

Oregon

# Small Farm News

Oregon State University Small Farms Program

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### Cover Photo:

#### Harvest at Blue Fox Farm

*Photo by Lynn Ketchum, Oregon State  
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# Blue Fox Farm

By: Maud Powell

**B**lue Fox Farm, a diversified organic vegetable operation in Southern Oregon's Applegate Valley showcases a number of characteristics of today's successful small farms: extended family partnerships, enterprise diversity, innovative marketing, and an interest in production improvement through research.

As the cost of agricultural lands in Oregon has skyrocketed in the past decade, land acquisition has become out of reach for many young farmers. Increasingly, young farmers are looking to family members or community partnerships to help secure agricultural property. Blue Fox Farm is a great example of this emerging family agricultural partnership. The farm is a collaboration of several family members: Dick and Bobby Kuegler, who helped purchase the property in 2003, and their two daughters, Melanie and Valerie, along with their husbands, Chris Jagger and David Kennedy. The two daughters and their families live on the farm, while their parents live in nearby Jacksonville. This partnership provides one example of the revitalization of family farms in Oregon and collaboration between generations.

Melanie and her husband Chris Jagger operate the produce component of Blue Fox Farm, while Valerie and David run the animal husbandry program. Chris and Melanie grow six acres of vegetables, using succession planting, greenhouses for season extension, and a comprehensive soil fertility



One of the Blue Fox Farm greenhouses full of starts awaiting transplant.  
*Photo by Lynn Ketchum, OSU Extension and Experiment State Communications*

program that includes cover cropping, green manures and crop rotation. Chris and Melanie have worked tirelessly since 2003 to steward the extended family property and to establish a successful farm business. They have developed working relationships with a number of local chefs and retailers, delivering consistent, high quality produce 45 weeks out of the year. They also have a strong presence at the Ashland and Grants Pass growers markets, and run a small Community Supported Agriculture Program. Valerie and David raise Icelandic sheep, Oberhasli dairy goats and ducks. Animal waste is composted and used to increase soil fertility throughout the property.

After the birth of their first child, Demian, last September, Chris and Melanie designed a new Community Supported Agriculture (CSA) model that they believe will work better for their family. Instead of selling CSA shares, they are offering "Blue Fox Bucks" (BFB) to their customers. Customers

can buy BFBs at the beginning of the season, thus providing Chris and Melanie the capital needed to purchase seeds and soil amendments, and then use them at the Blue Fox Farm market stands throughout the season. The



Chris Jagger converses with a customer at the Rogue Valley Growers Market.  
Photo by Lynn Ketchum, OSU Extension and Experiment Station Communications

new system will save Chris and Melanie the time and labor needed to pack individual CSA boxes and give their customers more choice. Concerns about cash flow, customer satisfaction and balancing farm and family resulted in the creation of a new form of direct marketing. This type of innovative and dynamic marketing is necessary for the success of small farms today.

Chris and Melanie's interest in sustainable agriculture extends beyond commercial production into the realm of university-based research. Blue Fox represented one of eleven organic farms that participated in OSU's OSPUD program. They found out about OSPUD at the Brienbush Farmer-to-Farmer gathering three years ago, where they met some of the OSU faculty involved with the program and some of the other participating farmers. OSPUD, funded by a Western SARE grant, was a participatory research project that linked growers with OSU faculty in an effort to improve potato production methods. Chris and Melanie had grown potatoes for years, but felt they could still learn a great deal about potato production. They were also curious about what it would be like to work with a university and whether or not they would actually benefit from working with OSU.

The couple was pleased with the management and operation of OSPUD. During an initial project meeting, the participants identified three areas of potato production to focus on: nutrient management, insect pest control (specifically wireworm and flea beetles) and disease control (late blight). The group met periodically over a two year period, during which time OSU faculty conducted research on each of the farms.

In terms of nutrient management, the OSPUD team explored the premise that it is unnecessary and therefore wasteful to add nitrogen to potato plants every year. Indeed, potatoes plants that received no additional nitrogen during the project yielded about the same as the plants that did.


The group meetings were informative, and also fun. "We sampled lots of different potato varieties," explained Chris. "So

many, in fact, that they all started to taste the same, except to the real potato connoisseurs." Chris described OSU faculty members as "our peers, rather than academics who were trying force information down our throats." The couple also enjoyed networking and sharing information with the other producers involved with OSPUD. While the number of small farms is increasing in the Rogue Valley every year, there are limited opportunities for experienced producers to work on collaborative research projects.



Radish bunches ready to be washed and delivered to market.  
Photo by Lynn Ketchum, OSU Extension and Experiment Station Communications

Chris and Melanie see the value in deepening their understanding of crop production through both university-based research and information sharing between farmers. Their interest in crop improvement is yet another reason why Blue Fox Farm has been so successful. To learn more about the farm, you can read Chris's blog at <http://bluefoxorganics.com>

Blue Fox Farm will be featured with other farms in the upcoming issue of ***Oregon Agricultural Progress Magazine*** - <http://oregonprogress.oregonstate.edu> 

# New USDA Assessment Addresses Climate Change & Agriculture

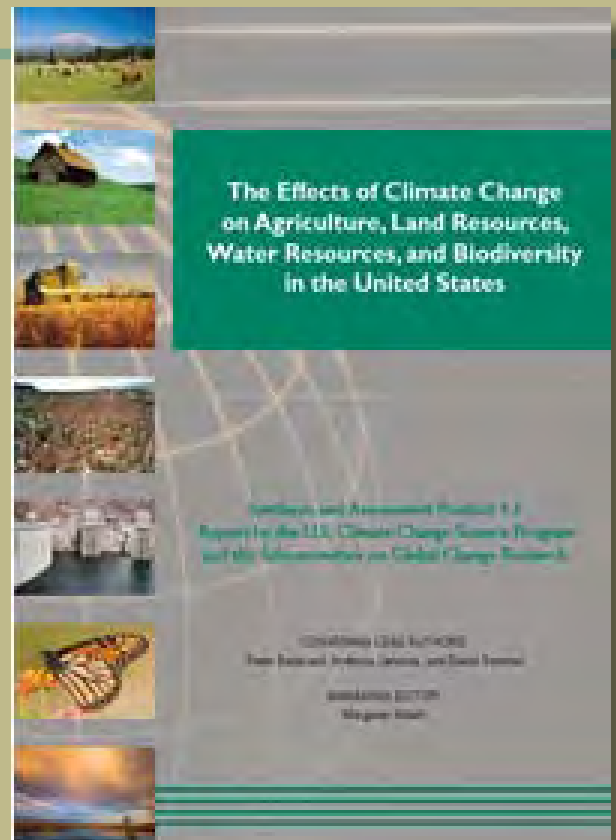
By: Garry Stephenson

“There is a robust scientific consensus that human-induced climate change is occurring.” Thus begins a new US Department of Agriculture assessment of the impacts of climate change on agriculture. Some overarching conclusions of the assessment:

- Climate changes – temperature increases, increasing CO2 levels, and altered patterns of precipitation – are already affecting U.S. water resources, agriculture, land resources, and biodiversity.
- Climate change will continue to have significant effects on these resources over the next few decades and beyond.
- Climate change impacts on ecosystems will affect the services that ecosystems provide, such as cleaning water and removing carbon from the atmosphere.
- The complex interactions between change agents such as climate, land use alteration, and species invasion create dynamics that confound simple causal relationships and will severely complicate the development and assessment of mitigation and adaptation strategies.
- Existing monitoring systems, while useful for many purposes, are not optimized for detecting the impacts of climate change on ecosystems. As a result, it is likely that only the largest and most visible consequences of climate change are being detected.


Some findings specific to agriculture:

- Grain and oilseed crops will mature more rapidly, but increasing temperatures will increase the risk of crop failures, particularly if precipitation decreases or becomes more variable.
- Horticultural crops (such as tomato, onion, and fruit) are more sensitive to climate change than grains and



oilseed crops.

- Higher temperatures will negatively affect livestock. Warmer winters will reduce mortality but this will be more than offset by greater mortality in hotter summers. Hotter temperatures will also result in reduced productivity of livestock and dairy animals.
- Weeds grow more rapidly under elevated atmospheric CO2. Weeds will migrate northward and are less sensitive to herbicide applications.

The report entitled *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States* is available for free online at: <http://www.climatechange.gov/Library/sap/sap4-3/final-report/default.htm> 



# It's the Time of Year...to Buy Hay!

By: Melissa Fery

When the rain stops and the sun decides to stay a while, haying equipment will be out in full force. For small-scale livestock producers that need to purchase hay for winter feeding, here are some tips to consider.


Due to increased costs for fuel and fertilizer, expect to pay a higher price for hay. Consider the number of animals you expect to carry over the winter and calculate their feed requirements. Plan to purchase enough hay to make it through the year to avoid costly feed later in the season. To calculate the amount of hay needed when pasture is not available (winter and late summer) you'll need to know the approximate weight of the bales. To support an animal at maintenance, it will require 2.5 to 3% dry matter intake. For example, you could expect a 1,000 lb horse or cow to eat about 25 to 30 pounds of feed per day. Sheep and goats that weigh about 150 lb will require 4-5.5 lbs of feed per day. Animals will consume good quality feed more readily than poor quality feed. You'll need to adjust the amount of hay to buy to account for waste of poor quality hay. Working, lactating and growing animals have increased feed requirements. It is advisable to purchase up to 25% extra hay to account for waste, increased feed requirements, or a late spring. This hay could be resold later if it is not needed.

If you haven't done so already, find a reputable grower and determine if they'll have the quantity you'll need. Waiting until the last minute may result in your buying poor quality hay or at a higher price. When possible, you might even take a quick look at the field before its cut to make sure there aren't an unusual amount of weeds, especially those considered toxic.

Good quality hay should be green and leafy with a sweet smell. Always avoid purchasing moldy hay or hay that was baled too wet. The moisture content of hay to be stacked inside a barn should be no more than 18%. Wet hay is a breeding ground for bacteria that will degrade the nutritional quality of the feed and in some cases will create enough heat that the bale may catch fire. Moldy hay should not be fed to livestock or horses.

Also evaluate the maturity of hay that you are buying. In western Oregon, with the unpredictable weather, it is often difficult to cut hay when the grass is at optimal maturity. Over mature plants have more stem material and less leaves, therefore the hay will have lower protein and energy values.

You might also consider having the nutritional content of the hay tested. Testing is completed after the hay is baled. When buying hay from the field, there may not be an opportunity to send a sample to the lab. However, knowing the nutrient content will still help determine a proper feeding ration.

For more information about testing hay and interpreting test results or making hay in Western Oregon, take a look at the extension publications available at <http://smallfarms.oregonstate.edu/hay-production> 

Reviewed with input by Shelby Filley, OSU Extension Service, Regional Livestock & Forages Specialist



Photo provided by Melissa Fery

## Oregon State Weed Board Grant Program

People, organizations and institutions may apply for grants to fund noxious weed control projects. It is a priority of the Oregon State Weed Board to fund projects that restore, enhance or protect fish and wildlife habitat, watershed function, and native salmonid or water quality. Grant applications must be for on the ground weed control projects for OSWB listed noxious weeds. Applications may include research, survey, project design if required to complete the control portion of the project. Application information is available at <http://www.oregon.gov/ODA/PLANT/WEEDS/grantindex.shtml>

# Feeding Pastured Poultry

By: James Hermes, OSU Extension Poultry Specialist

The pasturing of poultry is becoming a popular management method for many small flock producers, and even some moderately sized commercial farms. When pasturing chickens, the birds are allowed to roam in large areas that have various grasses or other forage plants. This is similar to systems commonly used for cattle and sheep. In fact, many producers will have their poultry flocks follow a cattle herd; the grazing cattle will keep the grasses short enough so that the smaller chickens can more easily move around.

Many pastured poultry enthusiasts like the fact the birds are able to graze in the grass just like the cattle and sheep. However, it must be realized that poultry have a different digestive system and cannot digest the grass. Cattle and Sheep are ruminants, animals whose digestion system has a significant amount of fermentation to break down plant cellulose, the woody parts of plants. The rumen portion of their digestive tract contains countless numbers of bacteria, protozoa and fungi that produce the proper enzymes so that the animals can utilize the cellulose as a source of nutrition. Poultry don't have this capability. So, while poultry managed in pasture systems appear to be eating grass, and they do eat some, they get almost no nutrition from the grass itself. These foraging chickens are looking for seeds and insects that are found in the pastures.

During the spring and early summer, insects are plentiful and provide an excellent feed source for chickens. And once the grasses, weeds and other forage plants in the pasture produce seeds the birds will readily consume them to obtain their nutrition. However, late in the summer the seeds are gone and insect numbers decline so the available nutrients for poultry are significantly reduced.

Therefore, it is important for producers of poultry in pasture systems to provide a year round supply of a prepared feed. Unlike cattle and sheep, poultry



Poultry grazing on Spring grass.  
Photo by Justin McGovern

require a balanced diet on a daily basis to thrive and remain productive. The birds should have feed available at all times. When the insect population of the pasture is high and when seeds are plentiful, the birds' consumption of prepared feed will decrease so some savings will be realized during spring and early summer. In the fall and winter, when pastures are nearly void of insects and seeds, the chickens will turn to the feed as their sole nutrition source.

So, remember to keep feed available to your pastured poultry at all times so their nutrition will always be at an adequate level for maintenance, growth and production. *Z*

## **New Publication Available** ***Scheduling Vegetable Plantings for Continuous Harvest***

Market gardeners try to schedule their planting so they can offer customers a continuous supply of fresh flowers, herbs, and vegetables throughout the growing season. This updated publication from ATTRA helps growers plan succession planting schedules.

Available online at:

<http://attra.ncat.org/attra-pub/PDF/continuousharvest.pdf>

# For the New Vegetable Farmer: Farmers' Market Displays & Attracting Customers

By: Melissa Matthewson

As a new grower, bringing produce to your local farmers' market is an excellent way to start selling your products and gain exposure for your farm. While the quality of your produce is extremely important, how you display your produce as well as how you interact




*Photo provided by Melissa Matthewson*

with farmers' market customers is critical to success. I have known farmers' market vendors who have beautiful and excellent quality produce, but do not have attractive displays and have suffered for it. When creating your market booth, take time with the details. They do count.

What farmers' market shoppers like is a display of produce that appears bountiful and abundant. Bring a lot of produce with you to market and build your display with copious amounts of vegetables and color. Create a display that incorporates many different depths and eye levels for people to look at. Have signs that clearly label your vegetables and articulate prices. Assume that people do not know what escarole or kohlrabi is. Give them cooking tips and recipe cards. People like to try new things and can usually be charmed into buying a bunch of scarlet turnips, for example, if you provide them with a good recipe on how to use that particular vegetable.

Use many different types of baskets or props that can hold salad mixes and loose greens and integrate bunches and heads in between those baskets. Shoppers can be shy, so make your booth accessible and less intimidating by thinking about table placement. Leave enough room for your shoppers to come in under your canopy. Double booth spaces help with this. Have bags hanging and accessible for people to shop and pick out produce. Think about using biodegradable or compostable bags as a marketing strategy. As well, integrate many

different colors into your display. Think about alternating between red and green head lettuces. Put rainbow chard up front and center or purple cabbage in between a number of green cabbages. As well, invest in a well-made large banner that has your farm name and location printed on it. People want to know who you are and where you are located.

Another important aspect of farmers' markets is the importance of engaging with farmers' market shoppers. Make eye contact with the person who is buying your vegetables and engage in conversation with them about how they may prepare the vegetables. Tell them about your farm. It takes a lot of energy to cultivate returning customers, but with a little extra effort on your part, they will come back and become steady shoppers. Also, stay active at your booth. Try not to sit and do not talk on cell phones. It makes farmers look disinterested to customers. Smile at people as they come by and seem interested in who they are and what they are doing at the market. Direct marketing is sometimes called relationship marketing, which is exactly what the farmers' market is—building community and new relationships through the exchange of food. People are coming to buy vegetables for the week, but also to meet and talk with their local farmer! 



*Photo provided by Melissa Matthewson*



# A Key to Farmer's Success: Matching Market Size & Management Structure

By: Garry Stephenson


**F**armers' markets are rapidly growing in number in Oregon and throughout the United States. Keeping these markets open and operating efficiently is important both for the farmers that sell at these markets and the communities these markets serve. Research from Oregon State University shows that in order to avoid internally inflicted problems that could be detrimental to a market, organizers should use management tools that are appropriate for the size of the market. In addition, to avoid outgrowing their management structure and to assure the readiness of their market for future growth, organizers should plan for implementing appropriate management practices to match an anticipated market size.

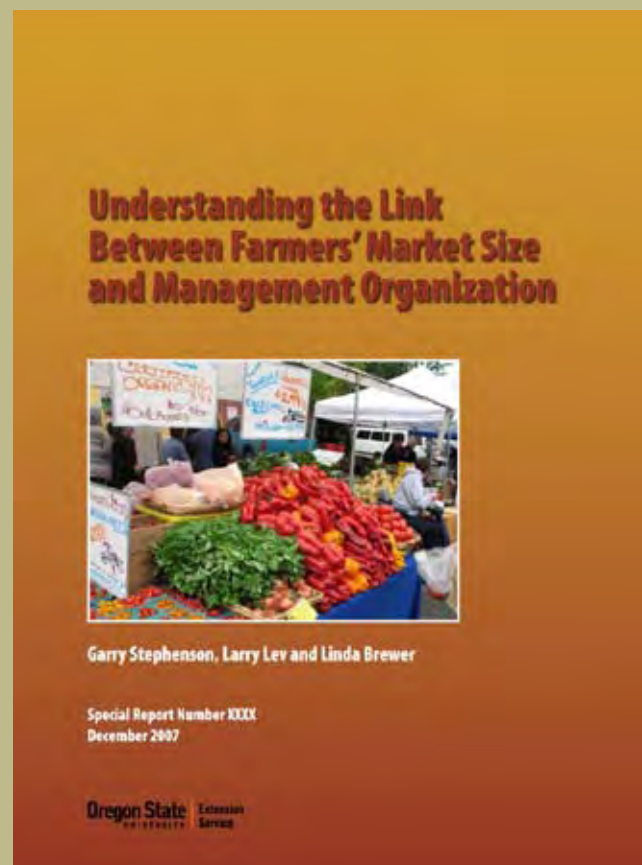
*Understanding the Link Between Farmers' Market Size and Management Organization* (Oregon State University Extension Service Special Report Number 1082-E) examines the relationship between the size of farmers' markets and the type of management organization they use. The report compares four market size categories to the management tools and resources commonly used by farmers' markets. There are significant differences in management tools used by markets of differing size.

Four categories for farmers' markets size were created using research data: *Micro* (8 or fewer vendors), *Small* (9 to 25 vendors), *Medium* (26 to 55 vendors), *Large* (over 55 vendors). The analysis of market size and management tools revealed an increase in number of management tools and an increase in management complexity as markets increase in size. Here are some key findings:

- Markets of different sizes use different management tools. As they grow, smaller markets add structures like the use of site maps and boards of directors. Larger markets add management complexity as they grow such as additional employees and sophisticated planning and budgeting.

- Matching management tools to current or anticipated market size makes best use of valuable resources and may reduce internal management problems.
- There is an important transition between small-sized markets and medium-sized markets. Small markets anticipating growth into medium size should be prepared. A key feature of this transition is the addition of a salaried manager (rather than a volunteer) to handle market operations.

The report by Garry Stephenson, Larry Lev and Linda Brewer of Oregon State University is available online for free at: <http://extension.oregonstate.edu/catalog/pdf/sr/sr1082.pdf>. 





# Carrot Rust Fly Biology & Management

By: Nick Andrews

Carrot rust flies (*Psila rosae*) are well known to growers of carrots, parsnips, celeriac, celery and other umbelliferous crops. The adult females are attracted to the odor of the host plant, and lay their eggs at the crown of the plant. The adults don't do any damage, but after the eggs hatch, larvae immediately burrow into the soil and start feeding on the roots. As the larvae grow, the amount of damage they cause increases. Recently planted crops can be killed resulting in stand thinning. After forming a tap root, more mature carrots, parsnips and celeriac suffer direct crop damage from the tunneling larvae (figure 1). The lower stems of celery are normally only damaged when populations are somewhat higher. The larval excrement or frass is rust colored, giving the flies their common middle name, and is deposited in the tunnels.

In Oregon the first generation adults are active from mid April to June. Larvae feed on roots starting in May and June with the subsequent second generation adults emerging in August and September. Late second and early third generation adults are active at the same time with the second generation adults lasting into October. Crop damage accumulates over time.



Figure 1. Carrot rust fly damage to roots. (<http://www.inra.fr/hyppz/>)

The activity of adult flies can be monitored with yellow sticky traps available from various suppliers including Great Lakes IPM (800-235-0285) and Gempler's (800-382-8473). Three traps are normally placed at the edge of the field nearest the previous carrot or parsnip crop and near any shelter belts. Researchers in the UK have shown that trap counts are increased when traps are set at a 45° angle (figure 2). Commercial growers sometimes use the traps to schedule insecticide sprays, or to find the best time to remove row covers.

Thresholds vary depending on the market tolerance for damage, and the cost of control measures. It is difficult to predict damage levels from the number of adults caught in traps, but a widely used monitoring service in the UK recommended that protection should start when 2-3 flies are caught per field in one week, and should continue until counts decline.



Figure 2. Carrot fly trap placed in a parsnip field just before emergence. Photo provided by Nick Andrews

The sticky traps are not specific to carrot flies, and there are some non pest flies that have a similar appearance. Figure 3 shows an adult carrot fly on a trap. They have clear wings, a shiny black thorax and abdomen with few hairs, an orange head with dark red eyes and translucent orange legs. With a bit of experience, the combination of these features makes it relatively easy to distinguish carrot flies from the other species trapped.



Figure 3. Carrot fly on a sticky trap (<http://www.aenews.wsu.edu/Mar03AENews/Mar03AENews.htm>)

Currently available pesticides are unlikely to provide acceptable control of large populations, so cultural methods for managing local populations are important for organic and conventional growers alike. Since carrot rust flies are relatively weak flyers, populations tend to be localized. Populations decline the further away susceptible crops are from the previous overwintering host crop. Flies probably travel less than 1000 yards in search of egg laying sites. The adults are

attracted to the smell of a host crop and fly upwind towards the smell. Isolation of crops from previous years' fields can significantly reduce carrot fly risk, especially when the new crop can be placed downwind of the previous crop (figure 3).

If crops can be planted after most of the first generation adults have died (late May to early June), the second generation infestations will be lighter. This doesn't hold true for adjacent sequential plantings since an early planting would support the first generation, and the second generation adults could fly to the later planting. Early harvest can also reduce the risk of damage from maturing second generation larvae and overwintering third generation larvae. Cull piles and overwintered carrots and parsnips can be a significant source of flies and should be managed accordingly. In recent conversations with carrot and parsnip growers we have started to speculate that trap crops may help reduce populations in an area. Our hypothesis is that if a couple rows of an attractive crop were planted in the previous years' field, it would attract a large proportion of the first generation flies, especially if the current years' crop is situated as far away as possible, and preferably downwind. After the first generation flight is over, the trap crop should be completely destroyed, then a few weeks later the process could be repeated with the second generation flies. To our knowledge, this method has been untested.

Organic growers have few available insecticides. Some formulations of spinosad, neem, natural pyrethrum and other materials are allowed for use on organic farms. Some of these products may have some efficacy, but remain largely untested in the Pacific Northwest. Conventional growers often use diazinon at planting and zeta cypermethrin (Mustang) during the season. Mustang is only effective against adults and to be effective, egg laying should be minimized. Therefore, it is prudent to time sprays with trap counts.

Small organic farms sometimes control carrot flies with row covers. To be effective, crops should be covered as soon as they emerge whenever carrot flies are

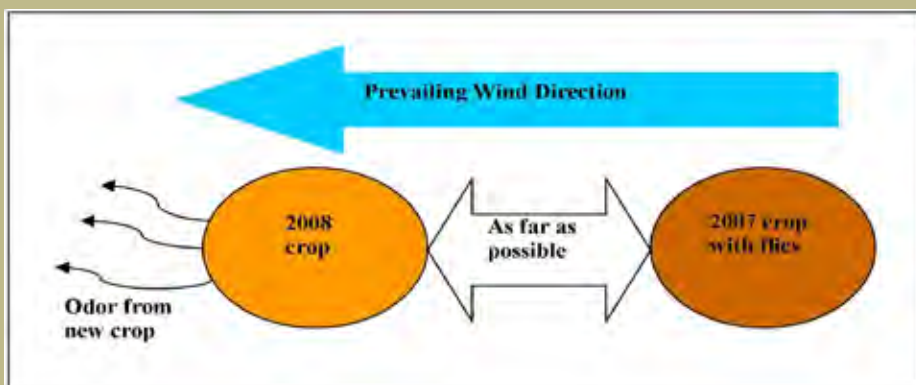


Figure 3. Year to year placement of crops that may reduce regional carrot fly pressure.

active. Special attention should be paid to keeping the crop covered and the edges of the row cover secured. As already mentioned, sticky traps can be used to determine periods of low adult activity when row covers can be removed with little risk of damage. If flies are allowed to lay eggs before a crop is covered, the larvae and subsequent generations will be trapped under the row cover and are capable of causing substantial damage.

An integrated approach to carrot fly management is critical for both organic and conventional farmers. Whenever possible it is helpful to work with neighbors to reduce the overall population in your area. Feel free to contact Nick Andrews if you would like help monitoring carrot flies or would like to discuss the most promising management strategies for your farm. 🌿

## Evaluating & Reducing Lead Hazard in Gardens & Landscapes

Lead contamination of the environment is an important human health concern. Designed to help homeowners evaluate and manage lead hazard in their landscape or garden. The new publication includes information on:

- How soils are contaminated with lead
- How to test your soil for lead contamination
- How to reduce exposure to soil lead

Available online at:

<http://extension.oregonstate.edu/catalog/pdf/ec/ec1616-e.pdf>



# Potassium Deficiency: Listening to Your Ears of Corn

By: Sam Angima

**P**otassium (K) is an essential nutrient to corn production. It is associated with movement of water, nutrients, and carbohydrates in plant tissue and if deficient, growth is stunted and yields are reduced. It has been shown that K stimulates early growth, increases protein production, improves the efficiency of water use, and improves resistance to diseases and insects. However, unless one is tuned to detecting symptoms of K deficiency, one can lose yield year to year in both field and sweet corn production.

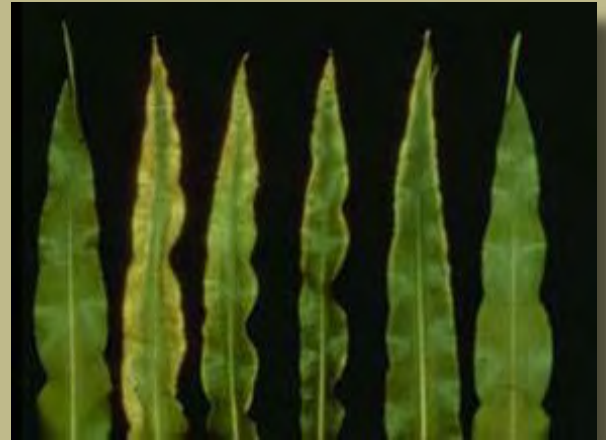
The total K content of soils frequently exceeds 20,000 ppm (parts per million). Nearly all of this is in the structural component of soil minerals and is not available for plant growth. Three forms of K (unavailable, slowly available or fixed, readily available or exchangeable) exist in soils. Usually the unavailable and slowly available forms are not considered essential to plant growth. The readily available portion is the one usually extracted in soil testing and gives a grower a sense of how much K is needed for corn production. Usually, less than 150 ppm K in your soil test indicates you have low levels and anything above 250-800 ppm is high to excessive. Depending on wet or dry weather and type of soil, your corn plants can exhibit deficiencies even when your soil tests indicate medium levels of availability.

When is it too late to tell if potassium (K) nutrition was a problem? K deficiency symptoms, when they exist, are usually best observed early in the season. During vegetative growth stages, K-deficient corn may show



The leaf on the top is from a check plot where no K was applied. The lower leaf is from a plot where K was considered non-limiting.  
Picture By H. Gelderman, Kansas State University

yellow or brown leaf margins. But, such symptoms may be difficult to detect at harvest. However as we approach the end of the season, it will be a



Potassium deficiency symptoms in corn. Normal corn leaf on the left, followed by most severe symptoms to least severe symptoms as you progress right.  
Picture by George Rehm and Michael Schmitt, University of Minnesota

good idea to learn what signs and symptoms your plants show to start planning for next year. At the end of the season, corn still can provide some visual clues about K nutrition. Ears may be low to the ground, stalks may be broken or lodged, and ears may be smaller and lighter, with unfilled tips. The following is a list of things to look for at the end of the season for K deficiency:

## Ears

- Insertion of ears at lower nodes
- Shorter ear length and narrower ear diameter
- Reduced grain weight
- Incomplete grain filling
- Premature black layer formation in seeds

## Stalks

- Accelerated leaf senescence
- Shortened internode length
- Narrowed stalk diameter
- Thinner stalk rinds
- Weaker stalks
- Increased incidence of stalk breakage and lodging
- Increased susceptibility to stalk rot

If you see any of these signs, it may be time to re-evaluate your potassium fertility program. This assessment is best made by taking a soil test and conferring with a knowledgeable consultant, adviser, or agent. You may plan to take a few plant tissue samples from this season or the next crop to monitor potassium nutritional status during the season. *✍*

# Local Growers Harness Sun to Produce Row Crops, Meet Sustainability Goals.

By: Stephanie Page, Energy Specialist, Oregon Department of Agriculture

**J**eff Falen and Eleanor O'Brien named their business Persephone Farm, after the Greek goddess of the seasons, but they could also have easily named the farm after Helios, the Greek god of the sun. By installing solar photovoltaic panels on their property, Falen and O'Brien have harnessed the power of the sun to offset part of their farm's electricity use with clean, renewable energy.



Solar Panels at Persephone Farm.  
Photo by Stephanie Page

Falen and O'Brien produce row crops on 13 acres of their 55-acre property in Lebanon and sell them at several farmers' markets in the Willamette Valley. In addition to a greenhouse and row crops, ground-mounted solar panels now dot a section of the farm landscape.

Jeff Falen explains that the farm's main goal in installing the system was sustainability. "Our goal is to be one hundred percent sustainable. We're not there yet, but that's what we're striving for," he explains.

Falen and O'Brien installed the first part of the system in 2004. It was a 6-kilowatt system that would offset about one-third of the farm's electricity use. Along with the solar panels, system components included inverters to convert direct current into alternating current, and an automatic shutoff system that would prevent the system from feeding electricity into the power grid when the power was down, to prevent injury to utility technicians working on the power lines. The system also includes a meter that measures

the farm's electricity use and electricity production. When the solar panels produce more electricity than the farm is converting, the meter spins "backwards."

"We now have a digital meter that displays our net electricity use," explains Falen, "but when we first

installed the system, we had an old-fashioned meter where the numbers would turn over. We got a kick out of watching the numbers on the meter actually spin backwards."

Persephone Farm's solar electric system is net-metered. Falen explains, "At the end of the year, Pacific Power subtracts our energy production from our energy consumption. We are only billed for the net amount of electricity we consume." Falen reports that the farm's utility provider worked cooperatively with them to install the system and implement the net metering process. "Pacific Power could have made it difficult for us to complete this project," he explains, "but they have been nothing but supportive."

In 2006, Falen and O'Brien added another 6 kilowatts of capacity to their system. Their solar photovoltaic panels are now offsetting about 2/3 of the farm's electricity use.

The farm had enough tax liability to use both state and federal tax credits for renewable energy projects, and they also received cash incentives from the Energy Trust of Oregon. Falen reports that Oregon's renewable energy tax credits have increased from 35%



to 50% since the second phase of Persephone Farm's solar project.

Falen points out that electricity is not the only source of energy used on the farm. "We've converted a small cultivating tractor from gas to electric, so the solar panels offset the electricity used to charge the tractor. We currently use a propane heater in our greenhouse, but eventually we'd like to convert to an electric heat pump and increase our solar electric capacity to offset that use as well," he says. *B*



Solar powered tractor at Persephone Farm.  
Photo by Stephanie Page

### FOR MORE INFORMATION

Oregon's Business Energy Tax Credit is 50% for renewable energy projects and 35% for energy efficiency projects. Applications are available at [www.oregon.gov/energy](http://www.oregon.gov/energy).

Energy Trust of Oregon offers incentives for a variety of renewable energy and energy efficiency projects. To be eligible, renewable energy projects must be installed in Oregon in the service territories of Pacific Power, Portland General Electric, NW Natural, Cascade Natural, or Avista Natural Gas. More information is available at <http://www.energytrust.org> or by calling toll-free 1-866-368-7878.

More information about federal tax incentives for renewable energy and energy efficiency projects is available at <http://www.dsireusa.org>, the Database of State Incentives for Renewables & Efficiency.

The Oregon Department of Agriculture maintains a Web site (<http://www.oregon.gov/ODA/energy.shtml>) about energy and agriculture, including types of renewable energy and energy efficiency projects, and incentives for energy projects. The Oregon Department of Energy also has information about types of renewable energy, including solar, at <http://oregon.gov/ENERGY/RENEW/index>.

## Persephone Farm Biological Control Farm Walk



### Farmscaping for Beneficial Insects on Your Farm

Persephone Farm, Lebanon, OR

Tuesday July 22

2:00 – 5:00 pm

Veggie Potluck after Walk

*If you are interested in beneficial insects, native pollinators, and habitat then this walk is for you!*

Afternoon farm walk for farmers on an established, diverse, certified organic vegetable farm.

- ★ Come share an afternoon with the expert farmers of Persephone,
- ★ learn about making beneficial habitat come to life on the farm
- ★ beetle banks, insectary plants, field margins
- ★ insect biology, ID and how to keep beneficials where you need them
- ★ join us for a veggie potluck
- ★ Call 541-737-6272 to register

This is another **BYOB** (bring your own bug) event sponsored by OSU's IPPC and Farmscaping for Beneficials Program.

# Tube Feeding Neonatal Small Ruminants

By: Dr. Susan Kerr, WSU-Klickitat County Extension Director

**I**t is essential that sheep and goat producers learn how to tube feed young animals. This simple procedure can often save a young animal's life, thereby increasing lambing and kidding crop rates and enhancing profitability. With a brief amount of instruction and a little practice, even children can perform this crucial task quickly, safely and effectively.

## Indications

When is tube feeding necessary? If an animal is too weak or otherwise unable to nurse, it needs to be tube fed. Other situations include maternal factors (lack of milk production, lack of mothering, mastitis, death) and management decisions to control various diseases (C.A.E., O.P.P., Johne's Disease, etc.). If the lamb or kid will drink from a bottle, this is always preferable to tube feeding.

## Importance of Colostrum

Colostrum is the first milk of a mother's lactation period. It is produced by the udder in the last weeks of pregnancy and lasts for a few days after delivery. It is darker and thicker than milk. It contains high levels of fat, protein, vitamins and special proteins called antibodies. These antibodies are produced by the dam's immune system to protect her against various diseases such as tetanus, enterotoxemia, E. coli and other diseases she was vaccinated against or experienced naturally in her life. Giving dams a booster vaccination two to three weeks before kidding or lambing helps ensure high levels of antibodies in colostrum.

Newborn animals must ingest colostrum within a few hours of birth. A newborn's intestinal tract is not very selective in the first hours of life; antibodies can be absorbed whole, which is essential for their function. After 12 hours of age, antibodies and other proteins are digested into amino acids and then absorbed; they can be used as a source of nutrition but no longer have any disease-fighting ability. The 12-hour time limit should be considered an absolute maximum—producers should strive to ensure adequate colostrum

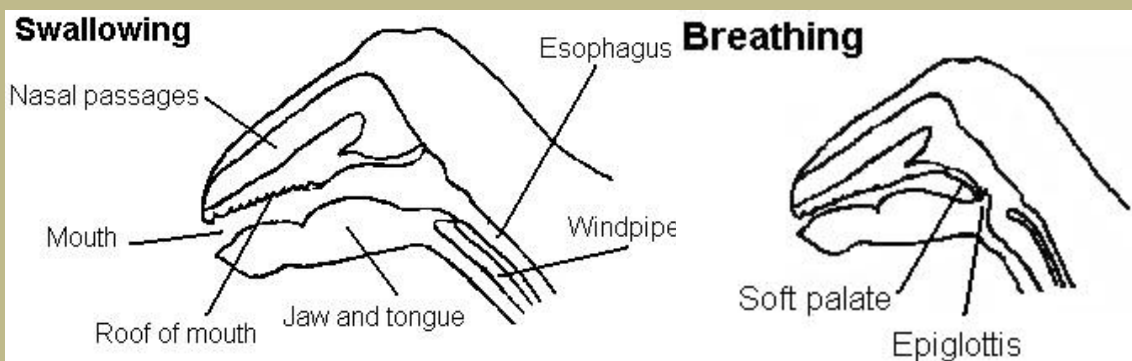
intake as soon as possible after birth.

Sources of colostrum in decreasing preference include the neonate's own dam, another dam of the same species in the herd, frozen colostrum from the same herd, fresh or frozen colostrum from a neighbor's dam of the same species, fresh or frozen colostrum from another species and commercial colostrum supplements. Commercial preparations should be considered supplements for poor quality or quantity of colostrum, not as colostrum substitutes. Each year, producers should harvest extra colostrum from high-producing animals and freeze it in case of emergency; update frozen colostrum reserves every year. Freezing colostrum in two-ounce portions simplifies future use and reduces waste.

Laboratory tests can confirm the quality of a sample of colostrum by measuring its antibody concentration. Blood tests in neonates over 24 hours old can confirm whether or not they have absorbed sufficient levels of antibodies. The lack of a protective level of circulating antibodies is called failure of passive transfer (FPT). FPT makes a young animal very susceptible to disease; many animals with FPT die of scours or pneumonia within two weeks of birth. After the first 12 to 24 hours of life, the gut is "closed" and can no longer absorb intact antibodies, so the only treatment for FPT is a costly intravenous transfusion of plasma antibodies.

## Anatomy

The diagrams below depict a simplified cross section of an animal's head. The "Swallowing" diagram shows the structures of the throat area during swallowing and the "Breathing" diagram shows the same structures during breathing. During swallowing, food and liquids are funneled down the esophagus instead of into the airway by the automatic function of protective flaps of tissue.





## Steps to Tube Feeding

1. Determine that tube feeding is necessary. If a newborn lamb or kid has not nursed within 12 hours of birth, it should be tube fed. If an animal is nursing or can take a bottle, there is no need to tube feed.

2. If the animal is hypothermic (cold), warm it before administering colostrum. Neonates must be warmed before colostrum can be absorbed properly. Stick your finger in the animals' mouth—if it seems cool, the animal needs to be warmed. Take it indoors, fashion a wool sweater for it, put it under a safe heat lamp, place it near a wood stove or do whatever it takes to warm it until the mouth feels warm. A moribund animal may need to be immersed in warm water for rapid warming. Dry all neonates thoroughly before putting them outdoors.

3. Warm the fluid to be administered to about 104°F. There is no need to feed colostrum if the animal is older than 24 hours old—milk will do. Electrolytes should be administered if the animal is weak due to dehydration from diarrhea. Frozen colostrum should be thawed in a warm water bath, not a microwave; microwaving will destroy the beneficial and protective antibodies in the colostrum.

4. Assemble sanitized equipment, including a feeding tube and a 60-cc dose syringe. Tube feeding kits are available through livestock catalogs and farm supply stores. An open ended, 0.4 meter-long piece of soft, flexible polyethylene tubing, six millimeters in diameter, with a smooth end is a safe and effective stomach tube.



5. Place the tube alongside the neonate's body, with the mouth of the tube at the animal's mouth



and the end at its last rib, where the stomach is located. Note how far the tube will have to be inserted to reach the last rib.

6. Sit in a chair and restrain the animal by facing it away from you, gently holding it by its shoulders between your knees; the animal's body will dangle down between your legs. If an assistant is available, she should hold the animal by the shoulders and let its body dangle. Never tube feed an animal on its side or it may inhale the fluid you are administering.



7. Hold the animal so its head is in a normal position. Dip the tip of the tube in clean water and slowly insert the tube in the animal's mouth. There is no need to use pressure or force, just gently advance the tube toward the back of the animal's mouth. The animal should swallow the tube readily and you can see the swallowing motion if you watch carefully. **THE GOAL IS TO INSERT THE TUBE INTO THE ESOPHAGUS, NOT THE TRACHEA.** If the tube enters the trachea (windpipe), the animal should cough, gag and react violently, but a moribund animal may not react. An animal that has swallowed the tube can still bleat and cry; an animal that has inhaled the tube can not make these noises.

8. Check correct placement of the tube by several methods:

- Seeing the animal swallow as the tube is introduced and advanced
- Watching the tip of the tube advance in the esophagus on left side of the animal's neck
- Being able to insert tube to 100% of previously-noted length (a tube inserted into the trachea cannot be advanced this far)
- Feeling the tube in the esophagus on the left side of the animal's neck (the tube cannot be felt if it is in the trachea)
- No gagging or coughing

- **BEST METHOD:**

Attach a 60-cc dose syringe to the mouth of the feeding tube after it has been fully inserted into the animal; pull the plunger back. As shown in the photo, if the tube is placed properly, it should be very difficult to get the plunger to move past a few cc marks. This is because the negative pressure created when the plunger is pulled back will cause the thin muscular walls of the esophagus to be pulled against the hole in the end of the tube, blocking any air flow in or out of the holes in the tube; also, there normally isn't much air in the esophagus or stomach. If the tube is improperly placed and is in the trachea, it will be very easy to pull the syringe's plunger back. This is because the trachea has sturdy cartilage rings and can withstand the negative pressure created when the plunger is pulled back; the tip of the feeding tube is not obstructed and the air naturally present in the trachea and lungs is pulled back into the syringe very easily. *If you understand, master and perform this check every time you pass a feeding tube, you will never accidentally drown an animal while tube feeding.*



10. As shown in the photo, after the required amount of fluid has been administered, crimp off or plug the end of the tube as it is withdrawn from the animal; this prevents the animal from inhaling any fluid as the tube is withdrawn across the pharynx.



### How Much and How Often?

An animal should receive at least 10% of its body weight in colostrum in the first 24 hours of life. For example, a 10-pound lamb should receive at least one pound (16 ounces) of colostrum during its first day. Frequent small meals of two or three ounces are better than one or two huge meals. If all goes well, the animal will only need to be tubed once, then can be returned to its dam to nurse free choice or bottle fed. Animals that do not respond well or do not get stronger within a few hours should have a thorough physical examination.

9. Remove the plunger of the dose syringe and firmly attach the empty syringe to the mouth of the feeding tube. Pour warmed fluid in. Let fluid trickle in via gravity. Do not force it in or the pressure may rupture the stomach. Thick colostrum may not flow in well and may need to be diluted with thinner colostrum to flow freely. Try to keep air from entering the tube and stomach.



### Biosecurity and Sanitation Concerns

Johne's Disease, Brucellosis, mycoplasmosis, O.P.P., C.A.E. and other diseases can spread to your herd through infected colostrum. If you are using colostrum from another herd, be sure the source is disease-free or heat-treat the colostrum. It is a challenge to pasteurize colostrum without destroying its beneficial antibodies. The key is to keep the colostrum between 132.8°F and 134.6°F for 60 minutes. To disinfect tube feeding equipment, rinse well immediately after use. Wash thoroughly with warm, soapy water to remove all debris. Dilute one ounce of bleach with 21 ounces of water and submerge all equipment in this solution for two minutes. Remove, rinse well, air dry and store in a clean place. Wash your hands well before and after tube feeding. *℞*



# The Satisfying Sound of Clean Water

By: Ellen Hammond, Water Quality Specialist, Oregon Department of Agriculture

A hhhh, it's summer and irrigation water is flowing through your property. It looks and sounds peaceful. It helps keep your pasture green and waters your horses. But is it clean? Is it safe for kids to play in? Is it healthy for your sheep to drink? Is it carrying manure that nurtures the algae in your pond? Are your cows trampling down the banks? Is the water carrying dirt that clogs your neighbor's irrigation pump? Is the condition of the water or ditch causing problems for your irrigation district? Are you inadvertently contributing pollutants to a nearby stream?

## WHERE'S THE WATER GOING?

Water can have different effects depending on where it goes. Does the irrigation water:

- stay on your property?
- continue to a **neighbor's** property?
- flow to a **stream**?

## WHAT'S IN IT?

What's in the water can have unintended consequences for people and fish.

### Excess **soil**

- clogs irrigation equipment
- fills ponds and ditches
- silts in fish habitat

### Excess **manure or fertilizer**

- creates algae in ponds and streams
- contaminates groundwater



Excess algae growth due to nutrients in water  
Photo provided by Ellen Hammond

### Excess **bacteria**

- are unsafe for human contact
- contaminate groundwater

## WHY DOES IT MATTER?

Being a good steward is very important, to you and to your neighbors. Losing topsoil reduces productivity, and lost productivity costs **money**. Also, who wants to harm people with bacteria or nitrates? Who wants livestock to drink water containing bacteria or algae? Who wants to degrade fish habitat with silt or excess algae?

Keeping water from harming humans or fish **is the law**. Oregon State Law states no person shall:

- pollute any water, including wells, ditches, and streams
- place wastes such as soil and manure where they are likely to enter water
- violate water quality standards

*Oregon requires landowners to prevent and control water pollution from their agricultural activities. This law is enforced by the Oregon Department of Agriculture.*

## MANAGEMENT TIPS

Making management changes is easy and benefits both your health and the environment.

1. Keep soil on the land and nutrients on site.
  - o Prevent erosion in adjacent fields by maintaining high quality pastures
  - o Don't over-irrigate



Unrestricted livestock access to surface water creates poor bank structure.  
Photo provided by Ellen Hammond

- o Maintain a grassy buffer along ditches and canals to filter potential pollutants out of runoff from fields

2. Keep **manure** out of ditches and canals:

- o Provide alternate drinking water source
- o Clean manure out of ditches before water is delivered
- o Pile manure away from canals and ditches
- o Fence livestock out of canals and ditches
- o Pipe ditches running through pastures

3. **Reduce amount** of runoff: schedule water applications and use appropriate equipment for crop needs.

4. **Reduce soil** in irrigation water:

- o Maintain vegetation on ditch banks to stabilize the banks and filter soil and fertilizer out of irrigation runoff
- o Fence livestock out of canals and ditches.
- o Pipe or line ditches.



Ditch is fenced off to protect water quality.

Photo provided by Ellen Hammond

5. **Reuse irrigation water:** collect in a pond, pump out, and use for irrigation.

6. **Apply fertilizer** based on crop needs, soil tests, irrigation schedule, and weather.

**WHERE CAN I GET HELP?**

Landowners can contact the following for help with evaluating their effect on canal or ditch water and making necessary changes:

- Soil & Water Conservation District - <http://www.oacd.org/>
- OSU Extension Service - <http://extension.oregonstate.edu/>
- Oregon Department of Agriculture- WQ Program (503) 986-4700
- Your irrigation district

Originally appeared in "From The Ground Up", Bend, Oregon. 

## Living on the Land

### Lane County



Living on the Land is a workshop series tailored for small acreage landowners and there are four classes and one field tour that make up the series. Classes are taught

by agency and industry professionals and local landowners. Living on the Land is sponsored by OSU Extension Service Small Farms Program, East Lane Soil and Water Conservation District and Coast Fork Willamette Watershed Council.

The classes will be held at the Creswell Community Center on Thursday evenings from 6 to 9 PM, beginning July 24 and concluding on August 14<sup>th</sup>. Topics include Managing Soil to keep it Productive, Pasture and Grazing Management, Understanding Water Resources, Wells and Septic Systems and Weed Management. The Saturday field tour will be from 9:00 a.m. to 2:00 p.m. on August 2, 2008 and will visit landowners in the Coast Fork Willamette River Watershed

The registration fee for the entire series is \$20.00 per person or \$30 per couple from the same farm. Fee covers class materials, evening session snacks, and field tour lunch. Registration is required prior to the event, limited space available.

Registration materials are available online at <http://smallfarms.oregonstate.edu/>. For more information contact Chrissy Lucas at the OSU Extension Small Farms Program, 541-766-3556 or Chrissy.Lucas@oregonstate.edu



# Calendar

## June

**20-22 - The Black Sheep Gathering**  
Celebrating natural colored animals and their fiber. Lane County Fairgrounds. Eugene. 541-484-1011 or [www.blacksheepgathering.org](http://www.blacksheepgathering.org)

**28-Introduction to Biodynamic Agriculture**  
This class will introduce participants to the nuts and bolts of biodynamic farming. OSU Extension Auditorium, 215 Ringuette St., Grants Pass, OR. For more information contact Maud Powell at 541-476-6613 or [Maud.Powell@oregonstate.edu](mailto:Maud.Powell@oregonstate.edu) \$25

**22-Farmscaping for Beneficials Farm Walk at Persephone Farm**  
Persephone Farm in Lebanon is bordered by the South Santiam River & Cascade foothills. 2:00PM to 5:00PM. Lebanon, OR. For more information contact Gwendolyn Ellen, 541-737-6272 **FREE**

## July

**24-Living on the Land**  
There are 4 workshops in the series and 1 field tour for small acreage landowners. 6:00 PM to 9:00 PM. Creswell Community Center. 99 South 1st St, Creswell, OR. Information - 541-766-3556 or [Chrissy.Lucas@oregonstate.edu](mailto:Chrissy.Lucas@oregonstate.edu). \$30


**25-Fruit Trees in Central Oregon**  
Learn to how to be successful with growing fruit in Central Oregon. 6:00 PM to 9:00 PM. Deschutes County Fairgrounds & Expo Center, Redmond, OR. For more information contact Dana Martin at (541) 548-6088 ext. 7957

**29-Farmscaping for Beneficials Farm Walk at Columbia Blossom Orchard (CBO)**  
The walk will feature CBO, a 32 acre diverse orchard of certified organic stone fruits for over 13 years. 2:00PM to 5:00PM. Mosier, OR. For more information contact Gwendolyn Ellen, 541-737-6272 **FREE**

## August

**2-Small-Scale Pastured Poultry Production**  
For small farm entrepreneurs or hobby farmers interested in adding laying hens, broiler chickens or turkeys to their small farm operation. Fair Oaks Grange, Sutherlin, OR. For more information contact Melissa Matthewson at 541-776-7371 or [melissa.matthewson@oregonstate.edu](mailto:melissa.matthewson@oregonstate.edu) \$25

**Please visit our website**  
<http://smallfarms.oregonstate.edu/events> for more Summer events.



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