

# Beginning Farmer Series

## *Plant-based enterprises*

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This presentation is intended to introduce beginning farmers, or people considering entering commercial agriculture, to the broad area of plant-based enterprises.

## Tonight's Discussion Topics

- Management considerations
  - Business concepts
  - Crop vs livestock factors
    - Recordkeeping
    - Cost of production
    - Marketing
- Basic factors/decisions
  - Conventional vs organic
  - Soil considerations
  - Production systems
    - U-pick
    - Hoophouse
  - Rotation planning
- Crop opportunities
  - Hay
  - Small grains
  - Tree fruit
  - Small fruit
  - Vegetables
- Equipment considerations
- Environmental considerations
- Sources of information
- Reflections for small farmers


We will attempt to cover a few management considerations without repeating information already presented in the previous sessions on 'farm business basics', and 'animal-based enterprises'.

We will discuss some basic issues common to anyone growing crops, including choosing between organic and conventional production, soil factors, selecting an appropriate production system, and crop rotation

A variety of potential crop enterprises will be introduced. Time will not allow for a lot of detail on these subjects.

A few comments on equipment, environmental considerations and sources of information will complete the presentation.

## Business concepts

- Farm business basics – Warren
  - Business management – Frank
    - 3 circles of expertise (finance – production – marketing)
    - SBA – good business plan
    - WOTS plan (weakness – opps – threats – strengths)
    - Merging production and business records
    - Marketing and market research
- 

In the first session of this 3-part webinar series, Warren Schauer discussed farm business basics:

### **Farm Business Basics**

Hobby farm rules  
Farm business plan  
Record keeping  
Basic tax management  
Fuel tax credits  
Sales tax  
PA 116  
Renting land  
Custom work  
Grants & cost shares  
Government programs

In the second session, Frank Wardyski covered aspects of business management related to animal-based enterprises. The concepts noted on the slide also apply to plant-based enterprises.

## Crop-specific business concepts

- Soil test records
  - Crop rotation records
  - Manure, fertilizer and pesticide application records
  - Crop management records
    - Planting, harvest, field activity dates
    - Yields and quality
    - Disease and insect records
  - Financial records for individual crops
  - Certified organic production requires rigorous recordkeeping
- 

A few crop-specific management practices include:

- Keeping systematic and careful soil test records. Monitoring soil nutrient levels provides a good source of information when making important, and expensive, decisions regarding fertilizer
- Crop rotation records: Whether on a field scale, as beds inside a hoophouse or in market garden plots, crop rotation should be carefully planned and followed. The plan should follow a logical, well-informed schedule over a period of 2-5 years, or even longer if semi-permanent crops are planted.
- Detailed records of soil nutrient and amendment inputs, including manure, fertilizers and pesticides.
- Additional crop management records, including:
  - Planting and harvest dates
  - Dates of other field activities (eg side-dress fertilizer, cultivation, hoeing, watering, etc)
- Detailed financial records for individual crops, including cost of production and marketing, and resulting income.
- Organic certification recordkeeping is really a separate topic and involved very thorough documentation. Examples of recordkeeping for the national organic certification requirements can be found at <http://www.ces.ncsu.edu/chatham/ag/SustAg/orgrecords.html>

# Soil Test Reports

MICHIGAN STATE UNIVERSITY  
MICHIGAN STATE UNIVERSITY  
SOIL AND PLANT NUTRIENT LABORATORY  
EAST LANSING, MICHIGAN 48824-1325  
(517) 355-0218

05/16/2005 15:15 986-635-7610 CHIPPEWA CO EXT PAGE: 02  
MICHIGAN STATE UNIVERSITY  
SOIL AND PLANT NUTRIENT LABORATORY  
EAST LANSING, MICHIGAN 48824-1325  
(517) 355-0218 MAY 13 2005

SOIL TEST REPORT FOR: ADDITIONAL COPY TO:

DATE	LAB #	COUNTY	Previous Crop	ACRES	FIELD ID	SOIL
5/16/2005	3172	Alger		20	1	Mineral

SOIL NUTRIENT LEVELS		Below Optimum	Optimum	Above Optimum
Soil pH 5.6	Lime Index 67.0			
Phosphorus (P) 16	ppm	█		
Potassium (K) 44	ppm	█		
Magnesium (Mg) 42	ppm	█		

ADDITIONAL RESULTS		OPTIONAL TESTS									
Calcium (Ca) (ppm)	CEC (meq/100g)	% of Exchangeable Base				Micronutrients (ppm)				Organic Matter %	Nitrate-N (ppm)
		K	Mg	Ca	B	Cu	Mn	Zn	Fe		
676	7.4	2.9	9.0	88.0							

RECOMMENDATIONS:  
Limestone: 2 ton/A Tillage Depth: 6 inches  
Target pH = 6.5 % Stand:

Year Crop	Expected Yield				Micronutrient (Optional)			
	Nitrogen (lb N/A)	Phosphate (lb P <sub>2</sub> O <sub>5</sub> /A)	Potassium (lb K <sub>2</sub> O/A)	Yield	Boron (lb B/A)	Manganese (lb Mn/A)	Zinc (lb Zn/A)	Copper (lb Cu/A)
1 Oats	90 bu	35	25	85	0.0			

This is a weakly buffered soil, so the lime recommendation is based on soil pH and target pH for the first year crop.

2 Barley	70 bu	45	25	85	0.0			
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This is a weakly buffered soil, so the lime recommendation is based on soil pH and target pH for the first year crop.

Test Methods: 1-11 soil/water pH, 2- Bran P1 Extractant, 3-1N Ammonium Acetate Extractant

SOIL TEST REPORT FOR: ADDITIONAL COPY TO:

DATE	LAB #	COUNTY	Previous Crop	ACRES	FIELD ID	SOIL
5/9/2005	31293	Chippewa	Pasture-Intensive Grazing	33		Sample #1 Mineral

SOIL NUTRIENT LEVELS		Below Optimum	Optimum	Above Optimum
Soil pH 6.6	Lime Index 70.0			
Phosphorus (P) 6	ppm	█		
Potassium (K) 59	ppm	█		
Magnesium (Mg) 207	ppm	█		

ADDITIONAL RESULTS		OPTIONAL TESTS									
Calcium (Ca) (ppm)	CEC (meq/100g)	% of Exchangeable Base				Micronutrients (ppm)				Organic Matter %	Nitrate-N (ppm)
		K	Mg	Ca	B	Cu	Mn	Zn	Fe		
1062	7.2	2.1	24.0	73.9							

RECOMMENDATIONS:  
Limestone: NONE Tillage Depth: 6 inches  
Target pH = 6.5 % Stand:


Year Crop	Expected Yield				Micronutrient (Optional)			
	Nitrogen (lb N/A)	Phosphate (lb P <sub>2</sub> O <sub>5</sub> /A)	Potassium (lb K <sub>2</sub> O/A)	Yield	Boron (lb B/A)	Manganese (lb Mn/A)	Zinc (lb Zn/A)	Copper (lb Cu/A)
Pasture-Intensive Grazing	6 ton	160	75	162	0.0			

Apply nitrogen in split applications of 40 to 50 lb/A at green-up, near June 1, near August 1 and near September 1.

Soil testing is actually a part of production records AND business records. The results of soil tests provide valuable information regarding the types and amounts of soil amendments, fertilizers and lime you may choose to apply. For field crops, soil testing every 3 years is recommended by MSU. A soil test should not include more than 20 acres and should take account known differences in past management or soil conditions. The 'regular' MSU test gives soil levels of phosphorus, potassium, magnesium and calcium, soil pH, lime index and other information. For an extra fee, MSU can provide % soil organic matter, various micronutrient levels, and other soil parameters.

Monitoring changes in pH and plant nutrient levels can result in decisions that save (or make) money.

## Rotation planning

- Critical for all annual crops, all systems, any scale
  - Reduces pest pressure
  - Use complimentary crops
    - Rye, sudangrass suppress/reduce weed populations
    - Legumes fix nitrogen – clovers, alfalfa, trefoil
    - Hi-volume biomass crops enhance OM
  - Utilize livestock and grazing in rotation if possible
    - Cattle, sheep, goats, swine, poultry
  - Doubling plot size can allow for alternate year soil building
- 

Crop rotation is an important function regardless of your scale of production. There are many benefits in a well-planned rotation. Likewise, there can be problems associated with a poorly designed rotation plan.

Many plant diseases and some insect pests overwinter in soil, so moving your crops reduces the chances of reinfection the following year. Some crops, including fall rye and sudangrass suppress weeds. Others, including the legumes, supply large amounts of nitrogen to the crop that follows.

Livestock, if available, can also compliment crop rotation systems. Grazing animals distribute nutrients through manure and can help manage weeds.

For market gardeners, if space is available, consider doubling the size of your production area and maintaining half of it in a soil-building crop in alternating years, switching your market crops back and forth annually.

## Western U.P. Rotations

- **Long Rotations** similar to eastern U.P.
  - Differences include more soil variability, less flat terrain, little hay exported
- Grass/clover/trefoil stands occasionally broken by small grains w/seeding
- Some winter wheat, field peas and corn silage



Rotations on traditional U.P. farms involve mostly field crops. In the western and eastern U.P., soils are predominantly heavy textured (clay) and crop choices are limited. Fields are often left in hay for prolonged periods, up to 10 years or more, followed by a single year in small grain such as oats with a new hay seeding included, then back to hay. There are some variations which include winter wheat, field peas and other annual forage crops.

## Central U.P.

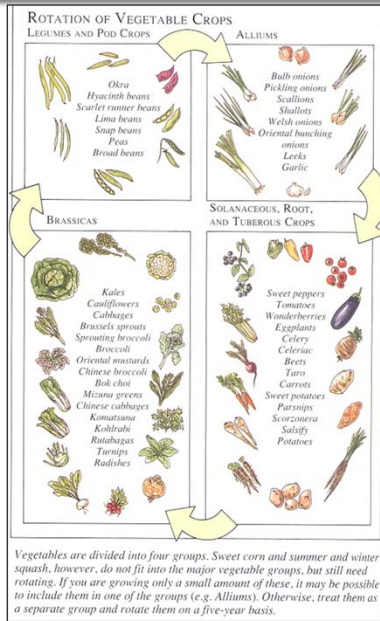
- **Main crops**
  - Hay – alfalfa, grass, grass/legume
  - Small grains – barley, oats, wheat
  - Corn – silage or high moisture grain
  - Others - Potatoes, dry beans, soybeans
- **Planting dates** – late April through May
  - Oats – potatoes – barley – corn – alfalfa
- **Harvest** through October
- **Soils** typically well-drained, variable pH



In the central U.P., soil types are typically better drained and crop choices are somewhat more diverse. Along the southern shore of the U.P., soils tend to be less acidic (higher pH) and more suitable for alfalfa. The majority of the better, tillable land is rotated with forages including alfalfa and grass/legume mixtures, small grains, corn and potatoes.



# Crop Rotation



## Advantages:

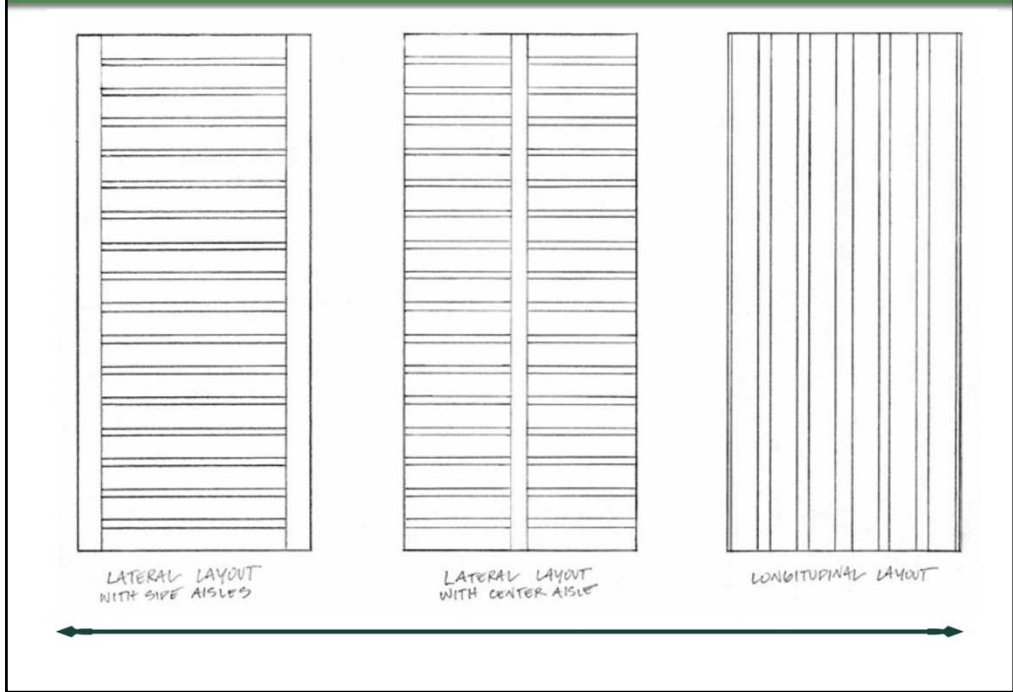
1. Prevents pest populations from building up.
2. Allows for soil improvement with manure/cover crops.

## Disadvantages:

1. Ideally suited for longer periods of time than feasible.
2. Short distances between beds - diseases can still spread.
3. Less practical in small garden

Phillips & Rix, 1993. *Vegetables*, Random House, NY.

On smaller acreages, market gardens or hoophouses with more intense cultivation of annual crops, crop rotation can be more complicated. Vegetables must be rotated very deliberately to minimize soil-born diseases. In smaller plantings, vegetables can be grouped into families and rotated as 'blocks'.



These sketches reflect planting bed patterns inside a hoophouse. Although rotation distances are limited, growers should still plan carefully to rotate as much as possible.

## Crop Rotation: *Options to Consider...*

- Insertion of cover/green manure crops where conditions allow:
  - Buckwheat
  - Fall rye
  - Red clover
  - Sorghum sudan
  - Field peas
  - Winter wheat
  - Others?



If your system allows, consider fitting cover or “green manure” crops into your rotation plan. Where space is not limiting, plots could be rotated out of production for a season and planted to soil-building crops. This will also help suppress soil-borne diseases.

If market opportunities, or on-farm uses, are available, rotating into a forage legume or small grain crop will also help build soil health.

Some cover crops, like fall rye or oilseed radish, can be sown in mid-late summer following harvest and provide a good boost to the following crop.

## Benefits of cover/conditioner crops

- Provide nitrogen
- Add organic matter
- Improve soil structure
- Reduce soil erosion
- Provide weed control
- Manage nutrients
- Furnish moisture-conserving mulch



Cover crops can provide a variety of benefits, including suppressing problem weeds, scavenging and storing plant nutrients in their tissues, and building up soil nitrogen (legumes) and organic matter.

## Preparing an old field for production:

- In spring, sow buckwheat, sorghum/sudangrass, millet, oats or some other spring-seeded annual crop with adequate lime and fertilizer.
- Work this crop into the soil in early August. It may need to be mowed before tilling.
- Sow fall rye in mid-late August. Rye will be very attractive to wildlife and regrow vigorously in spring. Rye is an excellent “scavenger” crop and will be able to extract plant nutrients unavailable to many other crops. These nutrients will become available to the following crop as the rye residue decomposes later.
- Work the rye into the soil in May
- Repeat the process for another year, or prepare the soil for a semi-permanent seeding (clover, alfalfa, grass, etc)



This basic soil-building program has proven effective for people starting with very poor sites. Information from a soil test is very important when deciding if a field or plot is ready for the intended crop.

Financial recordkeeping – review Warren’s info

Production records – rotation, inputs, weather, pest control, dates/rates, inputs, varieties, yields, quality, etc

Cost of production – *highly important info!*

Marketing records – method, price, transportation, etc

Recordkeeping for certified organic production



Careful bookkeeping is critical to your plant-based enterprise. Financial recordkeeping was covered during our first session. Crop production records should be as detailed as possible and include the basics (location, dates of planting/harvest, varieties, rate of seeding, rainfall/irrigation amounts and dates, fertilizers/manures/amendments, yield, quality and other pertinent factors).

Using financial and production records, a ‘cost of production’ can be estimated. This figure will be useful as you consider your marketing options and the price you must receive to make an acceptable profit.

Unless your crop is a hobby, you should make decisions based on hard financial facts. If it IS a hobby, then maybe its OK to continue in a ‘net loss’ or ‘break-even’ fashion.

Keep track of all your marketing contacts, available opportunities, volumes, prices and expenses.

If you are engaged in, or plan to pursue, certified organic production, then you must spend some time exploring the recordkeeping requirements. A sample of organic recordkeeping templates from North Carolina State University Extension is included in the supporting documents for this webinar. The recordkeeping is very extensive for certified organic producers.

Some basic plant enterprise factors....



The following are a few general ideas about start-up crop enterprises.....

## Scale of production

- Start small and build on experience
- New crops must be 'learned'
- Research available markets
- Develop a plan for excess or poor quality product
  - Low value markets
  - Donation
  - Compost
- Utilize your business plan



Start small, that way your mistakes and problems are smaller and you can grow as you gain experience and success.

New crops generally present a pretty steep 'learning curve'. It may take a few years to become familiar with the details.

Before investing your time and money into a new plant-based enterprise, make sure you have a realistic picture of the markets available and how you could exploit them.

Have a firm idea about how you can dispose of unsold, perishable product.

As you've already heard, develop a good business plan, modify carefully as you go, and stick to it.



## Suggestions from an experienced U.P. cabbage / U-pick strawberry producer

- Start small. Old sod fields generally have lots of problems – white grubs, wireworms, cabbage maggots and weed problems. Better to deal with a small-scale problem than a large one.
- Fencing is necessary if deer are plentiful
- Irrigation will probably be needed. It has been most years.
- Work up the ground one year ahead of time to minimize white-grub problems
- Kraut cabbage varieties work best. Transplants will cost ...
- Mangles are easier and cheaper to produce than cabbage.
- Try different varieties and techniques. You need to experiment to see what works best for you.
- It took me about six weeks to sell eight acres (1990) worth of cabbage (9/15 – 11/1). This is a considerable investment of time
- I suggest starting up with one acre cabbage and  $\frac{1}{2}$  - 1 acre mangles.

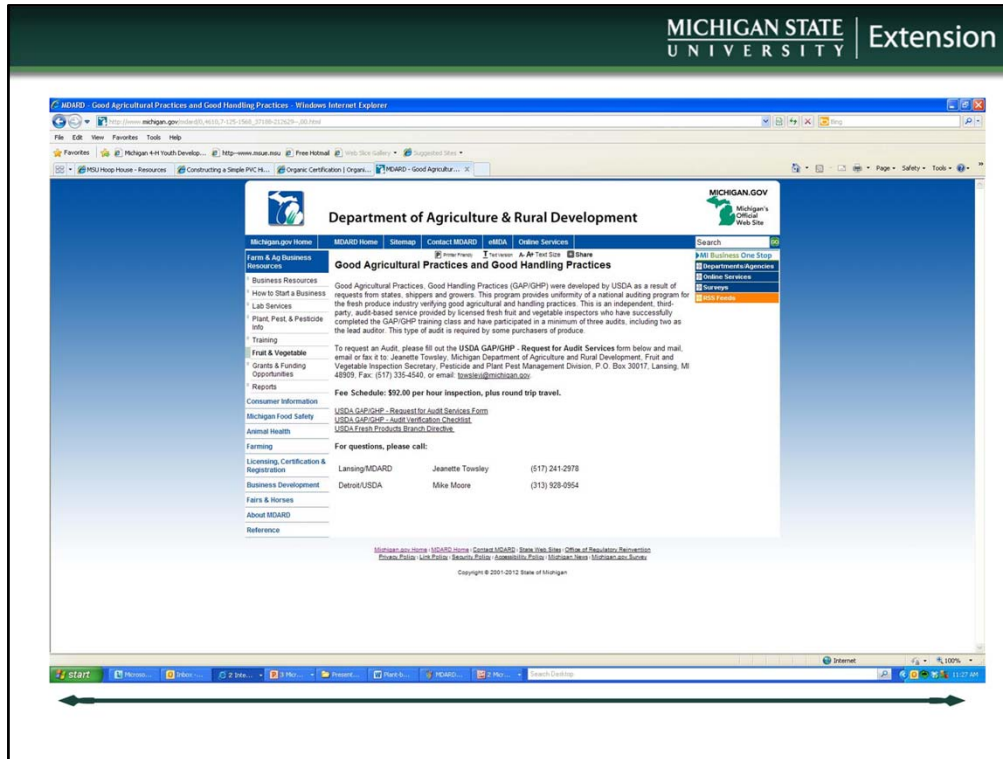
This set of suggestions serves as an example of things to think about. The suggestions were directed to people thinking about raising cabbage for deer hunters during the 1990's. They were provided to me years ago by the legendary Delta County Extension Director Don Pelegrini.

## Rules and regs

- Are there any for your product or practices?
  - Food processing
  - GAP inspection
  - MI Right-to-Farm
  - MI Cottage Food Law
- Check with MDARD, local health department



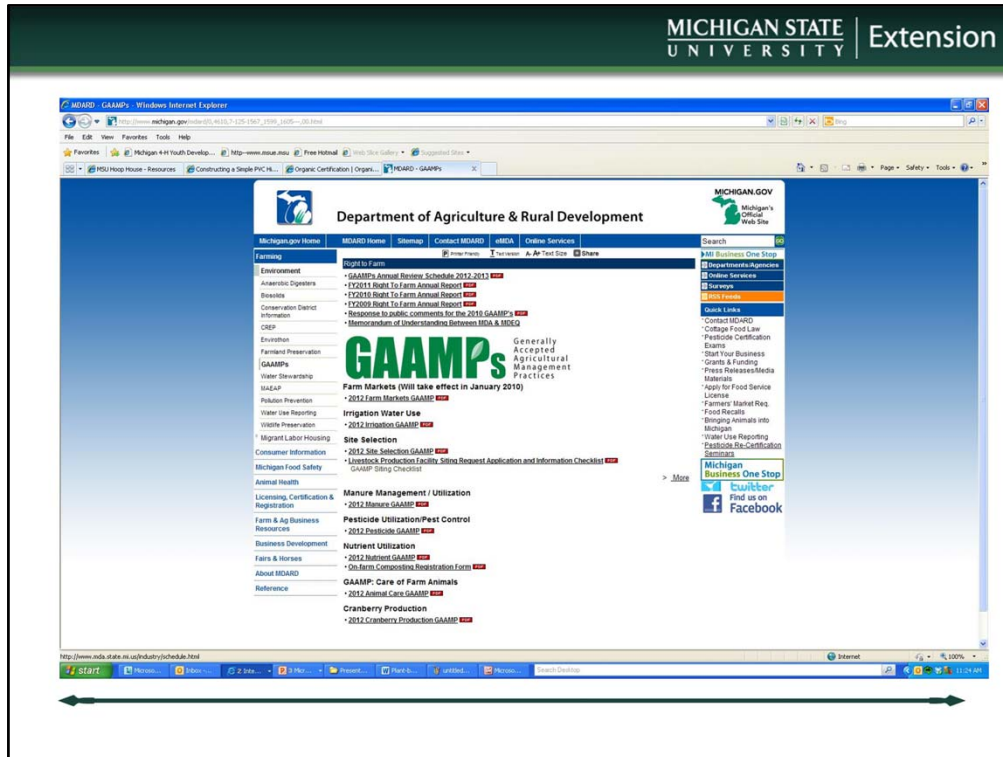
There are numerous guidelines and regulations that impact farmers across Michigan. Some may apply to you, depending on how you produce and market your product.



GAP (Good Agricultural Practices) certification is NOT a government regulation. GAP is a set of standards developed by large scale purchasers of agricultural products, mostly fruits and vegetables, to ensure that certain food safety practices are followed by the farms from which they buy their products. Spartan Foods, Walmart, Welches, and many food processors are examples of companies which require their suppliers to be GAP certified.

GAP inspection is conducted by private contractors and state government employees for a fee (paid by the farmer!). It is quite a rigorous process.


Small farmers selling direct to the public have no need to pursue GAP certification. However, the process is filtering down to local food systems. The Marquette Food Co-op recently sponsored two food safety workshops featuring MSUE educator Phil Tocco to introduce on-farm food safety issues to UP farmers supplying fresh produce to the co-op.



The Michigan “Right-to-Farm” law affects all farmers in Michigan. The purpose of the law is to protect farmers from ‘nuisance’ lawsuits. This is accomplished by setting a minimum standard of farmer performance regarding how they manage certain environmentally and socially sensitive tasks including manure management, care of farm animals, and others. The list from the Michigan Department of Agriculture and Rural Development website is shown.

Any complaints reported to the MDARD are followed up by a farm visit from an MDARD official, who determines if any GAAMP (generally accepted agricultural management practice) has been violated by the farmer. If not, then no action is taken. If yes, then the farmer is notified and given a timeline to make the necessary improvements.

## Conventional vs Organic

- Ethical / philosophical / social motivations
  - Profit potential / marketing motivations
  - Certified organic vs 'natural' products
  - Organic certification process
    - Certifying agencies
    - Transition period
    - Inspection
    - Recordkeeping
- 

People choose to adopt organic production practices for a variety of reasons. Sometimes these reasons involve deep commitment to an ethical, philosophical, social or health-motivated framework. Sometimes producers want to enter a marketing system with a very different framework than the established 'commodity' markets, often involving much higher prices for products.

Many U.P. growers raise and market 'natural' plant products, but do not undergo or maintain organic certification. Our local markets seem to allow this. The National Organic Program (NOP) rules allow small farmers and handlers who follow the national organic standards to sell their product as "organic", if and only if they: a) sell less than \$5,000 worth of organic agricultural products per year; **and** b) follow the national standards for production, labeling, and record keeping.

Review the MSU Extension publication "Transitioning to Certified Organic in Michigan – Where to Start?" at

<http://www.michiganorganic.msu.edu/uploads/files/31/TransOrganic.pdf>

This publication was also provided to webinar participants by email and during the webinar.

## What is my land suitable for?



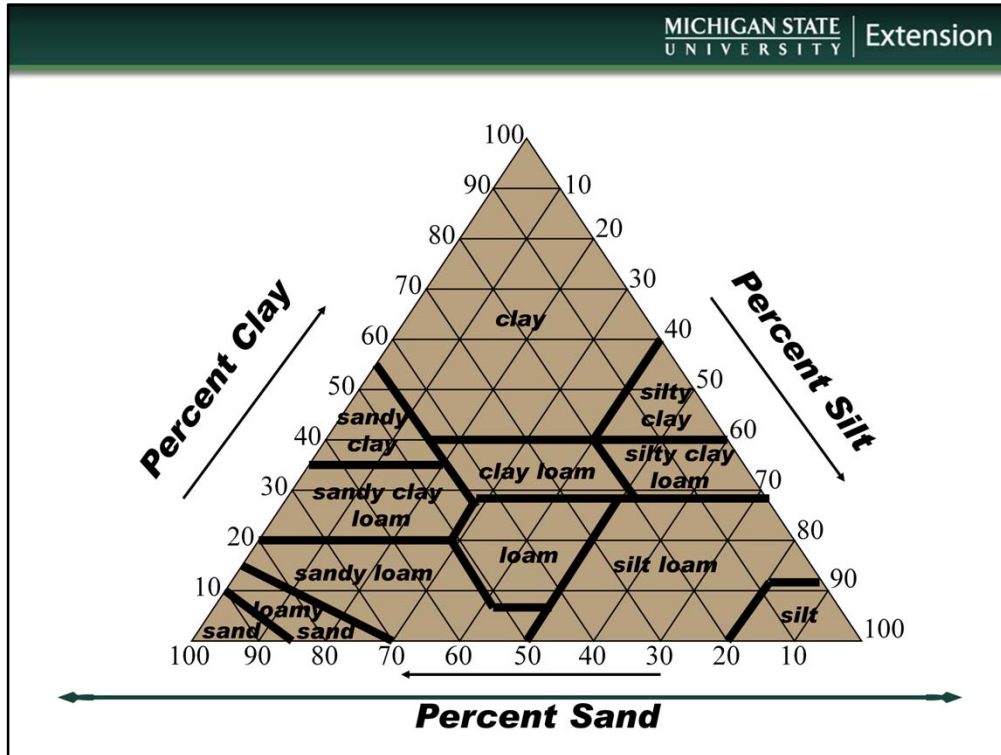
If growing crops on a smaller scale, such as in a hoophouse or in raised beds, you can make major adjustments to soil characteristics. However, if growing on a larger scale, you will want to carefully select appropriate crop species. For example, poorly drained soils are not suitable for apples, alfalfa, or canola.

## Soil considerations

- pH
- Nutrient status
- Organic matter status
- Soil texture
- Soil drainage
- Soil testing
  - MSU
  - AgSource
- County soil map information



Knowing as much as possible about your soil characteristics will be helpful. Soil test results, personal observation of texture and drainage and information available through NRCS soil survey data are great things to access.



Textural Triangle can be used to determine the texture of a soil.

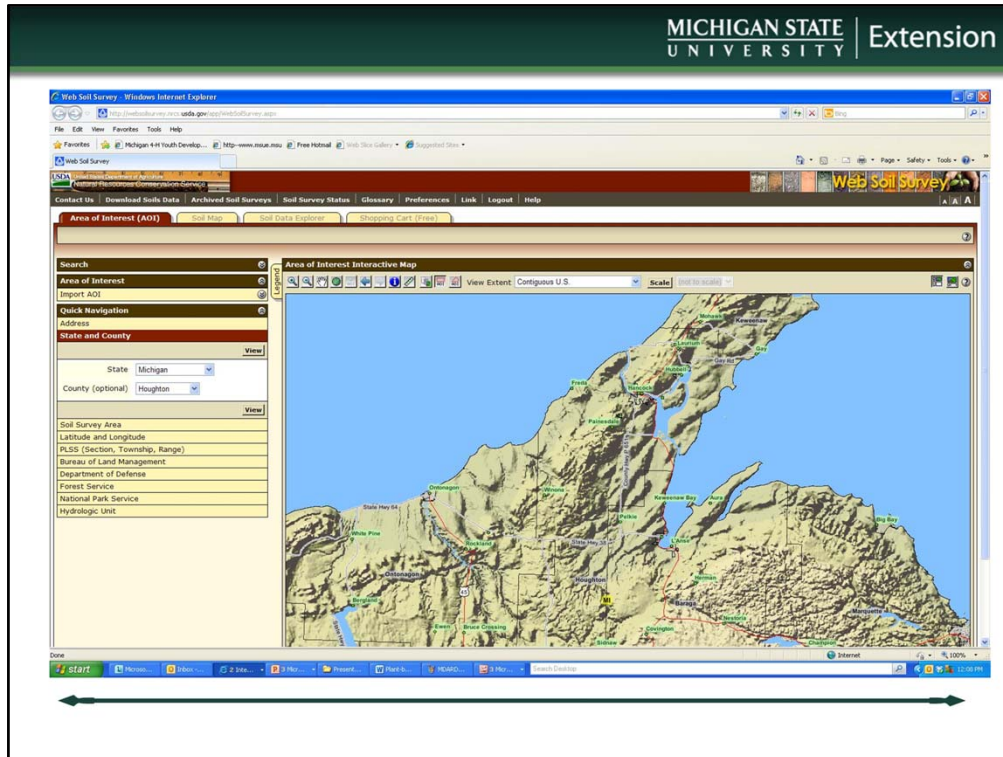
If the soil is 60 percent sand, 10 percent clay and 30 percent silt, what is its texture? Answer: sandy loam

If the soil is 40 percent sand, 20 percent clay and 40 percent silt, what is its texture? Answer: loam

If a soil is 20 percent sand, 10 percent clay and 70 percent silt, what is its texture? Answer: silt loam

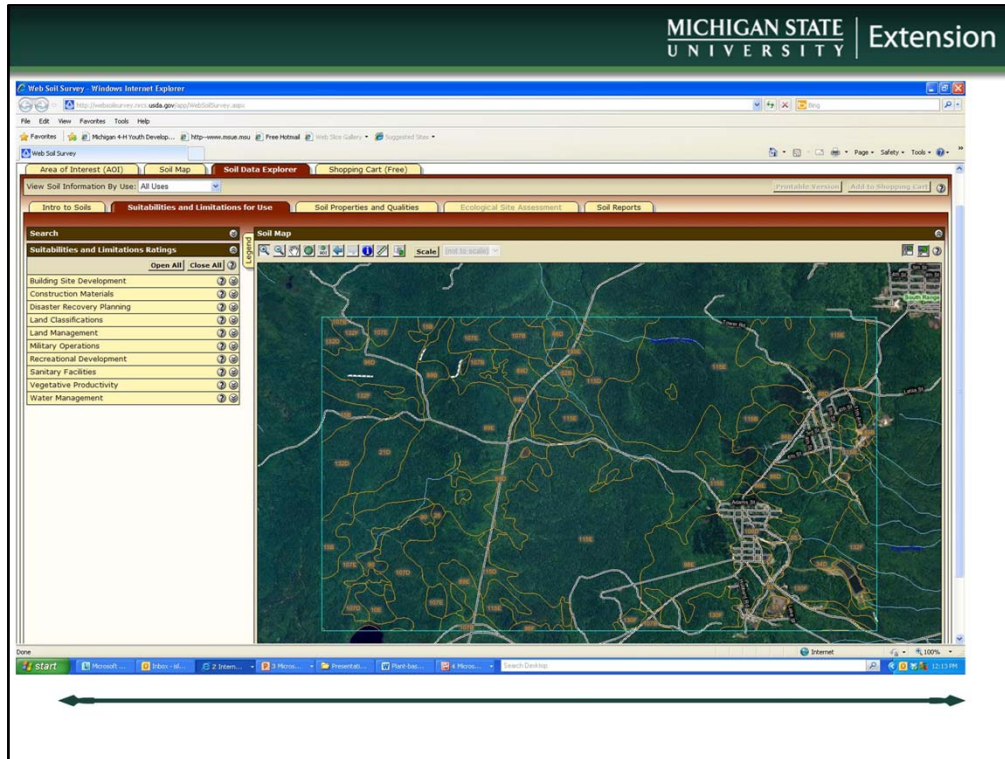
If a soil is 20 percent sand, 60 percent clay and 20 percent silt, what is its texture? Answer: clay





This is a screen shot from the NRCS ‘Web Soil Survey’ website. Paper soil test map books may be available for your location, but the USDA is focusing on making soil survey information available over the internet. It takes some time to learn to navigate the system. Once you do, you can pinpoint your land and gain considerable knowledge about the soil types present and their suitability for a variety of uses, including crop production, forestry, and building sites.

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>



Defining your 'area of interest' and selecting the appropriate overlays will give you details of the layout of soil types on your property. You can then access the characteristics of the individual soil types.

You should learn as much as you can about the soils on your own property, and on any property you are thinking about renting or buying.

## Crop production systems

- Field crops
    - Conventional tillage vs minimum tillage or no-till
  - Market garden scale
    - On-farm sales, farm market sales, CSA
  - Passive solar greenhouse (hoophouse)
  - Heated greenhouse
  - U-pick
    - Small fruits, tree fruits, vegetables
- 

There are several production systems to consider, including raising and selling 'commodity' or bulk sale products including wheat, oats, beans, etc. These are usually marketed through a broker or larger company. Hay could be considered a 'commodity' crop, although much UP grown hay is fed on-farm, or marketed directly to area farms or horse owners. Several UP farms use no-till or minimum tillage systems to reduce time and expense of seedbed preparation, also to avoid turning up rocks during tillage. No-till has advantages including more potential to build up organic matter in soil, soil moisture conservation, reduced soil erosion potential, and time savings. Disadvantages include increased dependence on chemical weed control, slower soil warm-up in spring, and need for a specialized planter, and removal of cultivation as a weed control option.


Many new U.P. farmers are quite small in scale and plant a variety of vegetable and fruit crops in smaller plots. These crops are then marketed through farm stands, CSA's, local farmers markets, and through local retailers interested in providing fresh, locally grown foods.

Passive solar greenhouses, or 'hoophouses', are becoming more common around the U.P. USDA farm programs support low interest loans for hoophouses, with numerous requirements and 'strings' attached. Hoophouse production can allow for short-season, cold tolerant crops including asian greens, spinach, pok choi, turnips, etc to be sown in late February or early March, harvest completed in May, summer crops established (tomato, pepper, etc), and a third crop planted in August. Two documents are provided to give a good background on the hoophouse system and its economic potential.

Heated greenhouses are needed for growing home garden transplants and baskets. There are a few heated greenhouse operations around the U.P.

U-pick operations are a very unique production system and include a great deal of customer service. Farmers considering U-pick should make sure they can tolerate unexpected behavior from customers. Also, there is considerable loss of product in U-pick operations that should be considered a normal expense. (Imagine people stepping on strawberries.....)

## Irrigation

- Field scale irrigation
    - Center pivot
    - Traveler gun irrigation
    - Solid, stand pipe
  - Small sprinklers
  - Trickle irrigation
    - Emitter line
    - Drip tape
  - State of MI requires irrigation reporting
- 

For those considering horticultural crops (vegetables and fruits), irrigation should be included in the plan. Larger farms utilize center pivot systems or traveler gun irrigators. For smaller field-scale operations, solid pipe with elevated sprinkler heads is more common.

Various systems are used in smaller production, including overhead sprinklers fed by smaller water lines or hoses, soaker hoses and drip, or trickle, irrigation. Of these systems, drip irrigation is probably the most desirable. It conserves water, placing water directly where needed without irrigating elsewhere. It eliminates disease problems associated with overhead irrigation and allows field work to continue during water application. Emitter lines consist of pvc water lines with drip emitter molded in place at intervals (6", 12", 24" etc). Emitter lines can last for several years if maintained properly. Drip tape is less durable and also significantly less expensive. Drip systems are very practical in small plot and hoophouse production.


PA 148 of 2003, as amended, and amendments passed in PA 33 of 2006, as amended:

*All systems with the capacity to withdraw more than 100,000 gallons per day (70 gallons per minute) average in any consecutive 30 day period are required to register and annually report their water use.*




The State of Michigan has strict reporting requirement for irrigators. However, you need to reach a fairly high threshold of water use before the requirements take effect.

## Benefits of drip irrigation

- Water use is reduced.
  - Fewer weeds germinate.
  - Fewer leaf diseases occur.
  - Wetting patterns are uniform (compared to overhead)
  - Field work can continue during watering
  - Soil structure is not damaged by water falling on bare soil
  - Insecticide and fungicide use is reduced (not washed off foliage by overhead watering)
- 

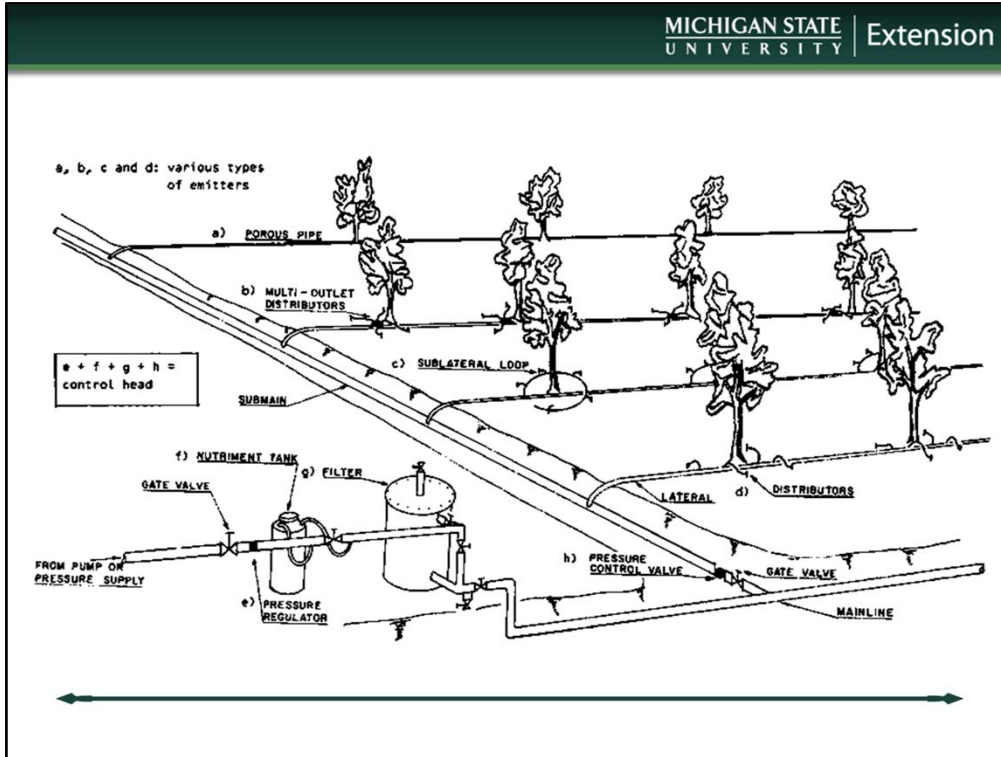
These are some of the main benefits associated with drip irrigation systems.

## Basic Components of a drip system

- Pressurized water supply (well or municipal system, elevated tank)
  - Backflow preventer, if fertilizer is applied through system
  - Filter
  - Pressure reducer
  - Valves
  - Main line (non-irrigating, delivers water to area to be irrigated) and gate valves
  - Emitters (several types: emitter tubing, emitter tape, bubblers, micro-sprayers, laterals, etc)
- 

A person considering this type of system should study to understand what is needed and involved before deciding what to install. The Dripworks.com website has a lot of educational information describing various products and how they work. You can visit at [www.dripworks.com](http://www.dripworks.com). There are also other companies with online catalogues and tutorials. This is not an endorsement of Dripworks over other companies.





This sketch gives an idea how a drip system might be laid out.

Some specific crop enterprises....



We'll now consider a few potential plant-based enterprises for the U.P.

## Vegetables

- Production system
  - Scale of production
  - Field scale
  - Market garden
  - Hoophouse
- Soil management
- Wildlife control
- Marketing
  - On-farm sales
  - Farmer's markets
  - CSA
- Crops species
  - Perennials
    - Aparagus
    - Rhubarb
  - Large volume crops
    - Sweet corn, cabbage, pumpkins, potatoes
  - Smaller volume crops
    - Cole crops
    - Solanacious crops
    - Leafy greens
    - Onion family
    - Others...

There is growing demand for locally grown vegetables. This is a national trend. However, our U.P. growing conditions limit production of warm-season vegetables including tomatoes, cucumbers, peppers, pumpkins, squash and vine fruits like melons.

Some vegetables including pumpkins, sweet corn and cabbage are well-suited to larger scale production and local markets can often accommodate considerable volumes. They are less labor intensive during the growing season than many other vegetable species, but require much effort at harvest time. Crops like cabbage and pumpkin have multiple market opportunities, including sales to hunters, retailers and directly to the public.

If a variety of vegetables are planned for sale as CSA, farm stand or farmers market products, then arrangement in smaller plots and hoophouses is more common. The Market Food Coop is currently seeking to expand the supply of fresh, local vegetables offered through their market store. This could provide an outlet for larger volumes. Consistency of quality and steady supply are needed if working with retailers.


Soil requirements for individual vegetable crops should be researched and carefully considered.

If deer or other wildlife (racoons, skunks, rabbits, etc) depredation is a serious threat, then appropriate measures must be taken. An effective deer exclusion fence may be needed. If so, it should be included in your business plan. Sturdy, tall (8'+), permanent, non-electric fence is the most effective, and most expensive. High tensile electrified fence is also

effective and less expensive, but instead of a true physical barrier, it provides a 'training' program for deer, shocking them when they try to get through. Less substantial fencing can also work fairly well, but requires a great deal of maintenance.

A good general article on deer fencing can be found at  
[http://www.mn.nrcs.usda.gov/technical/ecs/forest/Deer%20Browse/Reference\\_Fences%20and%20Deer%20Damage%20Management.pdf](http://www.mn.nrcs.usda.gov/technical/ecs/forest/Deer%20Browse/Reference_Fences%20and%20Deer%20Damage%20Management.pdf)

## Tree fruits

- Orchard siting
    - Soils, aspect, air drainage
  - Establishment
  - Management
    - Pruning
    - Fertilization
    - Pest control
    - Water
  - Marketing
- Species
    - Apples
    - Pears
    - Plums
    - Tart cherries
    - Apricots
- 

If tree fruits are considered as a commercial crop, the site of the orchard is extremely important. It should be selected to avoid frost as much as possible with good air drainage. Aspect of the land's slope is also important, with north facing slopes desirable to extend bud dormancy in the spring, avoiding bud/flower frost damage. Well-drained soils are very important.

Free-standing fruit trees on semi-dwarf rootstocks typically take about 5 years to come into bearing. Careful attention to training the tree to a desired structure is important during this period. Also, frequent watering is essential during the first year.

Fruit trees take a lot of management to reach their best potential. Annual pruning, fertilizing, irrigation, fruit thinning, pest control throughout the growing season, careful harvest, and post-season sanitation are all components. There is much to learn about diseases and pests specific to the various species...and how to control them. Organic options have improved in recent years, but still involve regular spraying.

As with all plant enterprises, growers should carefully consider their market plan before getting started. However, high quality, local tree fruit should be fairly easy to sell if the price is reasonable. Generally, there are people in most communities willing to pay a premium for locally grown produce of good quality. U-pick may provide a marketing opportunity. With apples, secondary processing into cider or baked goods is feasible. Careful attention to Michigan Food Laws is recommended.

Tree fruit species with good adaptation to U.P. climate include pome fruits like apples and pears. Some stone fruits including plums, tart cherries and apricots can also do well in many locations. However, they are less cold tolerant than the 'pome' fruits. Plums and especially apricots flower very early and are vulnerable to spring freezes that destroy flowers.

Sweet cherries and peaches are not well-adapted to our U.P. extreme cold temps and will eventually be killed off by a deep freeze (15F or colder). Of course there are exceptions here and there in the most unique microenvironments.

## Small fruits

- Siting
- Species
  - Strawberries
  - Brambles
    - Raspberries
      - Summer
      - Fall
    - Blackberries
  - Blueberries



Small fruit production is also an option. Again, siting is important. Well-drained, fertile soils in full sun are needed. Brambles should be located as far as possible from wild stands of raspberries, blackberries or thimbleberries. Irrigation is a must.

## Hay

- Forage species
    - Grasses: Orchardgrass, timothy, smooth brome tall fescue, quackgrass, p. ryegrass, festulolium
    - Legumes: alfalfa, clovers, birdsfoot trefoil
  - Forage management
  - Horse hay
  - Improving hayfields and pastures
    - Alternatives to re-planting
  - Forage testing
  - Marketing and storage
- 

As mentioned in the previous webinar session, the U.P. area is well-suited for hay production. Orchardgrass and timothy are dominant perennial forage grasses. There are others in production, including smooth brome grass, tall fescue, perennial ryegrass, festulolium and more. Legumes include clovers, alfalfa and birdsfoot trefoil.

Many acres of hay ground receive minimal management, with resulting low yield. The economics of hayfield improvement need to be carefully penciled out. It is possible that you could buy hay for your own livestock more economically than you could produce it yourself. If selling hay, you may need to increase yield per acre to allow for more hay from fewer acres. This can save time and wear on machinery. I frequently advise less experienced hay producers to postpone 'breaking up' and reseeding an old hayfield until they attempt to improve it through an improved fertilizer and harvest management strategy. Improved grazing practices can greatly improve hay fields that double as pasture.

Forage testing is a fairly simple and inexpensive way to determine the quality of the hay you are producing. It can serve as a powerful marketing tool, especially with higher quality hay. Horse hay customers are often more interested in green color and 'dust-free' quality than in laboratory analysis. Many U.P. farmers utilize the forage testing services at AgSource Laboratories in Bonduel WI, 715-758-2620 or <http://agsource.crinet.com/page2285/AgSourceLaboratories-Bonduel>

Storage practices are important unless hay is sold right off the field. Dry round bales can be wrapped in plastic or put into plastic 'sleeves' to protect them from moisture and allow



better outdoor storage. Indoor storage is preferable, but expensive. If space in a farm building is underutilized, hay storage could be an option.

Hay markets are very volatile and depend on the weather and regional production. Demand, and prices, can vary widely from year to year.

## Small grains

- Oats
  - Barley
  - Winter wheat
  - Spring wheat
  - Dry field peas
  - Specialty grains
    - Flax
    - Spelt
    - Organics
- 

Small grains prices have been relatively strong in recent years. Wheat has especially become a more attractive option. Oat prices have reached a point where a good oat yield could be moderately profitable. Oat acreage dropped 50% in Michigan from 2009 to 2010, resulting in fair demand. Barley is a good farm-produced feed, but current prices do not indicate that it will have potential as a cash crop this year.

Dry field peas are a practical, cold-tolerant crop for the U.P. and can provide an energy and protein-rich feed product for cattle, swine and poultry. Peas must be processed lightly (cracked or rolled) before feeding. North Dakota State University Extension has good information on feeding dry field peas to livestock. The value of field peas is strongly linked to the price of dry shelled corn and soybean meal. It should be considered an option for on-farm feed, although special arrangements could be made to grow and sell it to interested neighbors. Good markets exist for dry field peas in N. Dakota, too far for economical transportation.

Specialty grains could also be considered. Organic grains are certainly a possibility, but require organic certification, development of marketing contacts, and a longer timeline to enter the business.

## Ornamentals, floriculture, transplants

- Perennials
  - Nursery crops
  - Houseplants
  - MDA license required
- Annuals
  - Flower transplants
  - Vegetable transplants
- Christmas trees
- Competitive market
  - Farm market sales
  - Wholesale
- Specialty plants
  - Cold-hardy varieties
  - Hard-to-find plants
  - Organically produced




Perennial, live plants such as hostas, peonies, landscape trees and shrubs, herbaceous perennials, fruit trees and houseplants can all potentially be grown in the U.P. A state inspection and license is required for selling perennial plants.

Annual plants, usually sold as garden transplants, are produced by many small operations across the U.P. They are sold direct to customers at farms and farmers markets. Some producers also provide wholesale products to local retailers. As an example of very specific market planning, naturally produced, or organic, transplants could be produced and promoted to gardeners preferring to use those types of techniques.

Perennials and landscape plants well-adapted to our harsh U.P. climate can make a local business unique, such as Pete Nissila's well-known small nursery in Ripley (just east of Hancock). Pete has since retired.

Christmas tree production is also an option. Deer exclusion is necessary and a crop length of 6 years or so is common. Local marketing and U-pick are options, as well as entering larger, wholesale markets. MSU Extension educator Jill O'Donnell provides support to Christmas tree growers across Michigan. MSU Extension also maintains a Christmas tree area of expertise team website at <http://christmastree.anr.msu.edu/index.html>

## Equipment considerations

- Minimum
    - Need to be able to work in soil amendments/rotational crops
      - Tractor mounted tillage tools – moldboard, disk, field cultivator, PTO rototiller, mower (?)
      - Small motorized equipment – rototiller, mower
    - Planting tools
      - Drill, transplanter, broadcast seeder....
    - Haymaking equipment
      - Mower/conditioner, rake, baler, wagons, storage
    - Hand tools – hoes, shovels, forks, pruning tools, etc
      - Buy the best quality you can afford
- 

The beginning farmers should probably resist buying equipment not large or modern enough to do the jobs planned, and also resist spending more than needed for larger or more sophisticated machinery. Tractors and tractor mounted implements may be the largest machinery investment for new or small farms. Look around, ask around, make friends with some 'experts'. Everyone has their own ideas about what makes a good tractor. With some people, the color green is everything, with others, its red.

At a minimum, your tractor needs to have safety equipment, including Rollover Protection System (ROPS), adequate lights, etc. See the "10 Commandments of Tractor Safety" document included with the webinar materials.

Adequate tillage equipment is essential. Used equipment is OK, as long as it is in reasonable repair. You may be better off paying more for a workable unit than buying one that needs extensive repair.

## Environmental considerations

- Ground and surface water quality
    - Fertilizer application (synthetic and organic)
    - Pesticide application (synthetic and organic)
    - Soil erosion / sediment control
  - Plant and animal communities
    - Soil microorganisms
    - Pollinators
    - Wildlife
  - Human environment
    - Food access and safety
    - Quality of life
- 

Every farmer should be a conservationist. Protecting soil and water resources is essential for the sustainability of any farm. Surface and groundwater can be impacted by improper use of fertilizers, including manures and pesticides. Proper fuel storage and handling is also important. Incorporating good soil erosion controls in your farm plan is recommended. You can work with local NRCS staff to explore methods and potential government programs to help pay for them.

Good crop management should result in improved soil health. The microorganisms living in the root zone of your soil can be encouraged to thrive, or they can be depleted based on practices you choose to use. Pollinators including bees, wasps and other insects should be considered when utilizing any insecticides. Avoid spraying when they are active.

We must cohabit with wildlife, even if we resent them at times. Your farming practices can be attractive to crop damaging animals. Planning measures to minimize damage can reduce headaches later.

Your farming activities also contribute to the human environment...yours, your families, your community's. Access to fresh, local food, exposing people to the process of farming, and contributing economically to your local community are all ways local farms improve our social environment.

## Sources of information

- MSU Extension
- MSU Soil Testing Laboratory
- MSU Diagnostic Laboratory
- MSU Organic website
- University of Wisconsin Extension
- ATTRA Sustainable Agriculture Information
- NRCS Soil Map on-line
- Seed companies / State Crop Improvement Assn.
- Drip irrigation suppliers (ex: Dripworks, Inc.)

←.....many others→

There are many sources of information for new farmers, including those listed here. A listing of internet resources was provided in your webinar materials.

## Small Grains



We are now going to take a closer look at a few plant-based farm opportunities for the U.P.

- Weighted state average 2011 prices from Michigan Agricultural Statistics Service (dry beans = all classes)

	<b>Wheat</b>	<b>Oats</b>	<b>Barley</b>	<b>Dry Beans</b>
	<i>\$/bu</i>	<i>\$/bu</i>	<i>\$/bu</i>	<i>\$/cwt</i>
2011	6.70	3.40	3.50	45.80
2010	5.72	2.45	2.45	31.60
2009	4.25	2.21	2.80	33.50
2008	5.63	3.40	3.25	36.30
2007	5.01	2.91	2.50	31.90
2006	3.41	1.93	1.80	21.10
2005	3.13	1.89	1.80	19.60
2004	3.01	1.72	1.80	22.50
2003	3.25	1.65	1.70	19.30
2002	3.28	1.80	1.60	15.30

- Price check Feb 24, 2011 – Bark River, MI

←—————→  
Oats: \$3.25/bu, Barley: \$4.00/bu

Small grain prices have risen consistently, and in some cases dramatically over recent years.

Keep in mind that a bushel weights vary for different crops. Wheat – 60 lbs/bu, oats – 32 lbs/bu, barley – 48 lbs/bu. Dry beans are sold in units of 100 lbs (cwt).



## Oats

32 lbs/bu @ 14% moisture



### Soil considerations

- Fairly tolerant of wetter and low pH soils

### Average yield

- U.P. avg 2008-2011 (MI Ag Stats): 59 bu/a
- MSU U.P. Research Center:
  - 2008-2011, 4 yrs avg: 85 bu/a



Oats are well-suited to the U.P. Yields of 100 bushels per acre are not unusual. However, average yields reported to Michigan Agricultural Statistics Service are 59 bu/acre in recent years. For the same period, oat yields in variety tests at the MSU U.P. Experiment Station in Chatham resulted in average yields of 85 bushels/acre.

## Barley

48 lbs/bu @ 14.5% moisture



### Soil considerations

- Well-drained, fertile soils best

### Average yield

- U.P. avg 2008-2011 (MI Ag Stats): 40 bu/a
- MSU U.P. Research Center:
  - 2008-2011, 4 yrs avg: 56 bu/a



As mentioned, barley is a good, farm-grown feed grain, but does not appear to have much potential as a cash crop. The lower average UP yields of 40 bushels per acre, compared to the MSU variety trial yields of 56 bushels per acre implies that careful, meticulous management can improve performance. A high quality site with better soil type also comes in to play.

## Wheat



60 lbs/bu @ 13% moisture

### Soil considerations

- Well-drained with good water holding

### 2 main types

- Winter
  - Soft red winter (SRW)
  - Soft white winter (SFW)
- Spring – (*grain protein requirements*)
  - Hard red spring (HRS)

### Average yield

- U.P. avg 2008-2011 (MI Ag Stats): 51 bu/a
- MSU U.P. Research Center:
  - Spring wheat (2008-2011, 4 yrs avg): 39 bu/a
  - Winter wheat (2008 & 2011, 2 yrs avg): 54 bu/a

There is relatively little wheat acreage in the U.P.....about 1,200 acres total, including both spring and winter wheat. The State of Michigan raises over 700,000 acres of wheat.

Average yields of winter wheat in the U.P. are around 51 – 54 bushels per acre. Yields as high as 80 bushels per acre have been achieved by MSU at Chatham.

The timing of winter wheat can allow for flexibility in crop rotation. Winter wheat is planted around Labor Day in the U.P. and harvested in mid-August. This allows for a short-season crop, such as field peas, or a cover crop to be raised the following year, with winter wheat planted that fall.

## Dry field peas

### POSITIVES

- Potential farm-grown protein concentrate
  - 20-26% protein, 45-55% starch
- 60 lb bushel of peas
  - Protein and energy approximately equals 40 lbs corn grain + 20 lbs soybean meal
- Low N fertilizer needs, moderate P and K
- Tolerant of low soil pH
- Contributes up to 1.25 lbs residual N per bushel yield for following crop
- Perform well on all soil types
- Early planting and harvest – could rotate with winter wheat
- Frost tolerant
- Some N fixation - Up to 1.25 lbs N per bu harvested per acre



This slide includes some positive features of dry field peas.

## Dry field peas

### NEGATIVES

- “New” crop
- Disease pressure – seed rots, fusarium mildews, white mold – 4 year rotation desirable
- Modest yields – 40 bu/a? (60 lbs/bu)
- Need inoculation
- Require well-drained soil
- Rolling needed before feeding
- Limitations on feed percentage – NDSU
- No local commodity markets
- Distant seed supply
- Labeled herbicides limited/lacking



Naturally, there are also negatives. Dry field peas are probably a ‘new’ crop for most people. As such, they must be grown a few times to become familiar. A longer rotation is desirable to minimize white mold and other disease problems.

This is a grain most likely grown for on-farm consumption by livestock. It is certainly possible that neighbors could be interested in replacing part of their purchased corn and soybean meal with dry field peas if the economics is attractive.

Seed suppliers are distant and arrangements must be made in advance. No last minute decisions. Gristmill Enterprises, Inc in Warren, Illinois handles adapted varieties, as does Wolf River Valley Seeds in White Lake, WI

Herbicides labeled for field peas are very limited.

## Dry Field Pea feed economics

Value of Feed Peas (\$/Bu) Based on Corn and Soybean Meal Equivalency

Corn Price/ Bu	Soybean Meal Price per Ton								
	9.00/bu \$300	10.5/bu \$350	12/bu \$400	13.5/bu \$450	15/bu \$500	16.5/bu \$550	18/bu \$600	19.5/bu \$650	21/bu \$700
\$ 4.00	\$ 5.86	\$ 6.36	\$ 6.86	\$ 7.36	\$ 7.86	\$ 8.36	\$ 8.86	\$ 9.36	\$ 9.86
\$ 4.25	\$ 6.04	\$ 6.54	\$ 7.04	\$ 7.54	\$ 8.04	\$ 8.54	\$ 9.04	\$ 9.54	\$ 10.04
\$ 4.50	\$ 6.21	\$ 6.71	\$ 7.21	\$ 7.71	\$ 8.21	\$ 8.71	\$ 9.21	\$ 9.71	\$ 10.21
\$ 4.75	\$ 6.39	\$ 6.89	\$ 7.39	\$ 7.89	\$ 8.39	\$ 8.89	\$ 9.39	\$ 9.89	\$ 10.39
\$ 5.00	\$ 6.57	\$ 7.07	\$ 7.57	\$ 8.07	\$ 8.57	\$ 9.07	\$ 9.57	\$ 10.07	\$ 10.57
\$ 5.25	\$ 6.75	\$ 7.25	\$ 7.75	\$ 8.25	\$ 8.75	\$ 9.25	\$ 9.75	\$ 10.25	\$ 10.75
\$ 5.50	\$ 6.93	\$ 7.43	\$ 7.93	\$ 8.43	\$ 8.93	\$ 9.43	\$ 9.93	\$ 10.43	\$ 10.93
\$ 5.75	\$ 7.11	\$ 7.61	\$ 8.11	\$ 8.61	\$ 9.11	\$ 9.61	\$ 10.11	\$ 10.61	\$ 11.11
\$ 6.00	\$ 7.29	\$ 7.79	\$ 8.29	\$ 8.79	\$ 9.29	\$ 9.79	\$ 10.29	\$ 10.79	\$ 11.29
\$ 6.25	\$ 7.46	\$ 7.96	\$ 8.46	\$ 8.96	\$ 9.46	\$ 9.96	\$ 10.46	\$ 10.96	\$ 11.46
\$ 6.50	\$ 7.64	\$ 8.14	\$ 8.64	\$ 9.14	\$ 9.64	\$ 10.14	\$ 10.64	\$ 11.14	\$ 11.64
\$ 6.75	\$ 7.82	\$ 8.32	\$ 8.82	\$ 9.32	\$ 9.82	\$ 10.32	\$ 10.82	\$ 11.32	\$ 11.82
\$ 7.00	\$ 8.00	\$ 8.50	\$ 9.00	\$ 9.50	\$ 10.00	\$ 10.50	\$ 11.00	\$ 11.50	\$ 12.00

Assumption is that one bushel (60 lbs) of feed peas contains the equivalent protein and energy content of a blend of 20 lbs of soybean meal with 40 lbs of corn grain.

Corn: \$15.66/cwt, Soymeal: \$21.54/cwt (U.P. Ag Connections newsletter, March 2012)  
*Relative value of dry field peas = \$10.88/bu*



This chart shows the relative value of field peas compared to corn and soybean meal. With current (March 2012) corn and soybean meal prices, the relative value of field peas is about \$10.88 per 60 lb bushel.

## Dry Field Peas in trials at Chatham

2006

2007



Variety	bu/A	Variety	Test wt.	Yield - bu/A	Cotyledon type
DS Admiral	40.4	Aragorn	63	31	Green
Eclipse	29.9	DS Admiral	63	33	Yellow
SW D 5021	37.7	K2	63	33	Green
SW C 5116	37.7	Majoret	63	30	Green
SW D 5211	37.3	Midas	64	31	Yellow
SW D 5212	31.8	Mean	63	32	
Mean	35.8	CV	1.1	11.2	
LSD (0.05)	3.5	LSD (0.05)	1.0	5.4	

Two years of variety trials at the U.P. Experiment Station in Chatham show that 40 bushel yields of dry field peas are possible. At a value of \$10.88, that's \$435.20 per acre. A recent estimate of U.P. field pea production costs showed \$283.29 and included labor and land rent. So...field peas may be economical to produce if needed as livestock feed.

Don't plant to make money with them as a cash crop unless a firm deal with a neighbor is in place.

# Tree Fruits



A few comments on tree fruits.



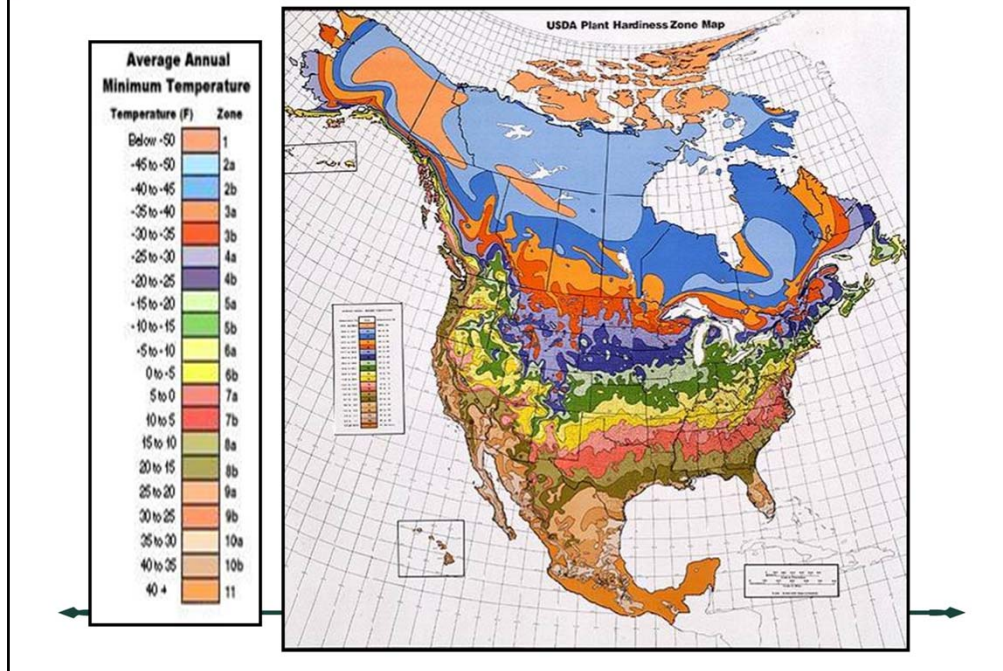
## Your Fruit Tree Site needs...

- **Acceptable soil type**
  - Drainage, pH
- **Sunlight**
- **Suitable Temperatures**
- **Soil fertility**
- **Topography**
- **Water availability**



Siting an orchard is a serious and permanent decision. These factors must be taken into consideration.

# Winter Hardiness



Hardiness is the ability of plants to tolerate cold temperatures. Cold tolerance varies between species, and even among cultivars of the same species. The USDA hardiness zone map groups locations with similar minimum winter temperatures. Plants are given corresponding hardiness rankings that tell growers which zones plants are able to survive in. These hardiness rankings are found on plant labels.

## Selecting Species, Varieties and Cultivars

- **Environmental limitation**

- Apple – YES
- Pear – YES
- European plum – YES
- Japanese plum – NO
- Tart cherry - ?
- Sweet cherry – NO
- Peach – NO
- Apricot - YES



- **Preferences**

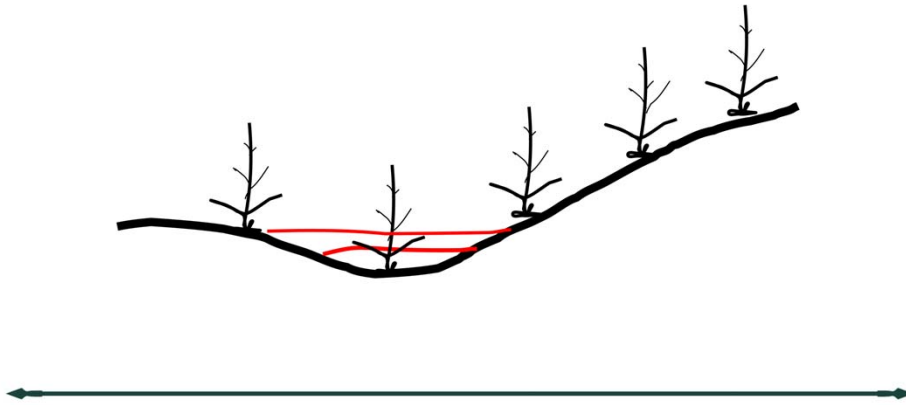
- **Intended use** →

Be sure to select cultivars with appropriate characteristics. Focusing on scab resistant apples, for example, will reduce or eliminate your need to spray to control scab disease. Consider the intended market plan and use of the fruit. Will it be eaten fresh, processed into cider, or cooked? Different varieties are better for different uses.

'Yes' and 'No' indicate whether I consider this species adequately hardy for our typical U.P. environment.

## Topography

**Cold air settles in low areas... "frost pockets"**



Areas with higher susceptibility to frost should be avoided.

## Selecting Varieties and Cultivars

### Space Availability



**Dwarf**



**Semi-dwarf**



**Standard  
(Full-sized)**



Once you have decided on species and cultivar, determine the type of growing and harvest system you intend to use. Decide on the size of the tree you can plant. For many cultivars, semi-dwarf, dwarf, and full-sized trees are available.

Most commercial apple orchards in Michigan grow their trees on dwarfing rootstocks and wire trellises. This allows for the trees to come into fruit bearing much sooner and for ease of spraying and harvest. Fully dwarfed trees always require support. Semi-dwarf trees are free-standing and give a more 'traditional' orchard design. Trees on semi-dwarfing rootstocks begin bearing fruit after about 5 years of training. Trees on standard rootstocks take a long time to begin bearing, usually 7-10 years. They become very large, often over 30' tall, difficult to spray, prune and harvest.

New fruit trees will definitely need protection from deer.

## Training and Pruning New Trees

- *See handout*

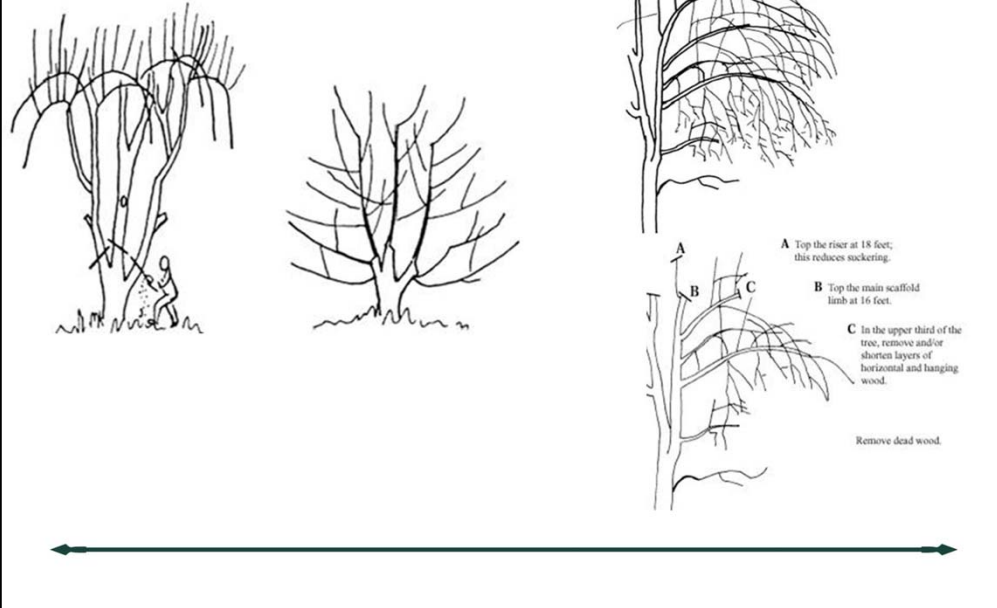


A copy of the handout prepared for an annual apple pruning demonstration in Alger and Marquette Counties was provided in your materials. This handout gives some simple ideas on establishing and managing apples and includes a guide for training young apple trees.

The training period is often neglected by inexperienced tree fruit growers, resulting in weak-limbed and poorly structured mature trees. Take time to learn about the desired pruning techniques for the fruit tree species you are interested in.

Pruning is an annual activity and will result in improved fruit size and quality.

## Pruning Old, Neglected Trees



If you have old, neglected trees on your farm, you can attempt to bring them down to size by ‘stubbing’ off the trunk and spending a few years training new branches.

One method is to make severe cuts to remove the upper mass of the tree. Where possible, make cuts 4-6 inches above a young, water sprout-type shoot. Manage re-growth to form a structure of scaffold branches much as you would a young tree.


Another method is to work with the existing structure of the old tree over a period of 3-5 years, thinning and selecting branches to open up the tree structure and encourage growth of fruiting wood

# Small Fruits





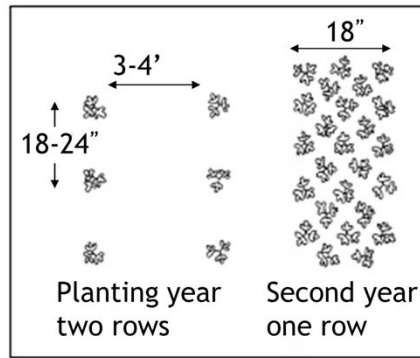
## Strawberry Culture

- June Bearing strawberries
    - Produce for 3-4 weeks in June to July
    - Early-, mid- and late-season varieties available
    - Larger yields
    - Best if planning to freeze or make jam
  - Site selection: full sun, avoid low-lying areas
  - Overhead irrigation essential to avoid frost damage
- 

Two main types of strawberry are grown, June-bearing and everbearing. June-bearing strawberries yield all their fruit over a 3-4 week period beginning in early to mid-June. This is an advantage over everbearing strawberries for growers who like to freeze berries or make jam. June-bearing strawberries also have slightly greater overall yields than everbearing varieties. Varieties of June-bearing strawberries are grouped into three categories, early season, mid-season, and late season, depending on when they fruit. However, the difference in fruiting time may be only a few days.

U-pick farms in Michigan grow June-bearing strawberries, allowing concentration of the picking season to a manageable time period.

# Training Systems



Matted Row System

Illustration: eesc.orst.edu

The matted row system is least labor intensive, but also produces the smallest berries. This is the most widely used training system and works well for June-bearing varieties. Plants are set 18-24 inches apart in rows, with 3-4 feet between rows. Runners are allowed to develop daughter plants in a bed about 12 inches wide. Weaker daughter plants should be removed if plants are less than 6 inches apart.

Although strawberry planting can be maintained for several years if carefully mowed and renovated, commercial growers typically plant and grow their stand the first year, picking off flowers to prevent fruiting and encourage runners. The second year is the best production year. The stand is left in place for a third year, then tilled under and rotated into a different crop for at least a year.

# Weed Control

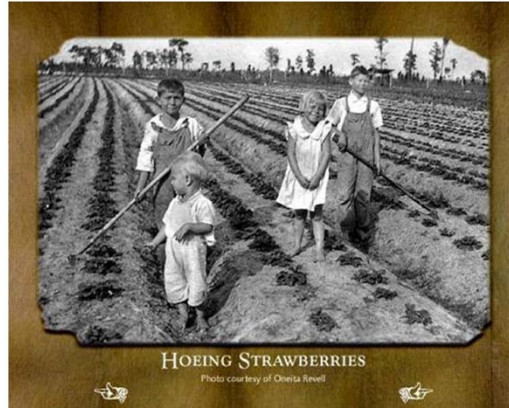


Photo: www.hardeecounty.com

It is critical to remove weeds before establishing a strawberries planting. Roundup and Kleenup work well at controlling grasses and broadleaf plants before planting. In existing beds, hoe around plants often to keep weeds down. Only hoe to a depth of 1 inch to avoid damaging strawberry roots.

Strawberry culture is labor intensive and involves a lot of hand work. "Christmas in July".....hoe, hoe, hoe

## Renovation After Harvest

- Four Steps:
  - Mowing plants
  - Tilling between rows
  - Thinning plants
  - Fertilizing



Set mower blade high to protect crown



Renovation of June-bearing strawberry plants after harvest prepares the bed for the next growing season and keeps a bed more productive. After harvest is complete, mow the foliage off plants leaving 1 inch of stem above the crown. Then till between rows, maintaining a row spacing of 10-12 inches. At this time, broadleaf weeds can be controlled effectively with 2,4-D, a relatively inexpensive herbicide.

Nitrogen fertilizer management is also important with strawberries. If fertilized with too much nitrogen in spring, berry quality is reduced and berries can become 'mushy'. Nitrogen fertilizer should be applied after harvest. An exception is very sandy soils, where a small part of the N should be applied in spring, the rest after harvest.

## Bramble Culture



Blackberry




Raspberry



The word bramble refers to both raspberries and blackberries. Both are well suited to many areas of Michigan, though thornless blackberries are less winter hardy than raspberries and do not grow well in the Upper Peninsula. Brambles have perennial roots and crowns, but the aboveground portion called canes live for only two years. For summer-fruiting brambles, the canes produce fruit only on two-year-old canes. The canes die after the second summer.

## Site Selection

- Avoid low-lying frost pockets
  - Do not follow hosts of Verticillium wilt
    - Brambles, strawberry, Solanaceous crops
  - Soil
    - Well-drained
    - Loam to sandy-loam
    - High organic matter content
- 

With few exceptions, raspberry and blackberry culture are the same. They benefit from similar site characteristics. Like strawberries, it is important to avoid frost pockets when selecting a planting site and areas where hosts of Verticillium wilt have grown. The best soil is a well-drained loam to sandy loam, with high organic matter. Avoid poorly drained soils which cause root dieback and increase susceptibility to Phytophthora root rot.

## Variety Selection

Summer-bearing Red Raspberries

Boyne



Latham



Red raspberries are extremely hardy and many varieties grow well in Michigan. There are some, however, that are not well-suited to U.P. conditions.

Boyne is early ripening with high productivity of medium sized, dark red fruits. Canby has short, spiny canes and is very hardy. Latham is extremely hardy and recommended for northern areas. It provides a long harvest season, but produces small berries of fair quality.

Black and gold raspberries are not well-suited for commercial production in the U.P.

# Variety Selection

## Fall-bearing Raspberries

Heritage



Redwing



Autumn Bliss



Fall Gold



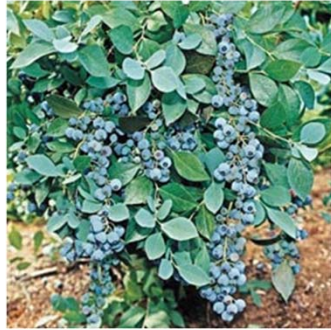
Fall-bearing raspberries produce fruit on one-year-old canes, called primocanes. These raspberries produce fruit on one-year old canes late in the growing season. It is important to select a variety with the best chance of producing a ripe, marketable crop before cold weather sets in.

Autumn bliss has the earliest fall harvest, with large, but soft fruits, and provides the best option for U.P. growers. Stay alert for newer, earlier maturing fall raspberries.

Heritage is the most popular fall-bearing variety grown in Michigan with high yields and exceptional fruit size, flavor, and firmness. Redwing produces smaller, less sweet fruits than Heritage, but has an earlier harvest season making it a better selection in northern areas. Fall gold produces average yields of flavorful, golden fruits.



## Blueberry Culture



“Half-high” blueberry



Lowbush blueberry



Two basic types of blueberry are highbush and lowbush. Highbush blueberries grow best in the lower half of the lower peninsula. Lowbush blueberries are also called wild blueberries.

“Half-high” blueberries are a group of hybrids developed first at University of Minnesota. The half-highs tolerate U.P. cold weather quite well and produce large berries similar to highbush. If you are considering commercial blueberry production from domestic plants, these are the types you should first consider. This is a link to an informational site at U of Minnesota:

<http://www.extension.umn.edu/distribution/horticulture/DG2241.html>

Wild blueberries may also be cultivated for commercial harvest. The State of Maine has a large “wild blueberry” industry. At least one commercial ‘wild’ blueberry farm exists in the U.P.’s Copper Country.

Blueberries have very specific site requirements including very low soil pH (5.5 max), high soil organic matter, excellent drainage, and high water table. They are not competitive with weeds and will not thrive if crowded by other species. Pollinating insects are needed for good fruit set.

## Very Cold-Hardy Blueberry Varieties

Lower growing	Higher growing
Northblue	St. Cloud
Northsky	Chippewa
Northcountry	Polaris



Highbush blueberry varieties vary in growth habit, susceptibility to disease, yield, berry flavor and size, and harvest season. Studies suggest that plants yield better when planted in multiple-variety plantings. Another benefit of planting multiple varieties is the ability to extend the harvest season when early-, mid- and late-season varieties are grown together. Another consideration is hardiness. Blueray, Patriot, Northland, and Jersey are the hardiest varieties.

# Grape Culture

Minimum 165 frost-free days



Frost Damage



Winter Injury



Grapes require a minimum growing season of 165 frost-free days, making their adaptation to the U.P. very limited. A lengthy frost-free season is necessary to protect growing shoots against frost damage in the spring, and extend long enough into the fall to allow the fruits to mature and vegetation to harden off. Growth that has not had time to fully mature is susceptible to winter injury.

Nevertheless, interest exists among U.P. farmers. A few growers are producing grapes along the Lake Michigan shoreline. A good microclimate is essential, along with variety selection, appropriate pruning and fruit thinning, etc.

If grapes are on your radar screen, be SURE to research carefully. MSU Extension has a viticulture educator, Duke Elsner and an informative website at <http://www.grapes.msu.edu/index.htm>

# Saskatoon Berry



Saskatoon berry is a multi-branched shrub of the *Amelanchier* genus, bearing edible fruit. It is a domesticated version of the service berry, or 'sugar plum' as known in the U.P. A relatively new Saskatoon Berry industry is thriving in Canada. The berries are good for jams and baking, as well as fresh eating. Saskatoons are used in similar ways as blueberries.

Plants can reach a height of 8-15 feet and a width of 6 feet. The plants tolerate a wider range of soil conditions than blueberries. They do not have the strict low pH requirement. Shrubs produce a profusion of white, trailing flowers in spring. Sweet, almond-tasting fruits are ripe in June.

## Regarding Program Evaluation.....

1. Thank you for completing on-line questionnaires and giving 'chat' feedback
2. 6-month follow-up  
In 6 months or so, we will be contacting you to ask what impact this educational program has had for you and your farm operation (changes in income, investment in farm, job creation/retention, other impacts)



The Beginning Farmer Course will be evaluated through both 'end of session' feedback and a follow-up contact with participants in 6 or 8 months. At that time, we will attempt to determine if the program has resulted in any measurable impacts, like increased income, new job creation, job retention and other practices and behaviors.

## Questions and Reflections.....

*Thank you for participating in the  
MSU Extension U.P. Beginning Farmer Webinar Series*

