallamy, Douglas W. *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants*. 360 pp. Portland, OR: Timber Press, 2007.

Wasowski, Sally. *Gardening with Prairie Plants: How to Create Beautiful Native Landscapes*. 304 pp. Minneapolis, MN: Univ. of Minnesota Press, 2002.

NATIVARS

Rodomsky-Bish, Becca. *Nativars (Native Cultivars): What We Know & Recommend*. <https://content.yardmap.org/learn/nativars-native-cultivars/>

Sweany, Helen. *How Effective Are Nativars? with Doug Tallamy*. <https://awaytogarden.com/nativars-with-doug-tallamy/>

White, A. *Are Native Cultivars as Valuable to Pollinators as Native Species?* <https://pollinatorgardens.org/2013/02/08/my-research/>

POLLINATORS AND WILDLIFE

Cornell Lab of Ornithology. *All about birds*. https://allaboutbirds.org/guide/Carolina_chickadee/lifehistory

Hatfield, R., S. Jepsen, M. Vaughan, S. Black, and E. Lee-Mäder. *An Overview of the Potential Impacts of Honey Bees to Native Bees, Plant Communities, and Ecosystems in Wild Landscapes*. The Xerces Society of Invertebrate Conservation, 2018.

Holm, Heather. *Bees: an Identification and Native Plant Forage Guide*. 224 pp. Minnesota: Pollination Press, 2017.

Monarch Joint Venture. *Interactions with Milkweed*. <https://monarchjointventure.org/monarch-biology/interactions-with-milkweed>

Schroeder, T. *Studies reveal a diversity of native bee species*. Kansas City, MO: Bridging the Gap, accessed May 2020.

The Xerces Society. *Attracting Native Pollinators: Protecting North America's Bees and Butterflies*. 384 pp. North Adams, MA: Storey Publishing, 2011.

APPENDIX A

SOURCES FOR INFORMATION ON RAIN GARDENS

KCMO Resident Rain Garden Booklet

<https://www.kcwaterservices.org/wp-content/uploads/2013/04/KCMO-Resident-Rain-Garden-Booklet-2015.pdf>

Kansas Healthy Yards rain gardens and bioswales video

<http://kansashealthyyards.org/component/allvideoshare/video/rain-gardens-and-bioswales>

K-State Rain Garden Guidebook

http://faculty.cpd.ksu.edu/lskab/KSU-LARCP_Rain-Garden-Guidebook-lrs.pdf

Lawrence Kansas Public Works raingarden brochure

<https://assets.lawrenceks.org/assets/public-works/docs/raingarden.pdf>

Mid-America Regional Council rain garden designs and instructions

<http://www.marc.org/Environment/Water-Resources/Landscaping-and-Lawn-Care/Rain-Gardens>

APPENDIX B

RECOMMENDED PLANTS FOR NATIVE GARDENS AND LANDSCAPES

Annuals and Perennials.....Scientific Name

Western yarrow.....	<i>Achillea millefolium</i>
Shining blue star*.....	<i>Amsonia illustris</i>
Thimbleweed*.....	<i>Anemone virginiana</i>
Prairie pussytoes.....	<i>Antennaria neglecta</i>
Pussytoes*.....	<i>Antennaria parlinii</i>
Canada columbine *.....	<i>Aquilegia canadensis</i>
White sage.....	<i>Artemisia ludoviciana</i>
Wild ginger *.....	<i>Asarum canadense</i>
Tall green milkweed.....	<i>Asclepias hirtella</i>
Swamp milkweed.....	<i>Asclepias incarnata</i>
Butterfly milkweed.....	<i>Asclepias tuberosa</i>
Whorled milkweed.....	<i>Asclepias verticillata</i>
White false indigo.....	<i>Baptisia alba</i>
Blue false indigo.....	<i>Baptisia australis</i>
Cream wilk indigo.....	<i>Baptisia bracteata</i>
Purple poppy mallow.....	<i>Callirhoe involucrata</i>
Oak sedge*.....	<i>Carex albicans</i>
Pitcher's leather flower.....	<i>Clematis pitcheri</i>
Mist flower.....	<i>Conoclinium coelestinum</i>
Bigflower coreopsis.....	<i>Coreopsis grandiflora</i>
Lanceleaf coreopsis.....	<i>Coreopsis lanceolata</i>
Prairie coreopsis.....	<i>Coreopsis palmata</i>
White prairie clover.....	<i>Dalea candida</i>
Purple prairie clover.....	<i>Dalea purpurea</i>
Shooting star*.....	<i>Dodecatheon meadia</i>
Pale purple coneflower.....	<i>Echinacea pallida</i>
Rattlesnake master.....	<i>Eryngium yuccifolium</i>
Boneset.....	<i>Eupatorium perfoliatum</i>
Sweet joe-pye weed *.....	<i>Eupatorium purpureum</i>
Wild Geranium*.....	<i>Geranium maculatum</i>
Indian physic*.....	<i>Gillenia stipulata</i>
Rose verbena.....	<i>Glandularia canadensis</i>
Common sneezeweed.....	<i>Helenium autumnale</i>
Rough ox-eye.....	<i>Heliopsis helianthoides</i>
Coral bells*.....	<i>Heuchera richardsonii</i>
halberd-leaf rose-mallow.....	<i>Hibiscus laevis</i>
Common rush.....	<i>Juncus effusus</i>
Round-headed bush clover.....	<i>Lespedeza capitata</i>
Tall gayfeather.....	<i>Liatris aspera</i>
Hairy gayfeather.....	<i>Liatris squarrosa</i>
Dotted gayfeather.....	<i>Liatris punctata</i>
Thickspike gayfeather.....	<i>Liatris pycnostachya</i>
Cardinal flower *.....	<i>Lobelia cardinalis</i>
Blue lobelia.....	<i>Lobelia siphilitica</i>
Virginia bluebells*.....	<i>Mertensia virginica</i>
Missouri evening primrose.....	<i>Oenothera macrocarpa</i>
Roundleaf groundsel *.....	<i>Packera obovata</i>
Cobea beardtongue.....	<i>Penstemon cobaea</i>
Smooth beardtongue.....	<i>Penstemon digitalis</i>
Pale beardtongue*.....	<i>Penstemon pallidus</i>

Fame flower.....	<i>Phemeranthus calycinus</i>
Wild sweet william*.....	<i>Phlox divaricata</i>
Prairie phlox.....	<i>Phlox pilosa</i>
Jacob's ladder*.....	<i>Polemonium reptans</i>
Solomon's seal*.....	<i>Polygonatum biflorum</i>
Prairie coneflower.....	<i>Ratibida columnifera</i>
Grayhead prairie coneflower.....	<i>Ratibida pinnata</i>
Sweet coneflower.....	<i>Rudbeckia subtomentosa</i>
Fringe-leaf ruellia.....	<i>Ruellia humilis</i>
Blue sage.....	<i>Salvia azurea</i>
Bloodroot*.....	<i>Sanguinaria canadensis</i>
Gray goldenrod.....	<i>Solidago nemoralis</i>
Showy goldenrod.....	<i>Solidago speciosa</i>
Drummond's aster.....	<i>Symphotrichum drummondii</i>
Smooths aster.....	<i>Symphotrichum laeve</i>
New England aster.....	<i>Symphotrichum novae-angliae</i>
Aromatic aster.....	<i>Symphotrichum oblongifolium</i>
Azure aster.....	<i>Symphotrichum oolentangiense</i>
Large flower bellwort*.....	<i>Uvularia grandiflora</i>
Western ironweed.....	<i>Vernonia baldwinii</i>
Culver's root.....	<i>Veronicastrum virginicum</i>
Golden Alexanders.....	<i>Zizia aurea</i>

Grasses.....Scientific Name

Big bluestem.....	<i>Andropogon gerardii</i>
Side oats grama.....	<i>Bouteloua curtipendula</i>
Prairie June grass.....	<i>Koeleria macrantha</i>
Switchgrass.....	<i>Panicum virgatum</i>
Little bluestem.....	<i>Schizachyrium scoparium</i>
Indian grass.....	<i>Sorghastrum nutans</i>
Prairie dropseed.....	<i>Sporobolus heterolepis</i>
Eastern gama grass.....	<i>Tripsacum dactyloides</i>
Blue grama.....	<i>Bouteloua gracilis</i>

Shrubs.....Scientific Name

Service berry *.....	<i>Amelanchier arborea</i>
Leadplant.....	<i>Amorpha canescens</i>
False indigo.....	<i>Amorpha fruticosa</i>
New Jersey tea.....	<i>Ceanothus americana</i>
Common buttonbush *.....	<i>Cephalanthus occidentalis</i>
American hazelnut *.....	<i>Corylus americana</i>
Eastern wahoo *.....	<i>Euonymus atropurpureus</i>
Smooth hydrangea*.....	<i>Hydrangea arborescens</i>
Fragrant sumac.....	<i>Rhus aromatica</i>
Smooth sumac.....	<i>Rhus glabra</i>
Golden currant *.....	<i>Ribes odoratum</i>
Black raspberry *.....	<i>Rubus occidentalis</i>
Maryland senna.....	<i>Senna marilandica</i>
Rusty black-haw viburnum *.....	<i>Viburnum rufidulum</i>

APPENDIX B CONTINUED

WETTER AREAS

Annuals and Perennials.....Scientific Name

Swamp milkweed.....	<i>Asclepias incarnata</i>
Mist flower.....	<i>Conoclinium coelestinum</i>
Boneset.....	<i>Eupatorium perfoliatum</i>
Common sneezeweed	<i>Helenium autumnale</i>
Halberd-leaf rose-mallow.....	<i>Hibiscus laevis</i>
Common rush.....	<i>Juncus effusus</i>
Thickspike gayfeather	<i>Liatris pycnostachya</i>
Cardinal flower *	<i>Lobelia cardinalis</i>
Blue lobelia.....	<i>Lobelia siphilitica</i>
Roundleaf groundsel *	<i>Packera obovata</i>
Western ironweed.....	<i>Vernonia baldwinii</i>

Grasses.....Scientific Name

Switchgrass	<i>Panicum virgatum</i>
Prairie cordgrass	<i>Spartina pectinata</i>

Shrubs.....Scientific Name

Common buttonbush *	<i>Cephalanthus occidentalis</i>
---------------------------	----------------------------------

SHADY AREAS

Annuals and Perennials.....Scientific Name

Shining blue star*	<i>Amsonia illustris</i>
Thimbleweed*	<i>Anemone virginiana</i>
Pussytoes*.....	<i>Antennaria parlinii</i>
Canada columbine *	<i>Aquilegia canadensis</i>
Wild ginger *	<i>Asarum canadense</i>
Oak sedge*.....	<i>Carex albicans</i>
Shooting star*.....	<i>Dodecatheon meadia</i>
Wild Geranium*	<i>Geranium maculatum</i>
Indian physic*.....	<i>Gillenia stipulata</i>
Coral bells*	<i>Heuchera richardsonii</i>
Cardinal flower *	<i>Lobelia cardinalis</i>
Virginia bluebells*.....	<i>Mertensia virginica</i>
Roundleaf groundsel *	<i>Packera obovata</i>
Pale beardtongue*.....	<i>Penstemon pallidus</i>
Wild sweet william*	<i>Phlox divaricata</i>
Jacob's ladder*	<i>Polemonium reptans</i>
Solomon's seal*.....	<i>Polygonatum biflorum</i>
Bloodroot*.....	<i>Sanguinaria canadensis</i>
Large flower bellwort*.....	<i>Uvularia grandiflora</i>

Shrubs.....Scientific Name

Service berry *	<i>Amelanchier arborea</i>
Common buttonbush *	<i>Cephalanthus occidentalis</i>
American hazelnut*	<i>Corylus americana</i>
Eastern wahoo *	<i>Euonymus atropurpureus</i>
Smooth hydrangea*.....	<i>Hydrangea arborescens</i>
Golden currant *	<i>Ribes odoratum</i>

PLANTS FROM OUTSIDE NE KANSAS (NATIVE AREA)

Annuals / PerennialsScientific Name

Eastern Blue Star*.....	<i>Amsonia tabernaemontana</i> ... SE KS
Pennsylvania sedge*	<i>Carex pennsylvanica</i>MO
Rose turtlehead*	<i>Chelone obliqua</i>MO
Leather flower*.....	<i>Clematis versicolor</i>MO
Calamint	<i>Clinopodium arkansanum</i>MO
Purple coneflower*.....	<i>Echinacea purpurea</i> ... SE KS
Closed gentian*.....	<i>Gentiana andrewsii</i>MO
Beebalm*	<i>Monarda bradburiana</i> ... SE KS
Royal catchfly.....	<i>Silene regia</i> ... SE KS

Shrubs.....Scientific Name

Ozark witchhazel	<i>Hamamelis vernalis</i>MO
------------------------	-----------------------------------

* Will tolerate some shade

Note: Plants that are difficult to find either through mail order or in regional garden centers have not been included in this list.

APPENDIX C

NATIVES AND NATIVARS

While the definition of a native plant can depend upon who you ask, the two definitions below capture the essence of what it means for a plant to be native without complicated addendums or artificial boundaries. Common examples of plants native to northeast Kansas include pale purple coneflower (*Echinacea pallida*), prairie blazing star (*Liatris pycnostachya*), and stiff goldenrod (*Oligoneuron rigidum*).

“A plant that is a part of the balance of nature that has developed over hundreds or thousands of years in a particular region or ecosystem. Note: The word native should always be used with a geographic qualifier (that is, native to New England [for example]). Only plants found in this country before European settlement are considered to be native to the United States.” — *Natural Resources Conservation Service*

“A plant species is actually native to the ecoregion where it has evolved in concert with soils, climate, fauna and other members of the plant community.” — *University of Maryland Extension Service*

A native plant that has been manipulated by selective breeding or crossbreeding to highlight a desirable trait is called a nativar. One example is the white “purple” coneflowers - a selectively bred *Echinacea purpurea* that has a white flower head. You can also get red, yellow, and orange “purple” coneflowers. Nativars will have a varietal name in addition to the species name. For example, *Echinacea purpurea* ‘Avalanche’ is one variety of white coneflower. Look for the variety name to distinguish between natives and nativars.

Should you plant nativars in a native garden? Answers vary and there are several factors to take into consideration.

GENETIC DIVERSITY

Plant traits manipulated can include color, height, style or size of bloom, disease resistance, and size of fruit. Variations in these traits are sometimes found in nature but are often the result of hybridization and selective breeding. A plant with a desired variation is most often propagated as a clone. Most nativars are grown as clones of the original stock (wild type) or are cloned from hybridized nativars which means there is no genetic diversity in the population of that nativar. This of course results in consistency in the desired trait but does not make the cultivar adaptable to changing environmental conditions.

Open pollinated seed production has the best opportunity for producing genetic diversity in a species. Why is genetic diver-

sity important? Think of genetic diversity as an insurance policy for environmental changes; to survive, species must adapt to changing conditions.

POLLINATORS AND PREDATORS

Recent research suggests that pollinator use of nativars as compared to strictly native plants varies and is dependent upon the trait manipulated. Emily Baisden and her team at the University of Delaware found a general reduction in leaf foraging on nativars whose leaves were red or purple rather than their native green¹. Red and purple colors are produced by a set of pigments called anthocyanins which are abundant in red and purple leaves, and anthocyanins may deter insect feeding.

In preliminary research out of the University of Vermont², thirteen pairs of native plants and their nativars were evaluated based on pollinator visits. Seven of the native cultivars attracted significantly fewer bee pollinators than the straight species. There was no significant difference in pollinator visits in five of the pairs. One native cultivar, *Veronicastrum virginicum* ‘Lavender Towers’ attracted significantly more native bee pollinators than the straight species.

AVAILABILITY

According to a survey of regional nurseries conducted by the Mt. Cuba Center, a botanical garden focused on native plants in Delaware, 77% of the native plants for sale in that region are nativars. Casual observation of our region suggests that is the case here as well. Straight native species are available through online catalogs and native plant sales, often conducted as fundraisers for local groups.

SITE SPECIFIC CONSIDERATIONS

Some characteristics emphasized in nativars may not influence pollinator visitation or herbivory and are better suited for your yard. Dwarf varieties and natives bred for disease resistance may be excellent choices for your garden beds.

¹Baisden, Emily C., Douglas W. Tallamy, Desiree L. Narango, and Eileen Boyle. “Do Cultivars of Native Plants Support Insect Herbivores?” *HortTechnology* 28, no. 5 (2018): 596-606.

²White, Annie, “From Nursery to Nature: Evaluating Native Herbaceous Flowering Plants Versus Native Cultivars for Pollinator Habitat Restoration” (2016). *Graduate College Dissertations and Theses*. 626.

APPENDIX D

SOURCES FOR REGIONALLY GROWN NATIVE PLANTS AND SEEDS

Retail Source Location Phone..... Website

KANSAS SEEDS

De Lange Seed, Inc. Girard, KS 620-724-6223 www.delangeseed.com
Douglas County Conservation District..... Lawrence, KS..... 785-843-4260 <http://www.douglasccd.com/>
Feyh Farm Seed Alma, KS 866-765-3415 <http://www.feyhfarmseed.com/>
Happy Apple's Farm Tonganoxie, KS 816-260-6417 <https://happyapplesfarm.com/>
Leavenworth County Conservation District Leavenworth, KS..... 785-338-9946 www.sccdistrict.com/
Sharp Bros. Seed Co. Healy, KS..... 800-462-8483 www.sharpseed.com
Star Seed Osborne, KS 800-782-7311 <https://www.gostarseed.com/>
Tri Star Seed Company Springhill, KS 800-874-3308 <http://www.tri-starseed.com/index.cfm>

KANSAS PLANTS

Grimm's Gardens..... Hiawatha, KS..... 888-459-2586 www.grimmsgardens.com/hiawatha/
Happy Apple's Farm Tonganoxie, KS 816-260-6417 <https://happyapplesfarm.com/>
Kansas Forest Service..... Manhattan, KS 785-532-3300 www.kansasforests.org
Sunflower Farms..... Cherryvale, KS 620-336-2066 NA
Vinland Valley Nursery Baldwin City, KS 785-594-2966 www.vinlandvalleynursery.com

REGIONAL SEEDS

Hamilton Native Outpost Elk Creek, MO 417-967-2190 www.hamiltonnativeoutpost.com
Missouri Wildflowers Nursery Jefferson City, MO 573-496-3492 <http://mowildflowers.net/>
Stock Seed Farm Mudock, NE 800-759-1520 <http://www.stockseed.com/>
Heartland Seed of Missouri, LLC..... Eolia, MO..... 866-476-7333 www.heartlandseed.com

REGIONAL PLANTS

Bluebird Nursery, Inc..... Clarkson, NE 800-356-9164 <http://www.bluebirdnursery.com/>
Critsite: Prairie and Wetland Center Retail Store.....Belton, MO 816-331-9738 <http://www.critsite.com/index.cfm/fuseaction/pwc.retail/index.htm>
Missouri Wildflowers Nursery Jefferson City, MO 573-496-3492 <http://mowildflowers.net/>
Sow Wild Natives..... Kansas City, MO 816-974-6201 <http://sowwildnatives.com/>
Great Plains Nursery..... Weston, NE..... 402-540-4801 greatplainsnursery.com
Down to Earth Services Kansas City, MO 816-207-7960 DTEKC.com
Easy Living Native Wildflower Perennials Willow Springs, MO... 417-469-2611 <https://easywildflowers.com/>

* Listing does not imply endorsement of products or services. Sources listed advertise a large selection of native plants.

NOTES AND DOODLES

