GOLD NEW Potatoes
$1.50 pound
Scott County from our farm

Fayette Co.
$1.50
Heirloom Tomatoes
100% Chemical Free
US Organic Farms

Certified organic farms, by zip code: 10,159

Data from 2007, the most recent agricultural census.

Retail sales of organic products

Organic and CNG Farms in KY, 2009

Fitzgerald, KDA, 2009
Exponential growth

- U.S. organic food sales have grown between 17 and 21% annually for two decades (total U.S. food sales over this time have grown 2-4% annually)

- Organic food sales represent approximately 3% of U.S. food sales.
  - (Organic Trade Association 2008)
Albert Howard (1873-1947)

- British agricultural scientist.
- 25 years in India.
- Critical of reductionist agricultural science and specialization.
- Blamed fall of past civilizations on unsustainable agriculture.
- Wrote *An Agricultural Testament* (1940).
Howard on Eastern agriculture

“The small-holdings of China, for example, are still maintaining a steady output and there is no loss of fertility after forty centuries of management.”

- Tiny farms
- Labor intensive
- Integration of crops and livestock
- Lots of legumes
- Little cultivation
Howard on Western agriculture

- Large, growing farms
- Monocultures
- Mechanization
  - Machines consume resources but do not contribute urine/dung
- Synthetic fertilizer dominates
- Food prices too low... farmers forced off land
J.I. Rodale

- Bought farm in PA to test Howard’s ideas
- Popularized term ‘organic,’ through his *Organic Gardening and Farming* magazine
- Relationship with science
  - Presented reader testimonials as research (“science for the people by the people”)
  - Solid long-term research trials continue
Certification: Who can use the word “organic”?

- >$5,000 annually?
  - *Must* certify.
- <$5,000 annually?
  - *May* certify
  - must follow standards
  - subject to audits (NOP pays)
- Misuse of “organic”
  - $10,000 fine

As of 10/21/02

USDA ORGANIC
Organic Certification Requirements

1. Management plan, approved by certifier
   - Required:
     • Boundaries, buffer zones separate organic from conventional
     • Organic seed, transplants
     • Maintain/improve soil fertility, organic matter
     • Rotation
   - Prohibited:
     • Synthetic fertilizers and pesticides
     • Genetically modified organisms
     • Sewage sludge
     • Burning (some exceptions)

2. Record keeping
Organic Production Standards

Organic agriculture is “a production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.”
Organic production standards

Organic agriculture is "a production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity."

Site specific conditions

- not a cookbook
- plans reflect unique characteristics of each operation
Organic Production Standards

Organic agriculture is “a production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.”

Cultural practices

*(how you grow)*

- crop timing
- crop selection
- resistance
- interplanting
- spacing
- orientation
- etc...
Organic Production Standards

Organic agriculture is "a production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity."

**Biological practices (use your friends)**
- release biocontrols
- develop beneficial habitat
- livestock grazing
- rhizobial inoculation
- etc...
Organic Production Standards

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Mechanical practices (use tools)
- till
- weed
- mow
- flame
- fence
- etc...
Organic Production Standards

Organic agriculture is "a production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity."

Ecological Balance

- achievement of steady state by ecosystem
- dynamic equilibrium between organisms and environment
- reduced outbreaks / extinctions (symptoms of imbalance)
Organic Production Standards

Organic agriculture is "a production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity."

Biodiversity

Diversity of living organisms

Consider scale:
- range from cellular to biome
- applies to genes, species, ecosystems
Organic Production Standards

- Land is certified by gov’t-approved agencies
- Farmer develops and follows organic farm plan
- Synthetic substances prohibited
  - Includes synthetic organics
- Natural substance allowed
  - Includes natural inorganics
- Maintain or increase soil organic matter content
- Separation from conventional products
  - In time – 3 year transition period
  - In space – buffer zones, barriers, separate containers, equipment cleaning etc.
- $10,000 fine for misuse of word
Clear Boundaries & Buffers

Conventional

Buffer

Organic

Conventional
Organic Seed and Transplants

- Expect 20% price premium
- Organic transplants difficult to find…
  - Potential market!
- No wetting agents or synthetic fertilizer in potting mix
- Organic fertilizers available
  - Bone meal, blood meal, soy meal, fish meal, compost etc.
Soil Fertility: Cover Cropping

- Rye/vetch mix adds ~135 lb N/ac
- Slow release
- Organic matter
- Erosion control
Cover cropping
Soil Fertility: Animal Waste
Soil Fertility: Animal Waste

- Raw manure pre-harvest interval:
  - > 90 days if edible portion does not contact soil
  - > 120 days if edible portion contacts soil
Soil Fertility: Compost

- No pre-harvest interval
- Strict requirements for manure-based compost
  - 131-170°F for 15 days in windrows
  - C/N = 25-40
Why Mulch?

• Weed management
• Moisture retention
• Add O.M.

What Mulch?

• Organic
  – wood chips, shredded bark, chopped leaves, straw, grass clippings, compost, sawdust, pine needles, paper

• Inorganic
  – gravel, stone, black plastic, landscape fabric
Organic Mulch

- 4”-6” to completely discourage weeds
- mulch next to stems invites slugs, rodents
- slows warming in spring
- adds O.M.

Plastic Mulch

- Warms soil, radiates heat at night
- Protects fruit from rotting
- Conserves moisture
- Non-renewable, non-biodegradable
- Organic standards require complete removal each year
Easy to grow organically in KY

Difficult to grow organically in KY
Conservation

• Encourage your friends
  – avoid harsh pesticides
  – soil fertility
  – above-ground habitat enhancement (farmscaping)

• Least expensive
• Least considered (few $$ opportunities)
• Most important (?)

Predators
Parasites
Pest diseases
Birds
Bats
Farmscaping

• Attract and support natural biological control organisms through whole-farm practices
  – hedgerows
  – insectary plants
  – cover crops
  – water reservoirs

  – insects
  – bats
  – birds of prey
## Bloom Timing of Native Plants Attractive to Beneficial Insects

http://nativeplants.msu.edu

<table>
<thead>
<tr>
<th>Native plant</th>
<th>Natural enemies</th>
<th>Bees</th>
<th>Bloom Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>wild strawberry</td>
<td>**</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>golden Alexanders</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>Canada anemone</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>penstemon</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>angelica</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>cow parsnip</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>sand coreopsis</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>shrubby cinquefoil</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>Indian hemp</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>late figwort</td>
<td>**</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>swamp milkweed</td>
<td>**</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>Culver’s root</td>
<td>**</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>yellow coneflower</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>nodding wild onion</td>
<td>*</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>meadowsweet</td>
<td>***</td>
<td>*</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>yellow giant hyssop</td>
<td>**</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>horsemint</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>Missouri ironweed</td>
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<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>cup plant</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>pale Indian plantain</td>
<td>**</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>boneset</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>blue lobelia</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>pale-leaved sunflower</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>Riddell’s goldenrod</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>New England aster</td>
<td>***</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
<tr>
<td>smooth aster</td>
<td>**</td>
<td>**</td>
<td>May, Jun, Jul, Aug, Sep</td>
</tr>
</tbody>
</table>

**KEY**

* good
** better
**** best
Farmscaping Practices

• Cover Crops
• Green Manures
• Multiple Cropping
  – The production of more than one crop on the same land in one year.
Farmscaping Practices

- Windbreaks, Shelterbelts and Hedgerows
  - linear barriers of trees, shrubs, perennial forbs and grasses planted along field edges
  - reduce windspeed
  - reduce wind erosion of soil
  - decrease the dessicating effect of winds on crops
  - enhance snow distribution
  - provide habitat for wildlife and beneficials
Inorganics

• Copper
  – toxicity problems with heavy, prolonged use
• Sulfur
  – 59% of agricultural fungicide use, by weight
  – high ecological impact (Cornell)
• Lime
• Bordeaux mixture (copper sulfate + lime)
Botanicals

• Chemicals derived from plants
  – Rotenone
    • rat poison, very toxic to fish, linked to Parkinson’s
    • allowed under NOP; temporary ban in Europe
  – Pyrethrum
    • neurotoxin, quick knock-down
    • chemistry inspired synthetic pyrethroids
  – Neem
    • inhibits moulting
    • biorational
NEEM: God's Gift to Mankind

Azadirachtin (Azadirachtin A)

Chemical structure:

- Molecular formula: C_{35}H_{44}O_{18}
- Exact Mass: 720.26
- Mol. Wt.: 720.71
Microbials

- Bacteria
  - e.g. *Bacillus thuringiensis*
- Fungi
  - e.g. *Coniothyrium minitans*
- Nematodes
  - e.g. *Steinernema*
Oils & Soaps

• Oils
  – Petroleum / vegetable based
  – kill through suffocation
  – most widely used insecticide, by weight

• Soaps
  – kill through desiccation (penetrate protective waxy covering)
  – mainly kill soft-bodied insect

• No resistance observed to these modes of action
The Kentucky Department of Agriculture has developed this list of 118 inputs approved for managing pests and diseases on organic farms in Kentucky.

Click table headers to sort. Use Ctrl-F to search within page.

<table>
<thead>
<tr>
<th>Company</th>
<th>Brand</th>
<th>Type</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaron Groff &amp; Son/I.G.S Enterprise, Inc.</td>
<td>Natural One Insect Repellent</td>
<td>External Livestock Parasiticides/Pesticides</td>
<td>None</td>
</tr>
<tr>
<td>Aberdeen Road Company d/b/a Hercon Environmental</td>
<td>Hercon® Micro-Tac II</td>
<td>Spray Adjuvant</td>
<td>Must only be used with an approved pesticide.</td>
</tr>
<tr>
<td>Aberdeen Roan Company dba Hercon Environmental</td>
<td>Hercon® Micro-Tac II</td>
<td>Spray Adjuvant</td>
<td>Must only be used with an approved pesticide.</td>
</tr>
</tbody>
</table>
Healthy Plants, Fewer Pests

• Key claim of organic agriculture
• Relates herbivore damage back to soil quality (Howard)
• Pests seen as “weeding out the weak”
• High sugar content indicator of plant health and pest tolerance
• Wishful thinking?
  – Often attacked but supportive research emerging
Early cabbage protected from frost and insect pests
Why use row covers?

• Retain heat to enhance plant growth and extend the growing season
  – Protect delicate crops from light frosts
• Reduce wind damage
• Exclude Pests
  – Protect crops from insect-borne diseases
Extra layer of frost protection for early tomatoes in a high tunnel
Pest exclusion

- Cabbageworms
- Flea beetles
- Squash bugs
- Colorado potato beetles
- Root maggots
- Leaf miners
- Deer
- Rabbits
- Birds
- Cucumber beetles
- Army worms
- Grasshoppers
- Squash vine borers
Row cover weight

- **Light**
  - Excellent light and water transmission
  - Pest exclusion
  - Little frost protection
  - Tear easily (single season use)

- **Medium**
  - Good light transmission (75-85%)
  - Good frost protection
  - Durable (several seasons)

- **Heavy**
  - Poor light transmission (50%)
  - Excellent frost protection
  - Very durable (4+ years)
Heavier row covers protect cool-season crops well into winter
Row covers can be anchored with bricks, boards, rebar, soil...
Row covers & pollination

- Many vegetables do not require pollination because the fruit (seed-bearing body) is not harvested. Row can be left on until harvest.
  - Leafy vegetables (e.g. lettuce, cabbage, kale)
  - Root vegetables (e.g. carrots, potatoes)
  - Stem vegetables (e.g. celery, rhubarb, chard)

- Some cucumber varieties produce seedless fruit without pollination. (Pollination of these degrades quality.) They can be grown under row covers, where they are safe from wilts vectored by cucumber beetle.

- Honeybees will forage under row covers that are open at the ends. Some other pollinators, like muscid flies, will not.

- Row covers are usually removed at flowering for insect and wind-pollinated crops, such as melons and squash. They can be replaced after fruit set.
Combining tactics for cucumber beetle management in muskmelon

Soil-Borne Disease

- Pathogens are present in soil
- Outbreaks of disease occur when: *susceptible hosts* meet *disease-causing pathogens* in a *favorable environment*. 
Field Studies at Au Naturel Farm
Average Sclerotia Survival After 2, 4, and 6 Weeks of Treatments

Germinating Sclerotia (of 160)
Purpose

OAK is a member-driven nonprofit organization. Members work together to:

- Promote Kentucky’s organic farms and farmers
- Share information with one another
- Guide research programs related to organic agriculture
- Educate consumers about organic food and farm products

Membership is open to anybody willing to support OAK and does not require an OAK event.

Mission

OAK promotes the production and sale of vegetables, fruits, and other organic products.

Formation

During 2000, OAK grew out of several grassroots efforts of small farmers and consumers wanting to establish higher standards in the local food market. OAK’s first program, the Vegetable Credit Program, seeks to stabilize prices for farmers and provide farm families with affordable access to fresh fruits and vegetables.

“IT know from friends and neighbors and from my own family that it is now possible for farmers to sell at a premium to local customers such products as organic vegetables, organic beef and lamb, and pasture-raised chickens.

This market is being made by the exceptional goodness of the product, the commitment of the farmer, and the support of the consumer.”

OAK events

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday, April 10</td>
<td>Early Earth Day</td>
</tr>
<tr>
<td>Thursday, April 15</td>
<td>KSU Third Thursday W</td>
</tr>
<tr>
<td>Thursday, May 20</td>
<td>KSU Third Thursday W</td>
</tr>
<tr>
<td>Thursday, June 17</td>
<td>KSU Third Thursday W</td>
</tr>
</tbody>
</table>

Google Calendar
RESOURCES

KENTUCKY

- Kentucky Department of Agriculture Organic Program
  - Essential documents from Kentucky's organic certification agency:
    - Certification procedures
    - Forms
    - Fee schedules

- Kentucky State University Organic Agriculture Working Group
  - Information generated by a group of researchers, teachers, and extension staff at Kentucky State University conducting projects related to organic agriculture
  - Updated schedules for [free sustainable agriculture workshops](#) held at the Kentucky State University farm on the Third Thursday of every month
  - ‘Ask an Expert’ service

- University of Kentucky New Crop Opportunities Center
  - Factsheets:
    - Organic transitioning and certification
    - Organic horticulture and field crop production
    - Organic sweet corn and asparagus production

- Higher education opportunities in Kentucky
  - Berea College [Agriculture and Natural Resources Program](#)
    - Bachelor degrees with opportunities for applied work on certified organic land
Welcome to the Organic Association of Kentucky (OAK) Google Group. OAK promotes organic production and consumption in Kentucky as part of a food and farming system that strengthens communities by being economically viable and environmentally sound.

PURPOSE

OAK is a member-driven nonprofit organization. Members work together to:

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- Share information with one another
- Guide research programs related to organic agriculture
- Educate consumers about organic food and farm products

Discussions 6 of 108 messages view all

Fw: Franklin County Fair Flower Show- Cut Flowers
By Kim Jordan - Mar 30 - 1 author - 0 replies

Fw: Franklin Co Winter School- CSAs, Organic/Sustainable Veggie Production, and Organic Apples
By Kim Jordan - Mar 25 - 1 author - 0 replies

straw/material question
By Idylwild Farm - Mar 22 - 2 authors - 1 reply

Call for newsletter submissions
By Brian - Mar 15 - 2 authors - 1 reply

Fw: St. Matthews Farmers Market
By Kim Jordan - Mar 11 - 1 author - 0 replies

Fw: Apple Tree Grafting Workshop- Sat, March 13, 1pm
By Kim Jordan - Mar 10 - 1 author - 0 replies

Pages 3 of 12 pages view all

Board of Directors' Bios
Last updated by Shayne - Feb 12 - 1 author - 3 pages long

Board meeting minutes - 03/29/10