

# Organic – What and Why



**Jim Riddle**

**Organic Independents LLP**

**[bluefruitfarm.com](http://bluefruitfarm.com)**

**[cerestrust.org](http://cerestrust.org)**

**[eorganic.info](http://eorganic.info)**



# Fundamental Organic Principle

Healthy soil  $\Rightarrow$  healthy plants  $\Rightarrow$   
healthy animals  $\Rightarrow$  healthy  
people  $\Rightarrow$  healthy earth





## ***“Organic production”***

**A production system that is managed ... to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.**

# Who Must Be Certified?

- All organic farmers and handlers who sell over \$5,000/year of organic products.
- Retailers do not have to be certified.
- Handlers who use the word “organic” only on the ingredient panel do not have to be certified.
- Handlers, such as warehouses, that do not re-package organic products do not have to be certified.

# Organic Certification

- Certification by USDA-Accredited Certifying Agent
- ± 90 Accredited Certifying Agents
- USDA accreditation to the National Organic Program regulation
- Accreditation for crop, wild crop, livestock, and/or handler certification
- <http://www.ams.usda.gov/AMSv1.0/nop>

# The Organic Certification Process

Step 1: Transition to organic production (36 months)

Step 2: Choose a USDA-accredited certifying agent

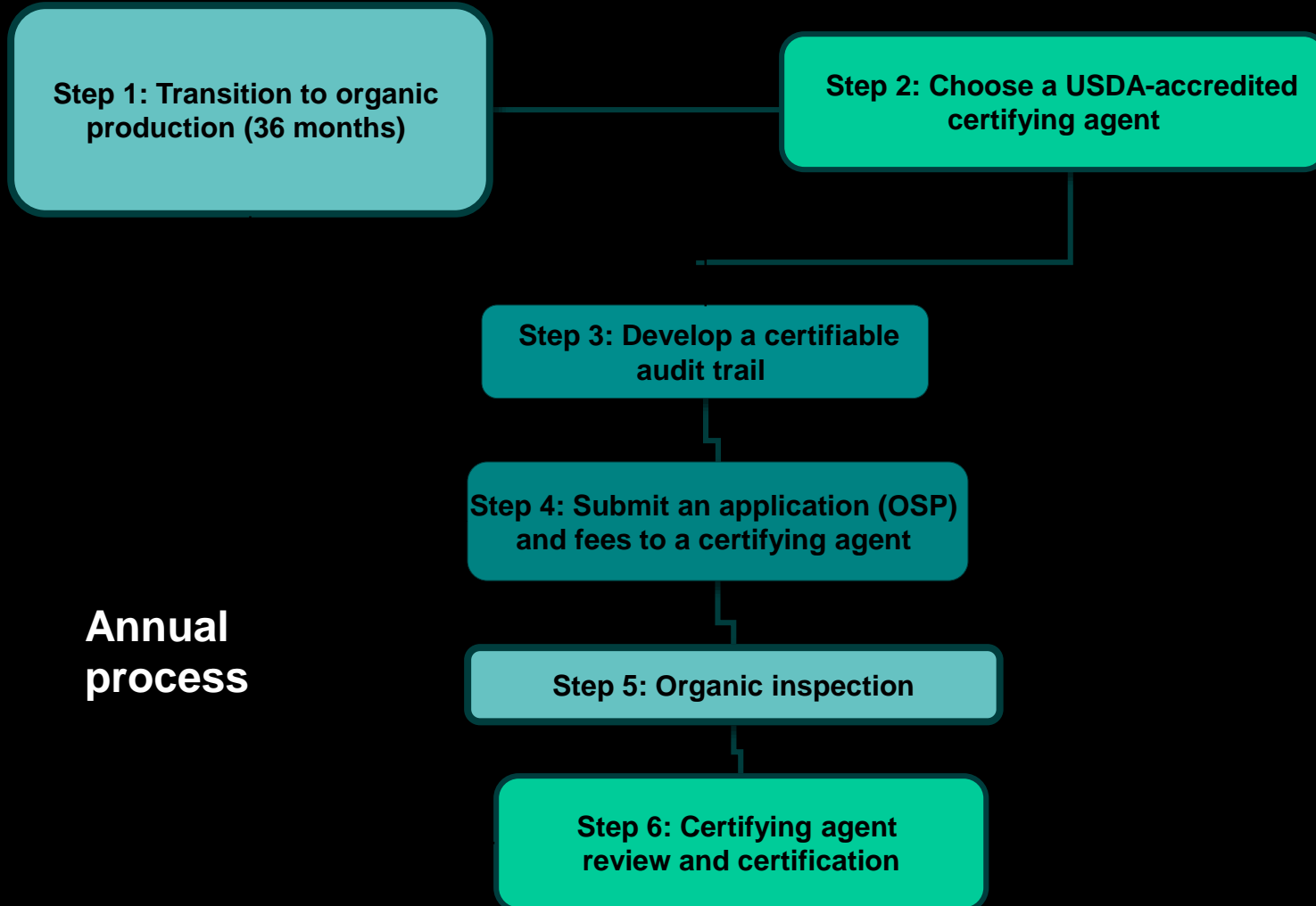
Step 3: Develop a certifiable audit trail

Step 4: Submit an application (OSP) and fees to a certifying agent

Step 5: Organic inspection

Step 6: Certifying agent review and certification

Annual process





# The Organic Certification Process

**Organic Producer Certificate**

The Midwest Organic Services Association, Inc. MOSA, has verified through a third-party inspection and review that this Producer's operation has met the organic standards of MOSA.

**DENNIS LOCKINGTON**  
R R 1 56208  
DE SOTO WI 54624

2001 Certified Organic Crops/Products: CORN, HAY, PASTURE, EGGS

Producer Number: WIG8364-01  
Associate Number: 421

This certificate serves to establish the current MOSA certification of the member named above and is not valid for trade. Transaction certificates are issued for requested trade purposes.


Diane Colif  
Authorized Signature - Certification Coordinator

4/2/2001  
Date

12-1  
State Number

4/2/01 - 9/30/01  
Certificate Validation Dates

MOSA-1-012-99  
MOSA Inspector Number



## Certification Options:

- Deny certification
- Grant certification
- Grant certification with minor non-compliances
- Suspend or revoke certification



# What Makes “Organic” Organic?

- Develop a mandatory Organic System Plan, describing proactive strategies to prevent problems - including planned inputs and practices.
- Follow the Organic System Plan.
- Comply with NOP organic production and handling standards.

## ICO Organic Farm Plan Questionnaire

Please fill out this questionnaire if you are requesting organic farm/crop certification. Use additional sheets if necessary. Sign this form. You must submit farm maps and field history sheets with this form. Attach all supporting documents (soil issue or water tests, rented or recently purchased land histories, etc.) outlined in section 10 of this questionnaire. This form or a renewal form may be used for re-certification, according to certifying agent policies. Do Not Use Staples!

MAKE SURE TO SEND ICOTWO (2) COPIES OF THIS FORM AND KEEP A COPY IN YOUR FILES AT ALL TIMES!

### SECTION 1: General Information

Name		Farm Name		Type of Organic Crops or Products: <input checked="" type="checkbox"/> Field Crops/Grains <input checked="" type="checkbox"/> Produce/Herbs <input type="checkbox"/> Other: _____																															
Address			City		<b>For Office Use Only</b> Received _____ Entered _____ Initials _____ Application Fee _____ Inspector Date _____ Late Fee _____ Paid _____																														
State	Zip code		Date																																
Phone		Fax																																	
		E-mail																																	
Legal Status: <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Trust or non-profit <input type="checkbox"/> Corporation <input type="checkbox"/> Legal Partnership (federal form 1065) <input type="checkbox"/> Other -specify _____																																			
Year first certified	List previous organic certification by other agencies		List current organic certification by other agencies		Year when complete Organic Farm Plan Questionnaire was last submitted																														
List all crops or products requested for certification, including acreage. <table border="1"> <thead> <tr> <th>Crop</th> <th>Acreage</th> <th>Crop</th> <th>Acreage</th> <th>Crop</th> <th>Acreage</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>						Crop	Acreage	Crop	Acreage	Crop	Acreage																								
Crop	Acreage	Crop	Acreage	Crop	Acreage																														
Have you ever been denied certification?		If yes, by whom? _____ Date of Denial: _____ Reason for Denial: _____ Was Denial appealed or the denial reversed? _____																																	
Do you understand the current organic standards for the certification type you are requesting? <input type="checkbox"/> yes <input type="checkbox"/> no		Do you have a copy of current USDA organic standards? <input type="checkbox"/> yes <input type="checkbox"/> no Do you have a copy of the EU Standards as applicable? <input type="checkbox"/> yes <input type="checkbox"/> no Do you have a copy of current ICO information packet? <input type="checkbox"/> yes <input type="checkbox"/> no																																	
Type of Certification Requested: (Please check all that apply) <input checked="" type="checkbox"/> US DANOP <input type="checkbox"/> ISO 65 EU																																			
Do you have any off-farm or on-farm processing done? (cleaning, bagging, bottling etc.) <input type="checkbox"/> yes <input type="checkbox"/> no If yes, you need to fill out an Organic Processing/Handling Plan and submit it with your Organic Farm Plan Questionnaire. Please call the certifying agent with questions or for an Organic Processing/Handling Plan.																																			
Is this product produced and/or handled for export only? If yes, what countries? <input type="checkbox"/> yes <input type="checkbox"/> no Please list which crops are intended for each type of certification, unless all are intended for export.																																			

# What Makes “Organic” Organic?

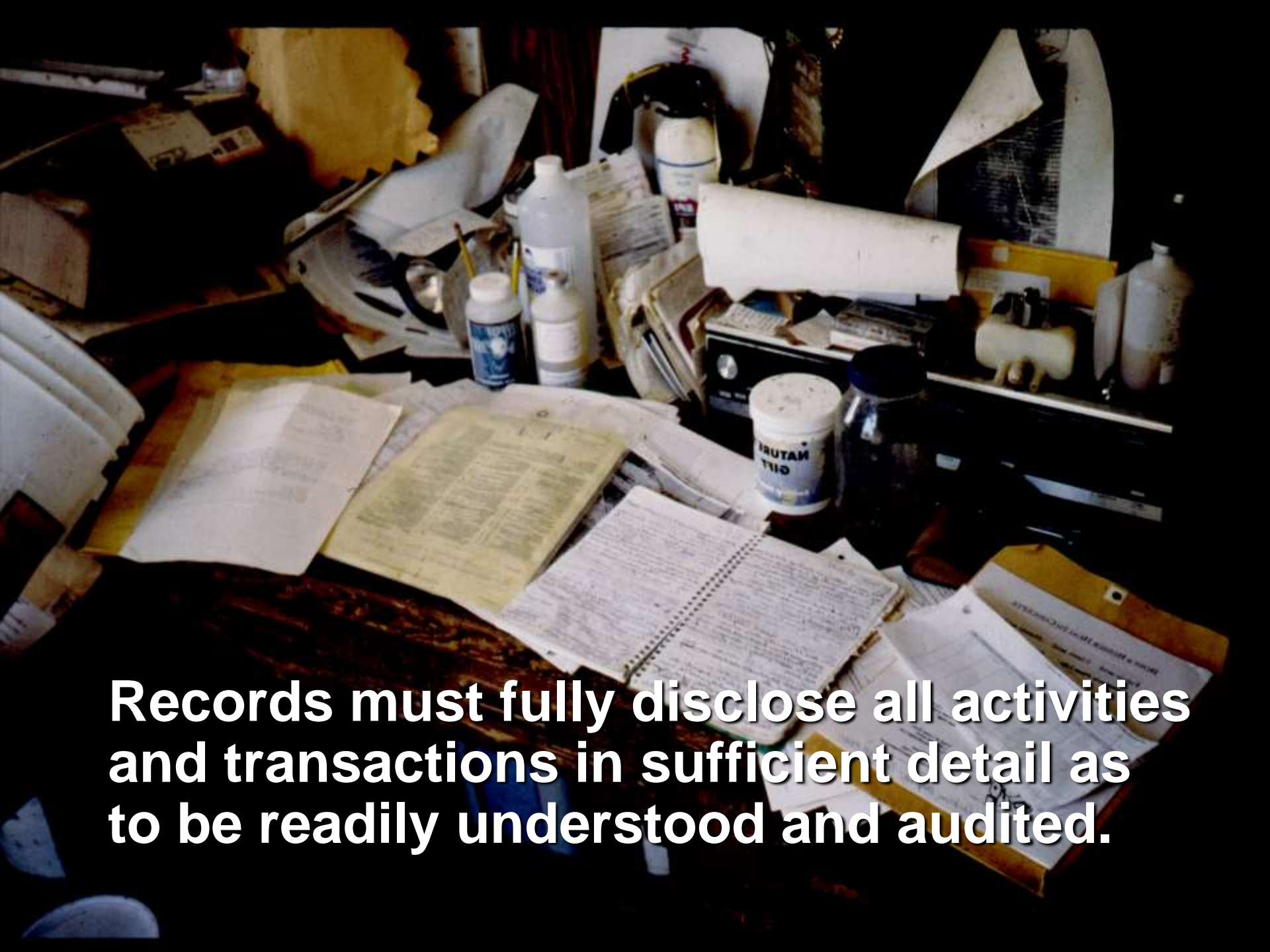
- Use only approved substances – either allowed non-synthetic or synthetic substance on National List.
- Annual on-site inspection and verification by USDA-accredited certifying agent.



# **205.103 Mandatory Recordkeeping**

**Records must:**

- **Be adapted to the particular business that the certified operation is conducting;**
- **Be maintained for not less than 5 years beyond their creation;**
- **Be sufficient to demonstrate compliance;**
- **Be accessible; and**



**Records must fully disclose all activities and transactions in sufficient detail as to be readily understood and audited.**



205.200 General. Production practices ... must maintain or improve the natural resources of the operation, including soil and water quality.



# **NOP Basic Crop Requirements**

- **Land must be free of prohibited materials for 3 years (36 months) prior to harvest of first organic crop.**
- **As needed, physical barriers must be established to prevent commingling and contamination.**
- **Split operations (part organic, part conventional or in transition) may be certified.**



**205.203(a) The producer must select and implement tillage and cultivation practices that maintain or improve the physical, chemical, and biological condition of soil and minimize soil erosion.**





## Crop Rotation:

- (a) Maintain or improve soil organic matter content;
- (b) Provide for pest management in annual and perennial crops;
- (c) Manage deficient or excess plant nutrients; and
- (d) Provide erosion control.



# **NOP Basic Crop Requirements**

- **Organic farmers must use crop rotations and plant and animal materials to maintain or improve soil.**
- **Fertility management must not contaminate crops, soil, or water with plant nutrients, pathogens, heavy metals, or prohibited substances.**
- **Application of “raw manure” is tightly regulated on crops for human consumption.**

# **NOP Basic Crop Requirements**

- **Burning as a means of disposal of crop residues is prohibited (may only use burning to suppress disease or to stimulate seed germination).**
- **Use of sewage sludge is prohibited.**
- **Must use organic seeds, if they are commercially available.**
- **May use untreated seeds if organic seeds are not commercially available.**
- **Must not use fungicide treated or genetically engineered (excluded method) seeds.**

# **NOP Basic Crop Requirements**

- **For pest control - May introduce natural predators or parasites; may develop habitat for beneficial species; may use non-synthetic controls, such as lures, traps, and repellants; may apply non-synthetic biological, botanical, or mineral inputs.**
- **Must not use arsenate treated lumber for new installations or replacement purposes in contact with crops, soil, or livestock.**

# **NOP Basic Crop Requirements**

- **For weed control - May mulch with natural materials; mow; graze livestock; hand weed; use mechanical cultivation; use flame, heat, or electrical cultivators; or use plastic mulch, provided that it is removed from the field at the end of the growing or harvest season.**

# **NOP Basic Crop Requirements**

- **For disease problems – May use management methods to prevent disease or suppress spread of disease; may apply non-synthetic biological, botanical, or mineral inputs.**
- **May only use non-synthetic biological, botanical, or mineral inputs or substances on the National List for pest, weed, or disease control when other practices are insufficient.**

# Residue Analysis

- **Certifying agent may require pre- or post-harvest testing when there is reason to believe that organic products have come in contact with prohibited substances or were produced using GMOs.**
- **Residue levels must not exceed 5% of the United States Environmental Protection Agency's tolerance level for the specific substance.**
- **No tolerance levels yet established for GMO contamination.**



# **NOP Livestock Requirements**



**Slaughter animals must be managed organically from last third of gestation.**

**Poultry must be organic from second day after hatching for meat and eggs.**





**Dairy animals must be fed and managed organically for 1 year prior to the production of organic milk, or a whole herd can be converted feeding organic and/or farm-raised 3<sup>rd</sup> year transitional feed.**



**Once converted, animals cannot be rotated between organic and non-organic production.**



**Feed for organic  
animals must be  
100% organic**





**Ruminants must have access to pasture during grazing season for at least 120 days/year with >30% dry matter intake.**







All organic animals must have access to the outdoors



## Prohibited

- Plastic pellets for roughage
- Feed formulas containing urea or manure
- Animal slaughter by-products
- Antibiotics
- Parasiticides for slaughter stock





Cloned and transgenic animals, and their products, are not allowed

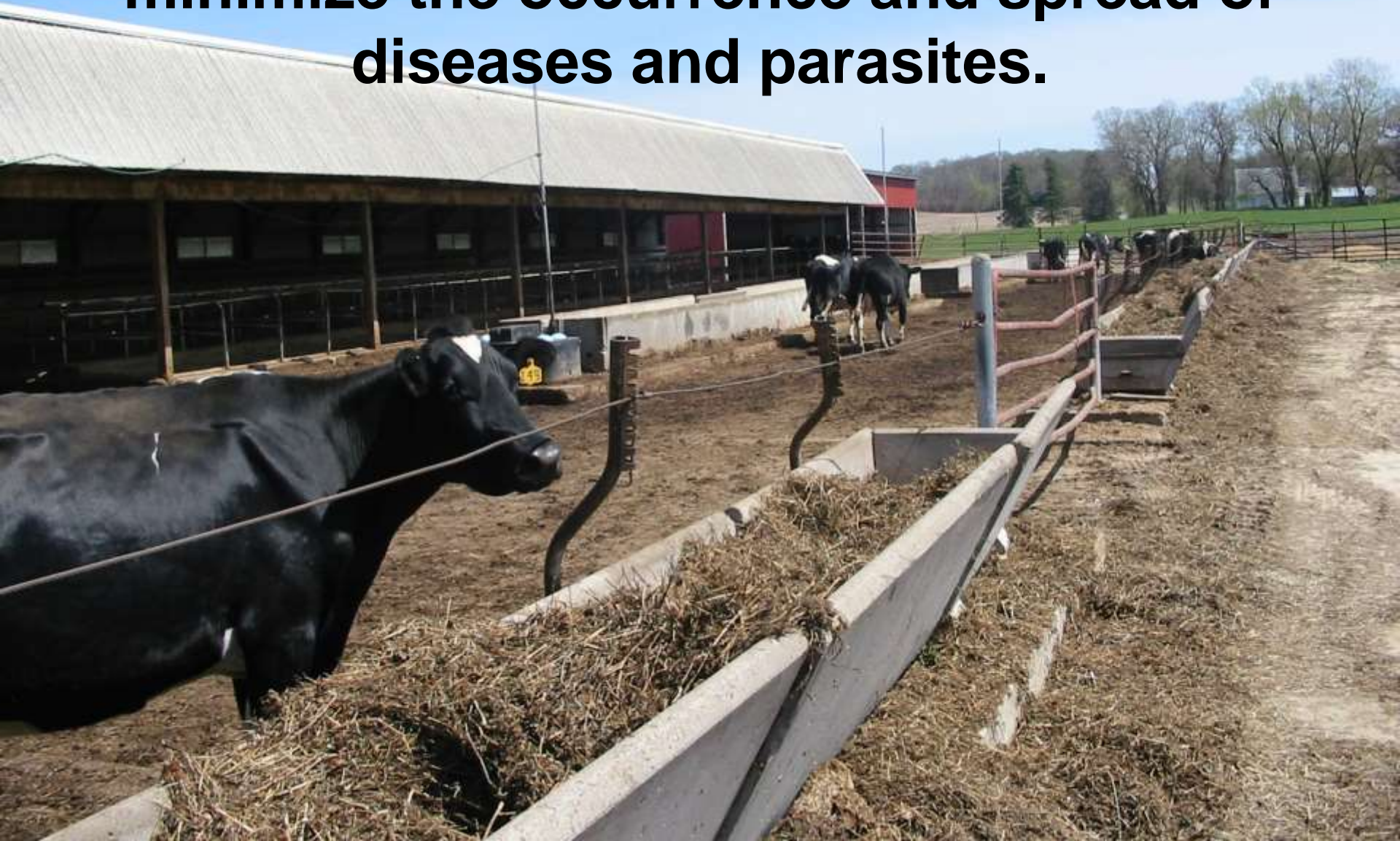


# **Preventive Health Care Practices**

- **Selection of species – suitable to site-specific conditions and resistance to prevalent diseases and parasites.**
- **Must accommodate natural behavior.**
- **Must provide nutritional feed ration.**
- **May use physical alterations, but only to promote animal's welfare, while minimizing pain and stress.**



**Must establish appropriate housing, pasture conditions and sanitation practices to minimize the occurrence and spread of diseases and parasites.**







**NOP Handling Requirements**

# **NOP Handling Requirements**

- **Organic System Plan**
- **Mandatory Record keeping**
- **Monitoring management practices**
- **May use mechanical or biological processing methods (cooking, baking, cutting, mixing, grinding, fermenting, distilling, freezing, etc.)**

# **NOP Handling Requirements**

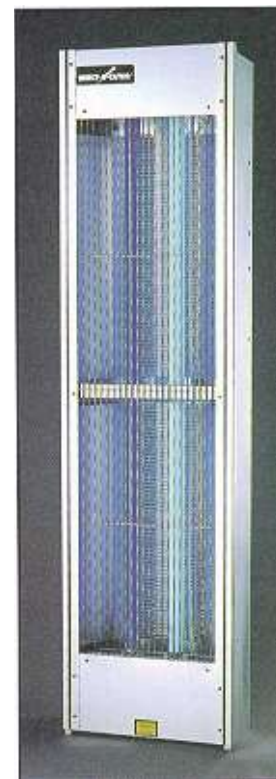
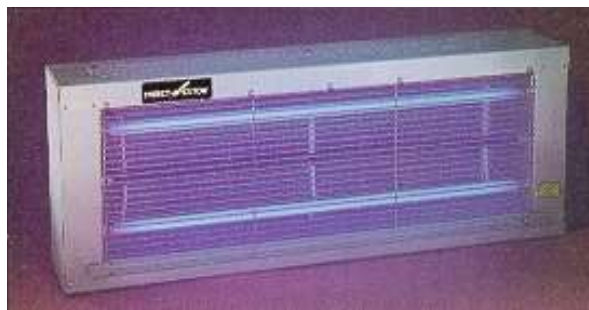
- **Must implement measures to prevent commingling and contamination of organic products.**
- **Must not use packaging materials that contain synthetic fungicides, preservatives, or fumigants.**

# **NOP Handling Requirements**

- **Must implement structural pest management practices to prevent pest infestations, through sanitation, exclusion, trapping, & monitoring.**
- **Must take steps to protect organic products if “prohibited” pesticides are applied.**
- **Must keep records of all pesticide applications and steps taken to organic products, packaging, and production areas.**







# **Violations**

**Any certified operation that makes a false statement or knowingly sells or labels a product as organic that is not produced in accordance with the Organic Foods Production Act of 1990 shall be subject to:**

- **Provisions of section 1001 of title 18, United States Code.**
- **Up to \$11,000 fine per violation.**

- 
- 
- 

# Why Organic

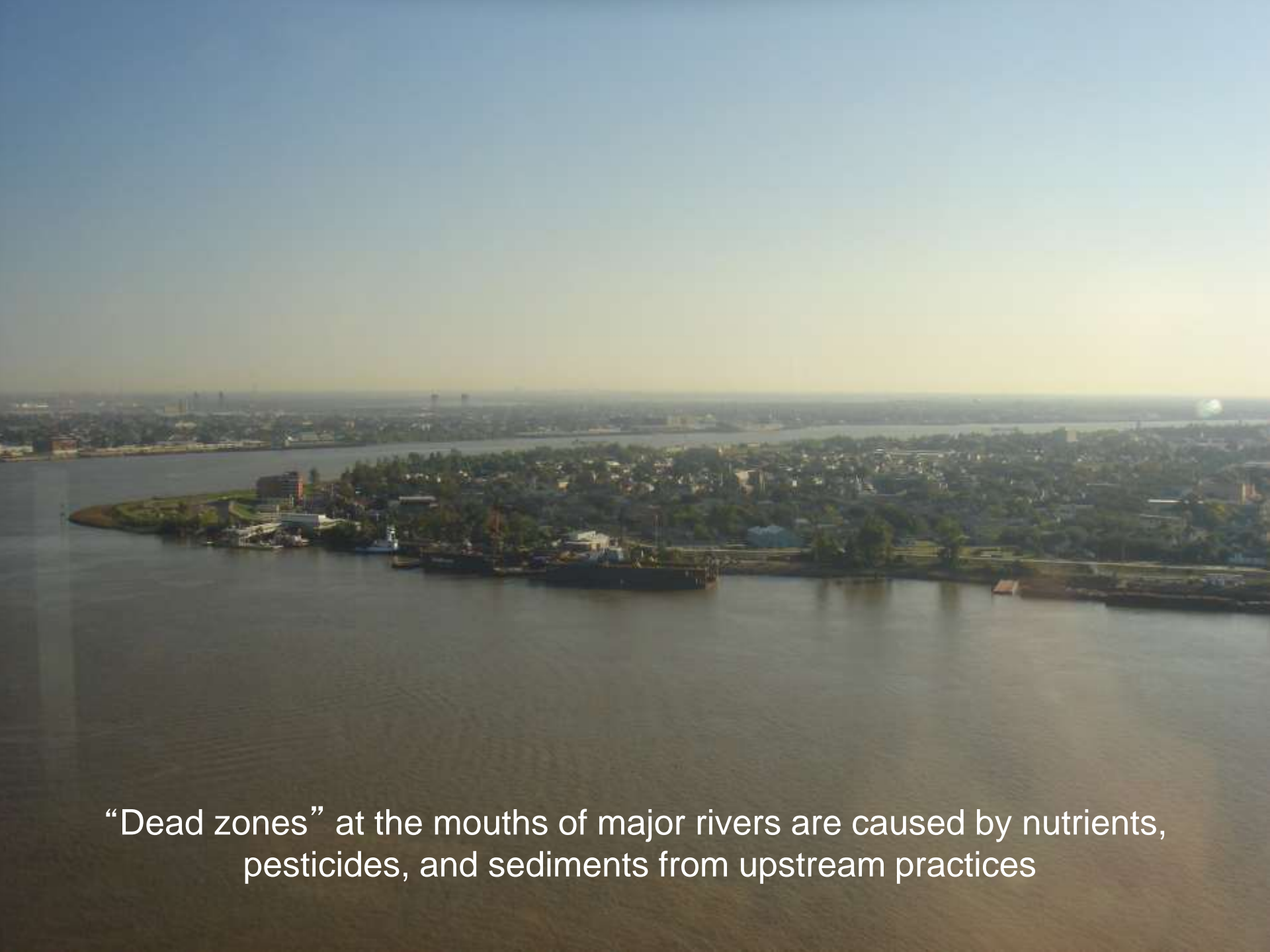


# ***ISU - Organic Production Increases Yields and Builds Soil Quality***

**Results from the ongoing study of conventional and organic cropping systems by Iowa State researchers show that organic systems increase yields and improve soil quality.**

**By the fourth year in an organic crop rotation, organic corn and soybean yields rose above conventionally managed fields. The improving performance in the organic plots is attributed to soil quality improvements: more soil organic matter, enhanced microbial activity in more diverse communities of organisms, and reduced soil acidity.**

<http://extension.agron.iastate.edu/organicag/rr.html>



“Dead zones” at the mouths of major rivers are caused by nutrients, pesticides, and sediments from upstream practices





Organic farmers protect ground and surface waters by not using toxic pesticides or synthetic fertilizers.

# ***Nitrates and Groundwater***

University of Minnesota researchers found that alternative cropping systems, including organic, reduced the amount of water lost in tile drainage by 41 percent compared to a conventional corn-soybean rotation.

Alternative farming practices also reduced nitrate-nitrogen losses by between 59 percent and 62 percent.

*Journal of Environmental Quality. July-August 2007.*



# ***Proceedings of the National Academy of Sciences***

***March 21, 2006***

In long-term research at Washington State, nitrogen (N) losses to groundwater and the atmosphere were reduced in organic orchards, relative to conventional orchards.

Annual nitrate leaching was 4.4-5.6 times higher in conventional plots than in organic plots.

The organically farmed soils exhibited higher potential denitrification rates, greater denitrification efficiency, higher levels of organic matter, and greater microbial activity than the conventionally farmed soils.

The study demonstrates that organic practices support more active and efficient soil microbial communities, shift the balance of N<sub>2</sub> emissions and nitrate losses, and reduce environmentally damaging nitrate losses.

These benefits boost the overall efficiency of nitrogen utilization within an organic system, and point the way toward improved environmental and economic farming system performance.



**Organic farmers do not use genetically engineered products - seeds, planting stock, insecticides, inoculants, or growth hormones.**



GM canola or "natural"?



**Scientists in North Dakota have now found that genetically engineered canola has escaped and cross-pollinated with wild relatives, creating transgenic weeds that are resistant to herbicides.**

*PLoS One. 2011;6(10):e25736. Epub 2011 Oct 5.*

<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0025736>



## *GM Bt Toxin Found in Midwest Streams*

According to researchers from Notre Dame, Loyola, Indiana and Southern Illinois Universities, Bt corn residues and associated Cry1Ab proteins are widely distributed and persistent in the headwater streams of the Corn Belt landscape, and can be measured in the water column 6 months after harvest.

*“Occurrence of maize detritus and a transgenic insecticidal protein (Cry1Ab) within the stream network of an agricultural landscape”*

<http://www.pnas.org/content/early/2010/09/22/1006925107.full.pdf>

## *Bt Corn Harms Aquatic Organisms*

Researchers at Indiana University have found that genetically engineered Bt corn harms aquatic insects and disrupts stream ecosystems. Caddisfly larva experienced high mortality and stunted growth when exposed to Bt corn pollen and crop residues.

*Proceedings of the National Academies of Sciences*  
(Vol. 104, No. 41)



Corn rootworm resistance to Bt hybrids expressing the Cry3Bb1 toxin has now been documented by University of Minnesota and Iowa State researchers.

*Gassmann AJ, Petzold-Maxwell JL, Keweshan RS, Dunbar MW (2011)  
“Field-Evolved Resistance to Bt Maize by Western Corn Rootworm.”*

<http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0022629>

# USGS – Neonicotinoid Insecticides in Streams in Corn and Soy Producing Regions



An area of intense corn and soybean production in the Midwestern US was chosen to study this issue because of the high agricultural use of neonicotinoids via both seed treatments and other forms of application. Water samples were collected from nine stream sites during the 2013 growing season. Neonicotinoids were detected at all nine sites sampled. Temporal patterns in concentrations reveal pulses of neonicotinoids associated with rainfall events during crop planting, suggesting seed treatments as the likely source. Concentrations frequently exceed chronic aquatic toxicity values during the growing season.



## *Bt Toxin Found in Maternal Blood*

Cry1Ab, a specific type of Bt toxin from genetically modified (GM) crops, has been detected in human and fetal blood samples. Upon testing 69 pregnant and non-pregnant women who were eating a typical Canadian diet (which included GM corn and soy) researchers found Bt toxin in:

- 93 percent of maternal blood samples
- 80 percent of fetal blood samples
- 69 percent of non-pregnant women blood samples

Maternal and fetal exposure to pesticides associated to genetically modified foods in Eastern Townships of Quebec, Canada

*Reproductive Toxicology, Volume 31, Issue 4, May 2011, Pages 528-533*

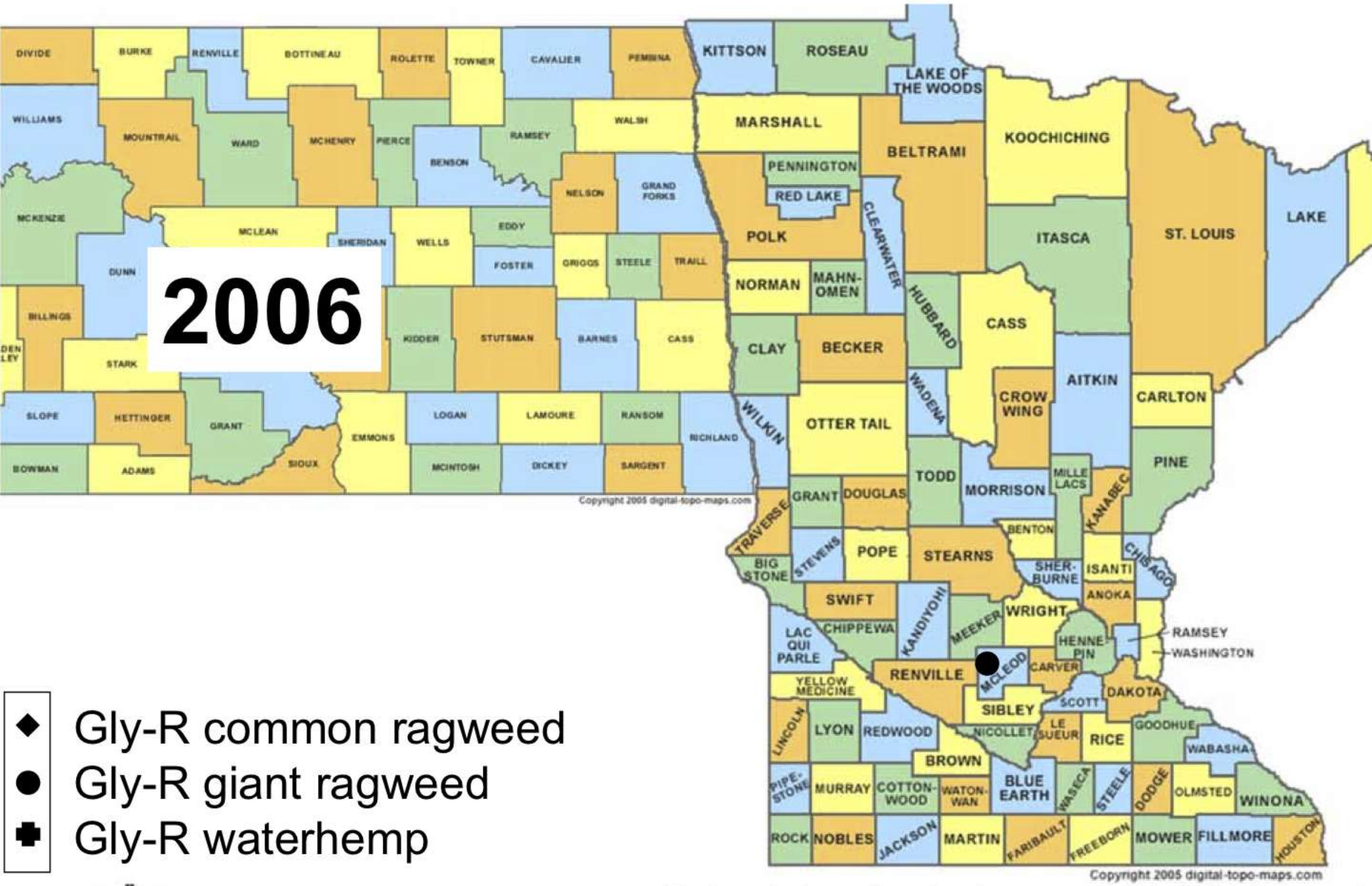


Over 20 glyphosate-resistant weed species have been Identified in the United States, with glyphosate-resistant horseweed, waterhemp and giant ragweed found throughout Illinois and Iowa. Weed scientists recommend applications of Atrazine, Simazine, 2,4-D, and other herbicides, in addition to glyphosate, for control.

*Weed Science, Oct-Dec 2011*

<http://web.extension.illinois.edu/ajmpu/news/news26408.html>

# Areas and counties of ND and MN having confirmed and suspected glyphosate-resistant weeds





# Areas and counties of ND and MN having confirmed and suspected glyphosate-resistant weeds

10 to 90% soybean fields gly-R C. Rag.

5 to 95% all fields gly-R waterhemp

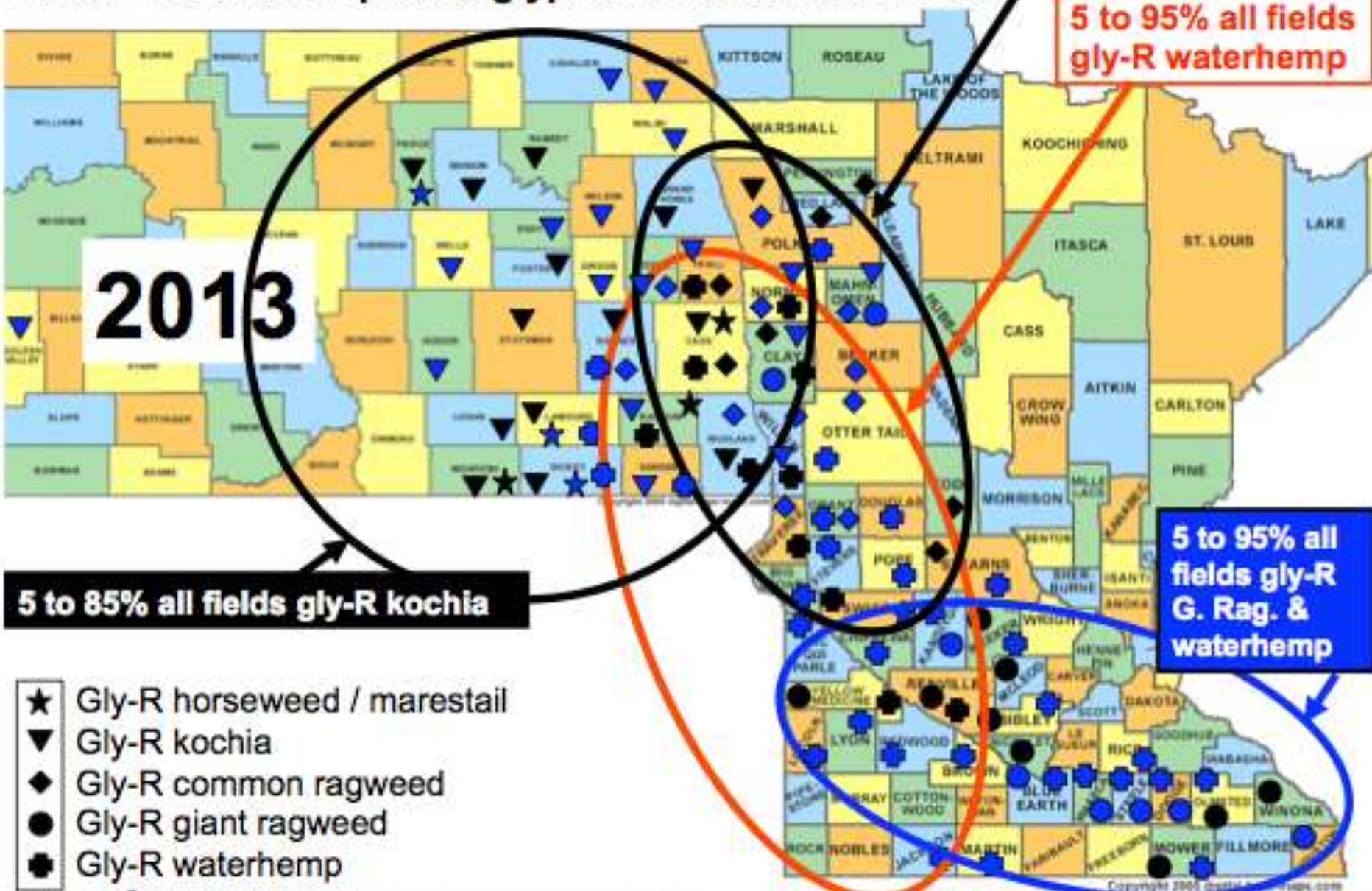
2013

5 to 85% all fields gly-R kochia

5 to 95% all fields gly-R G. Rag. & waterhemp

- ★ Gly-R horseweed / marestalk
- ▼ Gly-R kochia
- ◆ Gly-R common ragweed
- Gly-R giant ragweed
- ⬢ Gly-R waterhemp

Black symbols: confirmed resistant cases; Blue: highly suspected





# ***GM Crops Increase Herbicide Use***

Based on analysis of USDA pesticide use data, herbicide-resistant crop technology has led to a 527 million pound increase in herbicide use in the United States between 1996 and 2011.

# Monarch Declines

Published UMN research attributes decreasing Monarch butterfly populations to the loss of milkweed from the widespread use of “Roundup Ready” crops on millions of acres in the U.S.



***Decline of monarch butterflies overwintering in Mexico: is the migratory phenomenon at risk? Insect Conservation and Diversity 2011.***

***<http://onlinelibrary.wiley.com/doi/10.1111/j.1752-4598.2011.00142.x/abstract>***

# ***Glyphosate Residues***

GM soy from Iowa contained high residues of glyphosate and AMPA. Conventional and organic soybeans contained none of these agrochemicals.

Organic soybeans showed the healthiest nutritional profile with more sugars, such as glucose, fructose, sucrose and maltose, significantly more total protein, zinc and less fiber than both conventional and GM-soy. Organic soybeans also contained less total saturated fat and total omega-6 fatty acids than both conventional and GM-soy.



# ***Glyphosate Residues***

A 2014 study documented the presence of glyphosate in 75% of the air and rain samples collected and tested from Mississippi (1).

A 2014 U.S Geological Survey documented the presence of glyphosate in more than 50% of rivers and streams, soil and groundwater samples tested from 38 states (2).

(1) Pesticides in Mississippi air and rain: a comparison between 1995 and 2007. Majewski MS, Coupe RH, Foreman WT, Capel PD. Environ Toxicol Chem. 2014 Jun;33(6):1283-93. doi: 10.1002/etc.2550. Epub 2014 Apr 4. <http://www.ncbi.nlm.nih.gov/pubmed/24549493>

(2) Common Weed Killer is Widespread in the Environment  
[http://toxics.usgs.gov/highlights/2014-04-23-glyphosate\\_2014.html](http://toxics.usgs.gov/highlights/2014-04-23-glyphosate_2014.html)

# *Glyphosate and Beneficial Gut Bacteria In Poultry*

A 2012 study published in *Current Microbiology* shows that glyphosate, the main ingredient in Roundup, is toxic to beneficial gut bacteria in poultry. Disease-causing bacteria, such as *Salmonella* and *Clostridium*, are resistant to glyphosate.

Emilie Clair, Laura Linn, Carine Travert, Caroline Amiel,  
Gilles-Eric S  ralini, Jean-Michel Panoff. Effects of Roundup(  ) and  
Glyphosate on Three Food Microorganisms: Geotrichum candidum,  
Lactococcus lactis subsp. cremoris and Lactobacillus delbrueckii subsp. bulgaricus.  
Curr Microbiol. 2012 Feb 24.

# *Study Links Glyphosate, 2,4-D and Dicamba to Antibiotic Resistance*

Exposures of *E. coli* and *Salmonella* to commercial formulations of three herbicides were found to induce a changed response to antibiotics.

“Increasingly common chemicals used in agriculture, domestic gardens, and public places can induce a multiple-antibiotic resistance phenotype in potential pathogens. The magnitude of the induced response may undermine antibiotic therapy and substantially increase the probability of spontaneous mutation to higher levels of resistance.”

(CDC – 2M Americans infected; 23K die/year.)

American Society of Microbiology, *mBio*, 3/24/2015.  
<http://mbio.asm.org/content/6/2/e00009-15>

# ***Birth Defects and Glyphosate***

Argentinean physicians have reported significant increases in birth defects, miscarriages and child cancer in towns surrounded by GMO soy fields sprayed with glyphosate.

In Chaco Province, the rate of birth defects has gone from 19.1 per 10,000 in 1997 to 85.3 per 10,000 in 2008. Cases of child cancer rose from 29 to 40 per year from 1985 to 2001.

<http://www.reduas.fcm.unc.edu.ar/wp-content/uploads/downloads/2011/10/INGLES-Report-from-the-1st-National-Meeting-Of-Physicians-In-The-Crop-Sprayed-Towns.pdf>



## *RR Corn*



The health effects of Roundup-Ready corn (from 11% in the diet), cultivated with or without Roundup, and Roundup alone were studied 2 years in rats. In females, all treated groups died 2–3 times more than controls, and more rapidly.

In treated males, liver congestions and necrosis were 2.5–5.5 times higher. Marked and severe kidney nephropathies were also generally 1.3–2.3 greater. Males presented 4 times more large palpable tumors than controls which occurred up to 600 days earlier. Biochemistry data confirmed very significant kidney chronic deficiencies for all treatments and both sexes.

# GM Feed Effects on Hogs

Hogs in Iowa were fed either a mixed GM soy and GM corn diet or an equivalent non-GM diet in a long-term toxicology study of 22.7 weeks, the normal time from weaning to slaughter.

GM-fed female pigs had uteri that were 25% heavier than non-GM fed pigs. GM-fed pigs had a higher rate of severe stomach inflammation with a rate of 32% of GM-fed pigs compared to 12% of non-GM-fed pigs. The severe stomach inflammation was worse in GM-fed males compared to non-GM fed males by a factor of 4.

# World Health Organization Names Glyphosate “Probable Carcinogen”

Researchers from the International Agency for Research on Cancer, (the cancer research arm of the World Health Organization), found there was "limited evidence" in humans that the herbicide can cause non-Hodgkins lymphoma and convincing evidence that glyphosate can also cause other forms of cancer in rats and mice.

*The Lancet Oncology*, March 20, 2015

[http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(15\)70134-8/fulltext](http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(15)70134-8/fulltext)





Glyphosate, atrazine, 2,4-D, and other synthetic pesticides are not allowed in organic production. Numerous studies have shown that organic foods have lower levels of pesticide residues than non-organic foods.



# *Reduce Pesticide Exposure*

According to USDA pesticide detection data, conventional crops were six times as likely as organic to contain multiple pesticide residues.

California Dept. of Health found pesticide residues in 31 percent of conventional foods and only 6.5 percent of organic samples, and found multiple residues nine times as often in conventional samples.

Consumers' Union tests found pesticide residues in 79 percent of conventional food samples and 27 percent of organic samples, with multiple residues ten times as common in the conventional food.

The levels of residues found in organic samples were also consistently lower than levels of the same pesticides found in conventional samples, in all three sets of residue data.

*Food Additives and Contaminants, May 2002*  
*B. P. Baker; C. M. Benbrook; E. Groth; K. Lutz Benbrook*

## ***Environmental Health Perspectives***

Researchers at the University of Washington found that a diet composed of predominantly organic food “provides a dramatic and immediate protective effect against exposures to organophosphorous (OP) pesticides.”

Twenty-three children were enrolled in the study, which included three phases of testing for OP insecticide metabolites in urine.

Phase one - diet of conventionally grown foods.

Phase two - five days of a predominantly organic diet.

Phase three - return to a conventional diet.

All 23 children had OP insecticide metabolites in their urine in phase one, while levels were below the limit of detection during phase two, following the consumption of mostly organic food for just five days.

Once the children were back on the conventional food diet, the levels of insecticide metabolites in urine returned to those found in phase one.

The researchers concluded that, “consuming food grown using organic production methods can virtually eliminate exposures to a dangerous class of insecticides known to disrupt neurological development in infants and children.”

*Environmental Health Perspectives, Jan. 15, 2008*

<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info:doi/10.1289/ehp.10912>



## ***Pesticides in Frogs***

A new study has found that frogs in Iowa wetlands are accumulating a large number of different pesticides in their tissues, including up to eight different fungicides. Seventeen pesticides composed of eight fungicides, four herbicides, and five insecticides were detected in frog tissues.

**Pesticide concentrations in frog tissue and wetland habitats in a landscape dominated by agriculture.** Kelly L. Smalling<sup>a</sup>, Rebecca Reeves<sup>b</sup>, Erin Muths<sup>c</sup>, Mark Vandever<sup>c</sup>, William A. Battaglin<sup>d</sup>, Michelle L. Hladik<sup>e</sup>, Clay L. Pierce<sup>f</sup>. *Science of The Total Environment*, Volume 502, 1 January 2015, Pages 80–90.



# *Pesticides and Mental Health*

89,000 farmers and other pesticide applicators in Iowa and North Carolina have participated in a study led by the National Institute of Environmental Health Sciences.

Those who used organochlorine insecticides were up to 90 percent more likely to have been diagnosed with depression than those who hadn't. For fumigants, the increased risk was up to 80 percent.

“Our study supports a positive association between depression and occupational pesticide use among applicators,” the authors wrote.

*Environmental Health Perspectives, September 2014; Vol. 122, Issue 9*



Many farm families adopt organic practices to protect their family's health

# *President's 2010 Cancer Panel Report*

Urges consumers to choose foods grown without pesticides or chemical fertilizers, antibiotics, and growth hormones to help decrease risks of contracting cancer. “Exposure to pesticides can be decreased by choosing, to the extent possible, food grown without pesticides or chemical fertilizers. Similarly, exposure to antibiotics, growth hormones, and toxic run-off from livestock feedlots can be minimized by eating meat raised without these medications.”

*“Reducing Environmental Cancer Risk: What We Can Do Now.” Dr. LaSalle Leffall, Jr., Howard University, and Dr. Margaret L. Kripke, M.D. Anderson Cancer Center in Houston, 2010.*



## ***Organic Milk***

Studies have indicated that conjugated linoleic acids (CLA) naturally present in dairy products may have anti-diabetic, anti-mutagenic, anti-carcinogenic and anti-atherosclerotic effects on human health. Researchers in Germany, comparing the CLA content in organic and conventional milk, showed higher CLA,  $\beta$ -carotene, and  $\alpha$ -tocopherol content in organic dairy products. The study also found significant differences in the CLA of cream from organic versus conventional milk.

*3rd Quality Low Input Food (QLIF) Congress: Improving Sustainability in Organic and Low Input Food Production Systems, University of Hohenheim, Germany, March 20-23, 2007.*

<http://orgprints.org/10119/>



## *Organic Milk and Meat Enhance the Nutritional Quality of Mom's Breast Milk*

Mothers consuming mostly organic milk and meat products were found to have about 50 percent higher levels of rumenic acid in their breast milk. This Conjugated Linoleic Acid (CLA) is responsible for most of the health benefits of CLAs in milk and meat. The authors report that the greater reliance of organic beef and dairy farmers on pasture and forage grasses increases the levels of CLAs in milk and beef, and in turn in the breast milk of women eating organic animal products.

*British Journal of Nutrition, June 2007*

## *Lower Rates of Salmonella Infections*

Scientists in the U.K. surveyed 454 commercial chicken farms in 2004-2005, of which 54% were positive for *Salmonella*. About one-quarter of the isolates were resistant to one or more antibiotics.

On conventional farms with caged hens, 23.4% of the farms tested positive for *Salmonella*, compared to just 4.8% in free-range organic flocks. The research also showed that the bigger the holding size of chicken barns, the greater the *Salmonella* infection rate. Farms with 30,000 birds or more in one barn had four-times the infection rate of organic farms with the maximum size barn allowed by the Soil Association (5,000 birds or less).

*L.C. Snow et al., "Survey of the prevalence of Salmonella species on commercial laying farms in the United Kingdom," The Veterinary Record, October 6, 2007.*

## More on *Salmonella*

Scientists at the University of Georgia have found that 38.8% of conventional chickens tested were infected with *Salmonella*, while only 5.6% of organic birds were infected.

27.5% of conventional feed tested contained *Salmonella*, compared to 5% of organic feed tested.

39.7% of the *Salmonella* isolates from the conventional chickens were resistant to six antibiotics, while zero percent of isolates from organic birds were resistant.

*Food Pathogens and Disease*, Volume 7, Number 11, 2010.

# *Journal of the American Chemical Society* 2007

Ten-Year Comparison of the Influence of Organic and Conventional Crop Management Practices on the Content of Flavonoids in Tomatoes - UC Davis

Ten-year mean levels of quercetin and kaempferol in organic tomatoes were 79% and 97% higher than those in conventional tomatoes.

The levels of flavonoids increased over time in samples from organic treatments, whereas the levels of flavonoids did not vary significantly in conventional treatments.





## *How about Potatoes?*

Research published in 2005 comparing organic and conventional potatoes indicated lower nitrate content, higher vitamin C, and elevated concentrations of glycoalkaloids in potato varieties grown in organic farming systems.

*Quality of organically and conventionally grown potatoes: Four-year study of micronutrients, metals, secondary metabolites, enzymic browning and organoleptic properties. Journal of Food Additives and Contaminants: Part A, 22(6), 514 534.*

## ***Grapefruit Too?***

A study was published comparing conventional and organic production of pink grapefruit in Texas. Organic grapefruit had higher levels of ascorbic acid, certain health-promoting flavonoids, and sugars, and was lower in nitrates (a desirable nutritional attribute). It also had thinner, more yellow peels that would have graded "U.S. Fancy," a quality grade above the conventional fruit. Plus, the organic fruit had higher specific gravity, which is regarded as commercial advantage.

*Journal of Agricultural and Food Chemistry (Vol. 55, 2007)*



# ***Blueberries***



Researchers from the USDA and Rutgers University tested blueberries grown on five organic and conventional farms in New Jersey that shared the same soil, weather, and harvesting conditions. The effect of cultivation practices on fruit quality and antioxidant capacity in Bluecrop variety (*Vaccinium corymbosum* L.) of highbush blueberries was evaluated from random samples.

**Results showed that** organic blueberries had a significantly higher sugar content (fructose and glucose), malic acid, total phenolics, total anthocyanins, and antioxidant activity than fruit grown conventionally.

*Fruit quality, antioxidant capacity, and flavonoid content of organically and conventionally grown Blueberries (2008) Journal of Agricultural and Food Chemistry, 56 (14), 5788–5794*

# *Catsup*

USDA scientists found that organic brands of catsup contained 57 percent higher levels of the health-promoting antioxidant lycopene, compared to six national brands.

The team also found twice the level of antioxidant activity in organic catsup compared to catsup sold in fast food restaurants and/or vending machines.

On average the organic brands had about two-thirds higher total antioxidant capacity compared to the major national brands.





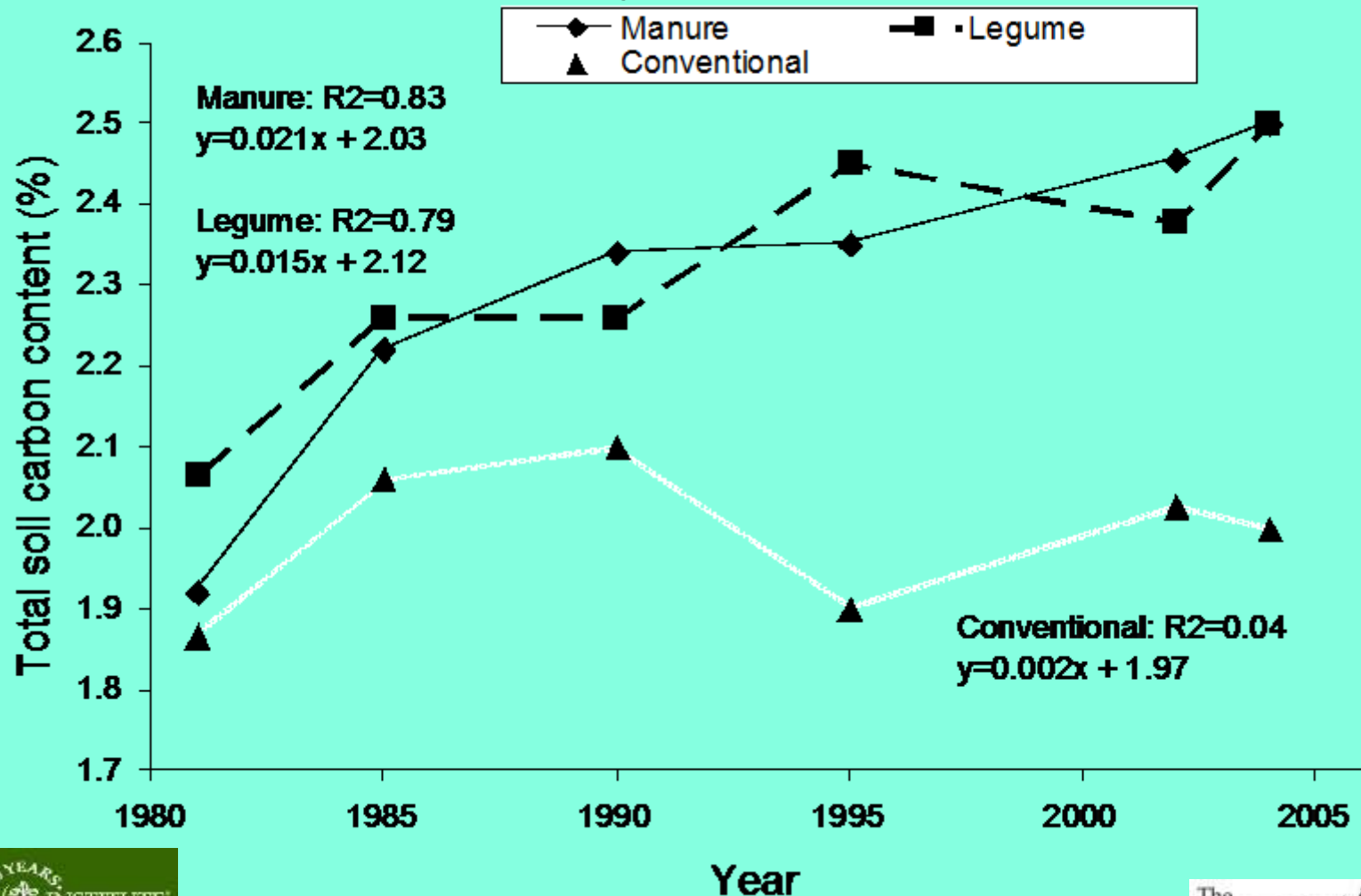
Organic farmers enhance biodiversity, providing habitat and food sources for pollinators

# *International Report on Organic Farming and Climate Change: “Organic Farming Can Help Mitigate Climate Change”*

The International Trade Centre, the joint technical cooperation agency of the United Nations Conference on Trade and Development (UNCTAD) and the World Trade Organization, released a draft technical paper focusing on organic agriculture and mitigation and adaptation to predictable and unpredictable impacts of climate change.

The paper is based on a review of peer-reviewed scientific literature and concludes that, “organic agriculture has much to offer in both mitigation of climate change through its emphasis on closed nutrient cycles and is a particularly resilient and productive system for adaptation strategies.”

# Long term Soil Carbon Accumulation in Organic and Conventional Farming Systems



# *ORGANIC AGRICULTURE and FOOD SECURITY*

The Food and Agriculture Organization of the United Nations cites research showing that, in subsistence agricultural systems, the adoption of organic practices results in increased yields up to 180 percent. The authors state, “Organic agriculture offers advantages in terms of enhancing food production where it is most needed by decreasing dependence on external inputs and increasing agro-ecosystem performance.”

*UN-FAO Organic Agriculture and Food Security, 2007.*

<ftp://ftp.fao.org/docrep/fao/meeting/012/ah952e.pdf>

*Access to Land and the Right to Food, 2011.*

<http://www.srfood.org/index.php/en/component/content/article/984-access-to-land-and-the-right-to-food>



# ***2007 USDA Ag Census***

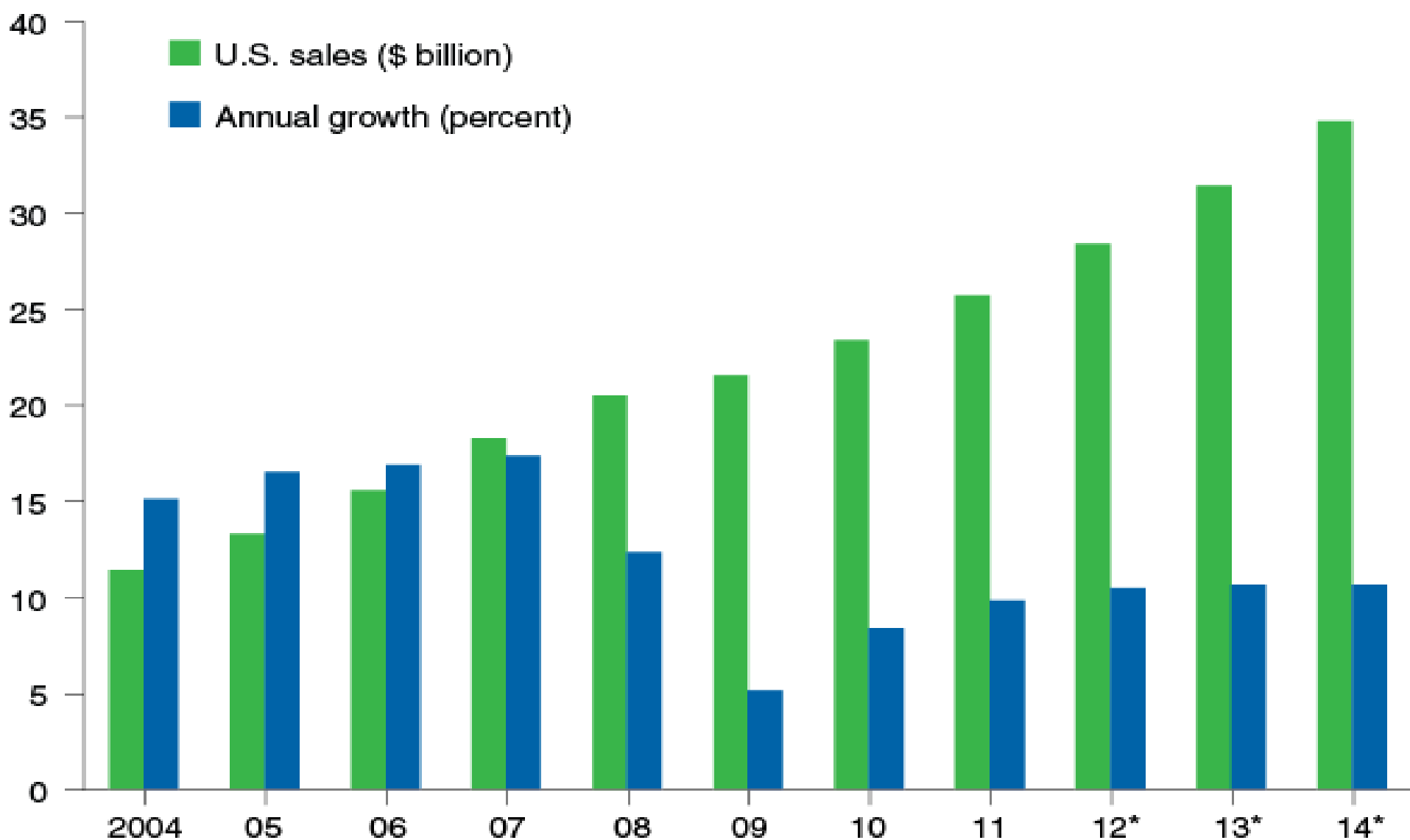
- 20,437 organic farms in US
  - 2,577,418 organic acres
  - Average organic sales = \$93,850
- 
- Average age – all farmers – 57.1
  - Average age – organic – 53.2

## Primary U.S. organic crops in 2011

Crop	U.S. cropland		Certified organic	
	Acres	Share of total	Acres	Share of total
	<i>Thousands</i>	<i>Percent</i>	<i>Thousands</i>	<i>Percent</i>
Corn	91,900	30	234.5	12
Soybeans	78,000	26	132.4	7
Hay	61,600	20	786.0	39
Wheat	54,400	18	344.6	17
Fruit and nuts	4,000	1	154.8	8
Vegetables	2,800	1	160.7	8
Rice	2,700	1	48.5	2
Barley	2,600	1	63.9	3
Oats	2,500	1	62.0	3
Dry beans, peas & lentils	2,100	1	46.5	2
Total, selected crops	302,500	100	2,034	100

Sources: USDA, Economic Research Service, based on information from USDA-accredited State and private organic certifiers and USDA, National Agricultural Statistics Service, "Agricultural Statistics 2012."

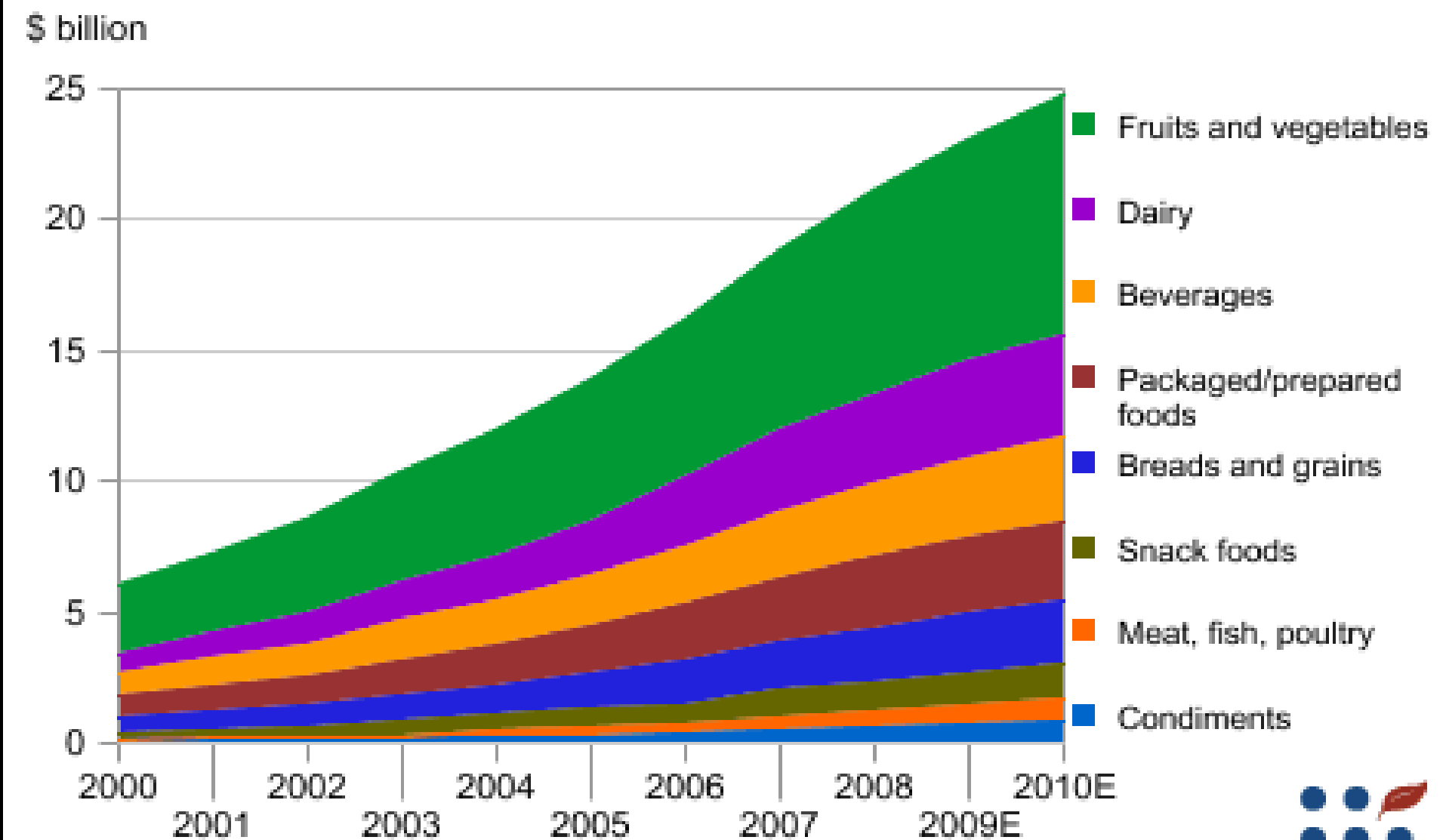
## U.S. organic food sales reached \$28 billion in 2012



\*Estimated.

Source: USDA, Economic Research Service using data from *Nutrition Business Journal*, 2013.

# Fruits and vegetables accounted for 37 percent of U.S. organic food sales in 2008



E = Estimate.

Source: Nutrition Business Journal.





We are all part of the web of life





**Thank You!**