

Down To Earth: Reports from the Field

Innovative Small Farmers' Outreach Program (ISFOP) • Lincoln University Cooperative Extension

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Woody Native Plants Could Provide Food and Habitat for Wildlife on Farms

By Dr. Nadia Navarrete-Tindall, State Extension Specialist –
Native Plants

Lincoln University Cooperative Extension's (LUCE) Native Plants Program (NPP) promotes native edible plants, both woody (trees and shrubs) and herbaceous (plants with stems and leaves that die down to the soil level), for human consumption and value-added products with income potential. In sustainable farming, habitat for pollinators and other beneficial insects is a must. That means that every bit of space in a small acreage farm is precious. Conservation practices can be used, such as those adopted in agroforestry. These include windbreaks or hedgerows (described below), forest farming, riparian (riverbank) forest buffers, alley cropping (widely spaced trees with another crop planted in the alleys between the trees) and silvopasture (combining forestry, forages and livestock production). The above can include not only pollinators' plants but also native edible plants. For example, windbreaks or hedgerows can be multipurpose, with two or three overlapping rows of vegetation that include trees, shrubs, brambles and wildflowers. This guarantees blooms throughout the growing season. It also maintains diversity. Windbreaks provide protection to crops and buildings by lessening the force of wind. In addition, they offer livestock shelter, wildlife habitat, food for people, materials for the cut flower industry and/or other value-added products.



Fritillary butterfly on Bee Balm blossoms.

Missouri has more than 3,000 native plant species. Many of these are woody, and more than 200 are now available in commercial nurseries. Choose plants grown from local seed to assure successful growth. Several nurseries in Missouri specialize in native plants. See Grow Native! (grownative.org) to find one near you. Nurseries offer selected varieties and/or open-pollinated (naturally pollinated) ones and will also give recommendations related to each species.

The NPP works on the FINCA (Families Integrating Nature, Conservation and Agriculture) project, which is funded by the National Institute of Food and Agriculture (NIFA). After four years of measuring growth and development, the best results were obtained by combining elderberry, wild plum, false wild indigo and climbing rose. They were easy to establish and maintain. And, they produced many fruit and flowers. This combination is particularly good for pollinators in the spring because these species bloom at different times early in the year. To provide nectar in spring and summer, wildflowers can be planted between woody plants. They can be grown in rows near windbreaks or

(continued on page 2)

Inside This Issue:

Woody Native Plants Could Provide Food and Habitat1 - 2
Utilizing Your Pasture More Fully through Mulitpecies Grazing.....	3 - 4
Opportunities for Small Farmers to Sell Products to Schools	4 - 5
Controlling Cucumber Beetles and Squash Bugs	6 - 7

Woody Native Plants (continued from page 1)

on idle land. Many times, pollinator habitat with good nectar sources is already available on farms; however, it often goes undetected by farmers.

Native bees, such as bumble bees, sweat bees and leaf cutter bees, require nectar, pollen and shelter all year. Woody plants can complement the food and habitat that wildflowers provide for these and other pollinators (e.g., flies, wasps, beetles and butterflies). The following is a list of plants that are easy to start and that will spread well, require little maintenance, are available commercially in local nurseries and can provide several benefits. They are also naturally resilient to extreme unpredictable weather patterns. This increases survival and guarantees growth and development. Most of these



Skipper butterfly on Blue Sage blossoms.

plants do not have insect pests or diseases. However, some (i.e., elderberries) may be susceptible to insects (e.g., Japanese beetles or mites) in a monoculture (when only that species is grown) or when selected varieties are chosen. To avoid spreading harmful insects or diseases, diversify your windbreaks by using several species. A combination of edible shrubs and herbaceous plants for hedgerows includes elderberry, false wild indigo, blue sage, bee balm, slender and hairy mountain mint and, as ground covers, common blue violet and ragwort (*Sambucus canadensis*, *Amorpha fruticosa*, *Salvia azurea*, *Monarda fistulosa*, *Pycnanthemum tenuifolium*, *P. pilosum*, *Viola sororia* and *V. papilionaceae* and *Senecio aureus*, respectively).

For more information about these species, see photos and a brief description at the end of this article. This combination could offer protection in urban areas, but for more open areas, a tree such as persimmon (*Diospyros virginiana*) could be added to offer more

wind protection. This hedgerow is being established at an urban farm in St. Louis. The NPP will visit later in the year to evaluate its survival and growth. For more information, contact Miranda Duschack at DuschackM@LincolnU.edu.

General recommendations for land preparation:

Clean your land of invasive grasses (e.g., Bermuda and tall fescue). The use of herbicides is not recommended, but it is up to the farmer. Prior to planting, add your choice of compost or organic fertilizer to boost the root system. The best time to establish shrubs and other native plants is in early spring and fall. If rain is not in the forecast, plan to water at least once per week for a month after planting. These plants are perennials (with a life cycle of two or more years, which will die off in the winter), so plan accordingly, and label the plants clearly. They are adapted to a number of environmental conditions. Some can withstand prolonged dry conditions, floods, shade and/or full sunlight. All respond well to controlled burns in the spring.

A partial list of plants that can be included in a hedgerow are:

False indigo bush (*Amorpha fruticosa*) is a nitrogen-fixing (a form of nitrogen that plants can use) shrub in the legume family, similar to peas, clovers, beans, etc., with multiple stems that can be up to 12 feet long. It adapts to a broad range of habitats. It grows in full to partial sunlight and in wet to dry soils. It provides nectar and pollen for native bees, butterflies and other pollinators.

Climbing rose (*Rosa setigera*) has pink flowers that bloom in early summer. It sprawls, and its branches can be 10 feet or longer. It grows well in full sunlight to partial shade and in moist to dry soils.

Elderberry (*Sambucus canadensis*) is a thicket-forming shrub that grows from root sprouts and reaches 8-12 feet tall. The fragrant white flowers form umbrella-shaped clusters and bloom in early summer. It grows in moist to average soil, under full sun to partial shade.

Wild plum (*Prunus Americana*) is a small tree that can form thickets. It grows well in full to partial sunlight. The fruit of the wild plum provides food

(continued on page 3)

Woody Native Plants (continued from page 2)

and cover for wildlife. It is used to make jellies and marmalades.

Bee balm (*Monarda fistulosa*) is a member of the mint family. It blooms from June to September and can grow to 5 feet. Leaves and flowers are very fragrant. They can be used for tea and to scent soaps. Bee balm grows well in poor soil in dry to moist conditions.

Blue sage (*Salvia azurea*) is also in the mint family. It can be used to flavor scones and shortbreads. It is a fall bloomer. All mints are visited by a diversity of butterflies and pollinators.

For a complete list of woody natives or for additional information, please contact the State Extension Specialist – Native Plants at (573) 681-5392 or Navarrete-TindallN@LincolnU.edu.

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Utilizing Your Pasture More Fully through Multispecies Grazing

By Randy Garrett, Farm Outreach Worker – Southwest Region

Multispecies grazing means having two or more species of livestock together or separately on the same land in the same growing season. This article only describes the multispecies grazing of goats and sheep with cattle. Multispecies grazing offers farmers a way to use their pasture more efficiently. In addition, goats, sheep and cattle produce different marketable products, which diversifies income sources. This type of grazing will help to grow the livestock industry and better use resources to feed a growing population. If producers are considering multispecies grazing, they should keep it as simple as possible and consider selecting animals that fit well into a low-input, pasture-based system.

For best results, the pasture and fences should be properly maintained. “Fences must be goat tight,” according to Dr. Elizabeth L. Walker, Associate Professor of Animal Science, Missouri State University, Springfield, Missouri. Using eight or nine strands of barbwire is recommended. If you use an electric fence, make sure that the fence is hot -- hotter than what would be needed for only cows. Because goats have smaller hooves, they are not grounded as well as cattle. Therefore, it takes a hotter wire to deter them. Goats must be trained to an electric fence. They will try a fence from time to time to see if it is hot.

Cattle, goats and sheep are commonly used for multispecies grazing. The manner in which these animals graze can differ greatly. Cattle are grazers that rely on forages that can be grabbed by the tongue. They are then pulled into the mouth and bitten off. Goats mainly graze at head height and above by standing on their back feet. They are known as browsers. Sheep typically graze with their heads down, but they sometimes graze at head height and above. Because of their split upper lip and smaller head, sheep typically graze closer to the ground than cattle. Sheep prefer to graze smaller and more tender forages.

Tall fescue is the chief cool-season forage in Missouri and surrounding states for a reason. It is tough, fairly drought-tolerant and grazing-resistant. It is best to manage what you have rather than to plant forages, especially those not adaptable to Missouri, as that is much more costly. Instead, focus on building herds and flocks that thrive on the forage resources you have, whether it is fescue, brush, weeds, etc.

Goats will consume most brush and tree species (e.g., oak and locust) as well as cedar at certain times of the year. Multiflora rose and blackberry are two favorites. Goats will readily eat most brambles and creepers, such as kudzu and poison ivy. Both goats and sheep will consume a variety of weeds. Some species (e.g., ragweed

(continued on page 4)

Utilizing Your Pasture (continued from page 3)



Fully using your pastures through multispecies grazing will provide more income per acre.

and ironweed) are very palatable, while several species of thistles are only somewhat palatable. There is a large variation within individual flocks and herds related to their willingness to eat brush and weeds.

The terrain of a farm can be another reason for adding goats and/or sheep to an operation. They are more adapted to grazing on steep or rocky areas. In contrast, cattle prefer moderate slopes and flatter pastures. The amount of livestock that can be grazed per acre will vary largely with management, forage resource, soil type, etc. A general recommendation is one cow/calf pair per two to four acres, with the addition of one goat or sheep per cow/calf pair.

The challenges with multispecies grazing depend on whether or not the operator is adding cattle to a goat and/or sheep operation or vice versa. Keep in mind that goats are not little cows. As mentioned above, fencing and handling facilities have to be considered when adding goats and sheep. There are also parasite and predator concerns with small ruminants. Goats and sheep need different mineral and supplementation programs than cattle. So, multispecies grazing requires a little more management.

Multispecies grazing is typically low-input and pasture-based. As such, it is best to use those breeds of goats and/or sheep that are easy to maintain. It also helps to graze animals that have been genetically selected to excel on a low-input system. They should have relatively low nutritional needs, good mothering ability and toughness. They should also be parasite resistance. Breeds to consider are Katahdin and other hair sheep as well as Kiko, Spanish or Pygmy goats. Moderate-framed cattle, such as South Poll cattle, lend themselves to a low-input, pasture-based set-up.

Unless you have a large acreage, where livestock

can self-rotate, rotational grazing is a must when using multispecies grazing. In addition, rested pastures are more robust in terms of energy reserves and later forage growth, and managed grazing offers clear advantages in forage use. Have as many paddocks as can be managed. Move them as often as possible, keeping in mind the “take half, leave half” adage. Rotational grazing can help with animal health, especially parasite issues. However, you should still check your goats often. Also, work with a veterinarian familiar with parasites.

Two advantages of multispecies grazing are increased cash flow opportunities and reduced risks. Overall, there are increases in revenue and pasture use, especially with brush and weed control. If you are considering multispecies grazing, you can learn more about it and related topics (e.g., parasite management) via university, Extension and Sustainable Agriculture Research and Education (SARE) websites.

Special note: The information in this article was compiled based on interviews with Dr. Elizabeth L. Walker, Associate Professor of Animal Science, Missouri State University, Springfield, Missouri, and Dr. Bruce Shanks, Associate Professor of Animal Science, Lincoln University, Jefferson City, Missouri.



Taking into account the nutritional, environmental and health needs of livestock in the winter will help ensure optimal animal welfare and performance.

Dr. Shanks raises Katahdin sheep, Kiko goats with South Poll cattle. At Lincoln University, he was involved in a research project grazing Katahdin sheep with cows.

For additional reading: University of Kentucky College of Agriculture Food and Environment. “Multispecies Grazing.” University of Kentucky Ag Master Grazer. Accessed February 23, 2017. http://www2.ca.uky.edu/grazer/aug12_Multi-Species_Grazing.php.

Opportunities for Small Farmers to Sell Products to Schools

By Jenna Wilkins, Farm Outreach Worker – West Central Region



Children enjoyed preparing and eating fresh salad greens as part of the Healthy Kids program.

Nationwide, the concept of farm-to-school has become increasingly popular. Many new groups have formed related to this topic. Currently, the United States Department of Agriculture (USDA) is offering grant funding to support this effort. Farm-to-school projects attempt to increase the amount of locally grown food in schools. This can occur through school gardens or by buying directly from farmers. In addition, concepts about local food systems are being included in the curriculum. Farm-to-school programs are being started nationwide, including in Missouri. The programs offer small farmers a new market for their products.

As director of the Farm to School Academy, Rachael McGinnis Millsap works with Kansas City-area growers, distributors and school districts to make fresh, locally grown foods more available to students. She also builds key partnerships and provides training to empower districts to overcome barriers to serving local food. For small farmers looking to sell their products to schools, Millsap suggests taking the following steps.

First, reach out to the staff of your regional Lincoln University Cooperative Extension (LUCE) Innovative Small Farmers' Outreach Program (ISFOP). Staff can help you identify nearby schools and school districts that are interested in buying food from local farmers.

Once you have found potential schools, speak with their food service directors. Find out what foods they want to buy locally. Open communication is the best way to making sure you understand the school's expectations for food safety. For example, some may require Good Agricultural Practice (GAP) certification or something similar. Also, be sure to discuss insurance, delivery and price. Keep in mind how these factors align with your broader farm business plan. Then, you can decide whether or not the benefits outweigh the costs.

If you reach an agreement with a school, start small, with only one school. Have a written contract. There are many uncertainties with crops and weather. Decide on quantities that you feel confident you can supply. There are several templates for purchasing agreements between farmers and schools that you can find online. If the weather cooperates, these transactions can be very beneficial. The students get locally sourced food, and farmers can diversify their income streams.

So, consider reaching out to sell your farm products to schools. Contact your local ISFOP Farm Outreach Worker (FOW) to learn more.



Rachael McGinnis Millsap, Director, Farm to School Academy, KC Healthy Kids

Controlling Cucumber Beetles and Squash Bugs in Cucurbit Crops

By Dr. Jaime Piñero, State Extension Specialist – Integrated Pest Management (IPM)

Striped and spotted cucumber beetles and squash bugs cause a lot of harm to cucurbit crops (e.g., cucumber, pumpkins, squash, watermelons). It can be a challenge to manage these pests in gardens and small farms. This article discusses two Integrated Pest Management (IPM) strategies: trap cropping and mass trapping. You can use them both to control cucumber beetles and squash bugs, with little or no insecticides applied to the cash crop.

Trap Cropping

Trap cropping means growing very attractive plants at the edge of the garden or cucurbit field. This lures the pests away from the cash crop. Insects massed on trap crops can be more easily killed with insecticides or by other means. Research about trap cropping has been conducted by Lincoln University Cooperative Extension's (LUC) IPM Program since 2011. This research shows that 'Blue Hubbard' squash is an excellent trap crop because it attracts many cucumber beetles and squash bugs. By using trap cropping, farmers have reduced inputs of fuel, labor, time and insecticides. Trap cropping also increases farm income, while protecting pollinators and other beneficial insects. For example, one producer in St. Peters, Missouri, has not sprayed insecticide on his cucurbit cash crop since 2011. He only applies a small amount of insecticide to 'Blue Hubbard' seedlings, which he plants at the corners of his fields. He currently markets his cucurbit produce as insecticide-free.

Using trap crops is easy and inexpensive. In Central Missouri, mid-April is the time to start growing 'Blue Hubbard' squash transplants. The key is to transplant two-week old 'Blue Hubbard' seedlings (trap crop plants) to the field at the same time you seed your cucurbit cash crop. If you grow your cash crop from transplants, then you will need to transplant the 'Blue Hubbard' seedlings at least two weeks before your cash

crop. You should use an insecticide to kill the insect pests on the trap crop. Remember, having one or two cucumber beetles or squash bugs on your cash crop does not mean you need to spray. You might not have to spray any insecticides on your cash crop.

- 2002-2015: Trap Crop plants located at the row ends
- 8 trap crops per row protected 70 Zephyr squash plants (cash crop)

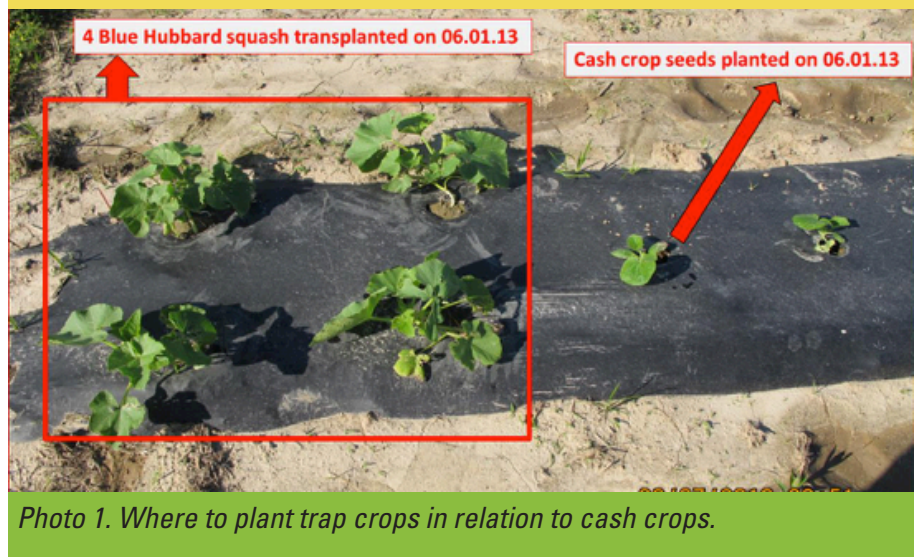


Photo 1. Where to plant trap crops in relation to cash crops.

LUC IPM program research has shown that cucumber beetles and squash bugs can be controlled using six to eight 'Blue Hubbard' squash plants in a small garden (about 100 cucurbit plants). For a small farm, if you grow cucurbits using plastic mulch and drip irrigation, transplant two to four 'Blue Hubbard' squash seedlings to both ends of each row (Photo 1).

Mass Trapping

The LUC IPM program recently developed a simple, mass trapping system. It has proven to be an effective IPM strategy to control cucumber beetles. When used in a cucurbit field, both striped and spotted cucumber beetles are drawn to the traps and away from the cash crop. Upon entering the trap, the beetles are killed after eating bait laced with insecticide. However, this mass trapping system will not control squash bugs. If squash bugs are the main pest in your garden or farm, trap cropping is recommended.

(continued on page 7)

Cucumber Beetles, continued, from page 6



The three parts of the trap are (1) a juice or milk jug, (2) a commercial, floral-based lure (or attractant) (source: AgBio© Inc., Westminster, CO; (303) 469-9221), and (3) a commercial stun pill that kills the trapped insects, composed of an insecticide, paraffin wax and powdered buffalo gourd.

Photo 2 shows the (A) protective wings of the AgBio© lure being removed to help disperse the scent, (B) lure being inserted through the mouth of a yellow-painted milk jug, (C) trap placement in a zucchini field (Lee Farms, Truxton, MO), and (D) the various ways to make entrance holes for the beetles. Results from research conducted from 2011 to 2013 at LU's George Washington Carver Farm showed that yellow-painted traps baited with the AgBio© floral lure performed best. In 2011, 28 baited traps killed 2,531 cucumber beetles (striped plus spotted) in a watermelon crop within nine days. This reduction of spotted and striped cucumber beetles decreased the need for an insecticidal spray. At the same time, marketable fruit was produced. In 2015, on-farm research on mass trapping was conducted at one commercial vegetable farm located at Truxton, Missouri.

Within eight weeks (May 21 – July 9), 28 traps killed 3,715 cucumber beetles (striped plus spotted). Overall, the traps were so effective that the average number of insects found per plant was 0.42. That number is below the economic threshold—the pest density at which applying insecticide is justified. Overall, the 2015 data indicate that, across the entire trapping period, for each cucumber beetle found on a plant, there were 26 cucumber beetles killed by a trap. In 2016, 15 traps killed 3,217 striped cucumber beetles in a six-week period.

For more information on mass trapping, see the LUCE IPM Program webpage: <https://www.lincolnu.edu/web/programs-and-projects/ipm>.

Results gathered over multiple years in various locations indicate that the mass trapping system developed is effective at suppressing striped and spotted cucumber beetles from cucurbit plants. Some producers in a couple of Missouri locations are currently evaluating the performance of this novel mass trapping system.

About Our Program...ISFOP

If you are a small farmer and need information, please contact an ISFOP Farm Outreach Worker (FOW). FOWs live and work in your community. They can provide information on ways to better manage your resources, reduce expense and increase income. They can also provide information on other programs and resources that may increase your income and the overall quality of life for you and for your family.

You are eligible to participate if you meet the following requirements:

- Your family lives on a farm, rural or urban.
- Farm products or income from the farm are necessary for you to live where you do.
- Your family provides the management and most of the labor for your farm.
- Your total annual family income is less than \$50,000.

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ISFOP Regional Map

