USDA National Agroforestry Center

Inside Agroforestry

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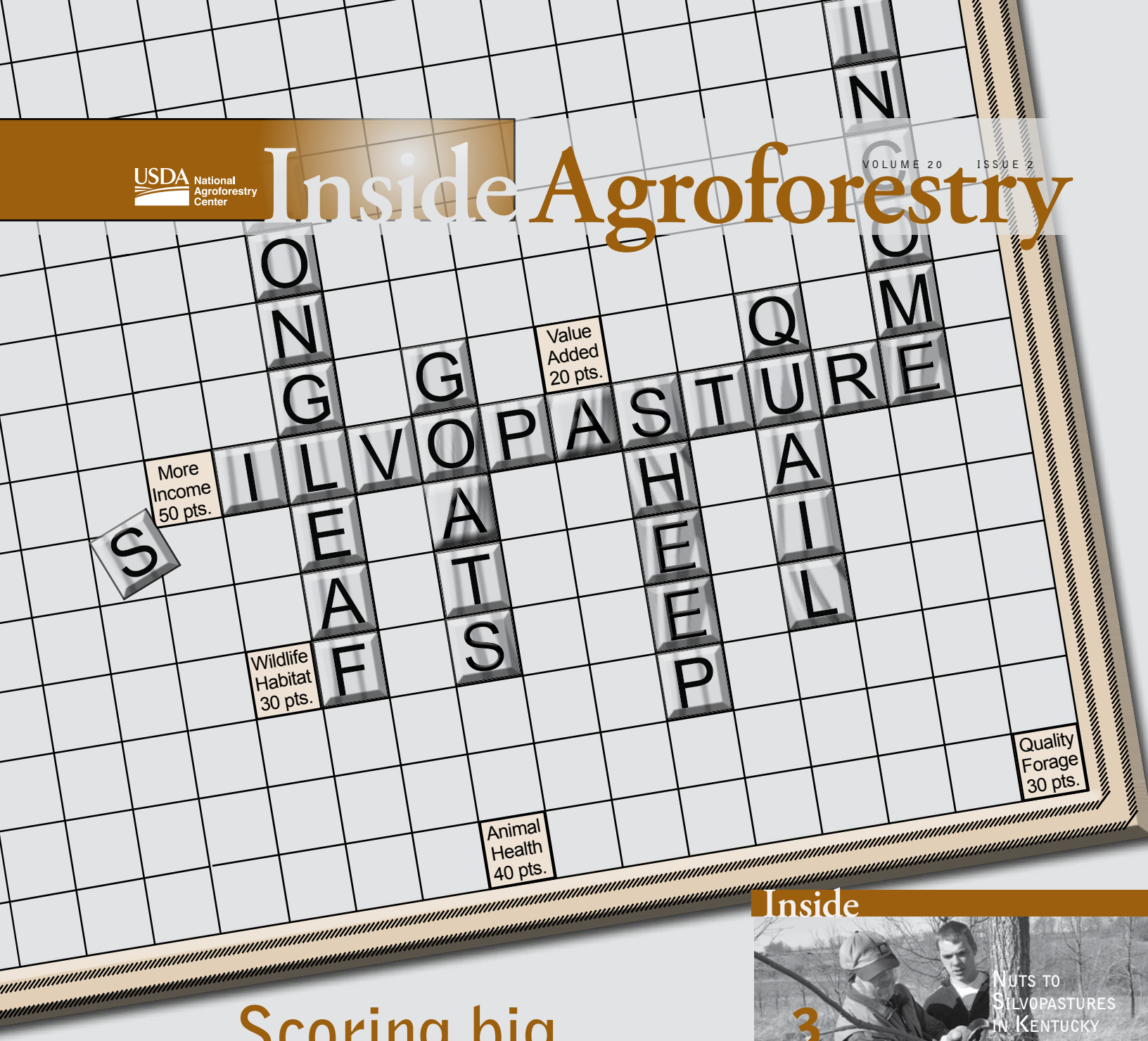

Scoring big with Silvopasture

Uma Karki, Ph.D.
State Extension Livestock Specialist
Tuskegee University
Tuskegee, AL

Initiative, research and education set Nimrod Stephens on a course of becoming a goat producer on his Quiet Oak Farm in Phenix City, AL, utilizing silvopastures and open-pastures to meet the growing demand for goat meat in U.S.

Making a decision to leave his lawn-care business after research showed that goat meat production was lagging behind demand, Stephens went to work on a piece of unused family land with only nine goats.

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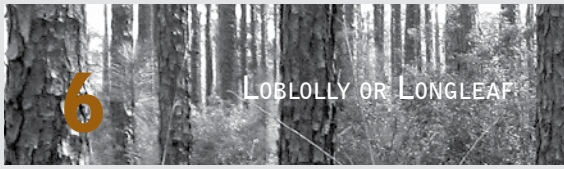
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NAC Director's Corner

A commentary on the status of agroforestry by Andy Mason, NAC Director

Silvopasture: What, Who, Where, Why, When and How?

I've decided to devote the Director's Corner to my take on the silvopasture questions of "what, who, why, when, where and how."

What is silvopasture?

"Silvopasture is a form of agroforestry defined by the intentional integration of a system of symbiotic, planned interactions that produces wood, forage and livestock products while simultaneously creating sustainable environmental benefits and ecosystem services." (Sharrow, S., et al; in North American Agroforestry: An Integrated Science and Practice, Garrett, H., editor; 2nd edition, 2009).

Who is applying silvopasture and Where?

NRCS reporting shows significant increases in demand for silvopasture technical and financial assistance. Nationwide, in 2009, only 770 planned acres were reported. In 2010, the planned acres jumped to more than 8,500, and in 2011, it reached almost 5,200 acres. Over the last 3 years, 26 states and Puerto Rico reported silvopasture applications, with the highest number of applications in Alabama, the highest number of acres in Oregon, and a significant number of applications of acres in Minnesota, Louisiana and Montana.

We will soon have more comprehensive information about who is practicing silvopasture in the U.S. Thanks to the cooperative work of NAC and the USDA National Agricultural Statistics Service, and a formal request from NRCS Chief Dave White, the first ever agroforestry question will be included in USDA's 2012 Census of Agriculture questionnaire: "At any time during 2012, did this operation practice alley cropping or silvopasture?"

Why would a landowner choose silvopasture?

Landowners are often looking for ways to both increase and diversify income from their farm/woodland. A typical silvopasturist is most likely the producer who already grazes livestock, has some woodland and is an "innovator" or "early adopter." This question is further answered in this issue's stories about producers in Alabama, Kentucky, Texas and New York.

When is the right time to choose silvopasture?

Only the producer knows if and when silvopasture is right for them. We know that information is the main driver in the adoption process and it must be timely, accurate, easy to obtain, equally accessible and inexpensive (see Agroforestry Note-43, "+H: The Human Considerations in the Adoption of Agroforestry" at www.unl.edu/nac/agroforestrynotes/an43g13.pdf)

If someone asked you tomorrow, "What do you think about silvopasture?" Are you prepared to provide helpful assistance in planning and applying a silvopasture system?

How can you learn more about silvopasture?

NAC has the following free silvopasture resources:

- Overview brochure: Working Trees Silvopasture (www.unl.edu/nac/workingtrees/wts.pdf)
- Guidebook: Silvopasture — Establishment & management principles for pine forests in the Southeastern United States (www.unl.edu/nac/morepublications/silvopasturehandbook.pdf)
- Online training: www.silvopasture.org/
- Additional publications: www.unl.edu/nac/silvopasture.htm

I encourage you to share with me your stories and perspectives about silvopasture. What science and tools are needed to advance silvopasture? Please email me at: amason@fs.fed.us

Sincerely,

Andy Mason

What's new at NAC?

More and more people are asking about agroforestry: "What is Forest Farming?" "Why should I consider creating a Silvopasture?" "What sort of crops can I grow in an Alley Cropping system?"

The USDA National Agroforestry Center has created six new PowerPoint presentations to answer some of the most common questions and provide a basic understanding of agroforestry in the U.S. There is an overview presentation of agroforestry and

a presentation covering each of the five agroforestry practices. All six PowerPoint presentations are available to download and use at your next workshop/event. Please feel free to customize the slides as needed for your local area and audience. We hope you find these presentations helpful and interesting. Go to: www.unl.edu/nac/presentations.htm

Doug Hines and his son, Logan, prune a grafted walnut tree in a reserve silvopasture of tall fescue. Photo by Sara Hines

Nuts to Silvopastures in Kentucky

Sid Brantly
NRCS State Grazing Specialist
Lexington, KY

In the beautiful rolling hills of Bourbon County, KY, home to beef cattle, horses, wildlife and fruit and nut producing hardwoods, sits Doug and Sara Hines' 160-acre family farm, where agroforestry practices are helping the family produce a sustainable economy.

When Sara and Doug purchased the land in 1991, their agricultural experience consisted of raising beef cattle, growing tobacco and other row crops, a direction they pursued in the following years.

However, these enterprises were not able to sustain the "family farm" that Sara and Doug had always envisioned. Searching for answers to their dilemma, they began to see the advantages of adding trees, particularly black walnut and hickories, to their pastures, thus creating silvopastures. The Hines recognized the value of integrating the overstory management with understory production — the agricultural and environmental benefits of silvopastures.

One of their first steps on their "silvopasture journey" was integrating native black walnut into their farming system, but an outbreak of Thousand Cankers Disease in nearby states spurred them to diversify the walnuts with other species.

"Shagbark and shellbark hickory grow well in my area," Doug Hines said. "And some of the best cultivars are very promising. I've worked closely with other members of the Kentucky Nut Growers Association to identify and propagate local hickories. I am also adding some of the late vegetating cultivars of Persian walnuts and heartnuts."

Why plant trees in the pastures?

In many regions of the world, trees are utilized to improve habitat for dairy cattle, goats, sheep and other livestock. They are used to block chilling winds and snow from lounging, feeding and birthing areas. Trees also can provide evaporative cooling and can reduce direct, solar radiation that dehydrates animals, plants and even soil organisms.

In her master's thesis, Alicia Buergler writes, "Moderating forage microclimate with appropriately spaced trees is an effective way to improve forage production in temperate pastures." And Paul, Turner and Larson writing in the 2000 Beef Cattle Report, "Beef cattle research in Kentucky demonstrated a reduction in deep body temperature as much as 1.4 degrees Fahrenheit, with improvements in daily gain rates that ranged as high as 1.25 pounds per day as a result of shade during summer heat stress periods."

Doug Hines explained how putting trees in the farm's pastures has affected their farm, "There was an opportunity to add trees without adversely affecting our pasture production.

"Black walnut in particular has an open canopy, which allows a good bit of sunlight to reach the ground. It also is late to leaf out. In many years, the first cutting of cool-season grass hay is being mowed as the native black walnut trees begin to leaf out."

A farm with diverse marketable products is more likely to be profitable and sustainable over time. Markets for livestock products typically trend up and down, sometimes making cash flow,

see **Nuts in Kentucky**, Page 8

Quantifying Quail Questions

Richard Straight
USFS Lead Agroforester
Lincoln, NE

People involved in silvopasture management readily recognize and actively integrate the associated goals and objectives of forage, livestock and tree management. Even though one of the most common and highly ranked values of landowners is wildlife, there has not been any research or effort to include keystone wildlife species such as turkey, quail and the red cockaded woodpecker in silvopastures. This information is greatly needed if silvopasture management is to evolve into a widely accepted way of managing multiple resources for profit.

In 2004, the USDA National Agroforestry Center (NAC) worked with the National Wild Turkey Federation to develop Agroforestry Note #28 (www.unl.edu/nac/agroforestrynotes/an28s06.pdf) on some basic ways to enhance a silvopasture that would be beneficial for turkeys in the southeast U.S. Some anecdotal information suggested that quail also might benefit from silvopasture management. But just exactly how to manage a silvopasture specifically for quail wasn't understood. Enter Tall Timbers Research Station near Tallahassee, FL.

Tall Timbers Research Station is the premier quail and habitat manager in the Nation. Their habitat management goals currently do not include grazing or improved pasture systems, although they are interested in building partnerships that could help improve the economic potential of farm, ranches and woodlands by shifting from the traditional paradigms to sustainable systems thus increasing diversity.

Tall Timbers' South Carolina Game Bird Research Director Jerold Sholar and South Carolina NRCS Grassland and Forestry Specialist David Findley also had noticed that quail and other wildlife species were sometimes found in silvopastures. But they wondered about how silvopastures could be managed to be even better habitat for quail. In conversations with NAC, it was decided to engage in a joint effort to monitor quail and mammalian nest predator populations in response to the addition of a silvopasture system on a farm located in Allendale County, SC. Sholar and Findley, along with Tall Timbers' Game Bird Research Director Bill Palmer developed a silvopasture system with improved pasture grasses (Bahia), warm season grasses, native forbs, legumes and loblolly pine trees. Predator and quail populations were monitored on a control pasture and the silvopasture simultaneously using techniques that are standard on all of Tall Timbers study sites. A base-line population was established and used to determine if the silvopasture components had a positive impact on the quail population.

David Findley shows a silvopasture demonstration site in 2011. Photo by Rich Straight

Bait is used to attract predators to plots of fine sand, such as this, where foot prints can be identified and counted to determine predator populations. Photo by Rich Straight

Conventional silvopasture systems consisting of pine strips and sod-forming exotic pastures provide low quality habitat for bobwhites. Although severe drought conditions and high predator context limited the quality of habitat response to this system, it is the opinion of the study team that the system developed for this project has potential for improving quail populations providing landowners with an additional potential income source (wildlife) with timber and cattle. Adding high quality, early successional habitat to a silvopasture system could provide landowners with additional opportunities for wildlife-based recreation that may also yield more income (lease opportunities). Studies on intensive, center-pivot irrigated farm land have shown significant increases in bobwhite populations by converting 5-25 percent of the row crop acres to early successional habitat, giving credence to the possibilities of this system. Sholar proposed taking an existing timber stand with 600 trees or higher per acre and thinning to 40 or 60 square foot of basal area, which would be the ideal scenario for timber grazing. This spacing allows for adequate sunlight for native plant recruitment. The concept described above is particularly well suited to the southeastern U.S.

"Sustainable systems require less input but create an opportunity for a higher rate of return per acre," Sholar said. "Therefore, we feel the concept that we devised for improving silvopasture will build a bridge to change that promotes diversity in habitat and should reward those that adopt this approach."

This project has laid the ground work for further investigation on the potential of this new silvopasture/timber grazing concept to positively influence quail populations and other early successional wildlife species.

Maximize returns with Silvopastures

Beverly Moseley,
NRCS Public Affairs Specialist
Bryan, TX

At the time of this writing, it's January 2012, and winter is upon Texas ranches. Shorter days give ranchers longer evening hours to reflect on last year's successes and challenges — and time to consider new management strategies for the upcoming year.

During this time of reflection, silvopasture is one resource management system landowners might have considered for optimizing cattle performance and ranch economics.

"For my operation, it was an opportunity to diversify both my open land and forestland management without losing productivity in either setting," Ross Brown said. Brown, a Harrison County rancher and district conservationist for the USDA Natural Resources Conservation Service (NRCS) in Marshall, TX, added that his operation on his family ranch, located near the northeast Texas town of Waskom, has always focused on forage, forest and wildlife management.

"Silvopasture gives us the ability to do this on the same acreage. The bottom line for us is increased economic performance per acre," he said.

Silvopasture benefits

Brown said if a landowner's objectives are primarily livestock and forage production, then a system that incorporates pines can work best. Hardwood trees, including pecan, hickory or walnuts, also can be managed for a silvopasture mix with livestock and forage.

"Pine trees offer less competition for moisture and provide a protective canopy year-round for livestock. A silvopasture system can be designed around both pine and hardwood trees, depending on soil types and the landowner's objectives," Brown said. "One issue with hardwoods is they have a much larger lateral root system, which creates more competition for moisture where the forages are concerned. This can be overcome with wider spacing of the trees and hardwood-specific site selection."

Brown said silvopasture benefits can include improved livestock performance, water quality and wildlife habitat, recreational opportunities, along with long-term profits from sales of wood products, such as sawtimber.

"I think it is a win-win situation, both environmentally and economically," Brown said."Since my involvement with silvopasture on our family ranch, I am confident that high quality forage with sustainable yields for livestock grazing is attainable in this setting.

"Livestock clearly prefer to graze in these areas in almost any weather condition, and with the presence of the forest component, the opportunities to manage for wildlife now exist where before that was not a consideration."

Relief during weather extremes

The unrelenting days of record-breaking heat that blanketed Texas in 2011 were a challenge for people and animals. Driving through

Ross Brown stands among pines on one of his ranch's silvopastures. USDA-NRCS photo

the state on any given summer day, cattle could be seen huddled under any available shade.

At Brown's ranch last summer, his cattle grazed the silvopasture area throughout the day during the extreme heat.

"The forage under the trees was green and actively growing during the record-breaking heat, while the forage in the open field was in a more dormant state with little green, actively growing vegetation. Grasses seem to be slower-maturing under the canopy of trees and because of this can be more palatable and higher in nutrient value," he said.

Cattle also can benefit from a silvopasture setting during extreme cold or wet periods.

"I think that we definitely improve livestock performance in a silvopasture setting. The protection offered by the trees in both hot times of the year and cold reduces the energy requirement of a cow and that can translate into increased profit for the cattleman," Brown said.

During spring and summer, these areas also can provide an area for an extended forage-growing season and provide the rancher with an opportunity to incorporate cool season forages for supplemental grazing during the winter. Tree canopies still allow enough sunlight to reach the grasses for optimal growth.

"If the primary consideration is forage production for livestock and hay, then I'd recommend warm season, perennial grasses under the trees," Brown said. "However, if the primary consideration is wood products, and wildlife is secondary, then native grasses might be more beneficial in the mix. Management will always depend on land management objectives."

Maximizing land use

According to the Texas Forest Service, Texas has more than 63 million acres of forestland and an estimated 468,000 private forest landowners — for whom Silvopasture can be a viable option.

see **Texas Silvopasture**, Page 9

Best Silvopasture: Loblolly or Longleaf?

Becky Barlow
Cooperative Extension Forestry Specialist
Auburn University School of Forestry and Wildlife Sciences
Auburn, AL

When shopping for my first car my dad said, "You had better pick out one you like because you are going to have it for a while!" The same can be said for the timber species chosen when designing a silvopasture. Since most landowners expect to grow timber for 30 years or more, the species selected might be the most important thing considered during the early planning stages. There are several questions that should be asked when making this choice: What are the long-term and short-term management objectives? What is the soil type? What species grow best in the region? What are the timber markets in the area?

In the southeastern United States, southern pines such as loblolly (*Pinus taeda*) and slash (*Pinus elliottii*) have proven to be well-suited for use in silvopasture systems. These pines work well in single, double or even triple rows of trees with forage corridors between them.

However, few studies have examined the suitability of another southern pine — longleaf pine (*Pinus palustris*) as part of a modern silvopasture system.

Until the 1920s when fencing laws were enacted, free-ranging cattle regularly grazed natural longleaf pine forests. As longleaf pine forests were eventually harvested and fire was suppressed on the landscape, longleaf was often replaced by its faster growing cousins, loblolly and slash. Eventually, only about 3 million of the original 90 million acres supported longleaf pine — a loss of over 96 percent of the original longleaf forest acreage.

Today, longleaf pine is enjoying a resurgence in popularity, with restoration efforts increasing across its range. A significant portion of this effort is concentrated in low-density plantings (less than 600 trees per acre) of longleaf pine in old agricultural fields that are often promoted with cost-share programs to improve wildlife habitat. While there is some historical evidence that natural longleaf pine stands may be ideally suited for use in silvopasture systems, little is known about how planted longleaf silvopastures will respond to grazing.

To find out, the USDA National Agroforestry Center collaborated, in 2008, with the Alabama Forestry Commission, Alabama Cooperative Extension, Auburn University School of Forestry and Wildlife Sciences and the U.S. Forest Service to develop a demonstration site to compare longleaf and loblolly silvopasture systems.

Using a former tree seedling nursery site near Atmore, AL, five-acre blocks were planted in double rows (six-foot by eight-foot spacing), leaving a 40-foot "alley" between double rows. These plantings continue to be monitored for survival and growth to examine the influence on silvopasture establishment activities. Of primary interest is how early seedling growth will affect the timing of cattle introduction. Since cattle figure prominently in the cash flow of silvopasture systems, understanding how tree growth can limit this timing is particularly important.

Seedlings were examined for first- and second-year survival. Seedling survival was variable for both loblolly and longleaf paddocks, ranging between 30 and 80 percent. Survival in the longleaf paddocks averaged 68 percent at the end of the first growing season and 78 percent for the loblolly. Some longleaf paddocks with very low survival were replanted at the end of the first growing season to fill in gaps where mortality was highest. At the end of the second growing season survival was an average of about 54 percent regardless of tree species.

Longleaf pine silvopasture such as this one located in south Georgia have the potential to produce around 100 bales of pine straw per acre per year when the trees are between the ages of 10 and 15 years old.
Photo by Becky Barlow

One factor impacting survival on all sites was equipment operator error. When alleyways were mowed, large groups of trees were unintentionally removed. Longleaf pine seedlings in the "grass stage" are especially difficult to spot among tall grasses, so it became clear that equipment operators must be made aware of seedling locations.

It is recommended that livestock be introduced into a silvopasture system only after the terminal bud of the tree seedlings are above the reach of livestock — typically about six to eight feet. By age four, loblolly pines in this study had reached this threshold with an average height of nine and a half feet. In contrast, longleaf pine of the same age averaged only about six inches. This was expected because early development of longleaf pine is characterized by a grass-stage period, when little or no increase in height occurs. The length of time between germination and the start of seedling height growth is usually 4-5 years and is followed by a period of rapid growth in height. Emergence from the grass stage can be unpredictable and may depend on seedling quality for planted stands, competition from other seedlings or vegetation, insect and disease incidence and climate. Silvicultural practices that reduce competition and improve soil conditions can reduce duration of the grass stage. The incidence of brown-spot needle blight caused by the fungus *Mycosphaerellaceae dearnessii M.E. Barr*, which varies by geographic location, also can increase the number of years a seedling remains in the grass stage.

Based on this study, loblolly pine silvopastures will be suitable for cattle grazing at a much earlier age than longleaf silvopastures planted at the same time. This difference can impact financial returns to the landowner if early livestock introduction is an important management objective. Replanting the longleaf paddocks increased up-front costs, which, in some cases, could have been eliminated with additional training of equipment operators. As this study continues, we will gain a better understanding of long-term costs and benefits

see **Loblolly or Longleaf**, Page 9

Passionate about Silvopasture

Troy Bishopp
Bishopp Family Farm
Deansboro, NY

When I think of visiting Seneca Lake in upstate New York on a beautiful, warm fall day, my mind fancies sipping a nice, semi-dry Riesling, strolling through the waterfalls of the Watkins Glen State Park and sneaking a peek at the famous race track where, in my boyhood dreams, I always took the checkered flag.

I can now add another attraction to that list — the November 2011 Northeast Silvopasture Conference. From the wide variety of license plates, I surmised that the more than 100 agroforestry enthusiasts attending this inaugural event have found a new destination as well. This brainchild of adding value to farms and woodlot has been on the minds of the Cornell University Cooperative Extension's (CCE) organizing trio of Brett Chedzoy, Jim Ochterski and Nancy Glazier for some time.

Ochterski, the Ontario County's Cornell Cooperative Extension Agriculture and Natural Resources Issues leader, summed up the mission that brought together farmers, foresters, students, conservation professionals, educators and community development advocates by saying, "We are seeking to catalyze the development of silvopasture in the Northeast by looking at the science, considerations in planning, research and practical implementation on the land. When it comes to putting livestock in the woods, we're learning to go from destructive to productive.

"To harvest any financial or environmental reward, we emphasize the value of a comprehensive forest and farm plan rooted in a long-term thought process."

John Hopkins from Forks Farm in Bloomsburg, PA, and Dr. Tatiana Stanton from Cornell's "Goats in the Woods" study showed the group how animals have enhanced their woodlands and scrub pastures. By using a variety of timed disturbances, pigs and goats were put in the understory to control invasive plants like multiflora rose and buckthorn. These eco-brush trimmers, kept in check with electric fencing, opened up the canopy understory for further enhancements like planting different grass and tree species.

Goats graze on multifora rosa in the understory of a silvopasture in upstate New York. Photo by Brett Chedzoy

> ***"When it comes to putting livestock in the woods, we're learning to go from destructive to productive."***
> **— Jim Ochterski, Ontario County's Cornell Cooperative Extension Agriculture and Natural Resources Issues leader**

Creating this savannah-like landscape adds value by more than just clearing undesirable undergrowth, according to John "the Silvo-culturist" Hopkins, who claims the woodlot pork tastes better than factory-farmed. That taste, he said, has local customers wanting more Forks Farm pork. And, thanks to that, he figured the hogs were adding $4,000 an acre after expenses — while helping reclaim under-utilized land.

The team of Dusty Walter, Gene Garrett and Larry Godsey from the University of Missouri Center for Agroforestry gave a presentation on the development, design, implementation and impact of tree-forage-livestock systems.

When attendees questioned the panel about how to apply these practices on their own land, the response of "it depends" resonated many times. They talked extensively about the benefits of natural shade, tree species, spacing and thinning. They also addressed the economics of establishing a system and the financial rewards to the landowner.

As an after-dinner treat, Agri-Dynamics founder, Jerry Brunetti, gave his interpretation of silvopasture as the "pantry and pharmacy for man and beast." Based on his research, farm work and books like "Wild Health" by Cindy Engel, and the 1928 classic, "Tree Crops" by J. Russell Smith, he said he has concluded that hedgerows with their diverse plant species and tree crops integrated into pastures have high quality, cost-effective medicinal qualities for all.

In the segment, "A Vision to Expand Silvopasturing in the Northeast," New York's NRCS Grazing Specialist Dave Roberts and Eastern Region National NRCS Forester Tom Ward teamed up with Small Farms Educator Nancy Glazier from the Northwest New York CCE and Dr. Peter Smallidge, Cornell's NYS Extension forester, to explain the possibilities. They discussed what every grazier needs to know about forestry and what every woodland manager needs to know about grazing. In addition, they explored suitable land evaluations, available resources and technical assistance for burgeoning silvopasturists. They reiterated that silvopasture is not grazing livestock in unmanaged woodlots or pastures.

The group then traveled to Brett and Maria Jose Chedzoy's Angus Glen Farms, LLC, bordering the Watkins Glen State Park to see,

see **Passionate** Page 11

Nuts in Kentucky

Continued from page 3

liquidity and profit-margin problems for a small, family farm. The addition of nut and fruit enterprises often helps mediate this risk by giving the silvopastoralist increased marketing options.

Grazing in the orchards?

Silvopastures create a more diverse range of "resource acquisition zones." Much of the nutrient resources for tall fescue, orchard grass, red clover, bluegrass and white clover pastures are primarily garnered from the upper 18 inches of soil, while the rooting zone for black walnut trees can be three to five feet.

In a "pastured" setting, the land is typically maintained in such a way that nutrient competition for the trees is minimized. Livestock graze or browse the plants that could become competitive with the fruit and nut trees, and maintenance (such as clipping or mowing) is carried out to remove any potential competition the livestock miss.

Fruit trees in grazed silvopastures benefit from the lack of fruit deteriorating on the ground, a bit of a throw back to another era when livestock on small, family farms vacuumed up any undesirable fruit that had potential to harbor overwintering insects and diseases. Also, the greater distances between trees in a silvopasture can provide a possible "disease/insect defense zone."

Sustaining a family farm

Sharing what his family has learned using nut trees in its silvopastures, Doug Hines said his original vision was rows and rows of grafted black walnut trees in the fields.

"I started by planting a five-acre field with rows of small, grafted black walnut trees and began strip grazing with portable electrified fencing," he said. "A single, unfortunate incident was enough to learn that cattle can devour many young trees in a very short time. Now I plant larger trees and fence each one with salvaged posts and wire from fence removal projects."

Transplanting can be labor-intensive, Hines said.

"Black walnuts, pecans and hickories are deeply tap-rooted, so a quality, long, steel-handled spade is absolutely necessary in hand-digging and transplanting these trees," he said. "I now have two grown sons and they are a great help when it is time to transplant trees. Also, larger trees require supplemental water during the summer for the first year or two after planting."

Keenan, Logan, Sara and Doug Hines (left to right) pose for a picture overlooking their Bourbon County, KY, farm. Photo by Sid Brantly.

Any plans to silvopasture must, by the very nature of trees, be a long-term project. Many nut trees are slow to bear. Hickories often require 15 to 20 years to bear well and for this reason, this type of multi-cropping is probably easier to justify if there is interest in the family farm being passed to the next generation.

Because of the long pre-production period, large up-front investments are not very practical. However, used fencing materials and providing one's own labor for fencing, grafting and weed control can minimize expenses.

Tree spacing depends on interim or long-term goals, livestock shade needs, forage production issues, water requirements for trees, harvest requirements (machine or hand picking fruit or nuts), as well as potential disease and insect problems. Pruning and thinning of nut trees also is an important management aspect of silvopastures that cannot be overlooked.

For commercial fruit or nut tree crops, it is important to acquire quality, adapted trees that will accomplish the farm's business goals. Since there is only limited information available to potential silvopastoralists in this area, it can be of great benefit to seek out local, state or neighboring state associations. There is plenty of information, Doug Hines said, to help established growers maintain their trees, as well as for those wishing to add nut-producing trees to their land.

Getting started

"For growers north of the traditional pecan belt, the Northern Nut Growers Association is a great source of information, and this group maintains an informative website," he said. "University extension programs also are excellent sources of information. The University of Kentucky and Kentucky State University have both been supportive of nut growers in Kentucky, and will assist this year in hosting the Northern Nut Growers annual meeting in Kentucky (July 22-25 in Lexington, KY)."

Fencing of salvaged posts and wire protects grafted hickory trees from livestock and wildlife on the Hines farm. Photo by Sara Hines

There are a number of good mail order sources for nut trees in the U.S. Both potted and bare root trees are available. For extensive plantings, it is desirable to learn to graft. Nut tree rootstock is easy to grow, and the producer has control over the rootstock selection. The equipment needs are minimal, and include a knife with a sharp blade, pruners and a hand saw. There are a number of sources for purchasing dormant scion wood, and many growers associations have plant material exchanges at their meetings.

Texas Silvopasture

Continued from page 5

Mary Webb-Marek, an NRCS forester in Bryan, said that a silvopasture has the potential to reduce economic risks because it produces multiple products.

"In east Texas, we have the market for timber products. Cattle markets also are here in east Texas," Webb-Marek said. "So it can be a good idea to diversify your operation's management system with a mix of cattle, trees and forage."

Pines in a silvopasture do have to be managed. This includes thinning or removing trees, pruning branches and cleaning up litter, such as pine needles.

"When this is done, you allow for your forage growth and you can get sunlight to the forage base," Webb-Marek said.

Silvopastures in the southeastern U.S. use four pine species — loblolly, longleaf, shortleaf and slash.

"Loblolly pines tend to be more suitable for a silvopasture because they are hardier when it comes to frost or freeze demands, especially in the state's northern counties," Webb-Marek said.

Loblolly are the preferred pine in a silvopasture, she said, because their root system is less extensive, laterally, than other pine varieties. Loblolly pines don't tend to outcompete forages for resources such as water, sunlight and soil nutrients.

Tree-to-tree and row-to-row spacings should be evaluated to optimize returns per acre of both forage and marketable timber. The spacing is related to the diameter of the trees and influences the rate of tree growth and forage production.

"For example, when you have an average tree diameter of 10 inches on one acre, you would expect to see an estimated 90 to 145 trees, about a 17- to 22-foot spacing between each row and between each tree within a row," Webb-Marek said, "This translates into a volume of more than 1,530 board feet per acre of commercial sawtimber, which today has a value of $300 per acre."

Landowners also should remember that pines, such as loblolly, can take 25 to 30 years to mature for sawtimber use.

"This is the long-term portion of your management system," Webb-Marek said.

In today's economies of high inputs and tight profit margins, a silvopasture could provide the diversity landowners need to maximize returns per acre.

"My father, Glen Brown, who is 81 years old, has spent most of his life managing those acres for pasture that I have converted to silvopasture. He recently said that the only problem he sees with our involvement in silvopasture is we don't have enough of it," Ross Brown said. "I would encourage landowners and managers who have an interest in maximizing returns per acre and addressing multiple-resource concerns, including forage, timber and wildlife, to consider silvopasture in their operations."

Adapted from Mosley's article first published in the January 2012 edition of The Cattleman as, *"Silvopastures provide diversity and can maximize returns."*

Loblolly vs. Longleaf?

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of longleaf and loblolly silvopastures.

Although this study shows that the introduction of livestock may be delayed in longleaf pine silvopasture systems when compared to loblolly, future potential benefits of longleaf pine should not be ignored.

First, there is long-term potential to restore imperiled longleaf pine forests. Second, most agroforestry systems have the potential to provide improved wildlife habitat and those species often associated with longleaf pine such as gopher tortoise (*Gopherus polyphemus*) and Northern bobwhite quail (*Colinus virginianus*) can benefit from these systems. Finally, longleaf pine silvopastures can produce additional revenue opportunities such as high quality pine straw. Landowners always should consider their objectives when planning a new agroforestry activity and plant the tree species — whatever it may be — that best meets those goals.

Because, hopefully, future generations will have silvopastures to enjoy for much longer than I had my first car.

But that is another story … .

NRCS offering two programs to get Silvopasturing

Silvopasture is one of those up and coming practices in the National Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG) arsenal.

Silvopastures can be established using one of two NRCS practices, either the Silvopasture Establishment practice 391 under the Environmental Quality Incentives Program (EQIP) or the Silvopasture Wildlife Habitat (ANM20), an Animal Enhancement Activity under the Conservation Stewardship Program. These two practices are available nationwide and are used to plan and establish the tree component of a silvopasture.

In either case, the number of silvopasture acres being planned has been increasing since 2009. In the southeast and south central U.S. it is the Silvopasture Establishment practice (391) that has been predominantly used, while in the western U.S. landowners have most commonly utilized the Silvopasture Wildlife Habitat (ANM20) practice.

If you are interested in establishing a silvopasture contact your local NRCS office and find out if either of these practices is available in your state.

Goats in the woods

Continued from page 1

After some additional researching, he got support from the Natural Resources Conservation Service (NRCS) through the Environmental Quality Intensive Program (EQIP) to develop fences and a watering system. Stephens also received necessary loans from the Farm Service Agency (FSA) for establishing other structures and performing needed activities to begin goat production. During the initial stages of goat farming, he got much needed education at the Tuskegee University Master Goat Producer's Certification Training Program. Here he learned about all aspects of goat farming, including health care, feeding and nutrition, breeding, record keeping, predator management, economics and marketing.

Unfortunately, like most beginning farmers, Stephens didn't have good quality pastures and not much changed there in the first two years. The many oak trees on the farm produced acorns that were readily eaten by deer. He thought the goats' diet could also be supplemented with these acorns. He kept adding goats through births and purchases until he had 65 animals in 2010. However, his profit margin was being hurt by the extra expenses for commercial feeds and hay. It was at this point that Drs. Uma Karki and Nar Gurung from Tuskegee University came to visit his farm. That, Stephens said, was the turning point in the management of his farm.

One key to the turn around was the knowledge Stephens gained on pasture development and sustainable management at the "Year-Round Pasture Production and Grazing/Browsing Management" training organized by Tuskegee University Cooperative Extension Program (TUCEP).

Pasture development

His pasture improvement gained momentum when Dr. Karki selected his farm for an on-farm research project funded by Southern Sustainable Agriculture Research and Education (SSARE).

Under this project, annual rye grass (*Lolium multiforumds*) and five different legumes — crimson clover (*Trifolium incarnatum*), arrowleaf clover (*Trifolium vesiculosum*), berseem clover (*Trifolium alexandrinum*), hairy vetch (*Vicia villosa*), and winter peas (*Pisum sativum*) were planted and a rotational grazing system was implemented.

Above: Goats graze in Nimrod Stephens' pasture on the Quiet Oak Farm near Phenix City, AL. **Below:** Stephens looks up from doing his farm's books at the kitchen table. Photos by Uma Karki, Tuskegee University Cooperative Extension Program.

These management changes provide him with a good amount of winter grazing, minimizing the need to purchase feed such as hay, commercial feeds and agricultural by-products.

"I have been saving tremendously on feeding costs since winter forages are up," Stephens said. "The health status of the goat herd is improving since they have started grazing green foliage."

He went through an effective hands-on training and experiential learning opportunity by being involved in this research. Now he is convinced that year-round, productive pasture is the basis for successful goat farming. He is expanding his pastures by including areas under the powerlines and establishing a silvopasture system in the wooded areas.

Silvopasture development

Stephens became acquainted with the silvopasture system when he attended the Master Goat Producer's Certification Training Program in 2009. But he was not serious about it until he attended a 'Silvopasture Practice' training organized by TUCEP in July 2011. Here he learned how a wooded land can be converted to a silvopasture system, expanding the grazing opportunity for limited resource livestock producers.

After the training, he began removing unwanted trees from a small portion of his wooded land (about three acres) adjacent to his open-pasture area. Under Dr. Karki's guidance, Stephens had the soil tested, applied the recommended lime and fertilizers, and planted a mixture of MaxQ tall fescue, crimson clover and chickory. He got the seeds from TUCEP under the "Year-Round Pasture Production and Grazing/Browsing Management" demonstration project.

Current situation

Stephens says he is happy with the outcome — green forages under the trees. He is planning to convert the remaining wooded area of a little more than 17 acres into silvopasture system when he can manage the necessary funding. "It will be necessary to achieve my goal of building the herd to a point for selling 180 goats every year," he said. "Only then will I be able to pay back the loan and support my living."

Presently, Stephens has nearly 10 acres of productive, winter pasture including the silvopasture. He predicts this pasture will be more than sufficient to feed his current herd of 23 breeding nannies, three breeding bucks, and 13 kids throughout the cool season.

see **Goats in the woods**, Page 11

Goats in the woods

Continued from page 10

Newly developed goat silvopasture stands on the Quiet Oak Farm. Photo by Uma Karki

Nimrod Stephens' message for other producers

- Get as much information as possible on goat farming by attending training programs, visiting model goat farms and talking to experienced producers and reading educational materials before starting goat farming. Then decide if one would like to get into this business.
- Contact all local agencies — NRCS, FSA and university extension services and apply for all the possible support.
- Work closely with experts in this area.
- Develop pasture, establish shelter, install fence and a water facility and have guardian animals available before purchasing goats.
- If there is not much open area, but plenty of wooded area, then develop a silvopasture system to minimize feeding costs.

Kid mortality has decreased compared to previous years as a result of better management and feeding strategies. As he looks back, Stephens said he feels strongly that limited resource goat producers need a package of education, inputs and continuous technical support from different local institutions.

He added that he is proud of what he has achieved in this short journey of goat farming and is very thankful to NRCS, FSA, Tuskegee University Cooperative Extension and Outreach Program, and Alabama Cooperative Extension System - Russell County Extension Office.

Passionate

Continued from page 7

Attendees to the 2011 Northeast Silvopasture Conference pose for a picture during a field tour of the Angus Glen Farms. Photo by Troy Bishopp

first-hand, the Chedzoys' 20 years of silvopasture on the ground and overhead. During the visit, Brett shared a wealth of practical knowledge on integrating cattle and goats into the woodlots or woods into pastures on their 250 acres of owned and leased land.

These grazing entrepreneurs use their locust groves to supply all the fence posts for the farm, have adopted fall and winter grazing strategies throughout the farm and are managing the timber as part of a holistic approach to long-term sustainability.

Accolades flowed for the two-day event. South Central Grazing Specialist Susan Truax from the Pennsylvania NRCS said she was pleased to learn about more tools and environmental/financial considerations to help landowners manage and improve their forests and forages. Mari Omland of Green Mountain Girls Farm in Vermont echoed her saying, "I now see the importance of shade and the symbiotic relationship of trees and pastures. I like the conversations around sustainable, organic, silvopasture practices. It was definitely worth the six-hour drive."

If the exceptional attendance and passion for Northeastern silvopasture systems were any indication, it would seem next year's conference may go from "silvo" to gold.

The conference was made possible by the USDA National Agroforestry Center, Natural Resources Conservation Service, U.S. Forest Service, Pennsylvania State University Cooperative Extension, Cornell University Cooperative Extension, Finger Lakes Sustainable Farming Center, The Cornell Small Farms Program, NYS Grazing Lands Conservation Initiative and the Upper Susquehanna Coalition. For more information, contact Brett Chedzoy, Schuyler County CCE at (607) 535-7161 or go to: www.forestconnect.info

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SmallWood 2012:
Forest Restoration
for a New Economy
Flagstaff, AZ
More information at:
www.forestprod.org/smallwood/

May 20-23, 2012
ANREP 8th Natural Resource
Extension Professionals
Conference
Hendersonville, NC
More information at:
www.anrep.org/conferences/2012

July 22-25, 2012
The Northern Nut Growers
Association's 103rd Annual meeting
Lexington, KY.
More information at:
www.nutgrowing.org/

July 24-26, 2012
Great Plains Windbreaks
Renovation and Innovation
Conference at the International
Peace Garden, on the border
of the U.S. and Canada
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