

# Welcome to the First Annual Upper Midwest Hazelnut Growers Conference!

SATURDAY, MARCH 13

**Upper Midwest**  
**Hazelnut**  
**Development Initiative**

# Building a Midwestern Hazelnut Industry

A Model for University Supported New  
Crop Development

Jason Fischbach  
UWEX Agriculture Agent  
Ashland and Bayfield County



# Who Am I?

- UWEX Agriculture Agent in Ashland and Bayfield County
- Co-Leader of the UWEX Fruit Crop Team
- Agroecologist (B.A. Carleton College, M.S. University of Minnesota)
- Hazelnut grower in Ashland County (~500 plants)





# Setting the Stage



Photo: Mark Shepard



# Setting the Stage

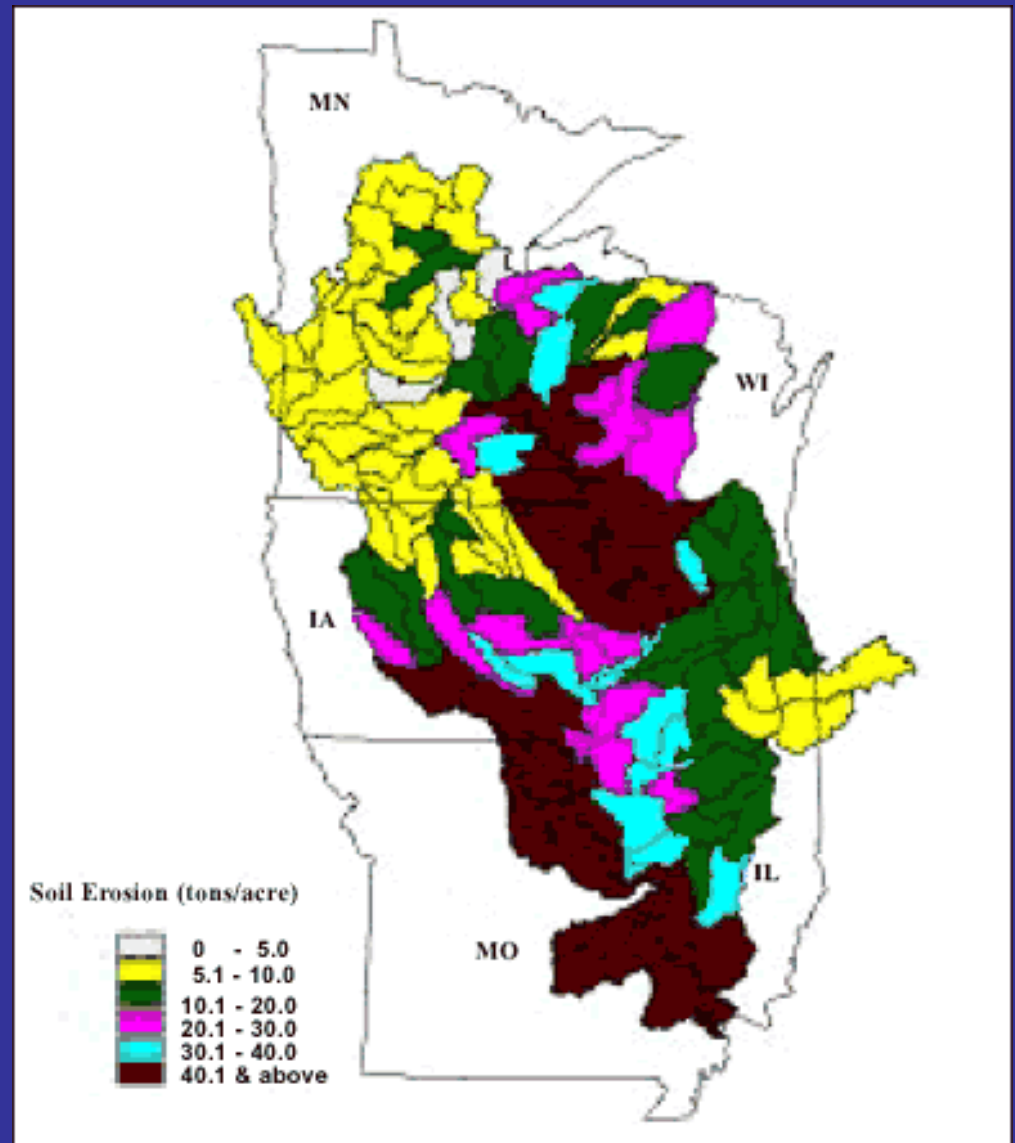
1. Why Hazelnuts, Why Now?
2. A New Model of New Crop Development
3. Upper Midwest Hazelnut Development Initiative
  1. Developing Viable Cultivars
  2. Building the Industry



# Why Hazelnuts, Why Now?

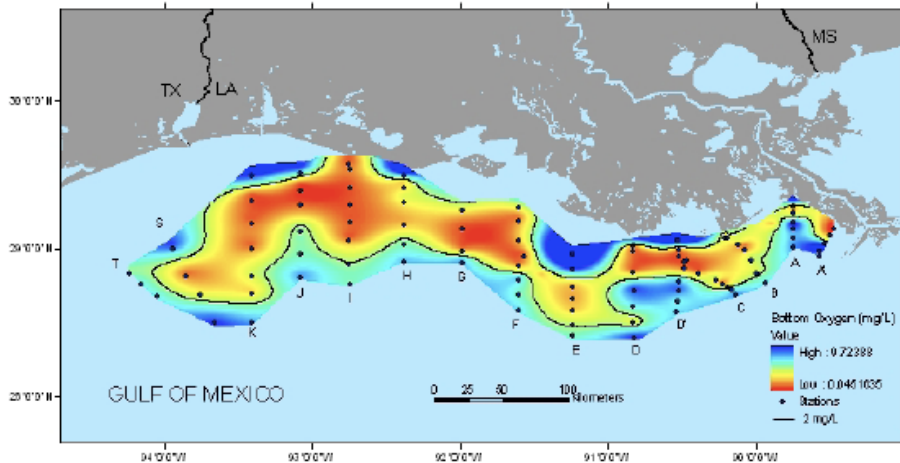
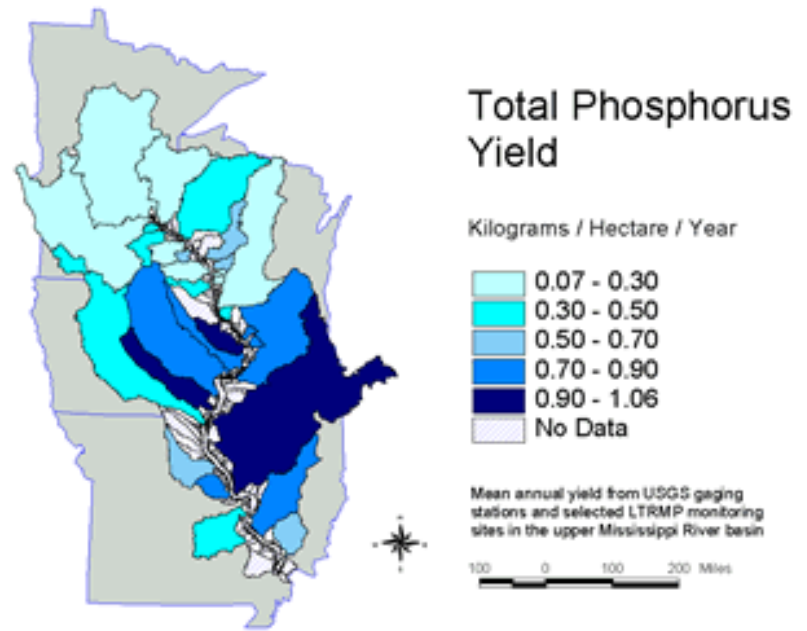
- Problems with annual row crops
  - Fossil-energy intensive
  - Nutrient losses
  - Soil erosion
  - Reduced biodiversity
  - Resource inefficient

Despite  
Conservation  
Tillage, Soil Erosion  
Is Still A Problem

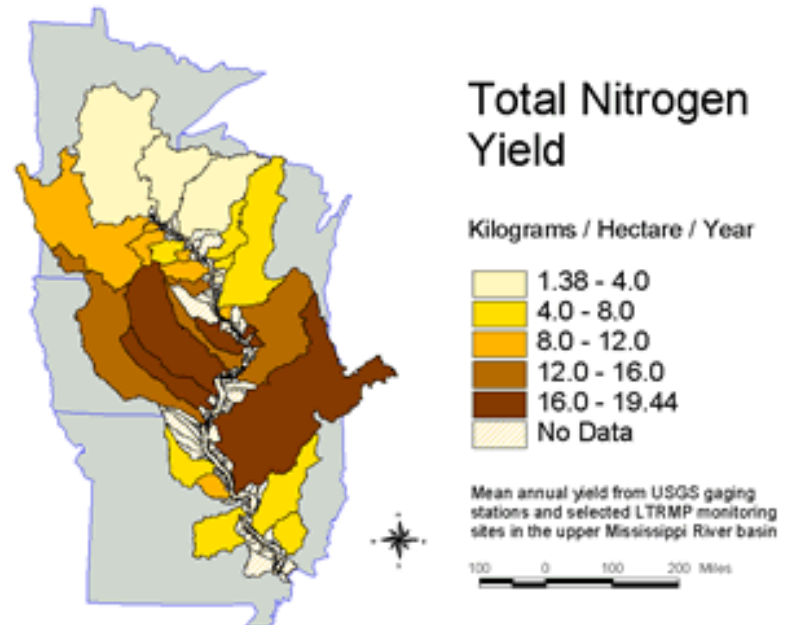


**Figure.** Soil erosion from agricultural sources by USGS 8-digit hydrologic units in the Upper Mississippi River Basin.

# Annual Row Crops Leak Nutrients to Surface Waters



Bottom-Water Dissolved Oxygen Concentrations for July 21-28, 2007, map by A. Sapp





# And to Groundwater

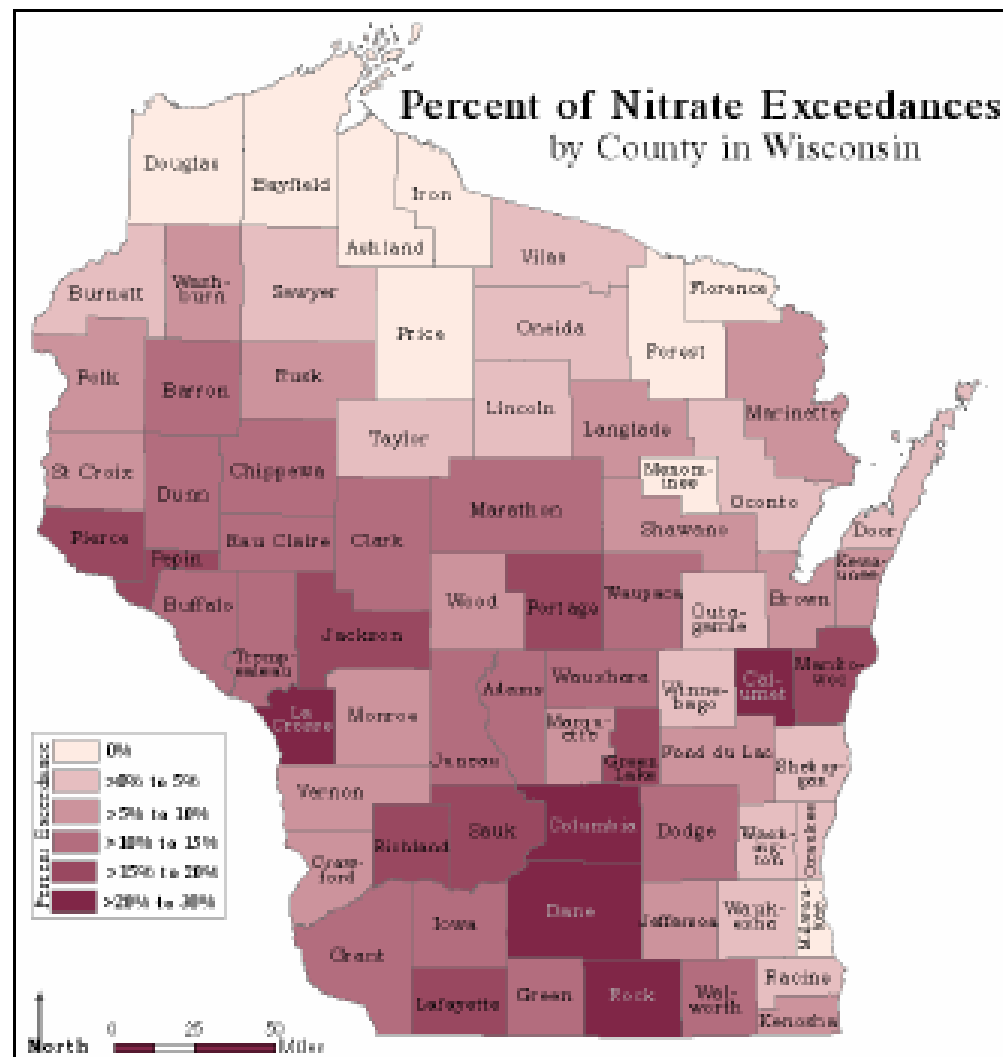


Figure 4.3 - Percentage of nitrate samples from private wells exceeding 10mg/L by county. Date sources: DNR, Center for Watershed Science and Education, and DATCP groundwater databases.

# Row Crop Agriculture Reduces Biodiversity



# Row Crop Agriculture is Fossil Fuel Dependent





# Row Crops “Waste” A Lot of Solar Energy



# Possible Solutions

- Soil conservation programs (PI, RUSTLE2, No-till, etc)
- Land retirement, set-aside programs (CRP, CREP)
- Perennial crops for animals (MIG, CRP, Forages)
- Perennial crops for humans (protein, oil, carbohydrates)

# Perennial Plants Solve Problems





# Perennial Plants Solve Problems

Sept

Dec

March

June

- Improve soil quality
- Reduce erosion and nutrient loss
- Reduce energy inputs
- Increase resource efficiency

1 m

2 m

Photo: Land Institute

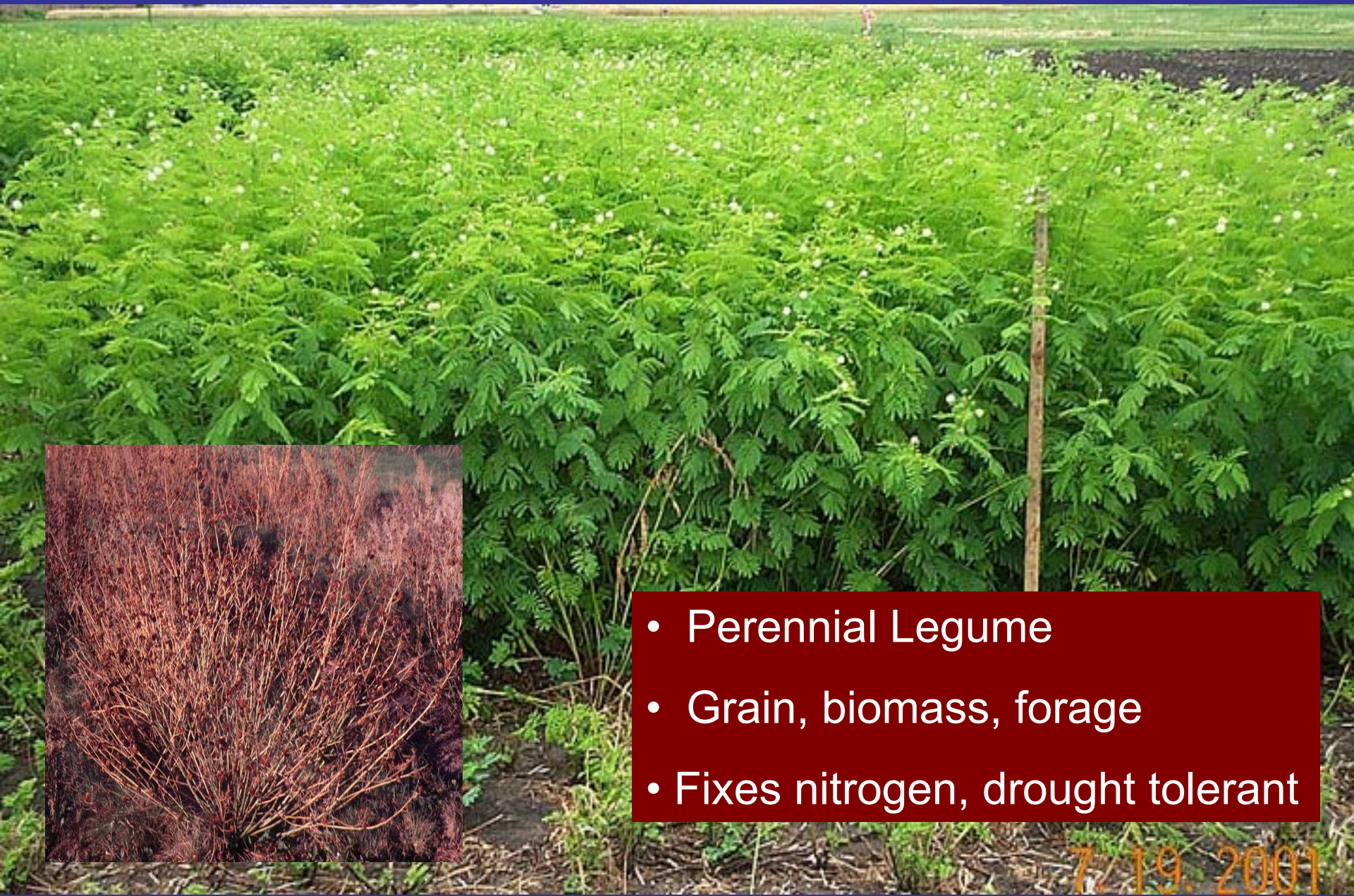
# Plant Breeders Wanted....

The goal is to develop perennial crops for people food, fiber, and fuel.

Domesticating native perennial plants is a good place to start.



# Illinois Bundleflower



- Perennial Legume
- Grain, biomass, forage
- Fixes nitrogen, drought tolerant

7/19/2001



# Switchgrass



- Perennial grass
- Biomass feedstock, forage
- Native C4 grass

# Perennial Wheat



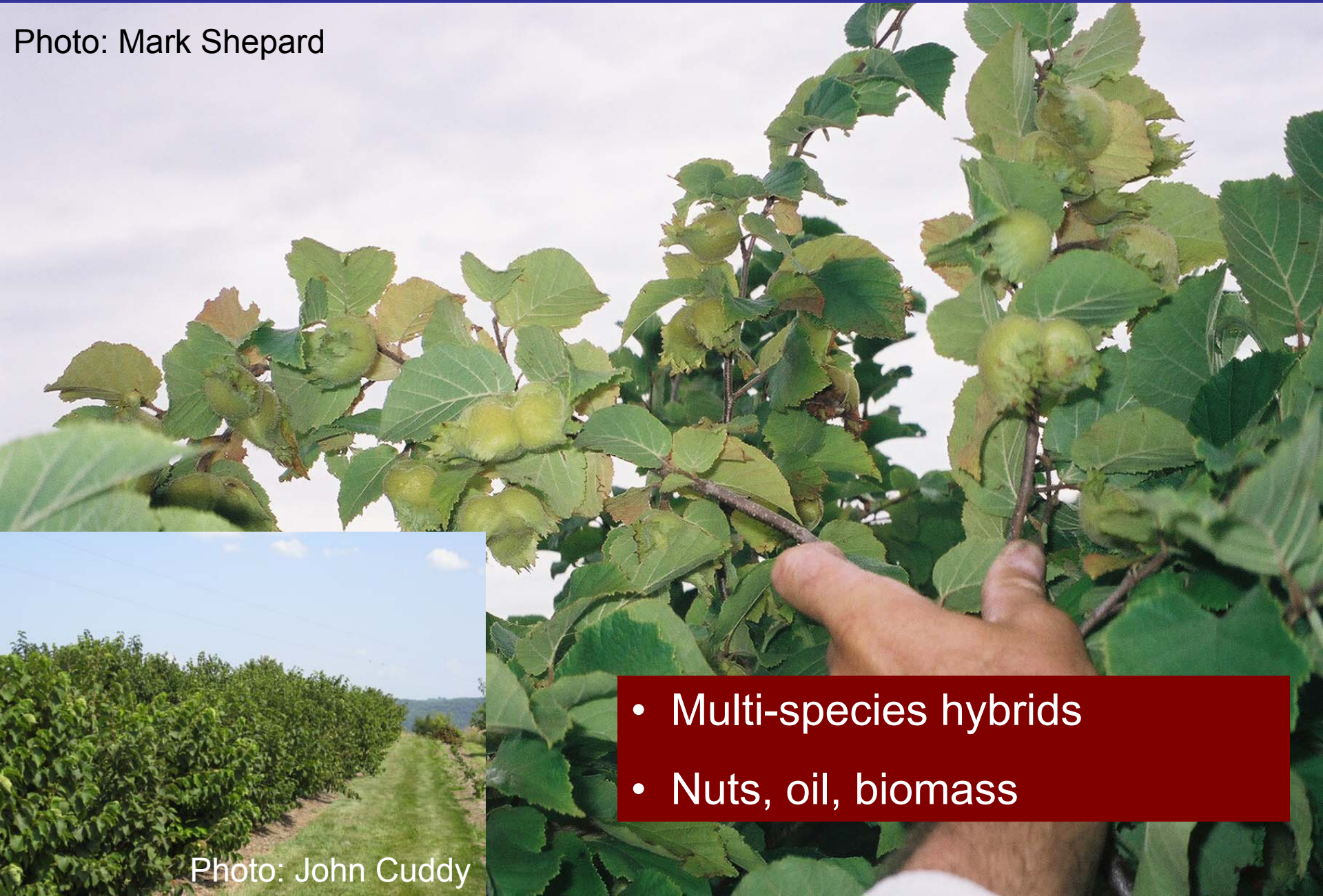
- Perennial grain crop
- Kernza (intermediate wheatgrass)
- MSU, Texas, WSU, Land Institute

Photo: Lee DeHaan



# Hazelnuts

Photo: Mark Shepard



- Multi-species hybrids
- Nuts, oil, biomass



Photo: John Cuddy



# Why Hazelnuts, Why Now?

- Diversified Market
  - Fresh-eating nuts
  - Cooking oil
  - Value-added products (confections, baked goods)
  - Bioenergy feedstock (oil, biomass)
  - Carbon sequestration
  - Ecosystem services

# Why Hazelnuts, Why Now?

- Early-adopters are leading the way and need help
  - 75+ growers in WI, 32 WI counties
  - 60+ acres in WI, MN, IA
  - Have deployed significant genetic diversity
  - Have requested help from the University

# The Hazelnut Crop

- 99.99% of hazelnuts come from European (*C. avellana*) or Turkish (*C. colurna*) hazelnuts
- European and Turkish species are not hardy to the Upper Midwest and both are susceptible to Eastern Filbert Blight
- Production is limited to Europe and Pacific Northwest

# Midwestern Hazelnut Production

- Two native hazelnut species (American and Beaked) are found throughout the region
- Private and hobby breeders have been making crosses between native species and European
- **Goal: A blight resistant, winter hardy shrub with consistent yield of large nuts.**



# Midwestern Hazelnut Production What Do We Know So Far

# Midwestern Hazelnut Production What Do We Know So Far

- All plants are genetically unique



Photo: Mark Shepard

# Midwestern Hazelnut Production

## What Do We Know So Far

- Some plants do better than others
  - Nebraska yields:
    - 4 ton/ha 3-year average husked nut yield of top 25 producing plants from a population of 5000+ plants (Hammond, 2006)
    - 1000kg/ha of oil compared to average soybean oil yield of 500kg/ha (Xu et al, 2007)
- 3562 lbs/ac in-shell nuts
- 115 gallons/acre hazelnut oil compared to 58 gallons/acre soybean oil



# Midwestern Hazelnut Production

## What Do We Know So Far

- Folks are having trouble establishing the plants



# Midwestern Hazelnut Production

## What Do We Know So Far

- Folks are having trouble establishing the plants

Year Planted	# Planted	Living Plants (as of 2008)	% Survival
Prior to 2000	5488	1284	23%
2000	10355	3170	31%
2001	6106	155	3%
2002	1696	824	49%
2003	3028	963	32%
2004	1390	826	59%
2005	2254	1367	61%
2006	4097	3119	76%
2007	5217	4146	79%
2008	2131	1580	74%
<b>Total</b>	<b>41762</b>	<b>17434</b>	<b>42%</b>

Data from 2008 Wisconsin Hazelnut Growers Survey

# Midwestern Hazelnut Production

## What Do We Know So Far

- Folks are having trouble establishing the plants



Challenges	Percent
Getting seedlings to survive	47
Lack of technical assistance	24
Rodent pests	24
Weed control	21
Deer browse	18
Difficulty of husking/cracking	17
Cost of seedlings	17
Variability of nut size	12
Lack of irrigation	12
Bird pests	9
Availability of seedlings	8
Insect pests	8
Variability among plants	6
Difficulty of harvest	5
Plant disease	5
Lack of markets	3

**Figure 6.** The percent of survey respondents that indicated the listed challenges were important to them. (N=66)



# Midwestern Hazelnut Production

## What Do We Know So Far

- Growers are scattered all over

County	# of Plants	County	# of Plants
Adams	5	Monroe	19
Ashland	890	Oconto	40
Bayfield	1465	Ozaukee	121
Buffalo	35	Pepin	23
Columbia	20	Pierce	213
Crawford	253	Polk	112
Dane	53	Portage	150
Door	9	Racine	20
Douglas	10	Richland	7975
Fond du Lac	35	Sauk	321
Grant	18	Shawano	48
Green	75	Sheboygan	61
Jackson	15	St. Croix	12
Kenosha	46	Vernon	4340
Kewaunee	8	Waukesha	18
La Crosse	40	Wood	3
Marathon	161	Not Specified	725

**Figure 2.** Number of hazelnut plants by Wisconsin County.

# Midwestern Hazelnut Production

## What Do We Know So Far

- Processing is a major bottleneck





# Midwestern Hazelnut Production

## What Do We Know So Far

- There are no proven viable cultivars for Midwestern production
- Eastern Filbert Blight is a lethal disease
- Hazelnuts have potential, but a great amount of work is necessary to make it a financially viable enterprise

# New Crop Development and the University



Photos: John Cuddy



# New Crop Development and the University

- **Challenge:** You can't have an industry without a crop and you can't develop a crop without an industry
- The University is increasingly less able to conduct long-term breeding projects of new crops on its own



# Upper Midwest HazelNut Development Initiative

A Multi-State Collaboration of Universities,  
NGOs, and Growers Working Together to  
Build A Midwestern Hazelnut Industry

# Upper Midwest Hazelnut Development Initiative

- Jason Fischbach – UW-Extension
- Mike Demchik – UW-Stevens Point
- Brent McCown – UW-Madison
- Anthony Kern – Northland College
- Lois Braun – UMN-St. Paul
- Don Wyse – UMN-St.Paul
- Jeff Jensen – Rural Advantage
- Minnesota Hazelnut Foundation
- Grower cooperators

**Minnesota  
Hazelnut  
Foundation**

**NORTHLAND  
COLLEGE**

**UW  
Extension**

**THE UNIVERSITY  
of  
WISCONSIN  
MADISON**



**College  
of Natural Resources**



**UNIVERSITY  
OF MINNESOTA**

**UNIVERSITY OF MINNESOTA  
EXTENSION**





# 2007 Hazelnut Development Strategic Plan

1. Grower outreach and education
2. Develop hazelnut cultivars
  - a) Existing hybrid plantings
  - b) Wild hazelnut plantings
3. Develop suitable processing technologies
4. Support grower organizational development

# Grower Outreach and Education

- **2008 WI Hazelnut Growers Survey**
- **2009 Hazelnut Field Days**
- **2010 Hazelnut Growers Conference**
- **[www.midwesthazelnuts.org](http://www.midwesthazelnuts.org)**

# Field Days Are The Best Way To Learn About The Realities of Midwest Hazelnuts



Photos: Brent McCown

The screenshot shows a web browser window with the address bar displaying "Home @ Midwest Hazelnut Development Initiative". The browser's toolbar includes icons for home, RSS, print, page, and tools. The website's header features the "Upper Midwest Hazelnut Development Initiative" logo on the left and the "UW Extension" logo on the right. A vertical navigation menu on the left side contains the following links: Home, About Us, About HIP, Enter HIP Data Here, Hazelnut Suppliers, About Hazelnuts, Hazelnut Blogs, Research Data, Upcoming events, and Contact Us. The main content area is titled "A Website For Midwest Hazelnut Growers" and includes a sub-header "1st Annual Upper Midwest Hazelnut Growers Conference" with the dates "Friday and Saturday, March 12-13, LaCrosse Center, LaCrosse, WI". Below this is a paragraph about the conference. Another section titled "Hazelnut Improvement Program (HIP)" includes a paragraph about genetic diversity and a small image of hazelnut plants.

Home @ Midwest Hazelnut Development Initiative

Home

UW Extension

**Upper Midwest  
Hazelnut  
Development Initiative**

**Home**

**About Us**

**About HIP**

**Enter HIP Data Here**

**Hazelnut Suppliers**

**About Hazelnuts**

**Hazelnut Blogs**

**Research Data**

**Upcoming events**

**Contact Us**

## A Website For Midwest Hazelnut Growers

This website is for growers and researchers working together to develop the hazelnut industry in the Upper Midwest.

### 1st Annual Upper Midwest Hazelnut Growers Conference

Friday and Saturday, March 12-13, LaCrosse Center, LaCrosse, WI

Make plans to attend the 1st Annual Upper Midwest Hazelnut Conference. The conference is for prospective, beginning, and experienced growers to learn more about growing hazelnuts, network with other growers, and help plan for further development of the industry.

### Hazelnut Improvement Program (HIP)

The majority of hazelnuts grown in the Upper Midwest are open-pollinated hybrids between American (*Corylus americana*) and European (*Corylus avellana*). For the most part, no two hazelnut plants in the Upper Midwest are the same. This genetic diversity provides a great opportunity to find and develop locally adapted cultivars. Click



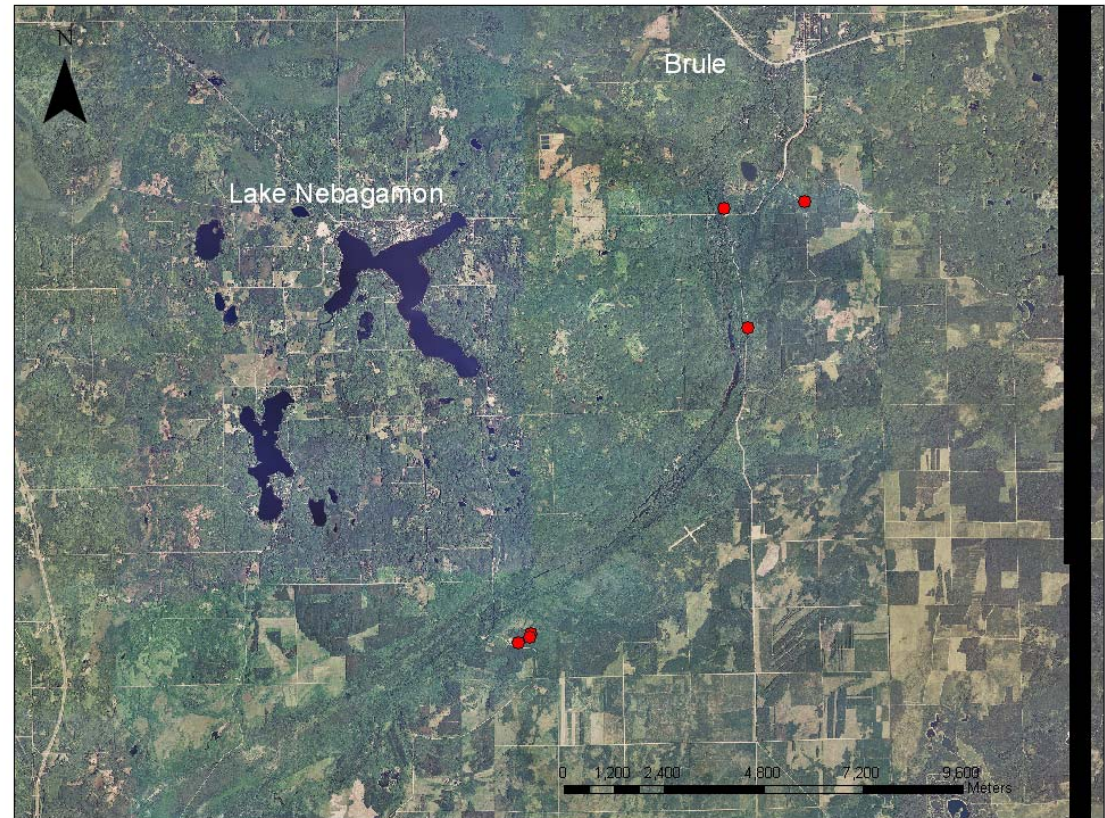


# [www.midwesthazelnuts.org](http://www.midwesthazelnuts.org)

- Information clearinghouse
  - Suppliers
  - Publications
  - Events
  - Research Reports
- Cooperative plant breeding (HIP)
- Grower networking
  - Blogs
  - Discussion Forum

# Hazelnut Cultivar Development

- **Hazelnut cultivar development**
  - Wild hazelnut screening
  - Genetic diversity analysis of wilds and hybrids



# Hazelnut Cultivar Development

- **Hazelnut cultivar development**
  - Hybrid hazelnut screening
  - Replicated performance trials





The logo for the Hazelnut Improvement Program is a yellow rounded rectangle with a thick brown border. Inside, the text "Hazelnut" is in brown, "Improvement" is in green, and "Program" is in brown.

# Hazelnut Improvement Program

## HIPsters Wanted

Tomorrow, 4:00-4:45PM

University Researchers Helping Growers Develop Cultivars

# Hazelnut Improvement Program

- Find high-performing plants in relation to its neighbors
- Vegetatively propagate the superior plants
- Plant clones of the superior plants in replicated performance trials to sort out genetics vs environment
- If it's good, plant more and/or cross with other nice plants

# HIP Data Entry Page

Enter HIP Data Here @ Midwest Hazelnut Developme...

Home Page Tools

**Upper Midwest Hazelnut Development Initiative**

**UW Extension**

**Home**

**About Us**

**About HIP**

**Enter HIP Data Here**

**Hazelnut Suppliers**

**About Hazelnuts**

**Hazelnut Blogs**

**Research Data**

**Upcoming events**

**Contact Us**

## Data Entry

Login

Enter your username and password to login. Forgot your username and password? [Reset your password.](#)

If you are a new user, [create an account.](#)

**Username**

---

**Password:**

---

Internet 100%

# HIP Data – Plant Information

Home

About Us

About HIP

Enter HIP Data Here

Hazelnut Suppliers

About Hazelnuts

Hazelnut Blogs

Research Data

Upcoming events

Contact Us

Complete the information below to create a new plant information record.

Planting:  \*

Plant ID:  \* *The unique identification number, code, or name for this plant.*

Year Planted:  \*

Month Planted:  \*

Species:  \*

Cultivar:  *Enter the cultivar name for this plant, if it has one.*

Plant Source:  *The nursery that produced the seedling*

Share This Plant Information with Plant Source:

- Yes  
 No

*Check yes if you want to share the plant performance data for this plant with the*

Done

Internet

100%

start

I...

H...

M...

M...

P...





# HIP Data – Shared Data Example

Planting Details for the state of WI					
Planting Identifier	State	County	Soil Type	Soil Series	Number of Plants
2005 planting	WI	Kenosha	Silty Clay		1
Berweger Flagged	WI	Ashland	Sandy Loam		4
Spring 2009					
Big Field	WI	Ashland	Silt Loam	480B	
Old Greenhouse	WI	Ashland	Silty Clay	580B	
Port Wing Flagged	WI	Bayfield	Sandy Loam		
Spring 2009					
Research Plot #1	WI	Bayfield	Clay Loam		
MPL					
Research Plot #10	WI	Portage	Sandy Loam		20
MPL					
Research Plot #10	WI	Portage	Sandy Loam		
MPL					
Research Plot #11	WI	Pierce	Loam		22
MPL					
Research Plot #2	WI	Bayfield	Sandy Loam		
MPL					
Research Plot #3	WI	Ashland	Sandy Loam		20
MPL					
Research Plot #4	WI	Ashland	Sandy Loam		13
MPL					
Research Plot #5	WI	Ashland	Sandy Loam		21
MPL					
Research Plot #6	WI	Sauk	Sandy Loam		20
MPL					
Research Plot #7	WI	Vernon	Silt Loam		20
MPL					
Research Plot #8	WI	Vernon	Silt Loam		20
MPL					
Research Plot #9	WI	Vernon	Silt Loam		15
MPL					
Swamp Field	WI	Ashland	Silt Loam	480B	2

*Data shown are only the data shared by other users.*

# Cracking the Processing Nut....So to Speak

## The Challenge....

There isn't yet enough Midwest hazelnut production to cash flow off-the-shelf processing equipment, but without processing equipment there is no efficient way to process and sell what production there is, and, thus, no good way to increase production.

# Cracking the Processing Nut....So to Speak

## Our Task Today and Tonight...

- Learn how others are processing
- Identify ways we can speed development of processing capacity