A Brief History of Agriculture

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- Small Populations
- Direct connection to natural cycles/NPP

- Large Populations
- Connection between natural cycles/NPP delayed
Prehistoric
??-10,000 BC

Ancient-Dark Ages
10,000 BC-1700 AD

Early Scientific
1700-1900 AD

Modern And Postmodern
1900-Present
Prehistoric Agriculture: Earliest Records in Fertile Crescent

10,000 BC

[Map showing Fertile Crescent and Mesopotamia]
5 Theories of Ag Origination

• Oasis Theory 1908
• Hilly Flanks 1948
• Demographic 1952
• Evolutionary/Intentionality 1987
• Feasting 1992
First Crops

- Wheat
- Flax
- Lentils
- Rice
Ancient Agriculture
Ancient Pest Management

Wooden Hoe

Egyptian Cat
Ancient Pest Management

Chinese Weaver Ants

Weaver Ant Nest
Scientific Age

- Technical Advances of the romans and greeks preserved and improved upon by the Moors
- Knowledge spread through 15th-17th centuries
17th Century

Hooke

van Leewenhoek
18th Century

Linnaeus

Tull Seed Drill
19th Century

Malthus

Population Growth Curve
19th Century

Liebig
19th Century

Mendel

Mendel’s Pea Experiment
19th Century

Darwin

Origin of Species (Tree of Life)
19th Century

John Deere Steel Plow

Steam Tractor

Land Grant Universities
Early 20th Century

Tractors Replace Farm Animals
Early 20th Century

• Haber-Bosch Process 1910
• Fritz Haber
• Kept Germany in War I (Ammonia to make bombs)
• Ammonia (NH3) produced from air, natural gas, and metal catalysts
• 100 million tons/yr of Ammonia produced for ag.
1930’s-40’s

- Synthetic organic insecticides (DDT)
- Synthetic herbicides (2,4d)
Later 20th Century

Better Living Through Chemistry!

Chloronated Hydrocarbons

Organophosphates

Carbamates
The Green Revolution

Norman Borlaug

Source: Library of Congress, Federal Research Division (adapted)
Unintended Side Effects...

Rachel Carson
1968-IPM is Born!

- Integration of biological and economic models

- Nixon mandated that federal agencies develop and practice IPM in 1972
Better Living Through GMOs?
Better Living Through GMOs?

Adoption of genetically engineered crops grows steadily in the U.S.

Note: Data for each crop category include varieties with both HT and Bt (stacked) traits. Source: 1996-1999 data are from Fernandez-Cornejo and McBride (2002). Data for 2000-07 are available in the ERS data product, Adoption of Genetically Engineered Crops in the U.S., tables 1-3.
Better Living Through GMOs?
Significant increase in Indian farmer suicides after GMO cotton was released
Maybe Not....

Glyphosate Resistant Weeds – September 2006

Italian Ryegrass
Lolium multiflorum

Common Ragweed
Ambrosia artemisiifolia

Horsweed
Conyza canadensis

Rigid Ryegrass
Lolium rigidum

Palmer Amaranth
Amaranthus palmeri

Goosegrass
Eleusine indica

Italian Ryegrass
Lolium multiflorum

Hairy Fleabane
Conyza bonariensis

Rigid Ryegrass
Lolium rigidum

Johnson grass
Sorghum halepense

Buckhorn Plantain
Plantago lanceolata

http://www.weedscience.com