

SARE Farmer/Grower Grant Final Report
“Open Range” Woodlands: An Untapped Resource for Small-Scale Farms
Grant ID Number: FNE08-649
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1. Goals: Chuck Talbott is interested in diversifying his farm and enhancing the earning potential and sustainability of his woodlands. His goal is to enhance mast production from crop trees (trees that produce soft or hard mast) for his pigs to consume. Talbott and Nic Heckett (his business partner) produce two-year, dry-cured Appalachian hams, similar to the mast-fed Iberian hams produced in the Dehesa region of Spain. We hope to produce 60-70% of our feed requirements on the farm. By managing our crop trees to increase mast production, we may be able to lower feed costs as well as produce a niche-market pork for high-end markets.

2. Farm Profile: Black Oak Holler Farm (BOHF) is located in Mason County, West Virginia in Appalachia's Central Forest Region. We breed and raise pigs on pasture, field crops, and in woodlots (photo rt.). This unique management system reduces dependence on fossil fuels, builds organic soils, and utilizes and may improve the forests. Finishing our pigs in the woods on tree mast takes advantage of a perennial feedstock that influences the flavor and fat profiles of our meat. Our genetics utilize the breed characteristics of the feral Ossabaw and Eurasian Wild Boar, and when crossed with Farmers' Hybrid/Large Black, we maximize the meat characteristics required for our own Appalachian Charcuterie - Woodlands Pork.



3. Participants: Scott Eggerud (Tri-State Timber Management, Inc., Ona WV) was responsible for conducting a Forest Management Plan and identifying crop trees and cull trees for our study. Drs. Dave McGill and Jim Rench (WVU Extension Specialist for Forestry) assisted in determining the animal impact on the study, project analysis and Farmer/Student/Consumer education. Mr. Rodney Wallbrown, Mason Co. WVU Extension Agent, advised in animal management and assisted in conducting our farmer and youth group workshops. Chuck Talbott and Nic Heckett are keenly interested in the feeding value and flavor enhancing properties of Appalachian mast. Talbott was responsible for all phases of the study.

4. Project activities: In March 2008, Talbott and Eggerud surveyed the 230A of woodlands and Eggerud submitted an approved Forest Management Plan in February 2009. Eggerud identified 511 crop trees and their respective cull trees for the prescribed 70A study area in April (see Table 1.).

Eighty percent of the crop trees identified were managed accordingly: cull trees were dropped and removed (by horses skidding the sawlogs) or double girdled and left standing.

Table 1. Predominant crop trees released and their respective cull trees					
Crop Trees (CT) Released	#CT	% Total	Avg. DBH/CT	Total Culled	# Culled/CT
White oak	232	45	14	522	2.3
Hickory	140	28	10	327	2.4
Black oak	31	6	14	79	2.5
Red Oak	28	5	14	62	2.2
Chestnut Oak	44	9	13	100	2.3
Persimmon	13	3	9	30	2.3
Walnut	4	1	12	12	3

We set out 24 mast traps (photo below) in August 2009 (3 species: White Oak, Chestnut Oak and Hickory; 4 reps per group: Study and Control; 3 mast collection traps per tree; see **Talbott Crop Tree Map 2011 in appendix**). Acorns were collected in cone-like traps constructed with shade cloth and attached to 0.5-m diameter ring of galvanized wire suspended by rebar approximately 1 m above the ground. Traps were checked at weekly intervals from mid-August through the completion of acorn drop (around mid November). Due to the unrepresentative production of mast for 2009 (see **Talbott Mast Harvest in appendix**) it was decided to request from SARE for an extension of the study and repeat the experiment. "Compared to the 39-year average, the 2009 mast index for all species combined decreased to an all-time low" (WV DNR 2009). Subsequently, 2010 was one of the best years for mast (WVDNR 2010).



5. Results: Samples collected from 17 trees were used to assess the effects of crop tree management on acorn and hickory nut production between 2009 and 2010 . Nine hickory trees and eight white oak trees had three seed traps placed beneath their crowns. Seeds (mast) were collected in fall of 2009 and again in fall of 2010 (Table 1). Another set of acorn traps had been placed under 4 chestnut oak trees, however, data collected from those trees was insufficient to test for crop tree treatment effects.

Table 1. Mast collected over a two-year period

	---2009---		---2010---		---Total---	
	Control	Thinned	Control	Thinned	Control	Thinned
Chestnut oak	0	8	184	89	184	97
Hickory	5	4	15	23	20	27
White oak	56	53	130	77	186	130

An analysis of variance was carried out to test for differences in the total two-year seed production. This measure simply combines both the 2009 and 2010 collections and represents the total number of seeds collected for each species over this time period. Statistical tests failed to show any differences for the two-year seed production across treatment for either hickory ($p=0.9910$) or white oak ($p=0.4693$). A correlation analysis was also made on these trees to check for a relationship between tree size (DBH) and acorn numbers. No significant correlations were found between tree diameter (measured to the nearest inch) and 2-year seed numbers for hickory ($r=-0.158$; $p=0.596$) or

white oak ($r=-0.273$; $p=0.513$). Our total mast accumulation within species and across years represented a four-fold increase in mast production, similar to the observations reported in the WVDNR survey when comparing mast for 2010 (516) with 2009 (126).

It is unclear why there was no increase in mast accumulation due to tree thinning. It may take longer than one or two years to realize an increase in mast accumulation due to a reduction in neighboring tree competition (canopy shading, nutrients). It was noted that some trees still maintained leaves into the summer even though the thinned trees were double girdled in the spring. This experiment did not observe the expected increase in mast production due to thinning and could also reflect an inadequate number of treatment/control observations, or variability due to aspect and positioning of the study trees. Our goal was to increase mast production by providing a better environment for our crop trees.

Dr. Dave McGill (WVU Forestry Extension) conducted a FFA workshop on November 7, 2008. Twenty-eight FFA and Vocational Education Students from Hannan Jr./Sr. High School visited the pig plots and observed our crop tree study in progress. Talbott and McGill discussed the "Crop Tree" study to the students, record keeping (Excel spreadsheet, attachment), reviewed tree identification and identified wildlife habitats and scat. McGill also presented topics on Ginseng Production, Identification of Maple Trees for Producing Appalachian Maple Syrup and Shiitake Mushroom Inoculation. The students inoculated their own logs and took them home. Due to the lack of mast produced in the 2009 season, our 2009 farmer workshop was rescheduled for 2010. There was also concern for possible N1H1 swine virus contamination with farm visitors.

In July 2010, I visited four farmers who raise swine in Webster and Pocahontas Counties with Greg Hamons, WVU Extension, and presented a workshop on niche-market pork to 17 participants. Surveys indicated farmer interest in developing value-added, direct marketing options.

6. Conditions: Cost of production (see economics) and flavor of the pork is effected by the amount and kind of mast produced in any given year. Similar to wine production, there are good years and bad years for growing grapes. Each year is accordingly different for producing dry-cured hams. Regardless of annual mast production, the flavor of the hams are also influenced by the forest flora and fauna (i.e. slow moving turtles), which all adds to the terroir, or unique flavor of "place".

7. Economics: With the paucity of mast production during 2009, the eighty, forest-finished pigs received 12 lbs/d of 16% barley/soy (3.2% DMI/BW) vs. 4 lbs/d (1.1% DMI/BW) of the same diet when mast was plentiful for the eighty pigs harvested in 2010. This reflects a savings in feed costs of \$4424 (@ \$280/T) due to feed supplementation of 28.8 T in 2009 (80 pigs x 12 lb/d x 60 days) vs. 13 T in 2010 (80 pigs x 4 lb/d x 60 days). Even when mast is plentiful, it is advisable to feed the finishing hogs a minimal ration so that they stay connected to the caregiver (see photo left). Pigs need to be conditioned to come for feed daily so that they will eventually load onto a trailer at harvest.



Woodland's 2-year, dry-cured hams from mast-fed hogs bring \$25/lb (photo right) wholesale in NYC, DC, Atlanta and Cincinnati. One distributor in NYC resells the hams for \$80/lb. Because of the added management required and risk involved with raising hogs in the



woods, I submitted a SARE R&E grant last year to identify a "Fair Farm Fare" pricing structure which will categorically recognize (on the label) the small-scale farmer's input into the retail price.

8. Assessment: Last year we had a dry fall and we had only one portable watering system for 50 acres of fenced woodlot. This limitation restricts the distance that pigs will travel for mast. We are currently examining ways with USDA NRCS to water our acorn finished hogs more efficiently. Preliminary observations from this study indicate that swine placed in woods for indeterminate short periods may help reduce infestation of Japanese Stiltgrass, an invasive weed to woodlands (Photo right).



About the time I *thought* that I understood our agroforestry system of finishing hogs on mast, Mother Nature sent me a curve. During 2010, 40 market gilts were bred in the summer by "visiting" Eurasian Wild Boars, while the gilts were hogging down corn and beans in the bottomland pastures. This presented a real problem as the gilts had to be brought out of the woods and moved to "emergency: farrowing huts in early October. Consequently, we were unable to sell these mast-fed gilts and the farm was over stocked with slow-growing pigs (75% of their genetic makeup was from feral breeds; no more than 50% is recommended for maximum hybrid vigor). Therefore we are now reevaluating the management of gilts in this free-range system and seeking other markets for those animals.

9. Adoption: We will continue to thin out around our crop trees to encourage mast production for swine consumption. Thinning out trees is like thinning out corn rows or any vegetable: no appreciable fruit will develop in overpopulated stands. I had envisioned that I would write a more comprehensive grant to include more farmers and provide a larger data set however, our experiment was very time consuming and the results were disappointing. I did learn how aspect effects mast variability and production; one group of study and control trees along a certain ridge had no acorns while the rest of the trees were plentiful. I would change the design of the mast traps to incorporate plastic hula hoops instead of hoops made from expensive steel reinforcing.

10. Outreach: Conferences/Workshops/ Presentations Our sylvopastoral-integrated farming system has solicited interest from several Sustainable Agricultural Groups across the East Coast. I spoke at four professional conferences in 2008 and 2009: 1.) The Swine School Conference, at Stone Barns Center for Food and Agriculture, co-sponsored by the Animal Welfare Institute ("Feeds and Feeding: Influencing Pork Flavor with Swine Diets", April 18, 2008 and "Silvo-Pastoral Opportunities with Pigs", April 19, 2008, Tarrytown, NY). 2.) Pastured Swine Conference presented by Innovative Farmers of Ohio and The Ohio Department of Agriculture's Rural Rehabilitation Program on January 10, 2009: ("Marketing Appalachian Pork While Promoting National Food Security" and "Integrated Crop and Sylvan Systems with Swine: Underutilized Resources for Appalachian Farms", January 10, 2009, Mount Vernon, Ohio) 3.) Organic Gardening and Farming Conference, sponsored by Northeast Organic Farmers Association of NY ("Crop-Trees:", January 24, 2009, Rochester, NY). 4) To Market To Market: Adding Value to Your Farm, the American Grassfed Association conference co-sponsored by Animal Welfare Institute ("From Spain to Kentucky: Acorn-Finished Ham", February 5, 2009, Lexington, KY). In 2010, I was asked to give two presentations ("From Spain to West Virginia: Acorn Fed Hogs to Produce Appalachian Gourmet Hams", Parts 1 and 2) and on our project at the Southern Ag. Workers Group in Chattanooga, TN. Three hundred people attended the two sessions and we sampled our hams from the 2007 harvest. I was invited to speak at Marshall University for the Society of Yeager Scholars (invited speaker), "Consumerism and US Food Security:

still.....unsettling for America", 11/9/10. In 2011 I presented the results of our SARE Farmer Grant to two graduate and one undergraduate class respectively: 1) Dr. McGill's Global Agroforestry Class (WVU, 17 students 1/11), 2) Dr. Mazlowsky's, Time and Place in Appalachia (an anthropology class at Marshall University, 10 students; 7/11) and 3) Dr. Fanatico's undergraduate class, Sustainable Agriculture (Appalachian State University, 13 students; 3/11). The title of my presentation was "From Spain to West Virginia: Producing Appalachian Gourmet Pork from Sylvopastoral Systems (see Talbott Appalachian Pork Presentation in appendix). We held an on-farm project workshop last December 4th attended by 22 farmers and 4H students). I gave a project review presentation, we demonstrated castration techniques, and sampled dry-cured pork (photo right).



In May 2009, Chuck Wesley of Whiskey Magazine and three chefs from Kentucky and Ohio paired our cured pork products (<http://www.whiskymag.com/magazine/issue88/12009732.html>) with various bourbons. Our 2009 dry-cured hams won the prestigious "2011 American Treasures Award" for artisan food. Mast-fed hogs from Black Oak Holler were also featured in newspaper articles and in videos produced for Internet audiences:

- 1) <http://www.sundaygazetteemail.com/News/201110013091>
- 2) <http://www.janeblack.net/why-not-west-virginia/>
- 3) <http://donaldlink.com/tasteofplace.html> "Backwoods pig roast" and "Hog heaven"

11. Report Summary: Black Oak Holler Farm, LLC produces a two-year, dry-cured Appalachian ham similar to the mast-fed Iberian hams produced in the Dehesa region of Spain. The goal of this study is to enhance mast production from crop trees (trees that produce soft or hard mast) for the pigs to consume. By managing crop trees to increase mast production, we may be able to lower feed costs as well as produce a niche-market pork for high-end markets. In 2009, we identified 511 crop trees and their respective cull trees for the prescribed 70A study area (10 crop trees/A). The crop trees identified were managed by removing or double girdling the cull trees and left standing. Acorns were collected in cone-like traps constructed with shade cloth and attached to a 0.5-m diameter ring of galvanized wire suspended by rebar approximately 1 m above the ground. Traps were checked and harvested at weekly intervals from mid-August through the completion of acorn drop (around mid November). Statistical tests failed to show any differences for the two-year seed production across treatments for either hickory ($p=0.9910$) or white oak ($p=0.4693$). According to our findings, thinning out mast trees did not increase mast production. However, this could reflect an inadequate number of treatment/control observations, or variability due to aspect and positioning of the study trees. A savings of \$4424 (@ \$280/T) in feed costs was observed due to feed supplementation of 28.8 T in 2009 (80 pigs x 12 lb/d x 60 days) vs. 13 T in 2010 (80 pigs x 4 lb/d x 60 days).

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Date