

WEST VIRGINIA SMALL FARM ADVOCATE

WVU Extension Service Small Farm Center Risk Management Education

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The Unprecedented Opportunity

BY TOM MCCONNELL, PROGRAM LEADER
WVU EXTENSION SERVICE SMALL FARM CENTER

West Virginia's food industry is growing. However, the difference between the last two Census reports from 2005 and 2012 really didn't show much change in acres devoted to vegetable production, in fact they were stuck at approximately 350 acres each year. But, there was one huge difference in the two reports. The 2012 report indicated that the number of farmers who reported to be growing fruit and vegetables had almost doubled from 350 to nearly 800. Never in my years

of working with farmers have I ever witnessed so much interest in a new enterprise. This movement involves the whole community and creates great opportunity.



Maybe a different way to think about the health of this industry is to consider other indicators, for example, is there a market for the product? Yes, there is an \$8.3 billion demand but that has been with us for a long time, but now we are just beginning to learn how to take advantage of it. Relating this to the before mentioned Census data tells me that more farmers are, at least, considering themselves growers. That is an important fact.

As more of our farmers begin to seize this unprecedented opportunity, their share continues to get slimmer. Today farmers are receiving just eleven cents of every dollar spent on food. Fifty years ago the farmer received over 50% of the food dollar. We all know that the other \$0.89 goes to what the economists call "marketing," which includes everything that is done to farm products before they arrive at the consumers table. And a growing share of that is convenience; processing and preparation. On an individual basis

that means that each farmer will have to provide more convenience or value adding to continue to grow or survive.

So if we shift our thinking from farm production to food production we will soon begin to think of this opportunity in the terms of community not as an individual or group of producers. This means that as we and our neighbors begin to assume more of the food processing, packing and possible transportation share of that food dollar our local cut would increase from 10.5 cents to 32 cents. Add in the retail trade, wholesale trade and food service the share jumps to over 80 cents or percent, so now we are talking about a \$6.6 billion opportunity. This would create countless jobs in communities all across the state. It would also secure a reliable market for future growth in the production sector.

So are we moving toward a state-wide food industry that includes all sectors including production and

Unprecedented Opportunity cont.

processing and benefits them all? Yes! West Virginia is developing its industry one local food community at a time through beginning food hubs and local food stores. Being able to sell locally produced farm products remotely will help numerous farmers and communities. As these grow to handle increased production and ultimately contract farmers to grow, it is hoped all economic strata will have access to fresh fruits and vegetables at a price they can afford.

Considering the future of our small family farms in West Virginia, we are quite certain that we are going to have to “grow” the next and future generations of food producers. We are always pleased to point to the Vocational Agricultural Science departments across the state and their energetic graduates, many of whom are already growing and marketing thousands of dollars of products. These young people already have experience and thus an advantage toward their future in food production.

Another group that is learning how to play a very important role in the local

food industry is the local high school ProStart departments. This program is dedicated to the Simulated Work Place concept where their graduates will be ready to work in the growing food preparation business like restaurants, cafeterias and food processing businesses. For the food producers to prosper by complying with the trends of increased food preparation, every food community will depend businesses and individuals who can add the value many marketing opportunities demand. For example, recently in Preston County several farmers grew butternut squash as a crop that would allow them a ‘plant and forget’ crop with one harvest with the added attribute of a long shelf-life so they could market them later in the year when their time was not so valuable.

The local Preston High ProStart peeled the squash, roasted them and pureed them in preparation of making squash soup to sell to the local school. One serving of squash soup for a student body of 1,100 consumed over 200 lbs. of squash. That sale would have never happened without that service. The process was a winner for all involved. The high school cafeteria staff will have a high quality soup to serve that is a dark orange vegetable, the simulated business received a piece of work that was valued at \$120 and the farmers found a new home

for a lot of squash. The group is also baking 1,200 dozen squash cookies for the WV Small Farm Conference.

Another ProStart program is presently helping a young entrepreneur refine her granola recipe and production protocol, and those students are helping and learning there too. In Cabell County a local FFA member, as well as farmer, engaged the local ProStart to shuck and clean his sweet corn to the specifications to market it to the local school. This is just another case where the sale would not have happened without ProStart and in the future maybe students from this program can see their way to start a business of their own to add value to other farmer’s products.

To encourage and support the ProStart program, we need to engage them in what we are doing on our farms and see where they can help our businesses grow and prosper. With each crop or each interaction between the farmer and ProStart, the local community will grow. The WVU Extension Small Farm Center is inviting ProStart students to this year’s Conference and to participate in future entrepreneurship trainings and competitions. We need this segment of our food industry and we are glad they are with us!

For more information, contact Tom McConnell at (304)293-2642 or email TRMcConnell@mail.wvu.edu.

2013 Food dollar: Industry Group (nominal)



Controlling the Dreaded Colorado Potato Beetle

BY DANIEL FRANK - DLFRANK@MAIL.WVU.EDU
WVU EXTENSION SPECIALIST – ENTOMOLOGY

The Colorado potato beetle, *Leptinotarsa decemlineata*, is a serious insect pest of several vegetable crops in the family Solanaceae. Plants commonly attacked by this insect include potato, eggplant, tomato, and pepper. Both the larval and adult stages feed on the leaves of plants, and if left unmanaged, can quickly cause extensive defoliation. Under heavy infestations feeding damage to above ground fruit may also occur.

Adult Colorado potato beetles are approximately 3/8 inch long and oval in shape. They have yellowish-white wing covers (elytra) marked with ten longitudinal black stripes (five on each wing cover). Larvae are red to pinkish in color, with two rows of black spots on each side of the body. In West Virginia, this insect typically has two generations per year. Adults spend the winter in the soil, or under crop resi-

dues and other organic debris. Adults become active in the spring (around May) and begin laying clusters of yellowish orange eggs on the undersides of leaves. After egg hatch, larvae feed for approximately two to four weeks before dropping to the ground to pupate in the soil. New adults typically emerge from the soil one week later to continue the next generation.

Neonicotinoid insecticides (e.g. imidacloprid) applied at planting has been the traditional method used by many West Virginians to control Colorado potato beetle. However, the effectiveness of these insecticides has been waning in some parts of the U.S. due to resistance. This insect has a long history of developing resistance to a number of the insecticide classes that have been used for its control. For instance, carbamate (e.g. carbaryl) and pyrethriod (e.g. permethrin) insecticides are now largely ineffective for controlling beetles. Rotating insecticides with different modes of action is essential for preventing, or at least delaying, the development of insecticide resistance. The spinosyn (e.g. spinosad, spinetoram), and diamide (e.g. chlorantraniliprole, cyantra-

niliprole) class of insecticides, as well as the active ingredients novaluron, and abamectin, can be effective insecticide options for rotation.

Non-chemical methods for management are also important. Selecting early-maturing cultivars and planting later in the season (June) may allow the harvest of crops before significant damage occurs. If practiced on a regular basis, hand removal can be an effective method for controlling Colorado potato beetle in small plantings. The larvae and adults can be removed and placed in a container filled with water and a few drops of dish soap. The dish soap breaks the water's surface tension so the insects sink into the water and drown rather than escape. Another non-chemical method involves the use of a spring trap crop planted a few weeks before the main crop to divert overwintering beetle populations. These trap crops can then be destroyed (along with any beetles) before the primary crop becomes susceptible to attack. Crop rotation may also be an effective option for larger growing areas. Growing susceptible crops only every other year, or planting these crops at least 1/4 to 1/2 mile away from the previous season's crop may help reduce beetle populations.



Farm Succession and the Family

BY KAREN COX

Have you devised a plan to transfer and distribute your farm assets at your retirement or permanent vacation? Is it in writing? If you want to see your farm live on after you are gone, you need to take action now, while you are of sound body and mind. Don't wait until a tragedy forces your hand. There are several methods to transfer your farm business to the next generation but among the heart of all of them are time and communication. If you attend the WVU Winter Dinner Meeting with Dr. Jesse Richardson from the Land Use and Sustainable Development Law Clinic at WVU's College of law, you would have heard him encourage everyone to never assume, "they know what I want." Voice your thoughts, then put them in writing.

It is important to identify potential successors early on and have a plan towards that future. All parties should be involved in planning including the parents / current owners, the non-farming heirs, and the farming heirs. Each should take some time prior to the meeting to write down broad goals for both the farm and for their personal future. Long term and short term goals should be considered. Include thoughts on where you are now, where you are going, how you will get there, and how much time it will take. When planning for succession, it is often better to meet in a neutral location such as a diner or coffee shop. From there you can better focus on the farm as a

business not a lifestyle. Once everyone is together, examine and compare goals and resolve any conflicting goals as well as unrealistic goals.

Good succession planning has three main steps:

1. Plan to shift the management of the farm gradually to the generation taking over the farm.
2. Enact a plan for assets of the farm to be transferred without interrupting the business.
3. Anticipate events that could disrupt the transfer of management and/or ownership. The top 5 are: death, disability, divorce, disaster, and disagreement

Step 1: The Management Shift.

Open communication is perhaps the most important characteristic of successful transitions. Form a farm management team and have regularly scheduled business meetings. Keep minutes and keep things professional. Business objectives should be specific and positive with clear dates and rewards for accomplishment. Obstacles should be predicted with several alternative solutions a standard part of the conversation. All members should have equal say in decisions. Deferring all major decisions to the senior members is a good way for the younger generation to become disillusioned and discouraged. Recognize that this shift may take years and start the shift early.

Be intentional about the shift. Set a date for when specific job responsibilities will be transferred then work toward that goal. After spending a lifetime building and growing a farm business it is sometimes hard to let go of the reins. But, through mentoring and shared responsibility, the younger generation will develop management skills that will give both generations confidence in the transition. Develop a list of jobs and roles that is both clear and comprehensive. While compensation can take the form of clothes, cash, or increased equity in the business, the payment should be well-defined in the job description. Cross-train everyone so each person has a solid understanding of all aspects involved in running the farm. Not only will these steps help the future success of the farm, but will make reporting income and expenses more accurate.

Step 2: Transferring Assets

Land is often the most difficult asset to manage in determining inheritances. If keeping the family farm alive is an agreed upon goal, the next question falls to how inheritance will be handled. While parents often want to treat their children equally, you can't subdivide a small farm and have it stay viable. Be sure that in passing down equal shares that you are not divesting the farm of its ability to function. Sometimes children who don't live on the farm will inherit sections of the farm only to offer to sell them back at

Farm Succession cont.

current market value. While this may seem balanced from a parental stance of equality, it establishes an automatic debt load for the farm increasing its chance of failure. Additionally, it is important to recognize and compensate for the added value on-farm heirs have created through their labor and personal investment. To be equitable other assets may be able to counter-balance land as an inheritance. Often however, talking about the options and being honest and upfront about challenges can prevent hurt feelings and lead to simple resolutions especially if a goal of farm survival has been set by the family as a whole.

It may be best to manage the inheritance issues separately from the farm and to incorporate the farm as a business entity. There are many business structures (LLC's, C-corps, S-corps, Partnerships, etc.) and your farm's needs will dictate what structure works best. Although it should be stated that partners are personally liable for the actions of other partners. A partnership agreement should always be written, even if it is simply sharing the cost of bulk feed and taking turns with delivery. A partnership (written or unwritten) will take precedence over your will; you can only dispose of what you are entitled to.

The business description and objective should be clear and plainly describe which assets are held by business and which are held individually. Titles and deeds need to reflect what happens if the business dissolves.

Step 3: Plan Ahead and Anticipate the Worst

Failure to plan is one of the main causes for losing farms along with a lack of economic viability and high land prices. If your farm is to survive you have to plan for the worst of days along with the best of days. Insurance for a business should always be held by the business not the individual.

The business agreement should be inclusive. Things that should be outlined in the business agreement include (but are not limited to):

- Name, purpose, and term of business
- Initial Contributions and itemized assets (don't just say farm equipment and buildings)
- Duties of partners: time allocations, expectations, and responsibilities
- Authority for operating bank accounts and profit and loss allocations
- Expenses, Salaries, and Benefits
- Voting rights and decision making conditions for managing the business

- Partner changes and buy-out options
- Liability and partner expulsion or suspension criteria
- Dispute resolution: mediation, arbitration, etc.
- Dissolution criteria and instructions
 - *What happens if owner ceases to be a partner (through retirement or death)
 - *Does the owner have right to receive rental payments for the land?

Is there an option to buy the land?
First right of refusal?

Remember there is no cookie cutter business system or contract that fits all farms or operations. Think through situations and discuss them with your lawyer, tax advisor, and insurance agent. When in doubt, err on the side of too much detail. And when it comes to planning how the next generation will take over the farm, it is never too early to start.

Watch for upcoming programs on farm transition planning. Meanwhile, for some winter reading, a great series of easy-to-read fact sheets on Whole Farm transition and Estate planning is available online at: www.extension.iastat.edu/agdm/wdbusiness.html.

Great News for Grass Farmers! Pasture, Rangeland, Forage Insurance has arrived in West Virginia!

Potentially the most important crop insurance product ever offered to WV farmers.

Designed to give you the ability to buy insurance protection for losses of forage produced for grazing or harvested for hay, which result in increased costs for feed, depopulating, or other actions.

Go to <http://www.rma.usda.gov/policies/pasturerangeforage/> or contact your crop insurance agent!

Replanting the Farm Following Natural Gas Development

BY: GEORGETTE PLAUGHER, PROGRAM COORDINATOR
WVU ES OIL AND NATURAL GAS EDUCATION PROGRAM, AGRICULTURE AND NATURAL RESOURCES PROGRAM UNIT.

As a farmer who will be impacted by natural gas development on your property, you need to move through the process with the end in mind. Even if you cannot be a part of all phases of development, the reclamation process is one where you can and should take an active role in planning. Once development is complete, the land must be reclaimed to a sustainable and usable condition in compliance with West Virginia state regulations.

Depending on the type of development, the amount of surface disturbance will vary and reclamation can



A natural gas pipeline during construction.

range from minor to major. However, all landowners have the opportunity to be involved in the reclamation and reseeding of vegetation of their property. Whether or not you own your mineral rights, you may specify in your lease or disturbance agreement your requirements for the reclamation of your property.

It is important to understand that natural gas development will remove some areas from agricultural production, may create new areas for agricultural production, or will provide an opportunity to improve wildlife habitat. As the landowner, you should choose, within reason, the types and species of plants that will be reseeded on your property. This may include grasses and legumes for pasture and hay land or a wildlife mixture that contains plants favored by animals, insects, and pollinators.

The reclamation planning process need not be complicated, nor time consuming. However, being involved will ensure you are satisfied with the outcome. The following checklist will assist you with reaching your natural gas reclamation goals.

For more information and recommended seed mixtures for replanting, read *A Landowner Checklist for Replanting Areas Impacted by Natural Gas Development* published by the WVU Extension Service Oil and Natural Gas Team available through any WVU ES county office or online at <http://anr.ext.wvu.edu/r/download/217153>.

Checklist for Replanting Your Land
(Specify the following in writing in your lease/soil disturbance agreement.)

A. Pre-Disturbance

- Conduct pre-disturbance soil testing.
- Conduct an inventory, take photos, and create a map of existing plants.
- Conduct a site evaluation to determine areas of concern or areas for preservation.

B. Disturbance

- Topsoil should be preserved properly and held in undisturbed areas for reuse.
- Adequate erosion control measures should be taken.
- Ensure areas outside of the disturbance zone are not impacted.

Farm Succession cont.

C. Post-Disturbance

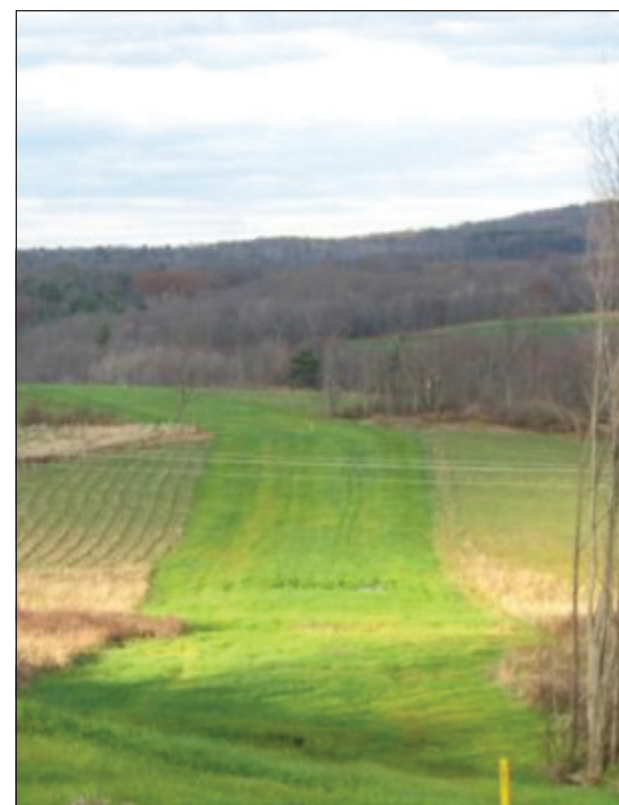
- ❑ Preserved topsoil should be pushed back onto the contoured areas at a thickness similar to before the land was disturbed.
- ❑ Areas of compacted soil should be scarified to a depth of 2-3 inches for good seed germination and rooting to occur.
- ❑ Conduct post-disturbance soil testing.
- ❑ Apply lime and fertilizer based on soil test results.
- ❑ Plant the proper seed mixtures using low or no-till (i.e. hydro-seeding) methods to stabilize and provide a suitable use of the site.
- ❑ Seed mixtures are site specific but general recommendations are included in the previously mentioned fact sheet.

- ❑ Mulch with straw (if no-till methods are used) at a rate of 1.5 tons/acre. (Hay can contain seeds from non-native and exotic species, thereby encouraging their spread). Mulching is not needed if the area is hydro-seeded.

D. Post-Seeding

- ❑ Re-evaluate the areas to ensure good coverage of plants has occurred in successive years.
- ❑ Re-seed areas that did not respond well to replanting.

Questions? Contact your WVU ES county Extension Agent or Georgette Plaughter, WVU ES Oil and Natural Gas Education Program coordinator at 304-329-1391 or Georgy.Plaughter@mail.wvu.edu.



A natural gas pipeline after reclamation in an agricultural field. Used with permission from Dave Messersmith, Penn State Cooperative Extension.

History's Alive at the Jackson's Mill Farmstead

JOSEPH OBIDZINSKI, AMERICORPS MEMBER, 4-H HERITAGE PROGRAMMING
JACKSON'S MILL FARMSTEAD AT WVU JACKSON'S MILL

Often, people tend to conceptualize places based on names. At the Jackson's Mill Farmstead, this is certainly the case. Many visitors come to the site because of a familiar name, "Stonewall" Jackson. However, 'Tom,' as he was known when he lived at Jackson's Mill was there only a very short time – from 1831-1842, when he went off to West Point, never to return (to live, anyways). Still, "Stonewall" is the reason that many people are drawn to the site. Once they take time to visit, visitors find that young 'Tom's' story

is only a single thread in the history and story that the Farmstead offers.

The history of Jackson's Mill dates back to 1801 when Colonel Edward Jackson (Thomas' grandfather) settled a piece of land on the West Fork River. By 1806, he had built a gristmill and within a short time, prospered. When Edward died, his son Cummins took over the operation of the mill. In 1831, Thomas and his younger sister, Laura, came to live at what was by then called: "Jackson's Mill." Thomas,

was not yet seven, but immediately began to work on the farm and in the mill. He grew up under very arduous circumstances. After Thomas left, Cummins remained on the property for a few years until 1849. With departure of Cummins, the Mill would never be the same. Over the years, others tried to revitalize the Jackson Mill, but any success was short-lived. In 1921, the Mill began a new life as a piece of the original property, which still contained the old mill building, was donated to the state of West Virginia

Jackson's Mill Farmstead cont.

for the purposes of establishing a state 4-H camp. Jackson's Mill, as it has been known to thousands, was born.

Over the years, much has changed at Jackson's Mill, but the focus on early West Virginia life and 4-H remains central to what is now known as WVU Jackson's Mill. One important change was the establishment of the Jackson's Mill Farmstead (or Historic Area), which includes the Old Jackson's Mill building, another West Virginia water-powered gristmill (the Blaker Mill – originally located near Alderson), dating to the 1790s – in which cornmeal and wheat flour are produced using the original stones – two pioneer cabins, as well as barn and blacksmith shop (both of which were built by the staff and volunteers at the Jackson's Mill Farmstead). The area also features a heritage garden with historically accurate varieties of vegetables and plants, which are used to educate visitors on what was grown and why.

Perhaps the most compelling aspect of the Farmstead is the success of the outreach program that it offers. As a part of the Extension service, it is the mission of the Farmstead

to share knowledge, and the program called "History Hitting the Road" offers hands-on experiential learning opportunities geared toward school-age youth (although, very often, adults join in as well). Between going to schools, field trips to the site, and public tours, the Jackson's Mill Farmstead sees thousands of people throughout the state and region each year.

While Jackson's Mill is not a working farm in the traditional sense, it has nonetheless created a unique model for agricultural history and learning. By varying the methods of presentation – be it hands-on learning, guided tours, or historic trade's demonstrations – the staff at Jackson's Mill ensures that every visitor comes away with something. While it can certainly be said that the Farmstead has a "backward focus," in this case, it is

fitting. By looking to the past, the staff of the Farmstead continually offer new generations the opportunity to not only learn about 'Tom,' but also about life in West(ern) Virginia during its' formative period. While this model is not appropriate for every site, it is unquestionably an interesting case study for the potential educational benefits of a historic site, focused on agrarian life in the early nineteenth century.

For more information about our site and programs, contact us at: jobidzin@mail.wvu.edu or dean.hardman@mail.wvu.edu

Also, check out our Facebook page at: WVU Jackson's Mill Farmstead and Heritage Programs



A Kickstarted Dream

KATE PACELLI, CO-OWNER
THE FARMER'S DAUGHTER MARKET & BUTCHER

Our family farm is located in Capon Bridge, and we noticed there was a great need for fresh food in the area. Outside of seasonal fruit stands, there are no fresh food options between Romney, WV and Winchester, VA. Judging from our local response, the community agreed!



We turned to Kickstarter, a crowdsource funding website, after finding we needed additional money to open our business at the beginning of 2015. By April 1st we had raised \$27,280, which was beyond our original goal of \$25,000.

It has been almost nine months since The Farmer's Daughter opened with only 2 employees. Now there are 6 full and part-time workers. We have had two interns and plan to offer more opportunities this year.



We are currently working with over a dozen local farms- from small family farms that supply us with eggs, to farms like Bigg Riggs Farm (in Loom, WV) and Mayfair Farm (in Bunker Hill, WV) who have other outlets like farmers markets. We calculated last month, that since opening May 30, 2015, we have purchased over \$100,000 from West Virginia Farmers - something we're very proud of.

What is surprising is the number of "regulars" that shop there are coming from Gore, Winchester, Romney, Wardensville and even Moorefield.

For more information contact:
Kate or Pete Pacelli at 304 856-2550,
info@farmersdaughterwu.com



Originally a fresh food and butcher shop, the 1,300-square-foot shop now includes house-made bakery items, local soaps and skin creams, craft beers and a nice wine selection.

Oh My Aching . . .

BY INETTA FLUHARTY
WEST VIRGINIA AGRABILITY PROGRAM SPECIALIST

Spring is just around the corner. For West Virginia farmers that can mean many different things. For some, spring means preparing the land for planting. For others spring means it time for equipment maintenance before putting in the hay. Still others, spring means it is time to tend to the livestock and their offspring. Whatever the agricultural operation, for those suffering with joint pain, mobility issues or chronic health conditions, spring can also bring new challenges.

Finding ways to make farming accessible is one mission of West Virginia AgrAbility, a partner program between West Virginia University Extension Service, West Virginia State University Extension Service, West Virginia Assistive Technology Systems, and The Arc of the Mid-Ohio Valley.

West Virginia AgrAbility assists farmers who have physical disabilities or cognitive limitations find ways to overcome new and unfamiliar barriers allowing them to continue in their chosen agriculture related professions. We believe that farmers with disabilities can attain or maintain independence by making informed decisions about how they want to live and work on their farm. West Virginia AgrAbility provides assistive technology and modification recommendations to aid the farmer in remaining productive in their chosen agri-business.

Assistive technologies offer options to help the farmer from the first planting through the last harvest, checking a fence line, maintaining a colony of bees, or pruning fruit trees. Forms of assistive technology exist for numerous handicaps, from struggling to bend or stoop to difficulty using hand tools. Examples of assistive technology that can be useful are:

1. Different types of handles on tools make gripping easier and relieve stress on joints.



2. Find tools offering additional grips to keep farmer in an upright position, which takes the stress off of the back and legs.



3. Using an additional step or lift on the tractor making access easier while decreasing the risk for additional falls.



My Aching cont.

4. A balancing device holds heavy tools and takes the weight off of shoulders, back, and arms.



5. Rotatable bee hives decrease the amount of lifting required and can be done from a chair when inspecting the colony or harvesting the honey.



If you or someone you know would like to know more about West Virginia AgrAbility or are having difficulty performing some of your farming tasks, contact Inetta Fluharty at 304-771-8747 or agrability@wvagrability.org for help in finding possible assistive technology solutions.

Insuring against an unexpected drop in cattle prices is as easy as L-R-P

West Virginia farmers have been using this tool for many years. No one will forget what happened to feeder prices last fall.



Go to
<http://www.rma.usda.gov/pubs/rme/lrp-feeder-cattle.pdf>
or contact your crop insurance agent.

Integrated Approach Key for Long Term Weed Control

BY BRUCE M. LOYD
WVU EXTENSION AGENT, LEWIS COUNTY

The question is often ask, “What can I use to control fill in your favorite weed here”? The person asking the question is looking for a herbicide recommendation. While herbicides are a tool to use in the quest to remove unproductive plants, they should not be the first consideration.

Maybe the question ought to be, “What changes can I make in my management that will get rid of this plant, or at least make it less likely to come back if I do spray a herbicide”? Whatever is growing in your pastures – whether it is a desirable forage species or a weed – it is grow-

ing there because it has responded well to the management of the field.

That does not necessarily mean the management is bad. Sometimes, certain weeds respond to the same things that our desirable forage species do. However, each time

Long Term Weed Control cont.

a herbicide application is being considered, you should ask yourself if there are any management changes that can be made to make it more difficult for this weed to survive.

Most herbicides used in pastures are selective to control broadleaf plants, but they will not kill grasses. However, since legumes, such as clover, are broadleaf plants, these herbicides also kill them. Legumes are very beneficial in pastures, so herbicide applications that kill legumes can be counterproductive.

If a pasture or a hayfield is infested with weeds at high population levels, it may be prudent to use effective herbicides to manage them first at the risk of losing desirable legumes, and then carry out proper agronomic practices described herein to prevent or delay future infestations.

The best approach to weed control is the integrated approach. Keeping pastures healthy is the first step. Practices that are part of healthy pasture might include soil fertility, pasture rotation, multispecies grazing, clipping to reduce weed seeds, and using herbicides wisely.

Start with soil fertility. It is well known that low soil pH or low levels of the major minerals phosphorus and potassium can lead to increased weed problems. This happens be-

cause most of the desirable forage plants are much more productive when soil pH is around 6.4 and phosphorus and potassium are adequate. When the soil fertility is poor and the desirable plants are not as thrifty, weeds can gain a competitive advantage because they can thrive in the poor soil fertility conditions.

A soil test will show what you have. Then make lime applications, if needed, to raise soil pH. Due to cost of fertilizer and/or availability of animal manure, you may need to prioritize fields, or raise the fertility level in stages. Most pastures with low soil fertility did not get that way quickly and will not be brought up quickly, except at great expense.

It is a great benefit for weed control when the pasture is divided and the animals rotated. If the pasture is continuously grazed – that is, livestock turned out in the spring and left on the same pasture until they are removed in the fall – your management is likely giving assistance to the weeds. Consider: in a continually grazed pasture, the desirable forage plants you want to see thrive are defoliated (leaves removed) on a regular basis. In areas close to water, this may happen every few days. The weeds livestock won't eat grow steadily as livestock continually crop off their competition - the desirable plants.

There is a program where cows can maybe be trained to eat the weeds they usually won't – but that is a topic for another day. Rotational grazing is the first step in teaching cattle to eat the more palatable weeds. In fact, some plants that we think of as weeds, such as dandelions and plantain, are eaten by and are beneficial to the animals since they carry trace minerals that are typically low in grasses and clovers.

So continuous grazing puts our desirable forage plants at a huge disadvantage. When the pasture is divided and rotated, all areas of the pasture have a rest period. During this time, grasses and legumes are allowed to grow taller, send roots deeper, and compete with the weeds for sunlight and moisture. Maybe more importantly, they get the opportunity to form a denser sod where new weed seedlings have difficulty getting established.

Weeds are opportunists. Give them an opportunity to grow and they will not disappoint. One of your jobs as a grassland manager is to reduce or eliminate those opportunities for weeds.

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Organic Methods of Plant Disease Management on Small Farms

BY: MAHFUZ RAHMAN, PH.D.

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Plant diseases caused by various microorganisms can cause enormous losses if weather conditions are favorable and growers do not pay attention to abnormal plant growth. These diseases are difficult to cure for several reasons. Primarily, these organisms are hard to see because they are so small. In many cases, the abnormality or symptom is visible after the organism has been inside the plant tissue for a significant time. This is among the reasons large scale commercial growers apply preventative synthetic chemicals regularly when weather conditions are favorable for disease development.

In small scale production systems where growers don't wish to use any synthetic products, a stringent set of good agricultural practices from seed selection to post-harvest handling of produce should be followed. It is imperative to keep in mind that small scale organic growers can utilize many different options to keep their crop free from diseases without synthetic chemicals.

1. Choose healthy seeds and transplants from resistant cultivars. Many disease causing organisms (patho-

gens) can be hitchhikers on, or inside, seeds. These are called seed-borne pathogens. During seed production in humid regions, seeds can be infected with many tiny organisms. Growers should purchase seeds from reputable companies that have been tested and certified to be below a certain infestation threshold or that have been treated to reduce pathogen infestation levels. If you keep your own seeds, the same level of precaution is needed. Seed treatment protocols are available from <http://ag.umass.edu/news/hot-water-treatment-of-seeds>.

If growing from transplants, they should be free from pathogen contamination and free from visible symptoms of disease. A simple trick is to keep a representative sample from the transplants trays under a humid plastic chamber for three to four days. If transplants are infected with a pathogen, they should show symptoms very quickly. This test is applicable to many diseases, but not all.

If any disease reoccurs yearly, select a resistant cultivar of the same crop. For example, State half runner green beans don't have any disease resistance and may be affected by rust, among others. In this situation, cultivars such as Boone, Concesa, Crockett, Embassy

and Hickok can be selected. A full list of vegetables with resistances and the vendor to buy them from can be found here: http://vegetablemdonline.ppath.cornell.edu/Tables/Bean_GreenTable.html.

2. Follow cultural practices that diminish the chance of disease introduction. In West Virginia, most growers start their transplants in a greenhouse or heated facility. Growers should make sure that all materials used in the transplant production system are clean and free of pathogens. By using clean, or new, pots, trays and soil-less potting mix, a grower can prevent the introduction of soilborne pathogens into the greenhouse system. Pots, stakes and trays can be reused only if they are properly cleaned with steam, bleach or other disinfectants. Intercultural operations should not be done during rainy weather or when plants are wet. Fungal spores can easily disseminate and cause new infection in these conditions. Take similar precaution with pruners and other tools. Disinfect them often while pruning diseased twigs or limbs from a tree.

Farm workers should also refrain from smoking while working with Solanaceous crops such as tomatoes. To-

Plant Disease Management cont.

bacco Mosaic Virus can easily spread from smokers' hand to plants. Field sanitation can also significantly reduce the chance of a disease organism's survival from one season to another. For example, fungal pathogens that cause early blight or Septoria leaf spot on tomatoes can survive on plant debris. Removing debris from the field or deep plowing plant residue helps decompose the tissues and kills the organisms quickly.

3. Rotate crops and treat soil with beneficial microbes and plant residues. Disease causing pathogens build up at a specific site over time if the same crop is grown for consecutive years. It is especially true for soilborne pathogens. If an area is infested with a pathogen that affects one family, a crop from a different family should be planted in the area the following year. The length of crop rotation will depend on the survival potential of a specific organism. In general three to four years is sufficient.

Some crops also have a suppressive effect on diseases. For example, after broccoli and other crucifer crops are harvested and the plant residue is plowed into the soil, the decomposition of the stems and leaves releases natural chemicals that can significantly reduce the number of *Verticillium dahlia* or *Fusarium sp* that cause wilt disease on many crops. This "broccoli effect" can be an important for crop rotation strategies. A recent study at the WVU Organic Farm showed that incorporating mustard plant residue or

mustard meal in infested soil reduces disease severity of soilborne diseases. This study also included beneficial microbes and grafting of tomatoes on resistant root stocks **(see Table 1)*

4. Utilize non-synthetic products for plant disease management. Organic producers with small farms can take advantage of approved non-synthetic chemicals and many beneficial microbe-based products that are listed at the Organic Material Review Institute website <http://www.omri.org/omri-lists>.

However, many of these products are not reported to control disease as well or as consistently as synthetic products. An important consideration for using such products is to apply them preventatively. Look for test results that use these products from reliable sources, especially from university researchers. Fixed copper such as copper hydroxide, copper sulfate, copper oxychloride sulfate and copper ions linked to fatty acids or other organic

molecules (such as Tennocop and Cueva) can be used to control bacterial, a number of fungal and oomycete diseases. The objective of using fixed copper is to ensure slow release (at ~pH 7.0) of copper ions that kill pathogens. However, if the water source pH is low, too many copper ions can be released at a time, absorbed by the plants and then the plant cells are killed. This is known as phytotoxicity. That's why it is critical to check the pH of the water source that is used to prepare a spray solution. Elemental sulfur can also reduce a number of fungal diseases including powdery mildew.

5. Balance nutrition. Vigorously growing plants can resist an onslaught of disease causing pathogens better than those with compromised growth due to imbalanced nutrition or a poor growing site that lacks adequate sunlight or drainage. Plants that receive too much nitrogen that show an excess of lush growth are also more susceptible to many diseases. For example, shoot blight due to the fire blight pathogen on apple trees is much more

*Table 1

Treatment and rate	Application method	Verticillium wilt (severity)*	Total yield (lb/plot)**	%Yield increase over non-treated
Non-treated check	N/A	28.5 a	32.1 c	-
Mustard cover crop "Caliente" 10 lb/A	Incorporated	7.8 b	36.9 bc	15
Mustard seed meal 4000 lb/A	Incorporated	10.8 b	42.9 b	36
Serenade Soil 1.34ASO 0.25 fl oz/oz 10 fl oz/gal 5% (v/v)	On seeds Potting mix Transplant water	7.8 b	42.0 b	36
Prestop 32WPO 0.25 oz/oz 10 oz/gal 2% (w/v)	On seeds Potting mix Transplant water	10.2 b	39.9 b	26
Grafted plant, 'Maxifort' rootstock	N/A	9.0 b	59.1 a	84

* Values represent average number of symptomatic leaves/plot. Means within a column followed by the same letter are not significantly different by Fisher's protected LSD test ($\alpha = 0.05$).

** Ripe tomatoes were harvested twice a week but the last harvest included green ones as well that accounted for total yield. Each plot had three plants.

Plant Disease Management cont.

serious on those with too much growth due to high nitrogen. On the other hand, potassium, silicon and calcium were found to suppress many diseases. If calcium is applied before harvesting apples and peaches, the higher calcium content in cell walls can prevent post-harvest decay or diseases.

6. Eradicate plants with diseases.

When plants show disease symptoms,

pathogens are already inside the tissue and it can be very difficult to kill. A good option is to remove those plants from the growing area so that disease organisms do not spread to healthy plants nearby. This is especially true for viral diseases. Any plants with distorted or curled leaves should be removed as soon as it is determined that the symptom is consistent with a viral disease. Weeds and other alternative

disease hosts can serve as a pathogen reservoir. Eradicating alternative hosts can also be very effective in preventing disease spread. For example, Solanaceous weed hosts, such as night shade, horse nettle and jimson weed are known alternative host of Septoria leaf spot that affects tomatoes.

Stocking Rate Affects Net Income and Drought Management

BY DR. EDWARD B. RAYBURN
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Livestock producers often think that they make the most money when they ship the most calf weight off the farm. However, when economics and risk management are concerned this is not the case. The economic view is of net income not just the check received for the calves. Risk management addresses the issue of what happens in a dry versus an average year. The following West Virginia case study can be useful in looking at the interplay of stocking rate, calf gain, economics and risk management.

A cow-calf farm was destocked due to a major drought in 1999. Over the following four years the farm was gradually restocked from 22 to 32 cows on the 90 acres of hay and pas-

ture land. This acreage provided all the grazing and winter feed for the herd. As stocking rate increased calf sale weight decreased from 655 to 569 pounds per head. This linear decrease in sale weight per head as stocking rate increased was similar to that documented in numerous research studies.

To calculate gross and net receipts calf sale price was on a slide from \$1.45/lb. for light weight to \$1.41/lb. for heavy weight calves. Cash cost per cow was \$315 to cover worming, fly control, vaccinations, mineral and other cash expenses per cow-calf pair. A fix whole farm annual cost of \$3600 was set for harvesting hay, bush hogging pastures, fence repair, utilities, taxes and other fixed expenses. These

values are averages for the case study farm and will differ from other farms based on local management practices.

When sale weight per head and total sale weight were extrapolated past 30 cows, maximum gross receipts would be achieved with 45 cows (Table 1). Prior to destocking, the farm supported 40 cow-calf pairs with some imported winter feed. When cash costs per cow were used to calculate net cash income, the economic optimal stocking rate was reduced to 35 cows (Table 1, Relative Net Income of 1.00). However, if stocking rate were reduced to 30 cows (86% of the optimum) net income would only decrease 1%. Annual forage yield in West Virginia varies with 2- out of 3-years having yields

Stocking Rate cont.

within ± 25 -30% of average. Thus, by stocking cows at 86% of the economic optimum, net income would be reduced by 1%, while forage production would be adequate for the herd 70% of the time. This demonstrates the value of stocking the farm below the average economic optimum as a management tool to reduce the risk of drought.

Doing so the cow-calf herd will have adequate forage 7 years out of 10 reducing the need to sell cows, purchase hay, and reducing the risk of overgrazing pastures. It is very close to the old western adage of stocking the range at 85% of carrying capacity protects you from drought 85% of the time.

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Stocking Rate	Calf Sale Wt.	Calf Value/Hd †	Gross Receipts	Cash Costs ‡	Net Income	Rel. Stocking Rate	Rel. Gross Receipts	Rel. Net Income
20	657	\$926	\$18,516	\$9,900	\$8,616	0.56	0.69	0.79
25	608	\$860	\$21,503	\$11,475	\$10,028	0.72	0.80	0.92
30	559	\$794	\$23,834	\$13,050	\$10,784	0.86	0.89	0.99
35	509	\$729	\$25,509	\$14,625	\$10,884	1.00	0.95	1.00
40	460	\$663	\$26,527	\$16,200	\$10,327	1.14	0.99	0.95
45	411	\$598	\$26,889	\$17,775	\$9,114	1.28	1.00	0.83

† Price of calves used a linear decline from light calves priced at \$1.45/lbs. to heavy calves priced at \$1.41/lbs.

‡ Annual variable cost/cow was \$315, with a fixed cost of \$3600

Vendor Applications due March 1 for the 2016 Winter Blues North Farmers Market

The WVU Extension Service West Virginia Small Farm Center and the Morgantown Farmers Market Growers Association (MFMGA) are excited to announce that the 2016 Winter Blues North Farmers Market will be held on March 24 from 4-7 pm at the Ruby Community Center at Mylan Park in Morgantown, WV. Vendor applications are being accepted now. The application packet may be found at the MFMGA website: www.morgantownfarmers.org. The deadline to apply is March 1.

This premier event gives the opportunity to showcase the bounty of West Virginia and demonstrate the variety of products available in winter months. The market is a producer-only market and does not permit reselling of items. The 2015 market featured a host of produce, meat, woolen, wood, and other farm-raised items, and was an excellent income-generation opportunity for participating farmers.

This year the market expects to attract even more vendors and customers. The event will feature local musicians and restaurateurs as well with food available for purchase. Minimal entry fees will be charged to customers. MFMGA will donate proceeds to Empty Bowls, an anti-hunger organization.

For more information about the event or to apply, see the MFMGA website (www.morgantownfarmers.org) or contact MFMGA president Kathy Evans at evansknob@aol.com

Noninsured Crop Disaster Assistance Program (NAP)

NAP provides financial assistance to producers of noninsurable crops when low yields, loss of inventory, or prevented planting occur due to natural disasters.

Go to: <https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/noninsured-crop-disaster-assistance/index>
or contact your FSA Office.

