

Fall 2014

Issue 23

www.ext.colostate.edu/sam

Inside this issue:	
From 4-H Goat Project to Cheesemaking School	1
High Tunnels: Strategies and Suggestions from Hidden Mesa	3
Vesicular Stomatitis In Colorado	5
CSU Researchers Put Home-Brewed Biofuel to the Test	6
Oil and Gas Development in Colorado	8
Noxious Weeds: Fall Control	8
Upcoming Events	9

From 4-H Goat Project to Cheese-making School!

by Kate Johnson, Briar Gate Farm & The Art of Cheese

It all started with a goofy Nubian doe named Skittles, who we brought to our small farm, west of Longmont, on a 12-hour journey through a blizzard!

In 2008, my oldest daughter, Megan (then 12) decided she really wanted to try raising a goat as a 4-H project. After researching breeds and scouring



Craigslist for possibilities, we found a small Nubian doe near Durango who had been bred to a Nigerian Dwarf buck and would be expecting first-generation Mini Nubian kids the following spring. We couldn't wait to go pick her up, along with a young companion wether (castrated male goat), in our mini-van equipped with two large dog crates.

Fast forward 6 years and Skittles is still happily living on our farm with her daughters,

Continued on page 2

Colorado Sustainable Small Acreage News is edited and published by:

Jennifer Cook, Small Acreage Management Coordinator, NRCS/CSU Extension,

57 West Bromley Lane, Brighton, CO 80601 303-659-7004 ext.3 jennifer.cook@colostate.edu

Please direct all inquiries regarding this publication to Jennifer Cook.



Colorado State University Extension and U.S. Department of Agriculture programs are available to all without discrimination. Colorado State University Extension, U.S. Department of Agriculture and Colorado counties cooperating.

4-H to cheesemaking continued from page 1

granddaughters and even a great-granddaughter. Megan is off to college, and I am a co-leader of a thriving goat-focused 4-H club in Boulder County, the new Utility Goat Superintendent for the fair, and the owner of a small business, The Art of Cheese — an Artisan Home-Cheesemaking School!

I initially learned how to make cheese with Skittles' milk by following a recipe for chévre from Ricki Carol's Home Cheesemaking book. I entered my homemade cheese at the Boulder County Fair and won a Champion ribbon for my Chévre with Kalamata Olives! After that I was asked to teach a cheesemaking class, and my cheesemaking career just took off. Since then, I have learned much more about cheesemaking by taking several local classes as well as a class in San Francisco from Luella Hill, known as the Milkmaid of San Francisco, and an advanced 3day course from Vermont cheesemakers, Linda and Larry Faillace of Three Shepherds Farm. I have been teaching home-cheesemaking at senior and recreation centers, a local community college, through the Colorado Extension Office, at a local cheese shop (Cheese Importers) and in private homes for about 5 years now. And since most of my students don't have their own dairy goats or cows, I have adapted all the recipes to work just as well with a variety of store-bought goat and cow milks.

This fall I opened a brick-and-mortar cheesemaking



school in downtown Longmont called <u>The Art of Cheese</u>. I am offering 10 different cheesemaking classes that cover 25 cheeses – everything from soft cheeses and mozzarella, to brie and camembert, cheddars and blue-veined cheeses. I even offer an in-house Artisan Home-Cheesemaking Certification for students who take 4, 7 or all 10 classes. I have also started doing corporate teambuilding classes (Team Mozzarella!) as well as other private group events.

When I'm not making cheese, teaching classes or running 4-H meetings, I am also breeding and selling Purebred and American Nubian as well as Mini Nubian dairy goats. Who knew that first little goat would set me on this new, wonderful path!

A great resource for getting started with sheep or goats is the **Small Ruminant Toolbox** at https://attra.ncat.org/ruminant/

Want to try your hand at home-cheesemaking? Here's a super easy and delicious recipe .

Artisan Handcrafted Ricotta

Ingredients: 1 gallon milk, ¼ cup apple cider vinegar, 3 TBSP salted butter, ¼ tsp baking soda.

- 1. Start with 1 gallon milk (goat's or cow's milk will work; 2% or whole).
- 2. Heat milk to 195 degrees, stirring regularly to keep from scalding.
- At 195 degrees, remove from heat and stir in ¼
 cup apple cider vinegar. Stir for a minute or two.
 (if curds do not separate from whey, heat to 205
 degrees).
- 4. Once curds form, ladle them out into a cheesecloth -lined strainer. Drain for 1 minute.
- 5. Add 3 TBSP butter and ¼ tsp baking soda. Stir. Eat. Enjoy! (can be frozen)

www.theartofcheese.com

High Tunnels: Strategies and Suggestions from Hidden Mesa

By Jennifer Cook, CSU Extension/NRCS

The Research and Demonstration Orchard is an experimental fruit orchard and vegetable garden located on Hidden Mesa Open Space in Douglas County, CO. It is managed by Douglas County Open Space in partnership with CSU Extension. Inside three peakroofed high tunnels, perennials plants such as raspberries, blackberries, strawberries, sweet cherry, goji berry, kiwi, and fig are being grown to see how well they produce in Colorado's harsh climate.

I recently spoke with the lead researcher and grower, Andy Hough of Douglas County, to see what he's up to on the farm. Over the past few years, Hough has had to fix the high tunnels damaged by heavy winds, rodents, snow, rain, and hail. Hough summed up for me his high tunnel building recommendations hoping to pass on his lessons learned to folks just getting started. He also offered some strategies to extend the growing season inside high tunnels.

High Tunnel Design Considerations

<u>Peak Roof vs. Arched Roof</u> – Hidden Mesa decided on using peak-roofed high tunnels, thinking the peaks would shed snow better. However, with our ever-shining sun in CO, snow melts and sheds just fine on an arched-roof high tunnel. If you choose to use the peak-roofed design, Hough recommends adding a ridge cap at the peak to stop the pointed roof supports from ripping through the plastic in our



Ridge cap installed at the peak of the high tunnel.

strong winds and summer heat. The ridge cap creates a continuous support line along the top and eliminates the individual support points.

<u>Risers and Rafters</u> – Hough recommends using risers every 4 feet to help with snow load and wind.

Wind – To keep the roof and sidewalls in place through heavy winds, Hough recommends two things. First, use a wiggle wire aluminum track set at least ¾ - 1 inch below the top of the wood framing to hold the plastic in place. The wiggle wire has two lips and a high tensile wire used to cinch the plastic to the wood framing. Hough says, "Wind blew the cover off the high tunnel because the wiggle wire track was set too high on the wood and not secured at enough points allowing the wind's uplift to rip the screws from the wood." Secondly, he recommends inserting screws every foot along the frame to keep the wind from ripping the track loose. The frame also is affected by the wind, though anchored down, it tends to move with the wind and go in and out of plum over time. To resist movement by wind, Hough nailed OSB or plywood to the 2x4 end wall framing to reduce movement.

<u>Water Drainage</u> - Erosion and water saturation occur around the outside of high tunnels because water and snow run down the roof and sides. Eventually the ground will erode enough to create holes or gutters in the earth. Hough came up with a few solutions:

- Use treated wood for bottom boards in anticipation of water saturation.
- Put road base or crusher fines along the outside base of the tunnel; or use landscape timbers to terrace the area to hold the soil in place.
- Dig a drainage trench 6-12 inches deep to move puddles away from sidewalls.
- Install a gutter to funnel run-off away from the high tunnel.

Rodent Control – To keep rabbits, gophers, and birds from getting in while the sidewalls are open, Hough recommends using chicken wire or hardwire cloth instead of nylon wire mesh (which rodents can easily chew through). **Continued on page 4**



Side panel with chicken wire and double wiggle wire track for gutter placement

High tunnels continued from page 3

<u>Doors</u> – If using doors, install exterior-grade doors to withstand the weather.

<u>Ventilation</u> – Ventilation fans aren't necessary if you are growing annuals in a high tunnel. However, if you are growing perennials in high tunnels, ventilation fans are needed in the winter in order to keep the inside temperatures cool enough so plants remain dormant while the sidewalls are rolled down. Even in January, internal temperatures can approach 100° F on a sunny day.

By growing perennial berries in high tunnels, Hidden Mesa growers are able to extend berry production in to the fall. For example, fall-bearing raspberries stop producing outside in early October. But with season extension strategies inside a tunnel, raspberries can be harvested into November.

Methods for Extending the Growing Season Inside High Tunnels

- ⇒ Put green compost piles inside at the four corners of the tunnel. The heat created by the composting action will heat the tunnel.
- ⇒ Solar hot water heaters use solar panels to heat water and supply heat inside the tunnel.
- ⇒ Heat Sinks Line the inside of the tunnel with black barrels full of water. The water heats up during the day and emits the heat in the tunnel at night.

- ⇒ Floating row covers. Use floating row cover or plastic to cover plants during cold snaps.
- ⇒ Use small electric or propane heaters under the row covers.

Resources

More about Hidden Mesa

http://parkerchronicle.net/stories/Experimental-orchard-garden-to-yield-lessons,56050

High Tunnel Specialty Crop Production in Colorado, CSU Extension – 1 hour webinar

https://connect.extension.iastate.edu/p34276512/?launcher=false&fcsContent=true&pbMode=normal

High Tunnel Handbook, UW Extension www.wyoextension.org/agpubs/pubs/B1234.pdf





Top: Floating row cover protects perennial plants during cold snaps.

Bottom: Peach tree blossoms in the tunnel during winter.

Vesicular Stomatitis Virus in Colorado

By Jennifer Tucker, Adams County Extension

Each year, Colorado livestock owners are put on notice to look out for vesicular stomatitis (VS or VSV) in their animals. Affected animals are identified by scab and sore like lesions on the mouth and tongue. Additionally, lesions can be found on the inside of the mouth, on the nose, in the ears, and occasionally along the coronary band above the hoof. Occasionally in horses, lesions are also noted in the groin or sheath area. All of the lesions are usually painful but the oral lesions make eating more difficult for the animal. Milk production and weight gain are typically affected during an outbreak.

This year has been an exceptional year for Vesicular Stomatitis cases. As of 8/27/14, The Colorado Department of Agriculture had found vesicular stomatitis in 8 Counties (Adams County, Boulder County, Broomfield County, Douglas County, El Paso County, Jefferson County, Larimer County and Weld County) and on 222 premises.

While VSV is rarely fatal to an animal, it is still detrimental to the agricultural industry. It is considered an internationally reportable disease. Much of the concern about VSV is due to its similar symptoms to footand-mouth disease (FMD). FMD is typically more severe, and was eradicated from the United States in 1929. The only way to differentiate between vesicular stomatitis and foot-and-mouth disease is through laboratory testing. Therefore, all animals exhibiting symptoms of VSV need to be tested for the virus to rule out FMD. Most animals fully recover from VSV in about 2 weeks.

VSV is transmitted or spread in multiple ways. Common biting insects, such as flies and midges are considered the most common method of transmission; it is also known to move from animal to animal from contact with one another or through shared water tanks and feed buckets. The scabs and fluid inside the wounds are known to carry the virus. However, not all animals in a quarantined facility develop vesicular sto-

matitis. Often times, it may run rampant through one paddock of animals, and a neighboring paddock seems to be unaffected!

Because of the erratic habits of flies, the spread of the disease is not always predictable. The disease spread seems to be more prevalent along waterways and in areas of standing water (lakes, ponds, irrigation, etc.) Pastured animals and those in stalls or drylots can be affected. Fly control is one of the best defenses against VSV.

If you suspect vesicular stomatitis on an animal, it is suggested to contact your veterinarian or the Colorado Department of Agriculture. The typical protocol requires samples (blood, saliva, fluid from blisters) be taken from suspect animals. If the lesions are consistent with VSV, the animals are placed under a hold order. A hold order requires the animals to stay at the current location until results come back on the tests. Testing typically takes 3 days. If the animal has a positive result, the facility is then placed under quarantine. Both hold orders and quarantines from the State Veterinarian's Office of the Colorado Department of Agriculture require that there is no movement of animals into or out of the facility. The quarantine is released 21 days after there is sufficient healing of the lesions.

For the most current information about Vesicular Stomatitis in Colorado, go to www.colorado.gov/ag or call the Colorado Department of Agriculture Animal Industry at (303) 869-9130.



VS blister on a horse

CSU Researchers Put Home-Brewed Diesel Biofuel to the Test

By Kortny Rolston

A homemade biofuel used by Colorado farmers to power their trucks and tractors performs similarly to conventional biodiesel and petroleum diesel, according to new studies by Colorado State University researchers.

The homemade fuel, which is made by mixing unleaded gasoline and oil crushed from oilseed crops, showed only a slight decrease in power when tested on a 2007 John Deere tractor engine at CSU's Engines and Energy Conversion Laboratory [1] in Fort Collins.

"There was an 8 to 10 percent drop in maximum power," said Aaron Drenth, a CSU doctoral student who led the most recent testing of the homemade fuel. "That's not very much — most drivers would never notice it. It's also consistent with what the farmers who use it have been telling us."

Testing the fuel

Drenth and Daniel B. Olsen, a professor of mechanical engineering [2] at CSU, have spent the past two years testing different versions of the homemade fuel, called TGBs (triglyceride blends), and comparing their performance to biodiesel, renewable petroleum diesel, and traditional diesel fuels.

They swapped out oils made from sunflower, corn, canola, soybean, pennycress, camelina and carinata seeds to make different TGBs. (Jerry J. Johnson, a CSU professor of soil and crop sciences, is leading a

parallel study to evaluate how well some of these oilseeds grow in Colorado.)

In addition to performance, Drenth and Olsen also evaluated the TGBs's emissions, fuel consumption and thermal efficiency. TGBs were comparable to biodiesel, renewable diesel, and diesel in each of those areas; in some cases, they outperformed one of the conventional fuels. For example, the engine got better "mileage" with TGB than with biodiesel. "We were surprised at how well TGBs did overall," Olsen said.

Promising results

Olsen and Drenth said the results of the study, which were recently published in the journal *Fuel*, are promising and that TGB appears to be a viable alternative for farmers. The study is believed to be the first to directly compare engine performance data of these different diesel engine fuels. "We are not advocating that people go out and start making fuel," Olsen said. "TGB did very well in our tests but more research is needed to understand its long-term effects on engines and potential safety concerns."

Olsen and Drenth began studying TGBs after they were approached by Perry Cabot, a research scientist with the Colorado Water Institute [3] and CSU Extension [4]. Cabot has worked with a group of farmers who operate The Big Squeeze oilseed processing facility near Rocky Ford. They mix the biofuel blend and pour it directly into their diesel trucks and tractors.

Continued on page 7



Diesel Biofuel continued from page 6

Cabot helped the group secure Colorado Department of Agriculture grants to add a filtering step to the crushing facility and to test the performance of TGBs at CSU's Engines and Energy Conversion Laboratory. "We wanted to see how well this fuel worked and CSU happens to have a lab that will test that," said Cabot, who also is an author on the study. "It was a natural collaboration between farmers and the university."

Home-brewed benefits

TGB fuel has many benefits over conventional biodiesels and diesels.

Manufacturing diesel fuel, whether it is petroleum or plant based, is a complex, multi-step process generally completed at expensive processing facilities. In contrast, TGB fuel is much simpler to make. Farmers crush oilseed crops they grow, filter out the solids and then mix it with unleaded gasoline until it is the consistency of diesel fuel you buy at the pump. It can be poured directly into conventional diesel engines. Many eco-conscious drivers have powered diesel vehicles on plant oils or leftover French fry grease, but the engines must be modified so they can process the thicker oil. The engine conversion kits cost thousands of dollars to purchase and install. "When I first heard that the farmers were doing this, I was intrigued," said Olsen. "I had never heard of mixing plant oil with unleaded gasoline to make diesel. So far, it seems to work for these farmers."

A step forward

Cabot believes the tests run in CSU's Engines and Energy Conversion Lab are a step toward proving TGB as a viable option for farmers – and potentially the public.

Keeping diesel tractors and trucks fueled isn't cheap. Farmers use hundreds, if not thousands, of gallons of diesel fuel each year so even a slight price increase can cut into profits.

If farmers can grow oilseed crops on a portion of

their land and make their own fuel, they could save a lot of money, Cabot said.

Since Cabot began working with the farmers at The Big Squeeze plant, he has become more than an advocate for TGB fuel.

He now makes his own in his garage to power a 1987 Mercedes-Benz 300D, which he has been driving for over 2 years. He has been able to use oilseeds grown at the CSU Agricultural Experiment Stations for national canola variety trials.

"It works great," he said. 'It runs as well as regular diesel and the old engine actually sounds calmer on TGB."

Endnotes:

- 1. Engines and Energy Conversion Laboratory : www.eecl.colostate.edu/
- 2. Mechanical engineering: www.engr.colostate.edu/me/
- 3. Colorado Water Institute : www.cwi.colostate.edu/
- 4. CSU Extension: www.ext.colostate.edu/



Camelina is one of numerous oilseed crops that can be crushed and mixed with gasoline to make a homemade biofuel diesel known as a triglyceride blend fuel.

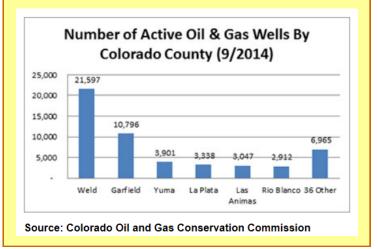
Oil and Gas Development in Colorado

Quick Facts

- Colorado is the 6th leading producer of natural gas and the 9th leading producer of oil in the U.S.
- In Colorado, natural gas is produced primarily through hydraulic fracturing and coal bed methane recovery while oil is produced primarily through hydraulic fracturing.
- Over 90% of new oil and gas wells in Colorado utilize hydraulic fracturing, and most of the recent growth in the industry can be attributed to the now cost-effective combination of hydraulic fracturing and horizontal drilling.
- The state exports about 3/4 of the natural gas it produces while crude oil produced in the state offsets about 1/3 of state consumption.

CSU Extension just issued a new fact sheet on Oil and Gas Development in Colorado. The fact sheet covers the basics of extracting, processing, and distributing oil and gas resources. Access the factsheet at www.ext.colostate.edu/pubs/consumer/10639.html

In addition, Dr. Ken Carlson with the CSU Center for Energy-Water Sustainability is leading a new CSU Water Watch project. The project will set up monitoring stations near oil and gas wells to monitor water quality and make data publicly available in real-time. The full story is at http://source.colostate.edu/testing-the-water/



Noxious Weeds: Fall Control

Fall is a good time to treat noxious weeds and to get a head start on next year's effort.

The seeds of annual Cheatgrass are germinating. They can easily be treated by removing them now or spraying in a few weeks after everything else is dormant.

Biennial thistles and knapweeds rosettes (seedlings) are beginning to grow this time of year. Treating them by either removing or spraying is much easier at this stage.

Many perennial weeds respond best to treatments during the fall. They are transitioning and sending food-stores to their roots which helps move herbicides deeper into the plant. Leafy spurge, Myrtle spurge, Canada thistle, Russian knapweed, Dalmatian and Yellow toadflax are all controlled better using fall treatments.

For more info on weeds visit www.ext.colostate.edu/sam/weeds.html



Scotch thistle rosette



Young Dalmation toadflax



Native Plant Master® Program Colorado

The Native Plant Master® Program has announced a newly expanded 2014 schedule of offerings. Explore a new park by taking an award-winning Native Plant Master® course. Sample one of the exciting new classes taught by CSU faculty and other experts. Topics include native plant landscaping, poisonous plants, native lawns, invasive weeds, grasses, orchids and more, alpine/subalpine plants and ecological restoration. Most of these popular offerings have a waiting list each year, so register early to ensure you get the class you want.

The Native Plant Master® Program is offered in many locations throughout Colorado. For more information and to register, please visit

www.conativeplantmaster.org

On-Farm Small Acreage Workshop November 1, 2014 8:30 am - 2:30 pm Hudson, CO

Join us for an educational workshop on a small acreage property in Hudson, CO. Learn about using cover crops and guidelines for grass seeding on pastures and oil and gas development sites. The day of the workshop, a grass drill will be used to plant grass into a cover crop mix and participants can learn more about how a grass drill works. An on-site soil pit will be a unique opportunity to learn about soils and soil health. Lunch will be provided. To regsiter go to www.ext.colostate.edu/sam/hudson-tour.html

High Tunnel Workshop November 6, 2014 1 pm - 4 pm Longmont, CO

Join us for a workshop on using high tunnels for season and profitability extension. The workshop will be held at Toohey and Sons Organic Farm, 7849 Ute Hwy, Longmont, CO. Jim and Christian Toohey will

share some of their experiences with high tunnel farming. Robert Rimol of Rimol Greenhouses will be on hand to discuss product selection, location, and use of high tunnels. Please RSVP to Joni Barr at 303-776-4034 ext. 108 or joni.burr@co.nacdnet.net. Sponsored by the Longmont and Boulder Valley Conservation Districts.

Hanna Ranch November 6, 2014 6:30 pm Brighton, CO

West Adams and Platte Valley Conservation Districts invite you to a viewing of the major motion picture, Hanna Ranch, the story of three generations on a family ranch in rural Colorado, that centers on the visionary eco-rancher, Kirk Hanna, whose fight was carried on by his amazingly determined wife and two daughters. A free hot dog bar and other snacks and beverages will be offered. There will also be door prizes before and after the movie. Movie starts at 6:30 at The Armory Performing Arts Center, 300 Strong Street, Brighton, CO 80601. Please RSVP to westadamscd@gmail.com

Swine Seminar - Today's Swine Operation - What You Need To Know November 15, 2014 Greeley, CO

The workshop agenda includes presentations on Bio-Security, Swine Heard Health, Reproduction, Farrowing & Post-Partum, and Swine Nutrition. To register go to www.weldextension.com

Responding to Disturbance: Effective Restoration & Monitoring Workshop December 3-6, 2014 Fort Collins, CO

Attend all or just a day of this event hosted by the Colorado Section of Society for Range Management. Topics include frameworks for rangeland restoration, rangeland deterioration and recovery, flooding and fire restoration, energy industry disturbances, noxious weeds, small acreage restoration, and a skills workshop on restoration implementation. To register and for more details visit

www.cssrm2014.eventbrite.com



For a list of upcoming events in your area visit CSU Extension Small Acreage Management website

www.ext.colostate.edu/sam/

Western Colorado Food and Farm Forum January 10, 2015 Montrose, CO

Whether you're looking to improve or innovate on your existing practices, hoping to start an organic orchard, or have an interest in conserving our region's crop diversity, the Food and Farm Forum has a myriad of resources and networking opportunities. The conference is scheduled for Saturday, January 10, 2015 at the Montrose Pavilion in Montrose Colorado. It will focus on improving the sustainable production, marketing and consumption of locally grown food products.

The 2015 conference theme is *Unlocking the Secrets of Raising Great Food*. This will be an opportunity for local food producers, organic farmers, restaurateurs, and related businesses to gather and share information and resources that will contribute to the viability and success of western Colorado agriculture. The Western Colorado Food and Farm Forum is a collaborative effort between the Valley Food Partnership, CSU Tri-River Area Extension Service, the City of Montrose Office of Business and Tourism, the Shavano Conservation District and the Rocky Mountain Farmers Union Cooperative and Economic Development Center.

Registration opens November 1st. To register and learn more about the Forum, visit the event website: www.foodfarmforum.org

Building Farmers Program

The Building Farmers Program for Denver, Jefferson, and Arapahoe Counties is a farm business incubator program focusing on business plan development for non-profit, for-profit, and indoor farms. Classes begin Tuesday January 20, 2015. Applications are available November 5th and due December 3rd. Participants will be notified of acceptance on December 15th. Classes will be held on Tuesday evenings at the Denver County Extension Office, and final business plans will be presented to peers and key community partners on Saturday, March 7th.

Information nights on the program will be held in November, so check with your county extension office for locations and times. If you have questions contact Danielle DuBois, Program Coordinator at ddubois@arapahoegov.com or 303.738.7977.

Colorado Fruit & Vegetable Growers Association Conference

February 25, 2015 Denver. CO

The CFVGA will hold its 1st Annual Conference, February 25, 2015 from 8:30 am - 6:00 pm at the Renaissance Hotel Conference Center in Denver, Colorado. This will directly precede the Governor's Ag Outlook Forum at that same venue, to encourage attendance of specialty crop growers at both events. Details and registration will be available Nov 15 at: www.coloradoproduce.org. Potential sponsors and exhibitors should email info@coloradoproduce.org by November 15 for inclusion in print materials. If you haven't already, consider joining CFVGA as a producer or affiliate member, and like them on Facebook: https://www.facebook.com/CFVGA.



Colorado State University Extension and U.S. Department of Agriculture programs are available to all without discrimination. Colorado State University Extension, U.S. Department of Agriculture and Colorado counties cooperating.