CHECKING IN
COOPERATIVE EXTENSION
LINCOLN UNIVERSITY

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Participants observe the use of goats to clear shrubs and weeds at a training session through Lincoln University Cooperative Extension's Small Ruminant Program.

Turning Obstacles Into Innovative Solutions That Impact Daily Lives

Using Goats to Control Invasive Weeds and Shrubs

by Mohan Acharya, Ph.D., Assistant Professor and Lincoln University Cooperative Extension State Specialist - Small Ruminants

The Midwestern United States is battling the encroachment of invasive weeds and shrubs. To combat this problem, goats are widely used to consume these plants as these animals are available in most geographical regions across the country, including the Midwest. Lincoln University Cooperative Extension (LUCE) in Missouri has designed comprehensive training programs to equip participants with hands-on skills in setting up electrified netting fences. The use of this technology affords many advantages to the goat owners.

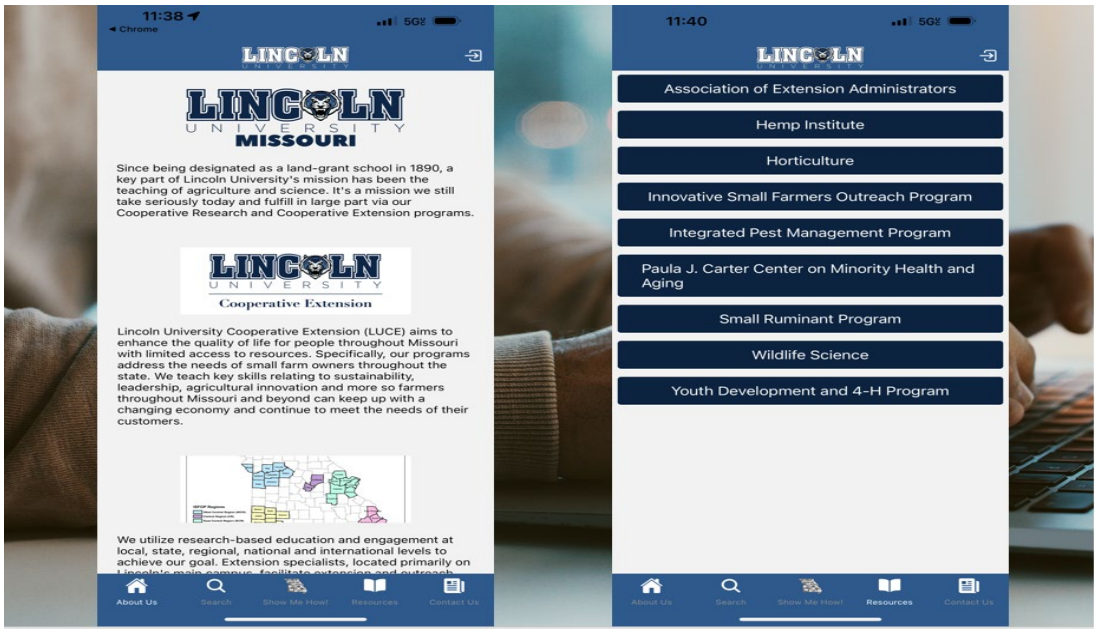
A portable electric fence can be easily built in areas where invasive plants, weeds and shrubs exist. These portable fences act as physical barriers, which keep goats and guardian animals inside the fence. At the same time, it deters predators (coyotes, bobcats, bears, wolves and mountain lions) from getting into the fence. Our training offers participants in-depth knowledge about fencing materials, fence posts, gates, use of energizers and grounding techniques.

Participants engaging in hands-on training to establish electric fences for goat grazing through Lincoln University Cooperative Extension's Small Ruminant Program.

Sheep and goats grazing inside an electric fence (electric net).

Strip grazing, which allows goats to graze in a given confined area for a period of time before moving to a different area, is made possible by using portable electric fencing until enough forages are available in the area. The fencing can then be moved to a new location for further grazing. Electronet fencing encloses goat herds in the new browse areas, made possible by a solar-charged battery that sends an electrical current that is enough to provide a shock to keep goats confined and deter predators.

This technology is very beneficial to producers whose pastures or woodlands are covered by invasive weeds and shrubs. Traditional technologies, such as mowing and herbicide applications, are expensive and environmentally hazardous. This modern technology offers small sheep and goat producers economic benefits, enabling them to save valuable dollars that would otherwise be spent on constructing expensive fences.



The Show Me How Team's website is designed for easy access to resources and services provided by Lincoln University Cooperative Extension.

The Lincoln University Show Me How Resource Library

by Callie Newsom, MBA
Lincoln University Cooperative Extension Associate
4-H and Positive Youth Development

Lincoln University Cooperative Extension's Show Me How Team had the privilege of being selected to participate in the incubation stage of the New Technologies for Ag Extension (NTAE). Excited to be selected to work on this grant, the Show Me How Team had one collaborated vision in mind to re-engage the disconnected population back to extension programs and services. Each team member saw an opportunity to bridge the gap between the disconnected population and all the resources and knowledge offered by the 1890 universities and their extension offices.

The LUCE Show Me How Team created a user-friendly 1890 extension resource library made accessible via a software app or kiosk. This technology would allow for all users with varying needs and digital access. The app's library will include lesson plans, video content, recipe ideas, fact sheets, guide sheets, and all other knowledge-based, educational documents. Users of the app would have 24-hour access at no cost, unlike periodic in-person programs or mobile educational displays, enabling re-engagement by giving everyone virtual access to extension programs and contents.

The Show Me How Team is composed of LUCE staff members Felecia Anderson, Regional Educator in Sikeston, Missouri; Susan Jaster, Farm Outreach Worker in the western region of Missouri; Callie Newsom, Extension Associate, 4-H and Positive Youth Development in Jefferson City, Missouri; and Mariann Wright, Assistant to the Regional Coordinator in Caruthersville, Missouri. The team has partnered with Dr. David Heise, Lincoln University Associate Professor of Science, Technology, and Mathematics, and students enrolled in his computer science class to develop an app for the team to pilot before expanding to the other 1890 and partnering universities.

The class was able to develop an application interface platform to host all the great work and publications produced at Lincoln University. Even though the grant's incubation period is over, the Show Me How Team is still committed to move these efforts forward to full completion.

Optimizing Mesotunnel Systems for Sustainable Production of Cucurbit Crops

by Touria Eaton, Ph.D., Associate Professor, Lincoln University Cooperative Extension — Horticulture

In the challenging landscape of cucurbit crop cultivation in the North Central Region of the United States, where cucumber beetles pose persistent threats to growers, a groundbreaking solution has emerged—mesotunnels. Dr. Mark L. Gleason, Professor of Plant Pathology, Entomology, and Microbiology at Iowa State University, along with Dr. Touria Eaton, Associate Professor of Horticulture and State Extension Specialist of Horticulture at Lincoln University of Missouri, led a project aimed at assessing the efficiency and optimizing the use of mesotunnels in organic production of muskmelon, a species of melon that belongs to the gourd family. Their two-year study revealed the benefits of mesotunnels, showcasing their potential to provide a blend of economic viability and environmental sustainability.

One of the challenges growers of cucurbit crops—plants that belong to the cucumber, melon, and squash families—in the North Central Region of the United States struggle to control is cucumber beetles and the bacterial wilt pathogen they spread. The bacterium kills plants, depresses yield, and drains profits. Insecticides are widely used to control the cucumber beetles. Excess applications of insecticides are neither economically nor environmentally sustainable. They are expensive and may damage pollinators and other beneficial insects.

Additionally, muskmelon is highly susceptible to bacterial wilt. Organic growers often avoid planting this crop because yield losses associated with cucumber beetle damage can be substantial and can sometimes exceed

Farmer Kelly Wheeler begins installing mesotunnels on her farm.

80%. Other than insecticides, management practices such as biochemical lures, perimeter trap cropping, delayed planting, and crop rotation have been tried but were not found effective. Growers also used low tunnels, low structures over the crops' beds, covered by spunbond polypropylene fabric. Low tunnels work well until they are removed to allow pollinator access. Removing low tunnels after pollination allows cucumber beetles to access the crop, which may cause the muskmelon to collapse and die from middle-to-late season wilt outbreaks.

Mesotunnels emerge as a distinct alternative to the challenges associated with low tunnels, where covers are commonly taken off during pollination. These structures are bigger than low tunnels and are covered by a breathable nylon-mesh fabric that remains in

Harvesting Innovation: Mesotunnels transform farmer Kelly Wheeler's fields into a space for sustainable cucurbit cultivation.

place all season. Bumble bee colonies are inserted underneath the cover to allow pollination.

To assess the efficiency and optimize the use of mesotunnels in organic production of muskmelon, Iowa State University and Lincoln University of Missouri applied for funding to North Central Sustainable Agriculture for Research and Education (NCR SARE) and were awarded. The principal investigators of the project were Dr. Mark L. Gleason and Dr. Touria Eaton. The trials occurred at both universities and were replicated for two years. The objectives were to evaluate the effect and feasibility of mesotunnel practices on muskmelon yield without using insecticides in organic systems.

Throughout the research project, data was collected and statistically analyzed. Results revealed that mesotunnels promise to deliver consistently high marketable yields without the risks associated with insecticide use – a change that could open up new growing and marketing opportunities for organic cucurbit growers.

The results of the project were widely disseminated to growers in Missouri and Iowa. Nine farmers tried this approach to grow cucurbits in Missouri, and one adopted the practice in her operation practices. All farmers favored the method and found it profitable and efficient in controlling cucumber beetles in cucurbits. Some of these farmers had found renting bumblebees for pollination a little cumbersome.