Sustaining the Pacific Northwest

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Controlling Leafy Spurge by Goat Grazing

Craig Madsen, Healing Hooves, LLC, Edwall, WA

Introduction

Leafy spurge (Euphorbia esula) is a long-lived, deep rooted perennial which grows in a wide variety of environments from dry to sub-humid climates, and on diverse terrain ranging from flood plains to ridges and mountain slopes. Leafy spurge spreads both vegetatively and through seed dispersal, is highly competitive, and is difficult to manage. Leafy spurge is now widespread in Montana, Wyoming, and North Dakota, and is currently expanding throughout eastern Washington range lands. The plant's milky latex, toxic to cattle and horses, causes lesions around the animal's eyes and mouth. Cattle will not graze in areas with more than 10-20% leafy spurge cover and thus the weed has the potential to reduce cattle grazing areas to zero (Sheley and Petroff, 1999).

In other states, Aphthona flea beetles have been successfully used as biological control agents for leafy spurge. However, these insects prove less effective in eastern Washington due to their lower survival rates. The latex properties of leafy spurge do not affect goats and sheep, instead providing high quality forage for the animals. Grazing with goats and/or sheep can significantly reduce the population of leafy spurge over a 3-8 year time frame. While no one management tool will stop the spread of leafy spurge, the tool of targeted goat grazing, combined with flea beetles, may be a long-term weed management strategy for long-lived perennial plants in eastern Washington, such as leafy spurge.

In 2006, Craig and Sue Lani Madsen of Healing Hooves, LLC, applied for and received a Western SARE Farmer/Rancher grant to further examine the biological control potential of goat grazing on leafy spurge. The grant period was May 2007 to November 2009, and the total funding amount was $10,000. Tom Platt, Washington State University Area Extension Educator based in Lincoln County, served as the Technical Advisor for the grant project. Cooperators on the grant included Kevin Hupp, Lincoln County Noxious Weed Coordinator, David Lundgren, Lincoln County Conservation District Manager, and Dennis Bly, Bly Ranches, who agreed to allow the project to be conducted on his ranch. The objectives of the project were to:

1) Change landowner perceptions of leafy spurge control from a goal of eradication to a focus on sustainable integrated pest management;

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Center for Sustaining Agriculture & Natural Resources

WASHINGTON STATE UNIVERSITY EXTENSION

WSU Small Farms Team

Sustaining the Pacific Northwest Food, Farm, & Natural Resource Systems

This quarterly newsletter provides information for people working towards community-based sustainable food, farm, and natural resource systems using interdisciplinary oriented research and practitioner knowledge.

WSU Small Farms Team
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2) Demonstrate using goats as a tool to manage leafy spurge; and

3) Demonstrate the opportunity for raising goats to diversify existing livestock operations and create new agriculture businesses.

Project Overview

The main purpose of this project was to demonstrate how to use goats and insects in an integrated approach to manage leafy spurge, which is located in two primary areas within Lincoln County: an infestation covering approximately 500 acres of rangeland on several adjacent ranches, and a second location on small landowners' 10-40 acre parcels. This study was conducted on one of the large ranches. To monitor the impacts of grazing on leafy spurge, the project installed two Land EKG transects on May 15, 2007 within the area to be grazed by goats. A Land EKG transect consists of a 200 foot transect with four 9.6 square foot plots evenly spaced along the transect. Data is collected within each plot. Transect 1 was located on a shallow upland range area, while Transect 2 covered a range of soil environments: plot 1 was located in a loamy bottom, plots 2 and 4 were in a shallow range area, and plot 3 was in a loamy, moderately deep soil area. Data and photos were collected in each plot in both transects prior to project initiation and periodically over the three year project period.

Over 100,000 Apthona Lacetosa (flea beetles) were released at the project site on July 16, 2007. A herd of approximately 260 goats grazed the project site twice each year for three years, once in May and a second time in October. Goat grazing occurred May 16-22 and October 13-17, 2007; May 21-27 and October 7-10, 2009; and May 18-24 and October 9-12, 2009. The May and October grazing periods avoided the time period when the Aphthona flea beetles were actively eating the leafy spurge. October grazing on leafy spurge regrowth was designed to provide significant stress to the plants. Data collection included number of stems of leafy spurge and the average height of the plants in each plot.

Results and Discussion

The response of leafy spurge to goat grazing varied between the two transects (Table 1). In transect 1, a drier upland site with shallow soils, goat grazing increased the number of leafy spurge stems at the May sample period in two of the three plots with leafy spurge while the other plot essentially showed no change in stem numbers. In Transect 2, with deeper and moister soils the number of leafy spurge stems declined in all four plots (Figures 1 and 2). No noticeable change occurred in leafy spurge due to flea beetles and we will continue monitoring the site to evaluate whether or not the flea beetle becomes established in the area.

When the second grazing occurred in transect 1 in October, the majority of the leafy spurge plants had turned red and were no longer actively growing and the second goat treatment was too late to provide grazing pressure on the leafy spurge. To control leafy

Table 1: Leafy Spurge Stem Counts Prior to (May 2007) and Following Two Goat Treatments (2008 and 2009)

Transect	Plot #	2007	2008		2009	
		May	May	Oct	May	Oct
1	1	12	23	8	29	12
	2	49	60	35	58	42
	3	0	0	0	0	0
	4	16	13	4	12	18
2	1	160	77	3	44	43
	2	15	6	8	5	5
	3	72	14	35	36	33
	4	16	10	7	2	3

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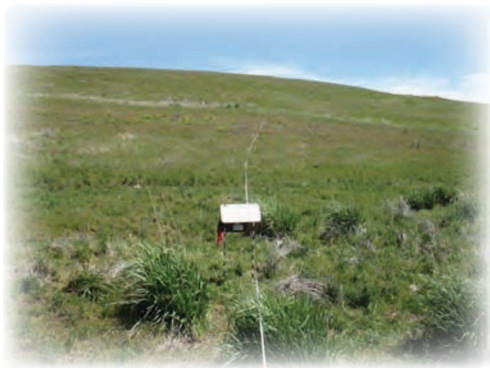
Figure 1

Transect 2 May 2007, prior to goat grazing.



Transect 2 May 2009 after two years of goat grazing.

Figure 2

Plot 1 in transect 2 (May 2007) prior to goat grazing.

Plot 1 in transect 2 (May 2009) after two years of goat grazing

spurge on drier sites, the second goat grazing should be scheduled earlier when the leafy spurge is still actively growing. In transect 2, the greater soil moisture resulted in a longer leafy spurge growing period and more regrowth in the fall. When the goats grazed transect 2 in October, leafy spurge plants were actively growing and the second grazing removed all the regrowth and new stems. By grazing plants during an active fall regrowth period, the plants were not able to replenish the root systems and thus had less energy for regrowth the following year.

Rhizomatous plants normally send out new shoots after being grazed or mowed. Therefore, the increase in leafy spruge stems as seen in transect 1, Table 1 is to be expected. To effectively reduce undesirable rhizomatous plants through goat grazing, time of grazing must be planned to stress the plant and prevent the plant from replenishing its root system. Multiple, well-timed treatments per year are needed to accomplish this objective as well as to prevent seed production.

This three year study shows the potential impact of using goats for managing leafy spurge. Several research studies have shown grazing by sheep and/or goats has resulted in a 80-90% reduction in leafy spurge in 5 years. A longer trial period is needed to confirm this potential.

Project Outreach

The project conducted three tours at the site so participants could see the goats in action and discuss an integrated approach to leafy spurge management. Four participants attended May 21, 2008 , nine on October 8, 2008, and 13 on May 19, 2009. Attendees included five large private landowners, with the remainder coming from county, state, and federal agencies. In addition to tours, the project presented a poster at the Regional SARE conference in Spokane, Washington in February 2009, and at the Washington Weed Conference in Yakima, Washington, in November 2009.

Conclusions

The three-year time period of this project proved too short to assess any impact from the flea beetle release. The impact of the goat grazing varied with soil depth. Soil depth influenced soil moisture and thus the timing and amount of leafy spurge regrowth. The different response of leafy spurge to grazing on the two transect sites probably resulted from the stage of plant growth at the time of the second grazing. To be most effective, the first grazing needs to be timed prior to seed set and subsequent grazing periods timed when the leafy spurge is actively growing. Goat and/or sheep grazing is a useful part of an integrated longterm strategy for controlling leafy spurge (Figure 3) and requires a minimum of 5 to 8 years for maximum effectiveness. If the flea beetles become established, they may also become the long-term tool for the management of leafy spurge.

Figure 3

May 2007 , goats beginning grazing treatment area.

May 2007 after goats finished first grazing treatment.

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Western SARE Farmer/Rancher Grants: 2010 Request of Applications

Western SARE (Sustainable Agriculture Research & Education), a USDA competitive grant program, has issued a request for applications for 2010 Farmer/Rancher grants. Farmer/Rancher Research and Education grants provide up to $15,000 to single producers and up to $30,000 for three or more producers. Western SARE grants fund projects that recognize whole-farm systems approaches, are multidisciplinary, produce measurable results that are beneficial to other producers, and examine the implications of adopting sustainable agriculture practices.

Producers typically use grants to conduct on-site experiments that improve their operation and the surrounding environment. Successful projects must include both research and education components, and an outreach plan for communicating the project findings is required.

Applications will be accepted through early December 2010. For more detailed information about the application guidelines, please visit the Western SARE grant website.

Some ranchers are unaware that leafy spurge limits grazing access by cattle, while other ranchers may be paying as much as $10,000 per year for herbicide programs to control leafy spurge. To effectively use goats to control leafy spurge, several issues must be overcome. First, ranchers must become aware of the effectiveness of goats to control leafy spurge. Second, goats must be effectively contained on range land with portable electric netting, which also eliminates the third issue, which is goat predation. Portable electric netting has plastic stays, wire and posts all in one unit, and comes in 160 foot rolls that cost around $0.90/foot. The electric netting is fairly easy to set up and take down and is relatively durable, lasting over five years with regular use. The fourth issue is recognizing the economic value of goats, which bring around $1 per pound live weight for meat in ethnic markets. Thus, there is an opportunity to convert leafy spurge, which is good quality goat forage, into a meat product that can be sold to cover the cost of management and potentially make a small profit while reducing herbicide costs.

A primary concern for ranchers is the large number of goats needed to create an impact over a significant area. For example, controlling leafy spurge requires three to four goats per acre for a 4 month period. An area of 500 acres would require 1500 – 2000 head of goats. This large number of animals requires a significant commitment by a rancher who must either find a goat producer who will bring in the animals, or he must acquire and manage the animals himself. In contrast, a small landowner (10-40 acres) would only need 30-160 goats and the corresponding equipment, with a significantly smaller investment and risk.

Land use payments also impact a landowner's willingness to use goats as a weed management tool. A large rancher typically gets paid when someone grazes their property whereas a small landowner typically pays for services. Therefore, in theory, small landowners should be more willing to pay for the use of goats for weed management. Yet, no small landowners attended any of the project tours. In hindsight, the project should have included a small landowner demonstration site and should have worked more closely with small landowners to determine their willingness to accept animals as a weed management option for leafy spurge. WSU Extension could offer a series of hands-on workshops for small landowners to learn how to manage goats for weed control, how to properly set up electric netting, and to explain the importance of monitoring grazing to attain the desired results. A common stock of electric netting, available on a rental basis, could provide an additional incentive for small landowners to try targeted goat grazing as a tool to manage leafy spurge. New tools require early adopters who are willing to try a new approach to an old problem. This project was a successful first step in demonstrating the possibilities of the tool of targeted goat grazing as a sustainable part of integrated pest management.

Silver Scurf Caused by Helminthosporium solani Can Be A Polycyclic Disease on Below Ground Potato Tubers

D.A. Inglis & B. Gundersen, WSU Mount Vernon NWREC, P. Hamm,OSU, HAREC, and D. McMoran, WSU Skagit County Extension

Introduction

Specialty potato growers in western Washington seek effective measures for controlling silver scurf on smooth-skinned red, yellow, and white potatoes. Quality is an important issue for fresh market potato sales and the lesions produced by H. solani reduce salability. In other potato production regions, potato seed treatments were efficacious in reducing silver scurf infections on the progeny tubers (new tubers that form from the seed tubers). However, in western Washington with its mild marine climate, seed treatments have not been as effective. In order to better understand the silver scurf disease cycle, this experiment was designed to explore how the disease spreads from infected seed tubers in the field production environment.

Methods

A small field trial was planted 28 May 2008 near Mount Vernon with a potato seed lot of cultivar 'Yukon

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Gold,' having an extremely high incidence (100%) and severity (57% to 90%) of naturally-occurring silver scurf lesions caused by H. solani. Experimental design was a randomized complete block with four replications. Researchers maintained the trial plots for 10 weeks using cultural practices typical for growing fresh market potatoes under western Washington conditions. Seed and/or progeny tubers from three plants per plot were destructively sampled seven times during the growing season to document infection and sporulation by H. solani below ground.

After digging, all sampled tubers were placed in paper bags, immediately brought to the laboratory, directly observed (without washing) for signs of H. solani using a dissecting microscope at 40x, and then photographed within a few hours of digging the sample. Researchers then documented conidiophore (hypha that produce conidia, which are asexually fungal spores) formation and spore multiplication on seed tubers, as well as the progressive movement of conidia onto developing stolons and roots, and then onto new progeny tubers. Tubers sampled on September 8, 2008, prior to harvest, were shipped overnight to WSU in Pullman for electron micrographs scanning. The identity of H. solani was confirmed via pure culture isolations in the laboratory and also by electron microscopy scanning.

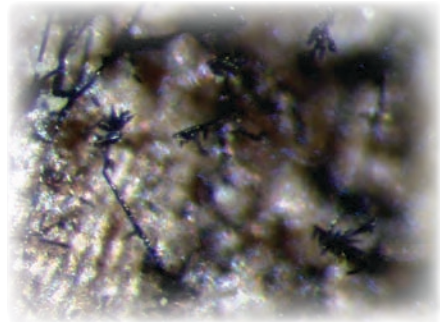

Figure 1: *H. solani sporulating below ground, on a seed potato of cultivar. 'Yukon Gold,' 47 days AFTER planting.*

Results and Discussion

Direct observations of buried, naturally-infected tubers indicated that H. solani can sporulate profusely on seed tubers below ground, even after the tubers become rotted, aged, dried or shriveled (Table 1). Further, the spores can spread onto newly developing potato tissues, such as roots, stolons, and progeny tubers, leading to silver scurf infections well before harvest (Figures 1-3). On the tubers, crevices and depressions near the stolon end, at eyes, and near sprouts appeared to be the most common locations for H. solani sporulation on buried tubers. Conidia were abundant on progeny tuber surfaces at the time tubers entered

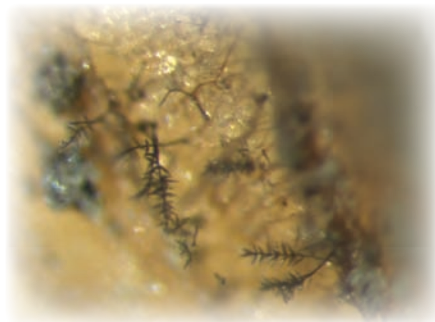

Figure 2: *H. solani spores forming below ground, on a progeny potato tuber of cultivar. 'Yukon Gold,' 103 days AFTER planting, and 14 days BEFORE harvest.*

Table 1: Silver Scurf on Buried Seed and Progeny Potato Tubers

Sample Time (DAP) b	Seed tubers				Progeny tubers					Microscopic observations
	Seed Piece Decay, %	H. solani rating c			No./ Plant	Wt.(g)/ Plant	H. solani rating c			
Jul 14 (47)	0	0/1	1/1	0/1	.	.	.	.	.	Hs sporulating on seed tubers, belowground—destructive sampling initiated
Jul 21 (54)	2	12/12	4/12	0/12	6.2	53.1	.	.	.	Hs sporulating on seed tubers especially in crevices and protected depressions
Jul 30 (63)	0	12/12	2/12	12/1	6.2	331.8	.	.	.	Conidiophores remain on seed tubers but no longer have numerous conidia; 'dehisced' conidia on eye/ sprouts/rootlets of developing tissues
Aug 12 (76)	16.7	10/12	2/12	5/12	5.5	439.3	.	.	.	Some conidiophores with conidia; dehisced conidia on stolons and progeny tubers, especially in protected depressions or protected areas like eyes
Aug 21 (85)	.	.	.	.	.	.	51/65	24/65	0/65	Hs actively sporulating on belowground tissues, including surfaces of progeny tubers
Sep 5 (100)	70.8	12/12	3/12	0/12	6.6	744.7	3/79	24/79	10/79	Hs still actively sporulating on seed tubers - especially progeny tubers in protected depressions of tuber surface; some Hs sprores dehisced and appear to be germinating on progeny tubers
30 Sep (125)	.	.	.	.	5.6	700.7	60/67	0/67	60/67	Conidiophores on progeny tubers mostly with dehisced conidia; these appear on tuber surfaces and on stolons

[a] The seed tubers were naturally infected with high levels of Hs prior to planting on 28 May.
[b] Each sample was composed of 4 replications of 3 plants. DAP = days after planting.
[c] H. solani sporulation on tuber: 0 = none; 1 = conidiophores but no conidia; 2 = conidiophores + conidia; 3 = dehisced conidia on surface.

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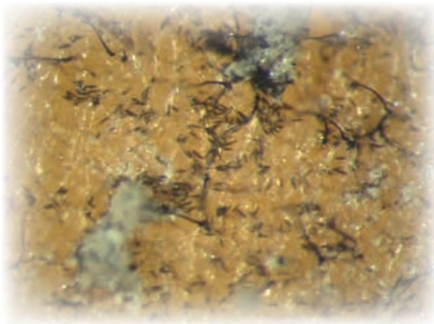

Figure 3: *H. solani spores on the surface of a progeny potato tuber of cultivar. 'Yukon Gold,' 8 days AFTER harvest and 1 day BEFORE storage. Note some spores have germinated on the tuber surface.*

storage. Of the seed and progeny tubers sampled on September 8, 43% and 16%, respectively, were positive for H. solani conidiophores and/or conidia. Isolates of H. solani were also collected from buried tubers and their pathogenicity on potatos confirmed.

Conclusions

Buried seed tubers are a primary source of inoculum for H. solani in western Washington. Seed treatments are commonly used to control silver scurf on specialty potatoes, but to be effective in this region, seed treatments must have long term residual activity. We hypothesize that moisture from rain or irrigation water percolating through the soil facilitates reproduction and movement of H. solani conidia below ground. Since prolific infection and sporulation on progeny tubers can occur prior to storage, disease interventions during the growing season such as alternative seed treatments, fungicide drenches, irrigation management, and/or disease forecasting based on below ground environmental conditions need to be investigated in addition to storage management.

Acknowledgements

We thank Dr. Lindsey du Toit, WSU Mount Vernon NWREC Seed Pathology Program, and WSU's Franceschi Electron Microscopy Center for assistance with light and scanning electron micrographs.

Organic Fertigation Products

Carol Miles, , & Jonathan Roozen, WSU Mount Vernon NWREC, Department of Horticulture and Landscape Architecture, Washington State University

Introduction

Fertigation is the application of fertilizer with irrigation water. Fertigation enables farmers to apply nutrients to crops at particular stages of plant growth, thereby optimizing nutrient applications with crop productivity. Applying nutrients as they are needed allows growers to reduce loss of nutrients from the root zone, especially in high rainfall areas and for nutrients that leach readily, such as nitrogen. This practice also eliminates additional soil compaction from tractor use and consumes no extra energy. In addition, there is less dependence on weather for timing of fertilizer applications.

Organic Fertilizer Products

For fertilizer to be effectively delivered through irrigation water, the fertilizer must be soluble and particles must be small enough to avoid causing blockages in the irrigation system. Completely soluble liquid and powdered fertilizers may be used for fertigation. Table 1 includes a cost analysis of liquid fertigation products based on cost per unit of nitrogen. Fertilizer products in this analysis included those listed on the Washington State Department of Agriculture (WSDA) Brand Name Material List and the Organic Materials Review Institute (OMRI) product list in March 2010. According to their labels, all products included in Table 1 are suitable for fertigation application to vegetable crops.

Table 1 also includes a cost analysis for each fertilizer product based on the cost per unit of nitrogen on percent by weight basis. The cost analysis involved three steps. First, we determined the price of the product from commercial suppliers. Second, for products sold on a volume basis we contacted manufactures for volume weight information. And third, for each product we calculated the cost of nitrogen per pound using the value for nitrogen content stated on the label. To calculate the cost of each fertilizer product, the organic fertilizer calculator developed by Oregon State University was used. Costs per unit nitrogen for organic fertilizer products ranges from $4.60 to $136.50 per pound.

Issues for Liquid Organic Fertilizers

When selecting a fertilizer product for fertigation, there are other considerations to be made in addition to price per unit of nitrogen. The ease of application is important since some products dissolve easily in water and are rapidly injected into the irrigation system without causing problems, such as clogged filters and emitters. Table 1 only includes liquid fertilizers, which in general are easily applied for fertigation. This study did not include solid fertilizer products suitable for fertigation and it would be necessary to evaluate those products both for cost and ease of application.

In early 2009, the National Organic Program (NOP) became aware that two liquid organic fertilizer products on the market in the U.S. were not compliant with USDA NOP regulations. The two products were Marizyme and Agrolizer, both made by Port Organic, Ltd. This discovery sparked a thorough review of liquid organic fertilizers with nitrogen levels higher than 3%. Liquid fertilizers with nitrogen percentages greater than 3% must now have documentation provided by a third party inspection, proving that all nitrogen is accounted for organically. Third party reviewers must audit producers based on NOP regulations as a condition of being recognized by the NOP, as well as undergo an audit themselves. These more rigorous measures are intended to help certifiers make the best judgment possible when approving organic fertilizers and other inputs. If you are certified organic, be sure to

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check the organic product lists prior to purchasing or applying a fertilizer product as listings can change frequently. If you have any questions about the suitability of a product for certified organic production, contact your certifier.

Grower Research Support

This project was funded in part by organic growers. For information about organic research and Extension projects and to contribute, please contact Anne Schwartz at 360-708-7987.

Table 1: Cost Analysis of Liquid Organic Fertilizer Products (as of March 15, 2010) that can be Injected Through Drip Irrigation Systems

(listed in order from least expensive per unit $/lb N to most expensive)

Product	N-P-K	Product Cost	Product Unit	Lbs/Gal	Price/Lb	Cost per Lb N
Converted Organics 521	5-1-1	$2.25	Gal	9.8	$0.23	$4.60
Converted Organics GP	3-2-1	$1.45	Gal	9.7	$0.15	$5.00
Alaska Salmon Fish Fertilizer	4.8-3-0.5	$3.00	Gal	9.35	$0.32	$6.67
Converted Organics XK	2-2-4	$1.65	Gal	9.8	$0.17	$8.50
BWF Banducci Inc.	3-1-1	$2.50	Gal	9.6	$0.26	$8.67
BWF Banducci Inc. Secure Organics	4-1-1	$3.75	Gal	9.6	$0.39	$9.75
Phytamin Fish Plus	4.5-4-1	$5.00	Gal	10.0	$0.50	$11.11
BWF Banducci Inc. Organique Exquis	3.5-1-1	$3.75	Gal	9.6	$0.39	$11.14
Phytamin All Purpose	4-3-4	$4.50	Gal	10.0	$0.45	$11.25
Phytamin Fish Concentrate	4-3.5-0	$5.00	Gal	10.0	$0.50	$12.50
Phytamin Fish	3-2-0	$4.00	Gal	10.0	$0.40	$13.33
Converted Organics LC	1-1-1	$1.25	Gal	9.1	$0.14	$14.00
Converted Organics Pacific Choice	1-4-0	$1.25	Gal	8.8	$0.14	$14.00
Eco-Nutrients Eco-Hydro Fish	2-4-0.2	$3.50	Gal	9.0	$0.39	$19.50
Aqua Power 100 % Fish Emulsion	5-1-1	$11.98	Gal	9.7	$1.24	$24.80
Bio-Gro Inc. Plant-X WSP	3-0-0	$8.00	Gal	10.32	$0.78	$26.00
Drammatic ONE Plant Food	4-4-0.5	$16.50	Gal	9.6	$1.71	$42.75
Converted Organics NC	0.4-1-0	$1.65	Gal	9.1	$0.18	$45.00
ORGUNIQUE General Purpose Plant Food	3-2-5	$14.72	Gal	9.4	$1.57	$52.33
ORGUNIQUE Tomato & Vegetable Food	3-1-4	$14.72	Gal	9.4	$1.57	$52.33
ORGUNIQUE Lawn Food	3-1-5	$14.72	Gal	9.4	$1.57	$52.33
BioFert Orgunique BioFish	3-1-2	$25.93	Gal	10.02	$2.59	$86.33
Drammatic "L" Liquid Fish Plant Food	2-2-0.2	$20.00	Gal	9.6	$2.08	$104.00
Organic Gem	3-3-3	$27.95	Gal	8.5	$3.29	$109.67
Drammatic Garden Fertilizer	4-4-1	$50.00	Gal	9.6	$5.21	$130.25
Earth Juice Grow	2-1-1	$23.50	Gal	9.0	$2.61	$130.50
Neptune Harvest	2-4-1	$30.00	Gal	11.0	$2.73	$136.50

First National Survey of Organic Agriculture Production Released

David Granatstein & Elizabeth Kirby,
WSU Center for Sustaining Agriculture and Natural Resources

Want to know how many acres of organic potatoes were harvested in Idaho? Or the value of organic blueberries in Oregon? Or the number of farms growing organic almonds in Washington? The first ever detailed survey of organic farms in the U.S. can answer your questions. The National Agricultural Statistics Service collected data from organic farmers for the calendar year 2008. Results have just been released and are available on line.

The survey included both certified and exempt farms, totaling 14,540 farms for the nation. Washington had the third highest number of farms (887) among the states, and the second highest farmgate sales ($281 million, 9% of national sales) after California (36% of sales). Oregon had the 4th highest sales. Idaho had the greatest number of acres in the region but the lowest sales value (Table 1). The acreage values for Washington and Oregon were lower than those reported for the same production period by Kirby and Granatstein (2009), based on farm data reported to certifiers.

The value of the crops grown varied tremendously among the three Pacific Northwest (PNW) states, likely due to extensive production of high value fruit and vegetable crops. In Washington, each harvested cropland acre produced $3,784 in sales compared to $1,426/acre for Oregon and $358/acre for Idaho.

Vegetable production

Nationally, organic vegetable acres comprise about 8% of all organic cropland acres. Organic vegetable sales totaled $290 million in 2008 (22% of all organic sales), second only to livestock product sales. California is by far the leading vegetable producing state. Washington and Oregon ranked second and third (Table 2), while Idaho had the least organic vegetable acres and sales in the region.

Major organic vegetable crops in the region include sweet corn, green peas, snap beans, onions, potatoes, and carrots (Table 3). NASS survey data for harvested acres of vegetables were lower than the 19,000 acres derived from certifier data (including double crop) in Washington, and over 6,000 acres of organic vegetables in Oregon (Kirby and Granatstein, 2009). This difference was particularly large for green peas and sweet

Table 1: Organic Agriculture in the PNW & California, 2008

	WA	OR	ID	Total PNW	CA
No. Farms*	887 (689C)	657 (424C)	254	1,798	2,714
All Acres	82,216	105,605 (115,502[a])	148,425	336,246	470,903
Harvest Crop Acres	60,772	57,204	93,946	211,922	218,838
Crop Sales (mil. $)	$230.0	$81.6	$33.6	$345.2	$839.0
Livestock Sales (mil. $)	$51.9	$74.0	$37.5	$163.4	$309.6
All Sales (mil. $)	$282.0	$155.6	$71.3	$508.9	$1,148.6

*Includes certified and exempt. Values in ( ) are from certifier data and only include certified farms.

[a] Values from Kirby and Granatstein, 2009; certifier data include all certified land cropped or not cropped.

Table 2: Organic PNW Vegetable Production (NASS 2008)

	No. Farms	Harvested Acres	Sales (Mil. $)
WA	321	14,776	$42.7
OR	204	5,188	$27.1
ID	61	898	$2.3
Total PNW	586	20,862	$72.1
California	546	82,818	$457.3

Table 3: Area, Value, and National Rank of Selected Organic Vegetables Grown in the Pacific Northwest.

Crop	Rank	State	Acres*	Certifier or CDFA Acres	Sales (mil. $)
Sweet corn	1	WA	3,932	7,689	$4.6
	2	OR	867	1,228	$1.3
Green peas	1	WA	3,202	5,243	$4.2
	2	MN	1,104		$0.7
Snap beans	1	WA	1,689	1,432	$3.6
	2	MI	854		$1.4
Onions	1	WA	1,479	1,051	$8.2
	2	CA	1,342	1,138	$13.4
Carrots	1	CA	7,266	11,599	$6.3
	2	WA	642	552	$2.5
Potatoes	3	WA	1,477	1,600	$4.3
	4	OR	840	1,101	$3.7
	5	ID	736		$1.6
Squash, all	1	CA	828	1,562	$5.1
	2	OR	373	377	$5.1

*Some WA and OR acreage differs substantially from certifier data (Kirby and Granatstein, 2009). WA certified sweet corn and peas = 7,600 and 5,200 acres. CA Dept of Food and Agriculture list 11,000 ac of organic carrots and 1,500 ac of squash.

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corn, which are often double cropped in the Columbia Basin, and also for carrots and squash acres in California

Clearly, the region is an important national producer of these crops. The average sales per acre of organic vegetables was $5,197 nationally, compared to $2,890, $5,223, and $2,561 for Washington, Oregon, and Idaho, respectively. This difference may relate to the proportion of crop going to processor markets versus fresh and/or direct-market sales.

Fruit production

Washington State is the leading U.S. conventional and organic producer of apples, pears, and cherries. Organic fruit sales were $154.8 million, $7.9 million, and $288,000 in 2008 for Washington, Oregon, and Idaho, respectively. Apple, pear, and cherry accounted for 93% of the organic fruit sales in Washington and 31% of the organic fruit sales nationally. Organic apples from Washington alone were valued at over $120 million in 2008. California is the leading organic fruit producer in the nation, with grapes (22,000 acres), citrus, soft fruit, and berries. Oregon is first for blueberry acres, second for pear acres, and third for grapes nationally. Washington is second for grape, peach, and blueberry acres.

Field crops

Idaho is the regional leader for organic field crops, with substantial acreage of hay and grains (Table 4). It is first nationally for organic barley and hay. While the region is a major conventional wheat producer (especially eastern Washington), it is a minor producer of organic wheat. The leading winter wheat producers are Utah and Wyoming, while the leading spring wheat producers are Montana and North Dakota. Research on organic wheat systems in the region is underway in hopes of enabling more production to fill unmet demand from regional markets.

Economics

The farmgate value of organic food in 2008 for the U.S. was $3.16 billion ($1.94 billion for crops, $1.22 billion for livestock products), a fraction of the $23 billion of retail organic food sales (3.5% of all food sales in the U.S.). Average sales from organic farms were $217,675 compared to $134,807 for U.S. farms overall. Producers reported a total of $2.5 billion in production expenses, an average of $171,978 per farm (U.S. average $109,359). So gross revenues were 62% higher ($83,000) and production expenses 58% higher ($63,000) than the average U.S. farm, showing organic to be a value-added enterprise. However, these values vary considerably by region and crop, and by year, as has been the case for organic apples in Washington. Sales from organic farms represented about 4.3%, 3.5% and 1.2% of all farm sales in Washington, Oregon, and Idaho, respectively in 2008. This share has been steadily increasing. In addition, considerable economic value is added through processing, especially for vegetables and fruits in the region. This value is difficult to determine from certifier data since it can double-count farmgate sales already reported by growers.

Table 4: Selected PNW Organic Field Crops

		WA	OR*	ID	Total
Barley	Acres	231	5,234		20,197
	Sales (mil. $)	$0.09	$3.8	$4.1	$8
Hay and haylage, all	Acres	17,637	32,544		108,183
	Sales (mil. $)	$3.6	$15.9	$19.9	$39.4
Wheat, spring	Acres	923	4,862	7,657	13,442
	Sales (mil. $)	$0.63	$4.2	$2.4	$7.23
Wheat, winter	Acres	2,294	1,489	5,166	8,949
	Sales (mil. $)	$2.4	$0.48	$1.4	$4.3
Total sales		$6.7	$24.4	$27.8	$58.9

* Some compiled certifier data (Kirby and Granatstein, 2009) differ substantially from NASS survey acreages. In Oregon, certified hay ground was approximately 20,000 ac higher than reported in the NASS survey. Conversely, certified barley and wheat acres totaled just 1,500 and 3,900 acres. Differences may be due to different crop category definitions, change of end use (e.g. barley planted for grain but cut for hay).

Large farms produced the largest share of sales in all three states, with Idaho having the most mid-sized farms (based on sales). Oregon had the greatest difference between small and large farms, with farms under $25,000 sales comprising 56% of the farm numbers, but 1% of all sales, while farms >$500,000 sales comprised 10% of farms and 81% of all sales (Table 5). Exempt farms reported an estimated $69,000, $751,000, and $340,000 in sales for Idaho, Oregon, and Washington, respectively, all less than 0.5% of total organic sales.

Table 5: Farm Distribution Numbers vs. Sales for the Smallest and Largest Farms.

Annual Sales	WA		OR		ID	
	Farms	Sales	Farms	Sales	Farms	Sales
<$ 25,000	46%	1%	56%	1%	34%	<1%
>$500,000	15%	80%	10%	81%	10%	71%

Organic growers have similar plans for the future in the three PNW states. Over the next five years, 29-33% of the farms plan to increase their organic acres, 43-47% plan to stay the same, 4-7% plan a decrease, and only 4-5% plan to exit organic production altogether. Forty-two to 53% of certified farms derived less than 25% of their income from

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organic sales, while 83-95% of exempt farms were in this category. Both Washington and Oregon have 20% of the farms deriving 100% of their income from organic sales, compared to 14% for Idaho.

Summary

Organic agriculture is a growing sector in the Pacific Northwest, one that is adding value to farms and helping smaller farms remain viable. The region is a key supplier of certain organic products such as apples, pears, cherries, blueberries, sweet corn, onions, herbs, and milk. A healthy organic sector will rely on moving these products to national markets as well as supplying more in-state demand through direct marketing channels. The 2008 Organic Production Survey contains a wealth of information to help growers, buyers, and policy-makers better understand the organic landscape. Interestingly, one farm in Washington actually grows organic almonds.

References

Kirby, E. and D. Granatstein. 2009. Profile of organic crops in Washington State – 2008. Center for Sustaining Agriculture and Natural Resources, Washington State University, Wenatchee, WA. 17 pp.

NASS. 2010. 2008 Organic Production Survey. Volume 3, Special Studies, Part 2, AC-07-SS-2. National Agricultural Statistics Service, USDA, Washington, DC.

Tidbits

2010 Diversity Award Goes to Marcy Ostrom, WSU Small Farms Program

Steve Nakata, Student Affairs, Equity and Diversity

WSU's Small Farms Program, led by faculty member Marcia R. Ostrom, received the 2010 Faculty Diversity Award. Representing more than 45 county and campus-based extension, research and teaching faculty, Ostrom was recognized during WSU's Showcase event on Friday, March 26.

The Small Farms Program began in 2000 to develop education and programs targeted specifically to the needs of small-scale and underserved farmers. The program's mission is to work with farmers and communities across Washington to foster profitable and equitable farming systems, land and water stewardship, and widespread access to healthy foods.

Much of its work is grounded in the fact that immigrant and women farmers are the fastest growing demographic sector of U.S. agriculture. Ellen Gray, executive director of the Washington Sustainable Food & Farming Network, said that while many of these farmers are highly skilled agriculturalists, they often have limited access to basic resources such as land, water, and farm financing. Sometimes they also lack essential business and environmental risk-management skills.

Most of their farms are small, with more than 75 percent of Latino-, Hmong-, or women-owned farms having fewer than 50 acres and less than $50,000 in annual sales. According to the 2007 Census of Agriculture, Washington has 35,269 farms that meet U.S. Department of Agriculture criteria for a small farm. They represent 89.9 percent of all farms in the state.

Ostrom and her team secured over $4 million in grants during the past six years to develop and implement many research and educational programs to assist underserved farmers. "The Small Farms Program has deliberately sought resources and developed effective outreach, recruitment, and culturally and language-appropriate training programs," said Linda Kirk Fox, associate dean and associate director, WSU Extension. "One of greatest contributions of the program is the collective awareness of the needs of diverse and underserved populations."

The Small Farms Program conducts a variety of educational field trips and workshops for underserved farmers,

Such awareness is evident in the letters of support for Ostrom and the program sent by 14 agencies across Washington. For example, Carol Gregory from the Renton-based BuRSST for Prosperity organization wrote that East African refugees in South King County are suffering in poverty due to lack of education and understanding of the English language. But in collaboration with WSU's Small Farms Program, they are building assets in their community by leveraging the skills and knowledge the East Africans have in farming. "For this, we are proud to recommend the WSU Small Farms Team for the Faculty Diversity Award," stated Gregory.

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"Finding ways to support this new generation of aspiring farmers will be critical to preserving the future vitality of Washington's agriculture and rural communities," said Gray in her letter of support.

"Through their teaching, research and outreach activities, Dr. Ostrom and her team have made a significant difference in the lives of diverse communities across the state," said Alex Tan, WSU Diversity Faculty fellow. "They truly exemplify the spirit of the award."

Ostrom, the Small Farms Program leader and extension educator based in Wenatchee, came to WSU in 2000 from Madison, Wisconsin, where she worked as a research outreach coordinator for the University of Wisconsin. In 2007 she received the Extension Award for Excellence from the National Association of State Universities and Land Grant Colleges, Western Region.

The diversity award includes a $1,000 honorarium sponsored by the Western Journal of Black Studies, the Office of the President, Office of the Provost, and the Division of Student Affairs, Equity and Diversity.

Survey Assesses Sustainability of EQIP Practices

NASC. Results from a recent survey conducted by Tufts University, in cooperation with the National Sustainable Agriculture Coalition, demonstrate that a majority of the conservation practices funded by the Environmental Quality Incentives Program (EQIP) are ranked as advancing sustainability, while several rank as not advancing sustainability. The survey results and accompanying article are published in the most recent issue of the Journal of Soil and Water Conservation. Of the 47 conservation practices that were considered by survey respondents, over 73% of the EQIP payments fell under the category of Advancing Sustainability, while over 26% of the EQIP payments fell under the category of Not Advancing Sustainability, including a number of irrigation and livestock waste-related practices.

Plant Buffers May Limit Spread of Antibiotics in Animal Waste

AFTA. Research by scientists at the University of Missouri Center for Agroforestry suggest that buffer strips of grasses and other plants can trap and break down veterinary antibiotics in manure fertilizers. For the full article, please see the website above.

Putting a Value on Nature Could Set Scene for True Green Economy

AFTA. Much environmental damage has been caused by the way we do business. Is there a way of changing our economic models from being part of the problem into part of the solution? Look at this Guardian article.

USDA Launches Open Government Site

ATTRA. On January 29, 2010, the United States Department of Agriculture launched its Open Government Webpage. The USDA Open Government Webpage serves as a portal to USDA activities related to transparency, participation, collaboration, innovation, and datasets. On this page, the public can learn about and comment on USDA information such as available and proposed datasets, records, reports, and other resources. You can also rank topics based on what you feel is most important to help USDA prioritize future actions. This is part of the Obama administration's Open Government Initiative.

usda.gov/open

Mobile Meat Processing

eXtension. The Central Coast region of California has a vibrant local food system, with a strong consumer base and marketing infrastructure developed in large part by the "Buy Fresh, Buy Local" public education program created by Central Coast Ag Network (trade name "Central Coast Grown"), a regional non-profit.

By 2007, regional demand for locally raised meat had become large and loud enough to warrant the significant financial and human resources needed to bring that meat from ranch to table – in particular, figuring out processing.

Ranchers in the region were willing to supply the meat, but the closest USDA-inspected slaughter facility (California has no state meat inspection program) was many hours' drive away. In addition, the closest processing facility had capacity and quality problems. Explore the history and process of the San Luis Obispo Mobile Meat processors.

Announcements

OSU. FoodHub is a recently launched online directory and marketplace designed specifically to connect wholesale food buyers and sellers. Larger institutional purchasers such as public schools, colleges, hospitals, and grocery stores are beginning to assign geographic preference to their purchasing criteria, right next to cost, quality, quantity, and delivery requirements. Yet too often finding regional suppliers is like looking for the proverbial needle in the haystack.

At the same time, farmers, ranchers, and fishermen continue to struggle to find markets for their products, having not found a viable method for accessing and profiting from the burgeoning local food market. FoodHub offers a viable and effective solution for both sellers and buyers.

Organic Pasture Rule Released

ATTRA. The U.S. Department of Agriculture announced details of the final regulation regarding access

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to pasture for organic livestock operations. This rule amends the National Organic Program (NOP) regulations to clarify the use of pasture in raising organic ruminants. This final rule is the culmination of a process that was initiated in 2005 when the National Organic Standards Board recommended that ruminants obtain a minimum 30 percent dry matter intake for at least 120 days. The final rule becomes effective 120 days after publication, June 17, 2010. Operations which are already certified organic will have one year to implement the provisions.

Preventive Controls for Fresh Produce: Request for Comments

The Food and Drug Administration (FDA) is announcing the opening of a docket to obtain information about current practices and conditions for the production and packing of fresh produce. FDA is establishing this docket in order to provide an opportunity for interested parties to provide information and share views that will inform the development of safety standards for fresh produce at the farm and packing house and strategies and cooperative efforts to ensure compliance. Submit electronic or written comments by May 24, 2010; (go to http://www.regulations.gov, in the search box, type in "FDA–2010–N–0085" to get to the comment section).

Resources

Vegetable Cost-of-Production Study Available

ATTRA. A new cost-of-production study for growing mixed vegetables on a small-scale farm is now available from the University of California Cooperative Extension. Growing costs for an assortment of tomatoes, winter squash, and melons on a four-acre farm are shown in the study. The costs are based on one-acre plantings and can be adjusted to smaller or larger acreage. The vegetables are sold at local businesses and various farmers' markets for which costs are shown.

Meat Curing Webinar Available Online

eXtension. View the archive recording and presentation slides from the Niche Meat Processor Assistance Network's (NMPAN) webinar on natural curing of meats. In this webinar, meat scientists, a processor, and an organic meat marketer explain ingredients, processes, and challenges to natural curing, along with product labeling and regulations.

USDA Releases Food Availability Data

ATTRA. Agriculture Secretary Thomas Vilsack unveiled the latest data on U.S. food availability per capita in a USDA database used by researchers, policymakers, media, and marketers to gauge consumption of individual foods and food groups. USDA's Economic Research Service (ERS), which created and maintains the data system, updates it annually. "Food availability" is essentially the per capita amount of food in the U.S. food marketing system available for consumption. ERS economists include production and imports of the various foods, and exclude exports as well as farm and industrial uses, to arrive at an approximation of what Americans consume on average.

USDA Food Atlas Provides Information on Access to Healthy, Local Foods

ATTRA. Your Food Environment Atlas, a new ERS online tool, allows users to map and compare counties across the United States on the ability of their residents to access healthful food. The tool covers numerous indicators that include health, demographic, and food access characteristics (e.g., proximity and concentration of grocery stores). It also includes data on local foods and farms that sell directly to the consumer.

NASS survey of organic producers

The results from the NASS survey of organic producers (2008) have been released.

Animal Agriculture Newsletter

The winter edition of this WSU newsletter has been posted.

Organic Production Webinars

eXtension. You can see archived and current webinars on the eXtension web site:

High Tunnel Production and Low Cost Tunnel Construction Webinar introduces using high tunnels for season extension. It covers common issues associated with tunnel production, and also provides a short overview of how to construct a low cost pvc tunnel. The Webinar is for growers who are interested in season extension, but who may not want to invest a large amount of money right away.

Organic Blueberry Production talks about how the results of an organic blueberry production systems research study have provided insight on best planting methods, fertilization, irrigation, weed management, and economic considerations.

The newly released Organic Pasture Rule provides an overview of the main components of the Pasture Rule.

View the full Winter/Spring schedule of eOrganic Farming and Research Webinars.

Report Outlines Federal Agencies That Influence the Food System

ATTRA. While the U.S. Department of Agriculture (USDA) is considered the most influential federal agency when it comes to our food system, many other government agencies combine to deeply affect what, and how, food is raised and consumed in the U.S. The Institute for Agriculture and Trade

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Policy (IATP) has published Beyond the USDA: How other government agencies can support a healthier, more sustainable food system, (PDF/280KB). The paper reports on federal agencies and their role in administering programs, grants and regulatory oversight that affect food. This agency-by-agency review covers food safety regulations, community economic and housing development, health education, food procurement, labor standards, trade negotiations, and transportation infrastructure

Guide to Funding and Grant Programs Available

ATTRA. The National Sustainable Agriculture Coalition (NSAC) has released a new tool that will help farmers with federal programs and grant opportunities. NSAC is introducing an updated "quick-guide" to federal programs and grants for farmers, ranchers, food entrepreneurs, and the researchers, educators, and community groups who serve them. This chart is a one-stop shop for links to the relevant USDA program websites (where they exist), brief descriptions of programs, and important dates and deadlines.

Ag Law Center Posts New Reading Rooms

ATTRA. The National Agricultural Law Center has posted two new online reading rooms. The new Forestry reading room is dedicated to the legal issues confronting the forestry industry. Issues such as carbon sequestration, the Endangered Species Act, global warming, renewable energy, public lands, agri-tourism, and taxation interact in various ways that affect forest owners. The reading room provides information on many legal aspects of the forestry industry including an overview article, major federal and state statutes and regulations, links to important government and private websites, and access to forms and state websites on forestry as well as scholarly works concerning the various forestry topics. The new Agricultural Leases Reading Room deals with the issues that face farmers when they lease their lands or are leasing additional farmlands. The room contains a comprehensive case law index on the subject, with cases involving a range of topics from leasing disputes to requirements under federal grazing permits.

New Guide to SARE Grants

SARE. Sustainable Agriculture Research and Education provides Grants and outreach to advance sustainable innovations to the whole of American agriculture. Got a great idea? Need a grant or loan to get a jumpstart? Check out Building Sustainable Farms, Ranches and Communities, a guide to federal programs that provide financial and technical support for sustainable agriculture.

Written for anyone fostering innovative enterprises in agriculture and forestry in the United States, the guide features program resources in community development; sustainable land management; and value-added and diversified agriculture and forestry. Building Sustainable Farms, Ranches and Communities is a collaborative publication of the Michael Fields Agricultural Institute and National Center for Appropriate Technology (NCAT). Additional funding was provided by the Sustainable Agriculture Research and Education Program (SARE) program, U.S. Forest Service, and the National Institute of Food and Agriculture (NIFA).

A Grower's Guide to Organic Apples

ATTRA. Cornell just released A Grower's Guide to Organic Apples. While developed for New York, it will probably be useful for growers in western Washington and Oregon.

Organic Crop Rotation Manual Now Available

ATTRA. *Crop Rotation on Organic Farms: A Planning Manual* provides an in-depth review of the applications of crop rotation including improving soil quality and health, and managing pests, diseases, and weeds. Consulting with expert organic farmers, the authors share rotation strategies that can be applied under various field conditions and with a wide range of crops. The book includes instructions for making rotation planning maps and discusses the transition to organic farming.

Organic Seed Alliance releases Three New Organic Seed Production Guides for Carrot, Beets, and Lettuce

Organic seed production is an expanding market opportunity for organic growers, but requires specialized skills and technical information. Organic Seed Alliance (OSA) has released three new guides that provide the practical, step-by-step information growers need to successfully produce lettuce, carrot, and beet seed. The development and publication of these guides was made possible with support from Organic Farming Research Foundation (OFRF).

These publications compliment OSA's other educational publications covering crop biology as well as practical field practices for seed production. Publications are one arm of outreach for OSA's educational programs. Via workshops, field days, conferences, and publications OSA has worked with over 1500 organic farmers in the US and Canada, developing and improving farmers' skills in organic seed production and on-farm organic plant breeding.

Free downloads of these new releases and other OSA publications are available online.

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NTFP Information Exchange

NTFP Information Exchange is a free, nonprofit website designed to help develop or expand commercial nontimber forest product income opportunities and living wage jobs on small to medium-sized forestlands in the United States. It is currently in development but already features:

- A discussion forum for where users can interact and upload announcements and resources.

- Hundreds of free downloadable how-to guides and fact sheets on management and marketing.

- A searchable database with over 1,300 commercially known species (not including native seed).

- Links to NTFP buyer and seller directories.

- A gallery of free, high quality images for commercial marketing (images available soon).

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