Oregon State University
Extension Service

Summer 2018

Oregon Small Farm News

Oregon State University Small Farms Program

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Cover Photo: June 19th CSA box.
Photo by Garry Stephenson

Oregon Small Farm News Layout by: Chrissy Lucas

Dry Farming Project Continues to Expand! Multiple Research Projects Engage with the Dry Farming Collaborative in 2018

By: Amy Garrett, Small Farms Program, Oregon State University Extension Service

As the Dry Farming Collaborative (DFC) expands and interest in dry farming grows throughout the maritime Pacific Northwest and beyond, many questions arise. Just for starters:

- What crop varietals do well dry farmed in our region?
- How do we assess and select a site suitable for dry farming?
- Can fungal inoculants enhance drought tolerance?
- How can other researchers increase the participation and collaborative nature of applied research in the field of agriculture and horticulture?

There are multiple research projects working with the DFC this year addressing these very questions, and more than 30 sites throughout western Oregon and Washington hosting dry farming trials. The DFC is a group of growers, extension educators, plant breeders, and agricultural professionals partnering to increase knowledge and awareness of dry farming management practices with a hands-on participatory approach. Growers involved decided this past winter how much space they would like to allocate to dry farming and which projects they would like to be a part of.

Dry Farming Collaborative 2nd annual winter meeting in January 2018.
Photo by Tegan Moran

Here are descriptions of the four research projects engaged with the group this year.

Pulling 5' soil core at Sunbow Produce in November 2017
Photo by Amy Garrett

DFC Varietal Trials:
This effort is funded in part by the USDA Northwest Climate Hub (2017-2019). Several varieties of six different crops that had some history of being dry farmed were selected with the DFC. Thirty growers selected which crop varietals (tomatoes, corn, beans, squash, melons and zucchini) they wanted to grow replicates of, and a main trial with three replicates of each variety was established at an OSU research farm site. Some of the following data is being collected by growers over the course of this study such as: soil preparation activities, crops, varieties, planting date(s), planting density, harvest date(s), yield, sensory evaluation (color, texture, sweetness), and field notes (pests, disease, weeds). 5' soil cores are being pulled at each site and classified by Certified Professional Soil Classifier/Soil Scientist Andy Gallagher of Red Hill Soils.

Participatory Research Methods
Semi-structured interviews, also funded by the USDA Northwest Climate Hub (2018), will be conducted to inform our understanding of participatory research methods so as to provide scholarly information for others looking to do similar kinds of applied agricultural research. DFC members interested in participating in these conversations are contacting Gabrielle Roesch-McNally (USDA Northwest Climate Hub Fellow) and being interviewed this summer. Graduate student research assistant, Melissa Parks, will be assisting in setting up and conducting these interviews. The target demographic is adult farmers (>18 years old) who have been involved, in some capacity, with the dry farming research and collaborative work that OSU Extension Small Farms Program has been leading. These interviews will be intended to deepen our understanding of how to increase the participation and collaborative nature of applied research in the field of agriculture and horticulture.

Fungal Inoculant Study:
Thirteen DFC sites are participating in a study on the use of fungal seed inoculants to improve dry farmed crop performance, led by OSU Postdoc Lucas Nebert, and funded by USDA AFRI (2018-2020). We will be testing a commercially available fungal seed treatment called BioEnsure, which has been shown to improve drought tolerance in various crops. The fungus is naturally found living inside plants (known as an endophyte), and is registered organic by the Organic Materials Review Institute (OMRI). This year, we will be trialing the inoculant in corn, beans, winter squash and tomatoes. Participating DFC members will trial the inoculant in at least one variety of corn, bean, squash, and tomato, providing at least two adjacent 100 sq ft plots for each variety for a control vs. inoculant comparison (though replication of both control and inoculant is encouraged), and are asked to measure yield.

Dryland Squash and Tomato Production Project:
This project is funded by the USDA Risk Management Education Partnerships Program (2017-2018). The primary objectives are:

- To determine if soil series descriptions and plant available water data can be used to predict site suitability for dryland tomato and squash production.

- To assess dryland yields of Winter Sweet and North Georgia Candy Roaster winter squash and Early Girl tomatoes across 30 sites

The varieties selected were shown in 2016 and 2017 trials to be productive when grown under dryland conditions. The following assessments will be made:

- Soil series: Project staff will collect 1-2 five foot soil cores per site and project soil taxonomist, Andy Gallagher (Red Hill Soils) will describe the soil series cores.

- Plant available water: Watermark sensors were installed at 15, 27, 39 and 51 inch depths within project plots. Project staff will use handheld readers to read sensors at least twice per month from planting to harvest.

These research projects are just brushing the surface in deepening our understanding of dry farming. There are many lessons to learn from countries with drier climates and a long list of topics yet to explore such as: best practices for dry farmed orchard systems, development of dry farmed crop varietals for our bioregion, minimal and no-till strategies for organic dryland farming, nutrient management for dry farmed vegetables, and optimal planting density for various dry farmed crops, just to name a few.

For more information on the OSU Dry Farming Project visit: http://smallfarms.oregonstate.edu/dry-farm/dry-farming-project

2018 Dry Farming Field Days

SAVE THE DATES!

July 30th – OSU Vegetable Research Farm - Corvallis, OR

August 13th – OSU Oak Creek Center for Urban Horticulture – Corvallis, OR

August 27th – 46 North Farm - Astoria, OR

The Dry Farming Collaborative will be hosting three field days this summer! Come learn about dry farming, see crops (tomatoes, squash, melon, zucchini, dry beans, corn) grown *with little or no* supplemental irrigation in the field.

Join the Dry Farming Collaborative Facebook group!

For more info and to RSVP for field days visit:

http://smallfarms.oregonstate.edu/dry-farm/dry-farming-project

There will be limited space available so register early!

For questions contact: Teagan Moran
Teagan.moran@oregonstate.edu or (541) 766-3553

Many thanks to our sponsors!

Oregon State University

USDA Northwest Climate Hub
U.S. Department of Agriculture

USDA RMA
Risk Management Agency

AnOvation Group LLC

Red Hill Soils

open source seed initiative

Fertile Valley Seeds

Johnny's Selected Seeds
An employee-owned company

Baker Creek Heirloom Seeds

College of Agricultural Sciences and OSU Extension Service Present

COMMUNITIES, FOOD, RESILIENCE

Conversations and reflections on the role of land grant universities, Oregon's community food systems, partnerships, and the paths ahead

SAVE THE DATE!
WEDNESDAY, SEPT. 5
2:30 TO 6:30 P.M.
PORTLAND ART MUSEUM
Fields Sunken Ballroom
1219 SW Park Ave, Portland, OR

Speakers

Lauren Gwin, Moderator
OSU Center for Small Farms & Community Food Systems

David G. Lewis, Keynote
Ethnohistory Research, LLC, Past Tribal Historian for the Confederated Tribes of Grand Ronde

Shorlette Ammons, Keynote
Center for Environmental Farming Systems, North Carolina State University

Stephanie Grutzmacher
OSU College of Public Health and Human Sciences

Join us for an event intended to spark bold and visionary conversations around food systems and community food resilience.

Presentations will be followed by examples and discussion of systems-level work on these complex and critical issues.

Continue the conversation during a reception at the Oregon Historical Society across the street, and view the exhibit that celebrates OSU's 150th anniversary.

This event will be livestreamed, with viewing parties planned at OSU Extension and Experiment Station sites statewide.

For questions or disability accommodations, contact Amanda at 541-737-1581, amanda.bielenberg@oregonstate.edu or visit **bit.ly/FoodOSU150**

A Dim Light Ignited a Century Ago: The Invention of Vegetable Grafting by Farmers

By: Toshihiko Nishio, Rice Farming System Researcher
Translated and edited by: Shinji Kawai, Faculty Research Assistant, Department of Horticulture and Alice Formiga, Assistant Professor, eOrganic Director

Vegetable grafting can prevent soil diseases, encourage growth in cold temperatures, enhance vigor and make continuous planting possible. As environmental issues gain more attention, grafting is becoming even more important, since it conveys benefits without the use of agricultural chemicals. Although grafting is a slow process, that is changing with the use of grafting robots.

Kanro Watermelon grafted on Ochiai Cucumber.
Photo copy provided by Toshihiko Nishio, originally from a journal article published in 1931: Koshiro Tateishi. 'Research on Watermelon Grafting' Journal of Practical Horticulture. Vol. 11(3). Seibundo Shinkosha. 1931.

Fruit trees and grapevines have been grafted since ancient times. By the end of the mid 19th century, grafting was standard practice in Japanese tree fruit production. A book published in 1859 by the agronomist Nagatsune Okura described how to graft grapes and oranges along with detailed illustrations. Although *Lagenaria* gourds were grafted to increase fruit size in China as early as the 5th century, vegetable grafting has only recently become common. So, who came up with the idea to graft tiny vegetable seedlings one by one?

According to several reports, a farmer in the Akashi Region of Japan was the first to graft a watermelon onto a Japanese *Cucurbita moschata* squash in 1927. His name was Chozo Takenaka of Hayashizaki Village in the Akashi region. Akashi was a watermelon production area during the economic boom that followed World War I. However, there was an outbreak of Fusarium wilt, and the disease spread as the watermelon acreage increased. Takenaka had likely tried to imitate the grafting of fruit trees. After experiencing success, he told others about it, and the technique spread. Another article published in 1931 also mentioned that eggplants were being grafted onto *Solanum integrifolium* to prevent bacterial wilt.

It is also possible that watermelon grafting may have been discovered independently by several farmers around the same time. As early as 1931, 60 hectares of grafted watermelons were being grown in the Chiba Prefecture, which was another watermelon growing region. Vegetable seedlings were grafted onto the same or different species, and even different families in some cases. This was an historical breakthrough comparable to today's biotechnology.

After vegetable grafting was initiated, a great deal of research was done at Japanese agricultural experiment stations to refine the technique. Notable advances were made by Seizo Watanabe and Jutaro Murata in the watermelon regions of Chiba and Nara. They introduced *Lagenaria siceraria* as a rootstock, and implemented a simpler technique using plants at the primary leaf stage. Due to these new approaches, grafting spread rapidly.

In addition to the mainstream research, special mention must be made of Koshiro Tateishi, a

principal at the Soegami Agricultural School in Nara. His report on how to choose rootstocks and results of performance trials were published in 1931. The academic report was unusual for its time in that he included many photos, such as one of a greenhouse full of grafted watermelon fruit. Tateishi encouraged neighboring farmers to start grafting, and his report conveyed the enthusiasm about watermelon production at that time.

Grafting clips developed by Takeo Fujii.
Illustration by Eiko Goto.

Cucumber grafting was initiated by Mitsuharu Ishibashi at the Chiba Agriculture Research Station in 1957. He proved that grafting encouraged shoot growth at lower temperatures, and reduced problems with pests and soilborne diseases including Fusarium wilt (*Fusarium oxysporum*). Grafting spread further throughout Japan when a simple technique using clips was developed by Takeo Fujii of the Chiba University Horticulture Department in 1964. Grafting of eggplants and melons became more popular after the mid-1960s. For eggplants, the ornamental eggplant or "pumpkin tree" (*Solanum integrifolium*) was used as a rootstock against bacterial wilt (*Ralstonia solanaearum*).

In recent years, the most widely used method of grafting is known in Japan as the Zen-Noh system, which was developed by Toshitaka Itagi at the Zen-Noh agricultural technology center in 1990. Itagi had been the president of the Kanagawa Horticultural Experiment Station and the director of the research station at the National Agricultural Research Center. He moved to Zen-Noh after his retirement, and put all his efforts into developing simpler grafting techniques in plastic plug trays, which had recently been introduced from the US. At the time, cucumbers were usually grafted after the emergence of the first true leaf, and eggplants and tomatoes were grafted after the fourth or fifth true leaf. Itagi made it possible to perform grafts before the cotyledon opened on cucumbers, and at the 2.5 leaf stage for eggplants and tomatoes. Many people thought plants at these stages were too young to be grafted, but Itagi proved them wrong by introducing three new innovations: First, he cut the angle at 30 degrees to increase the contact surface and make the stems easier to press together. Second, he used soft plastic tubes with a vertical slit to support the grafting point. He used several different sized tubes, which come off as the seedlings grow. Third, he built a container to provide optimum humidity, light and wind conditions, which increased his success rate to almost 100 percent.

The Zen-Noh method also increased the speed of grafting. Previously, 400-500 grafts could be made per person per day. The Zen-Noh method made it possible to graft between 1,000 and 1,200 per day. In an interview with the author of this article, Itagi emphasized that the plastic tubing was the key to the success of his method. He recalled that one day he happened to visit a store that sold screen windows. It was the plastic fasteners that kept the screen on the

wooden frames gave him the idea. New ideas can come in unexpected places!

In Japan, the percentage of vegetable planting acreage using grafting is: watermelon: 93.9%, cucumber 92.6%, melon: 32.0%, tomato: 57.7%, eggplants: 79.0% and hot/sweet peppers: 13.5% (2009 survey by NARO Institute of Vegetable and Tea Science). In Europe, 130 million vegetables were grafted in Spain in 2009, and 59 million were grafted in Italy in 2010 (data compiled by Dr. Perez-Alfocea). In North America 40 million tomatoes, principally for hydroponics, were grafted in 2006 (estimated figure by Dr. Kubota).

Zen-Noh grafting.
Illustration by by Eiko Goto

Farmers who need solutions are often the best and most appropriate innovators. In the case of grafting, a dim light ignited by a farmer over 80 years ago now shines more brightly than the person who invented it could have possibly imagined.

Additional Resources on Vegetable Grafting

- Guan, W. and S. Hallett. 2016. Techniques for Tomato Grafting. Purdue Extension HO-260-W. https://extension.purdue.edu/extmedia/HO/HO-260-W.pdf
- Guan, W. and X. Zhao. Techniques for Melon Grafting. University of Florida Extension HS1257. https://www.southernsare.org/Educational-Resources/SARE-Project-Products/Fact-Sheets/Techniques-for-Melon-Grafting
- Hu, B., N.R. Bumgarner, M. Young, S. Short, D. Wolfe, M. Soltan and M.D. Kleinhenz. Grafting Guide. Ohio State University Extension Bulletin 950. https://u.osu.edu/vegprolab/grafting-guide/
- Miles, C. ,L. Hesnault, S. Johnson and P. Kreider. 2013 Vegetable Grafting: Watermelon. Washington State University Fact Sheet FS100E. https://s3.wp.wsu.edu/uploads/sites/2071/2014/04/Grafting-Watermelon-FS100E.pdf
- Reid, J. and K. Klotzbach. Grafting Cucumbers for Yield and Cold Hardiness in High Tunnels: A Cornell Vegetable Program Challenge Grant. Cornell University. https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/5/91/files/2016/04/grafting-cucumbers-reid-2kuwye6.pdf

SARE Fellows Visit Oregon!

By: Maud Powell, Small Farms Program, Oregon State University Extension Service

Every year since 2007, USDA's Sustainable Agriculture Research and Extension program (SARE) and the National Association of County Agriculture Agents (NACAA) has offered a national Fellows program. The program is designed for Extension faculty who are interested in learning more about sustainable agriculture in different parts of the country. Eight Fellows, two from each of the four SARE regions, meet twice a year for a week at a time, for tours and workshops. In early June, the Fellows visited Oregon, visiting various farms and research sites with Small Farms Extension faculty Maud Powell and Heidi Noordijk. Additionally, Small Farms Extension Faculty Amy Garrett, who is one of the current Fellows, participated in the tour.

SARE Fellows from across the US toured Oregon in early June 2018. Photos provided by Maud Powell

The goal of the program is to enhance understanding of sustainable agriculture through broad-based training and hands-on exposure to successful and unique sustainable agriculture programs. Participating Fellows are better able to create new programs that meet the needs of their local clientele upon returning to their home states.

SARE Fellows this year hail from New Hampshire, South Dakota, Maryland, Texas, Kentucky, Oregon, and Indiana. Additionally, SARE coordinators from Delaware and North Dakota attended.

The tour included visits to Mt. Hood Organics outside of Mt Hood, LaMancha Farm in Sweet Home and the Double J Jerseys Ranch in Monmouth. Fellows also toured many of the demonstration sites of the researchers at the North Willamette Research and Extension Center in Aurora, as well as one of Amy Garrett's dry farm plots in Corvallis.

In the middle of the week, the Fellows spent half a day visiting Persephone Farm in Lebanon and taking a deeper dive into the farm's sustainable agriculture practices. With the guidance of Oregon Tilth staff member Tanya Murry, they brainstormed ideas for increasing the profitability of certain crops. Finally, the Fellows visited Newport, where they took a "dock walk", learned about OSU Extension's Sea Grant program and got to try Dungeness crab. Over dinner on their final night, the Fellows remarked on Oregon's beauty and the inspiring farmers and Extension faculty they had met over the course of the week.

Oregon State University Extension Service

Crop Talks

Farmer Network and Farm Tours

Presented by Rockford Grange and Oregon State University, Small Farms Program

Join us every 4th Tuesday from April through September where farmers will come together to network, share a meal and learn something new.

2018 Schedule

April 24 Saur Farming, Parkdale, OR
May 22 Oak Rose Farm, Hood River, OR
June 26 Treebird Organics, Trout Lake, WA
July 24 Rahane Farm, Hood River, OR
August 28 Stepping Stone Grown, Mosier, OR
September 25 Stonework Farm, Snowden, WA

Oregon Farm Direct Nutrition Program (FDNP) 2018 Info for Farmers

Provided by the Oregon Department of Agriculture

FDNP connects eligible seniors and WIC families with the freshest local produce available, and the wonderful farmers who grow our food. Participating farmers earned $1.4 million in FDNP sales last year!

In 2018, $1 million more in state funding is available for this program. With more funding and more eligible FDNP customers, you can help solve food insecurity in your community by bringing healthy food to eligible seniors and WIC families!

FDNP recipients receive green $4 pre-printed checks to spend with authorized farmers who sell their own produce at farm stands and farmers' markets. FDNP recipients are nutritionally at-risk young families enrolled in the WIC (Women, Infants & Children) program, and eligible low-income seniors.

FDNP checks are for locally-grown fresh, unprocessed fruit, vegetables, and cut herbs. Shoppers may now use their checks from June 1 through November 30.

If you were authorized last year to accept FDNP checks: Look for a packet in the mail from the Oregon Department of Agriculture.

If you are new to the FDNP: Please call the Oregon Department of Agriculture at 503-872-6600 for an application packet, if you meet these eligibility requirements:

- You own, lease, rent, or sharecrop land to grow, cultivate or harvest crops on that land in Oregon or a bordering county, and
- You sell your produce at a farmers market or farm stand.

How can you bring FDNP shoppers to your farmers market booth or farm stand?

- Consider advertising your produce and FDNP participation at your local WIC clinic, senior center, and office of Aging. (Find your local WIC clinic at (WIC website address) and locations for aging services at www.ADRCofOregon.org)
- In addition to your current farm stand and farmers market booths, consider setting up a pop-up stand at your community's senior centers or low-income senior housing.
- Notify your local WIC clinic about the pop-up stand so both WIC families and seniors may participate.

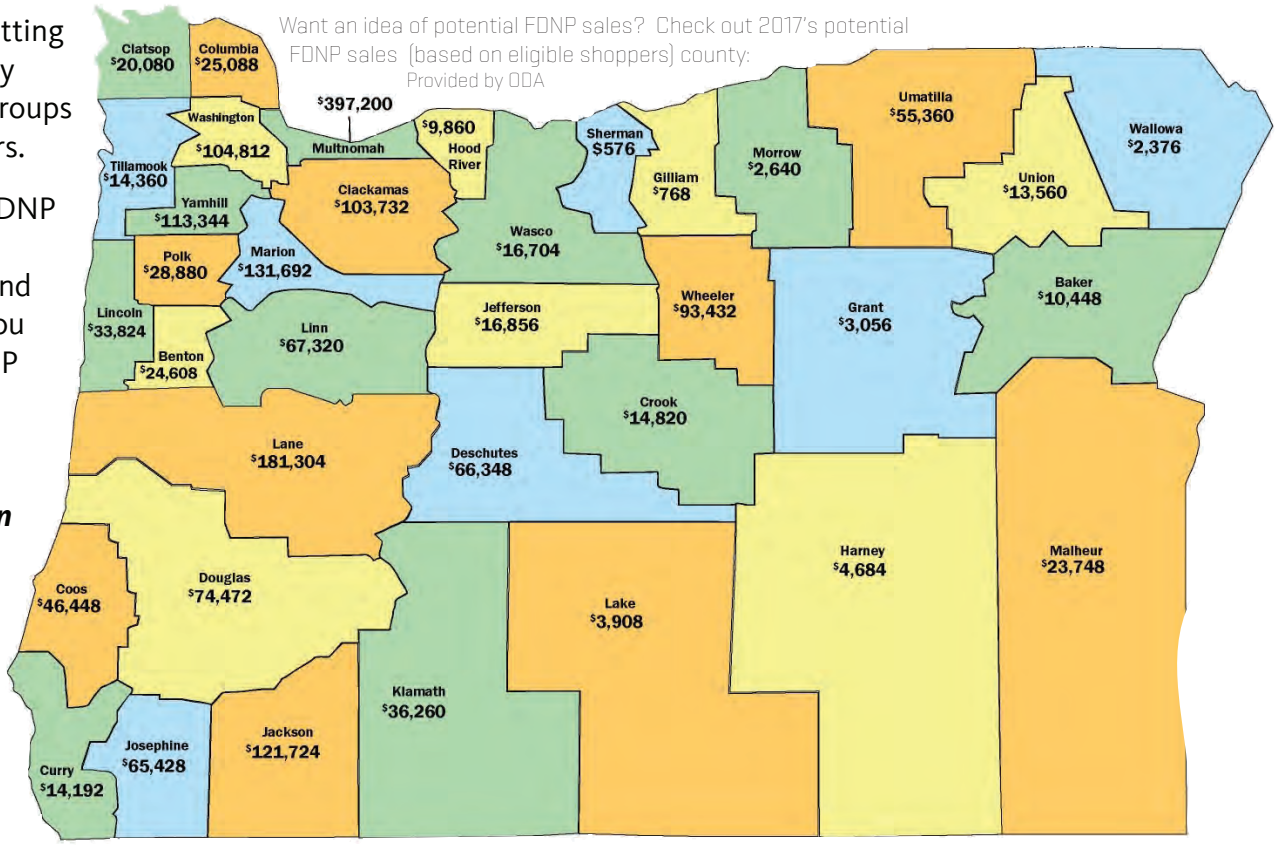
Oregon Department of Agriculture

Oregon Health Authority

WIC OREGON

- Consider setting up a delivery service to groups of customers.
- Post your FDNP farmer sign whenever and wherever you accept FDNP checks!

For more information on FDNP farmer participation, contact the Oregon Department of Agriculture at 503-872-6600.



Mechanical Cultivation Field Day – Save the Date!

August 16th, 2018

OSU Vegetable Research Farm, 34306 NE Electric Rd, Corvallis OR

Take advantage of this unique opportunity to network with other farmers, researchers, and tractor/tool suppliers and learn about the latest in mechanical cultivation for weed control in vegetables. We will have live demonstrations of multiple cultivating tractors and in-row cultivating implements, with experts on-hand to answer questions. Keynote speaker Eric Gallandt (University of Main Weed Ecology & Management Specialist) will discuss the keys to effective field prep for weed control, how to fit mechanical cultivation into your farm, and his research on stacked cultivation tools.

Companies present with their equipment include: Sutton Ag, KULT Kress, Tilmor, Tuff-bilt, Leeagra, Solectrac, and BCS.

The $25 registration fee includes lunch. Event and registration information is online. For questions please contact Nick Andrews (503-913-9410) or Clare Sullivan (541-602-2009).

Find this online at https://smallfarms.oregonstate.edu/

Pastured Poultry Workshop

Corvallis, OR
August 15-16, 2018
8:30 AM-4:00 PM each day

Want to improve your Pastured Poultry Production & Support Network?

Organized by OSU Extension, UC Davis Extension, Veterinary Medicine & Engineering, and NCAT/ATTRA National Sustainable Agriculture Information Service, this workshop includes time for discussion and problem-solving. Whether you are aspiring, beginning or a few years into your business, we will address both technical and business topics to support the development of your poultry enterprise.

Special Oregon Guest Speakers:
Lauren Gwin, Niche Meat Processor Assistance Network (NMPAN): Processing and Regulations
Local Pastured Poultry Farmer (to be announced): Raising and Marketing Pastured Eggs & Meat

- **Preventive Strategies for Bird Health**
- **Feeding and Nutrition**
- **Housing and Equipment Systems Design**
- **Regulations: Options for Processing and Marketing**
- **Efficient Recordkeeping to Support Decision-Making**
- **Resources and References for Enterprise Development**

Cost of the workshop is $40, which includes lunch and a light breakfast both days, & educational materials.
To Register https://ucanr.edu/survey/survey.cfm?surveynumber=21362

For more information, contact NCAT Specialist Ann Baier by email annb@ncat.org or call 530-792-7338

University of California Agriculture and Natural Resources
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ATTRA SUSTAINABLE AGRICULTURE

How to Starve Animals with a Full Stomach

Dr. Susan Kerr, WSU NW Regional Livestock and Dairy Extension Specialist

"What do you mean my cow/horse/sheep/goat/ llama/alpaca/elephant died of starvation? She had all the hay she could eat!"

Sadly, these words are sometimes uttered by livestock owners experiencing a painful lesson about hay quality. Some hay is of such low quality (Photo 1) it can't support maintenance nutritional requirements, let alone growth, lactation, pregnancy, or work. This article will focus on grass hay, but the basic principles discussed also pertain to legume and mixed grass/legume hay.

Photo 1. Low-quality grass hay big round bale for use as bedding, not animal feed.
Photo provided by Susan Kerr

Quality Affected by Harvest Time

Two crucial components of hay quality are protein content and fiber content. As depicted in Figure 1, protein content decreases and fiber content increases with increasing grass maturity. Grass harvesting is a compromise between quality and quantity because the two are inversely related. Early harvested grass will be high quality (higher protein content, lower fiber content, and higher fiber digestibility) but the hay yield will be low. Late harvested grass will be lower quality (lower protein content, higher fiber content, and lower fiber digestibility) but more hay tonnage will be harvested.

Grass harvest time is affected by weather and soil conditions: it must be delayed until soils are dry enough so harvesting equipment does not get stuck and mowing, raking, and baling activities will not damage soils excessively. Reed canary grass (RCG) is a prolific grass that does well in wet areas. It can be difficult to make good quality RCG hay because by the time haying equipment can get onto RCG areas, the plants can be very mature. This will result in a great amount of harvested grass, but the quality will be even less than that of the "dough phase" shown in Figure 1.

TYPICAL CHEMICAL COMPOSITION OF GRASSES

MATURITY	CP	ADF	NDF
VEG-BOOT	>18	<33	<55
BOOT-EARLY HEAD	13-18	34-38	55-60
HEAD-MILK	8-12	39-41	61-65
DOUGH	<8	>41	>65

Figure 1. Typical Chemical Composition of Grasses. From "Using a Hay Test for Feeding Livestock" presentation by Shelby J. Filley, Oregon State University Extension Service Regional Livestock and Forage Specialist. CP = crude protein. ADF = Acid Detergent Fiber. NDF = Neutral Detergent Fiber.

Fiber Content and Hay Quality

Neutral detergent fiber (NDF) includes all types of plant cell fiber: cellulose, hemicellulose, and lignin; it estimates hay intake by animals and a low number is desirable. Acid Detergent Fiber (ADF) includes the less digestible parts of plant cell

Desirable Hay Fiber Levels

NDF: <50%

ADF: <35%

fiber: cellulose and lignin; it estimates fiber digestibility and a low number is desirable. Both types of fiber increase with increasing plant maturity. Photo 2 is a visual metaphor of a plant cell using a cardboard box to represent the outer cell wall (cellulose; digestible), plastic bag to represent the lignin layer (completely indigestible), paper wrapping to represent the inner cell wall (hemi-cellulose; digestible), and sugar to represent cell contents (sugars, protein, fat, pectin, and starch; extremely digestible).

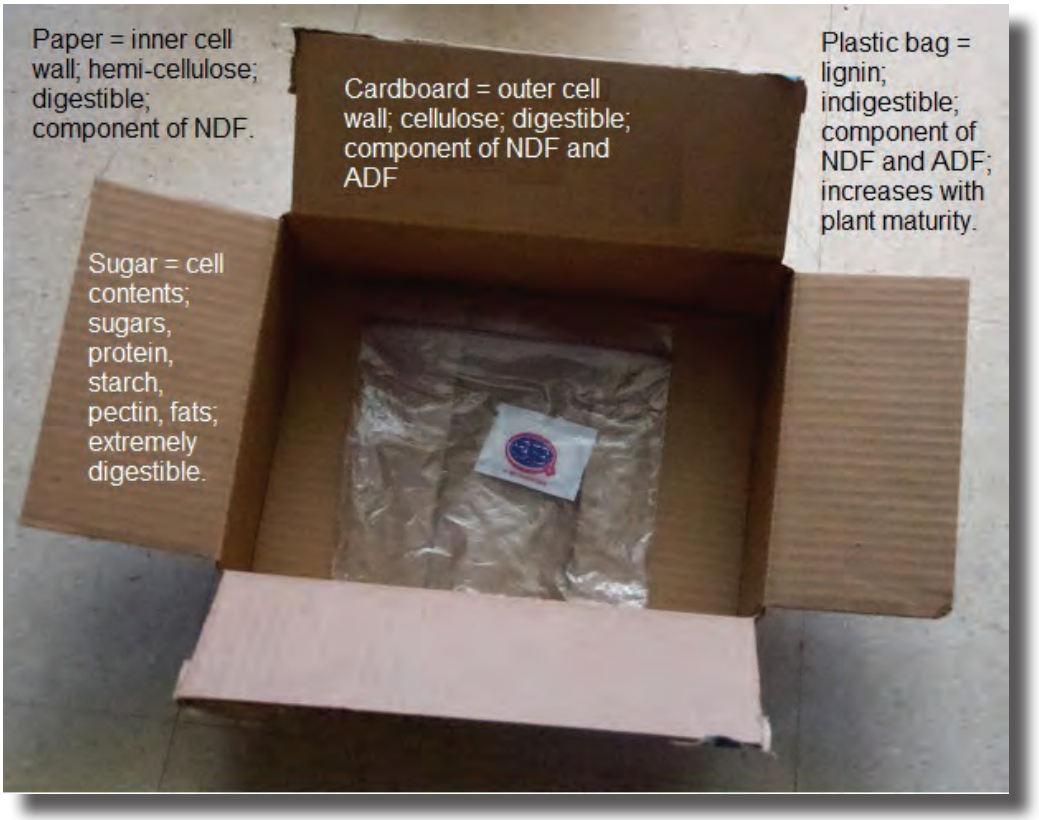


Photo 2. Depiction of components of plant cell showing relative digestibility of components. Photo provided by Susan Kerr

RCG can easily be 5 to 6 feet tall when the soil in which it is growing is dry enough for heavy equipment. Plants this tall need to produce more structural fiber to stand up; this is lignin, which is completely indigestible. NDF and ADF of mature RCG will be very high, so both feed intake and digestibility will be reduced.

Protein Content and Hay Quality

Like fiber digestibility, protein content of grasses decreases with increasing plant maturity. Young plants—even RCG—can have impressive crude protein (CP) levels, sometimes exceeding 20% on a dry basis. For ruminants, the dietary nadir (lowest amount) of crude protein needed for survival is 7%. Below this, there is insufficient protein for rumen microbes to reproduce, so fiber digestion ceases. The ruminant will be hungry and ingest more feed, but the fiber will be indigestible, the rumen will fill and stay full, and the animal can starve to death with a full stomach.

Fresh Forage vs. Hay

Lush spring grass pasture can have high protein content and high fiber digestibility, but will also have very high water content—as much as 90% of grass weight will be water in early spring. As shown in Table 1, if pasture is made available to livestock on an as-fed basis (i.e., grazed), animals will need to consume a great deal of fresh forage to meet their intake potential and nutritional requirements compared to hay, from which most water weight has been removed.

How to Prevent Full Belly Death

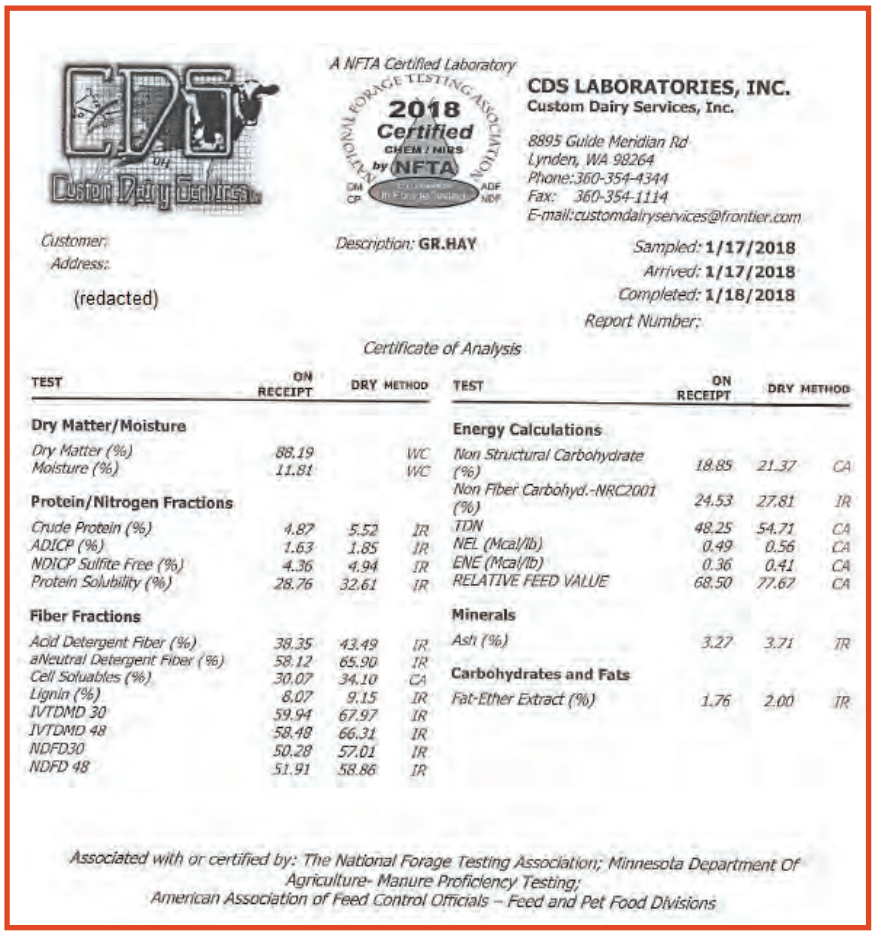
The only way to know the nutritional value of hay is to test it. The Resources shared below describe how to take a forage sample for analysis, where to send it, and how to interpret results. The testing laboratory, Extension educators, veterinarians, and livestock nutrition consultants can also help with interpreting and using the information contained in forage analysis reports.

Figure 2 is an example of a low-quality grass hay report from a forage analysis laboratory; note its very low crude protein content and high ADF, NDF, and lignin levels. Its Relative Feed Value (RFV) is 77.67. As a comparison, mature alfalfa hay has a RFV of 100.

Fresh Forage vs. Hay Intake			
Forage type	**% water**	**% dry matter**	**# forage**
Fresh forage (pasture)	90	10	360
Hay	10	90	40

Above: Table 1. Fresh forage vs. hay intake for 1200 lb. mature beef cow at 3% body weight of dry matter ingested.

Below: Figure 2. Poor-quality grass hay chemical analysis report.
Report courtesy Custom Dairy Services, used with permission.



A NFTA Certified Laboratory

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Custom Dairy Services, Inc.

8895 Guide Meridian Rd
Lynden, WA 98264
Phone:360-354-4344
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E-mail:customdairyservices@frontier.com

2018 Certified CHEM / NIRS by NFTA

Customer:
Address:
(redacted)

Description: **GR.HAY**

Sampled: **1/17/2018**
Arrived: **1/17/2018**
Completed: **1/18/2018**
Report Number:

Certificate of Analysis

TEST	ON RECEIPT	DRY METHOD		TEST	ON RECEIPT	DRY METHOD	
Dry Matter/Moisture				**Energy Calculations**			
Dry Matter (%)	88.19		WC	Non Structural Carbohydrate (%)	18.85	21.37	CA
Moisture (%)	11.81		WC	Non Fiber Carbohyd.-NRC2001 (%)	24.53	27.81	IR
Protein/Nitrogen Fractions				TDN	48.25	54.71	CA
Crude Protein (%)	4.87	5.52	IR	NEL (Mcal/lb)	0.49	0.56	CA
ADICP (%)	1.63	1.85	IR	ENE (Mcal/lb)	0.36	0.41	CA
NDICP Sulfite Free (%)	4.36	4.94	IR	RELATIVE FEED VALUE	68.50	77.67	CA
Protein Solubility (%)	28.76	32.61	IR				
Fiber Fractions				**Minerals**			
Acid Detergent Fiber (%)	38.35	43.49	IR	Ash (%)	3.27	3.71	IR
aNeutral Detergent Fiber (%)	58.12	65.90	IR				
Cell Soluables (%)	30.07	34.10	CA	**Carbohydrates and Fats**			
Lignin (%)	8.07	9.15	IR	Fat-Ether Extract (%)	1.76	2.00	IR
IVTDMD 30	59.94	67.97	IR				
IVTDMD 48	58.48	66.31	IR				
NDFD30	50.28	57.01	IR				
NDFD 48	51.91	58.86	IR				

Associated with or certified by: The National Forage Testing Association; Minnesota Department Of Agriculture- Manure Proficiency Testing; American Association of Feed Control Officials – Feed and Pet Food Divisions

RFV is a way to compare the expected intake and digestibility of various roughages—a higher number is better. Low quality hay such as this example can be included in livestock rations if supplements are provided to meet animals' energy, protein, vitamin, and mineral requirements. If provided as the sole feed, low-quality hay such as that in Figure 2 cannot maintain any species of livestock at any life stage. Ruminants need a fibrous diet to keep their rumens working well, so savvy producers can use low quality (read: inexpensive) forage as a ration foundation, adding some grain for energy and perhaps lick tubs, barley cakes, dry peas, or a little alfalfa for protein. Body condition scoring, growth rates, milk production, and general health can help assess effectiveness of a nutritional program.

Conclusion

Just as one would not expect a baby to grow well or a tri-athlete to perform well on a diet of just high-fiber/low-calorie rice cakes, most classes of livestock cannot perform well or remain healthy on low-quality fiber diets. No matter how much low-quality forage they consume, they will not be able to meet their nutritional requirements; they will use body reserves of energy and protein until death ensues. If inexpensive low-quality hay must be incorporated into livestock rations, producers are obligated to supplement the ration with nutrients needed to meet their livestock's' nutritional requirements.

Resources

Forage Quality Testing: Why, How, and Where
https://extension.psu.edu/forage-quality-testing-why-how-and-where.

Analytical Laboratories and Consultants Serving Agriculture in the Pacific Northwest (forage analysis)
http://analyticallabs.puyallup.wsu.edu/analyticallabs/services/.

Interpreting Forage and Feed Analysis Reports
https://extension.msstate.edu/sites/default/files/publications/publications/p2620.pdf.

Matching Hay Quality with Animal Nutrient Requirements
https://extension.oregonstate.edu/animals-livestock/beef/matching-hay-quality-animal-nutrient-requirements.

ORGANIC HAZELNUTS
SECOND ANNUAL SUMMER FARM TOUR

Join us!

AUGUST 15, 2018
9:30 AM – 4:30 PM

ORGANIC HAZELNUT GROWERS ASSOCIATION

Organic hazelnuts are now proudly grown in Oregon and gaining interest with new growers!

Join the Organic Hazelnut Growers Association's summer tour at one certified organic farm and one transitioning farm in the mid-Willamette Valley.

TOPICS INCLUDE:

- **Growing Organically:** A systems approach to fertility, pest management and more
- **Research Findings:** Recent findings from organic farms
- **Organic Certification:** Understanding organic certification and transition
- **Finding Success:** Shared challenges, needs and solutions for organic processing and marketing

Check-in starts at 9:00 at Cold Springs Farm at 35541 Cold Springs Road, Lebanon, OR.
For lunch and the afternoon sessions we'll transition to the Lackner Family Farm at 40455 Gisler Road, Scio, OR.

Lunch is served. Pre-registration is required.
Cost: $18 for Organic Hazelnut Growers Association members. $45 for non-members.
Join the OHGA and save!

For more information and to register visit www.pesticide.org/organichazelnuts

NORTHWEST CENTER FOR ALTERNATIVES TO PESTICIDES

OSU Oregon State University

USDA U.S. Department of Agriculture Risk Management Agency

WESTERN SARE Sustainable Agriculture Research & Education

What's Fresh and When?

Oregon Seafood Consumer Guide 2018

Salmon

	Coho	Chinook
North Coast *U.S / Canada Border to Cape Falcon*	July 1 to Sept. 19	May 1 to Sept. 19
Mid Coast *Cape Falcon to Florence South Jetty*	No Season	May 4 - 14 and May 19 - 31 June 4 - 12 and June 16 - 30 July 5 - 12 and July 16 - 31 Aug. 3 - 7 and Aug. 13 -17 Aug. 25 - 29 and Sept.1 - Oct. 31
South Coast *Florence South Jetty to OR / CA Border*	No Season	May 4 - 14 and May 19 - 31 June 4 - 12 and June 16 - 30 July 5 - 12 and July 16 - 31 Aug. 3 - 7 and Aug. 13 -17 Aug. 25 - 29

Pacific Halibut

June 27
July 11
July 25
Aug. 8

These dates are only open until the quota has been reached for the year.

Dungeness Crab

Jan. 15, 2018 to Aug. 14, 2018

Dec. 1, 2018 to Aug. 14, 2019

Albacore Tuna

June to October

Depending on when species arrives

Pink Shrimp

April 1 to October 31, 2018

Lingcod, Rockfish, Sole, Flounder, Blackcod

Throughout the Year

Please Note: These are NOT RECREATIONAL harvest dates.
For more information contact Kaety.Jacobson@oregonstate.edu

Sea Grant Oregon

Oregon State University Extension Service

Oregon Farm Bureau Seeks Calendar Photos

By: Oregon Farm Bureau

Oregon Farm Bureau (OFB) invites all photography enthusiasts to enter their best images of Oregon agriculture to the annual OFB Calendar Contest.

Twelve selected photographers will have their work featured as month images in the 2019 Oregon's Bounty Calendar.

The award-winning calendar celebrates all aspects of Oregon agriculture: the products, the people, the production, the landscape, the enjoyment, anything that depicts the beauty, technology, culture, enjoyment, or tradition of family farming and ranching.

Horizontal-format, high-resolution images — both close-ups and panoramic views — are needed of all types of agriculture in all seasons.

Subject ideas include scenes from farmers markets, close-ups of ag products or crops in the field, planting and harvesting crops, panoramic scenes of farmland, people enjoying Oregon-grown ag products, portraits of farmers/ranchers/families, farm animals, state or county fairs, 4-H and FFA events, on-farm festivals, to name just a few.

Photographers with images selected for month pages in Oregon's Bounty will receive a photo credit in the 2019 calendar, which is mailed to 67,000 Farm Bureau members, and copies of the calendar. Everyone who submits an image will receive a complimentary copy of the calendar ($20 value), provided they include their mailing address.

The deadline for entries is Sept. 15, 2018.

Photographers do not need to be Farm Bureau members to participate and there is no limit to the number of photos that can be submitted.

Photo specifications and contest rules are below and also at ww.oregonfb.org/calendar.

Calendar

July

12 - Small Farms School
2018 Workshops and Speakers Forage and Pasture Management: Woody Lane, Lane Livestock Services; Raising Ducks and Geese: Dave Holderread, Holderread Wildfowl Farm; Economics of Poultry: James Hermes, OSU Extension; Ergonomics for Farmers: Josh Volk, Slowhand Farm; Hand Tool Maintenance: Bob Denman, Red Pig Garden Tools; Small Engine Troubleshooting and Repair, Matt Zacher, Canby Rental and Equipment; Leasing Farmland; Urban Farming. 8:00AM - 4:30PM. Clackamas Community College, 19600 S. Mollala Ave, Oregon City, OR. heidi.noordijk@oregonstate.edu ***FEE***

August

15 - Organic Hazelnuts Farm Tour
Join the Organic Hazelnut Growers Association at their second annual farm tour. Topics include - Growing Organically: A systems approach to fertility, pest management and more; Research: Recent findings from organic farms; Organic Certification: Understanding organic certification and transition; Finding Success: Shared challenges, needs and solutions for organic processing and marketing. 9:30 AM - 4:30 PM. 35541 Cold Springs Rd.,Lebanon, OR. Contact: Sharon Selvaggio at 5037040327 or sselvaggio@pesticide.org. ***$35/members or $45 nonmembers***

September

11 - NWREC Vegetable Variety Field Day
Join us for an afternoon of field tours, tasting tables and discussions about vegetable varieties with plant breeders, Extension agents and see companies. Featured vegetables: Tomato, Pepper, Winter Squash, Cucumber, Leeks, Carrot and Lettuce 3:00PM - 6:00PM. 15210 NE Miley Rd, Aurora, OR. Registration Link http://smallfarms.oregonstate.edu/2017-nwrec-vegetable-variety-field-day-rsvp

Check our online calendar at for the most up to date events http://smallfarms.oregonstate.edu or at http://extension.oregonstate.edu/smallfarms

Want to add your event to our calendar then please submit your information at http://calendar.oregonstate.edu/advanced/list/extension-smallfarms/ "Click the Submit an event button." Events have to be approved and will not immediately post. If you have questions please contact Chrissy Lucas at Chrissy.Lucas@oregonstate.edu or 541-766-3556