# Canadian Winter Conference

The Big Picture: Soil Health to Crop Health/Food Quality to Human Health

Arden Andersen, D.O., M.S.P.H., Ph.D.

# Arden Andersen Background

- Raised on dairy/crop farm in Michigan
- Undergraduate degree in agriculture; taught vocational agriculture at HS level
- Farm management/soil/plant nutritional consulting since 1983; authored numerous books, manuals, course DVD's and CD's, taught in 8 countries and 2 languages; consulted in 11 countries; given professional testimony/presentation in 3 countries.
- Masters of Science in Public Health from USF and residency trained and board eligible in Occupational Medicine; Board Certified in Public Health; Boarded in Prolotherapy
- Ph.D. in Ag-Biophysics
- USAFR Flight Surgeon
- Family Practice/Occupational Medicine, Lansing, Kansas
- Cenegenics trained

# What is human health?

- Ability of one's body to sustain life so that one can experience life to its fullest potential without the need for chemical/pharmaceutical intervention to abate/cover symptoms of malfunction.

# Bird's Eye View

- Outcome regardless of methods employed
  - **Health** – maximum brix, mineralization, nutrition, taste, yield to genetic potential, free of disease/parasites autonomously
  - **Pre-Disease** – "appears healthy" due to artificial control of disease/parasites, disease waiting to happen, accepted yield, mineralization, nutrition, brix - majority of crop production today including organic production
  - **Disease** – recycling of deficient/defective systems unable to provide needed nutrition/sustenance for consumer

Health

Sustainable living system taking in adequate energy equal to or greater than energy is being lost; strong immune system able to protect the organism from all predatory threats: at the top of Maslow's Hierarchy

Pre-disease

Declining system balance, weakening immune system unable to sufficiently protect the organism from predators and inherent internal degradation: loosing energy faster than replacing it

Disease

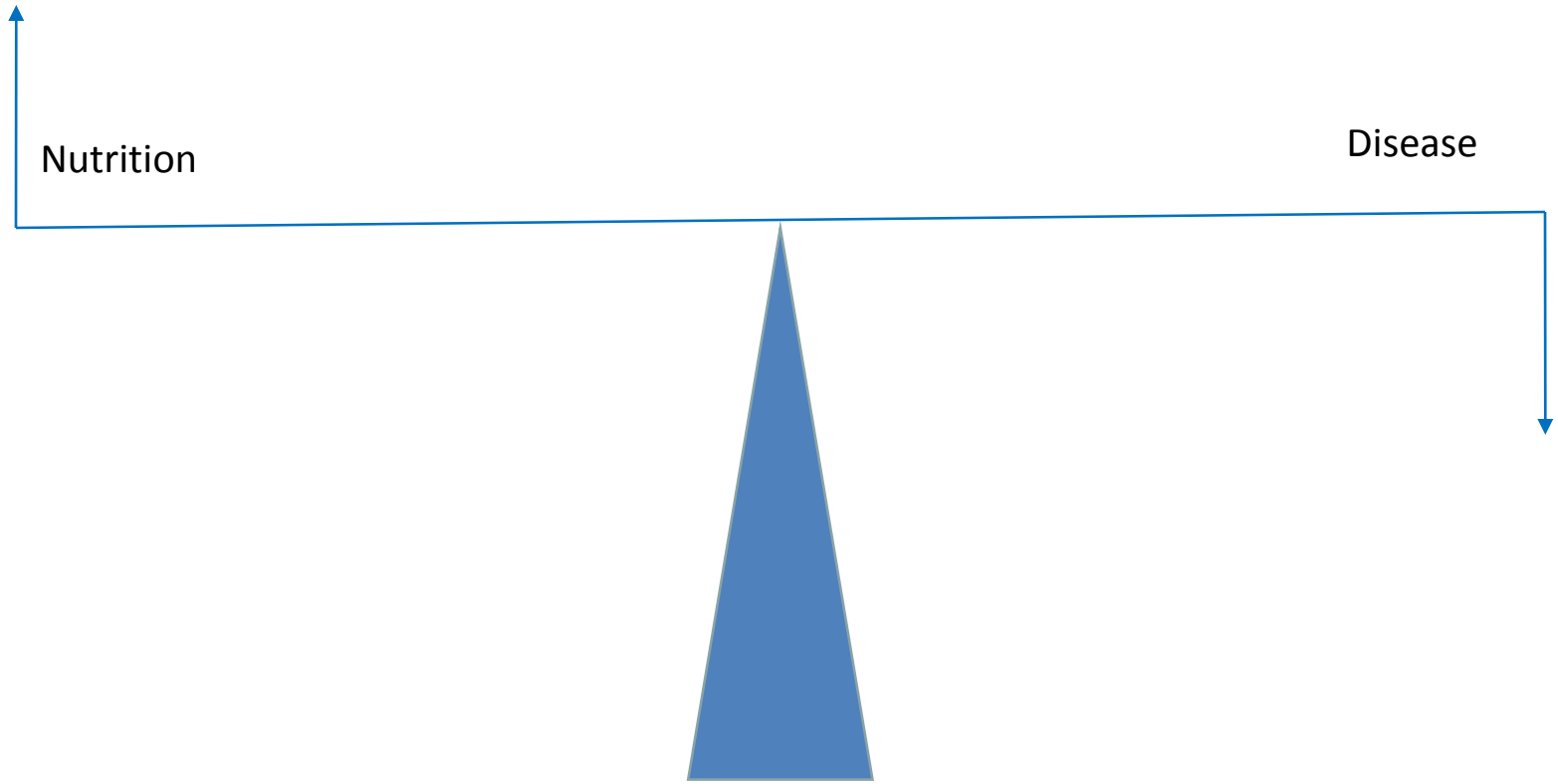
Sufficient system imbalance that recyclers appear; question is whether they will prevail or will the system sufficiently regenerate: loosing energy much faster than replacing it if at all

Death

Recycle carbon, hydrogen, oxygen and nitrogen via microorganisms

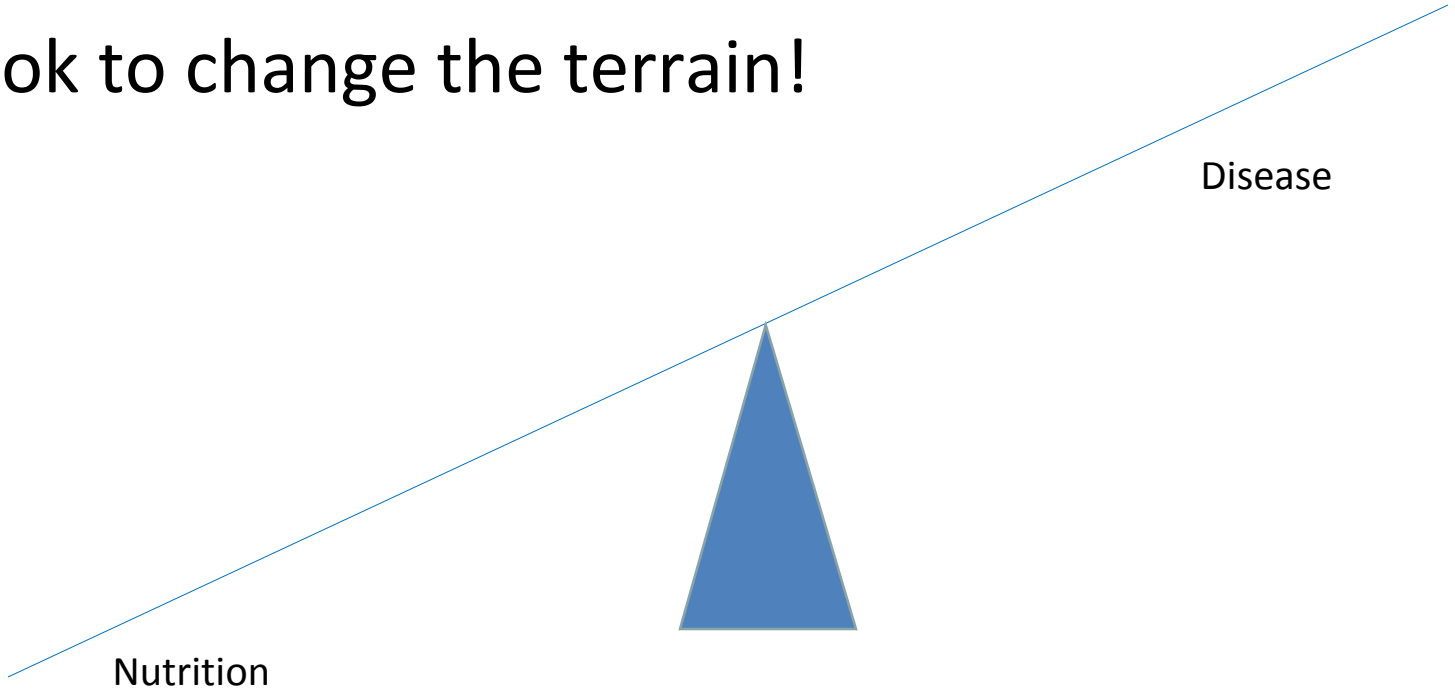
# Nutrition v. Disease

- Balance of Nature



# Time Management

- One can spend eternity looking to ID every disease organism associated with a given condition.  These are only the opportunists.
- Look to change the terrain!



# What is health, disease?

- Is it something with which one is born?
- Is it something with which one dies?
- Is it genetic?
  - what does “genetic” mean?
    - what are genes?
- If as a parent, you have mastered a task and teach your child your technique, does it guarantee success?
  - If the child fails, was it the parent’s will the child failed?

# Health/Disease Continuum

- Health
- Pre-Disease
- Disease
- Death

| | |
|---|---|
| **balanced therapeutic vitamins and minerals** | **high brix mostly vegetable diet** |
| **dairy, moderate diet pyrethrum OTC multi-min/vit** | standard brix fruits and veggies |
| **dairy, processed meats glyphosate refined CHO SAD** | pesticides contaminated foods environmental factors |
| **hydrogen cyanide** | contaminated foods pesticides |

# Ultimately…

- Health and disease are mindsets
  - they are the result of the actions made by the person based upon their thoughts, beliefs, attitudes
    - diet, lifestyle, exercise, stress relief, intoxication

# Disease v. Health

- Why do women get yeast infections after antibiotics?  Does the drug have yeast spores?
  - No! The antibiotic kills off the good bacteria!
  - It is the same in the soil and on the plants.

# The real issue in Ag is quality of the product produced for human consumption

- USDA data shows up to 38% decline
  - Protein, Ca, vit. C, P, Fe, riboflavin
    - ABC News March 1, 2006 by Megan Carpenter
  - 43 foods 1950 – 1999
    - Davis, Epp and Riordan; JACN, Vol. 23, No. 6, 669-682 (2004)
  - Fe, Zn, Cu, Mn, Se
    - Average 63% decline 1941 – 2001
      - Huling, December 15, 2001

# DID YOU KNOW? Our food today is LESS NUTRITIOUS than before WWII!

- Mineral Depletion in Food 1940-1991

| Vegetables | Fruits |
|---|---|
| Lost **76%** of their copper | Lost **19%** of their copper |
| Lost **49%** of their sodium | Lost **29%** of their sodium |
| Lost **46%** of their calcium | Lost **16%** of their calcium |
| Lost **27%** of their iron | Lost **24%** of their iron |
| Lost **24%** of their mag | Lost **15%** of their magnesium |
| Lost **16%** of potassium | Lost **22%** of potassium |

- David Thomas, Analysis of UK *Composition of Foods 1940 – 1991. Nutrition and Health 2003, Vol 17, pp. 85-115* from *The Composition of Foods*, Ministry of Agriculture, Fisheries and Foods and the Royal Society of Chemistry
- Considering the amazing technological advancements in plant breeding, genetic engineering, conventional precision farming practices, how is it possible that all this technological advancement has actually reduced food nutritional value?

All foods are NOT nutritionally enhanced equally depending upon the soil/fertilizer management practices employed not the genetics or varietal differences.

# Salad List

- green leaf lettuce, colored leaf lettuce,kale,spinach,water cress,swiss chard, beet greens, dandelion greens, dill
- white and colored onions,yellow, green, red peppers,jalopenia and yellow banana peppers, zucchini
- tomato,colored carrots,celery,olives,jicama
- cucumber,broccoli,cauliflower, brussels sprouts
- snow peas,avocado, palm hearts, artichokes, mushrooms
- pumpkin seeds, dried cranberries
- olive oil vinaigrette

# SAD Salad List

- “Green Salad”
  - high-nitrate iceberg lettuce
  - anemic low brix tomato
  - Creamy Italian, Ranch or Thousand Island (all dairy based) dressing smothering the “salad”
- “Alternative Green Salad”
  - Macaroni and cheese; whipped cream Jello mix; whipped cream chopped fruit mix; potato salad
- Slice of white flour bread with sugar laced marshmallow peanut butter and sugar laced home made jam - may or may not be “organic”

# Mineral Depletion 1960's

- "Spectrometer analyses of over 4,000 grain samples taken in 11 midwest states over just the last four years indicate an unmistakable decline in trace minerals…"
- "The average copper content in all the corn analyses… 2.56 ppm… but for the last year 1968 was less than 0.82 ppm…a drop of approximately 70 percent"
- "The hog man may notice that his animals are quite nervous…magnified if the animal is put under any stress…animals being loaded into a truck for market began to shake and quiver and had trouble standing"
- National Hog Farmer, Swine Information Service, No. E25, 1968.

# Trace Mineral Levels In Grains Dropping

DES MOINES, IOWA

Livestock producers who fail to check the trace mineral content of the grains and roughages they feed today may be inviting serious problems and economic losses.

Spectrometer analyses of over 4,000 grain samples taken in 11 midwest states over just the last four years indicate an unmistakable decline in trace minerals, according to O. G. Rasmussen, an animal nutritionist and director of research for Triple "F" Feeds.

The change in copper alone shows a significant trend, Rasmussen said. "The average copper content in all the corn analyses for the first three years of the study was 2.56 parts per million. But for the last year of the study—1968—the average copper content of the corn samples was less than .82 parts per million. That's a drop of approximately 70 percent and it should serve as a warning signal, particularly to pork producers."

Rasmussen said the 4,000 samples were gathered by Triple "F" Feeds in its scientific analysis program, which provides a spectrometer analysis of feedstuffs for farmers.

What does the decline in trace minerals mean to the individual farmer? Rasmussen cited iron and copper as examples.

"Both these elements are essential in building blood," he said. "In addition to a 70 percent drop in the copper average in corn, we also found that the average iron content of the corn samples for the first three years of the study was 21 parts per million, while in 1968 the average was only 15 ppm.

"To a hog producer, this could mean the development of what is called a stress syndrome, and we have observed this in many situations. Actually it's a blood condition caused by a copper-iron deficiency.

"The hog man may notice that his animals are quite nervous—they may shake and even go into convulsions and die. This condition is magnified if the animal is put under any stress—even that of being moved into another pen.

"We have observed these symptoms in young animals, animals of 150 lbs. and even in animals ready for market. In one case, animals being loaded into a truck for market began to shake and quiver and had trouble standing. Some fell over and died within minutes.

"These were white pigs and within a few minutes we could see a hemorrhaging effect spreading from the jowls along the belly back to the hams. The animals actually turned blue on their undersides and some started bleeding from the nose.

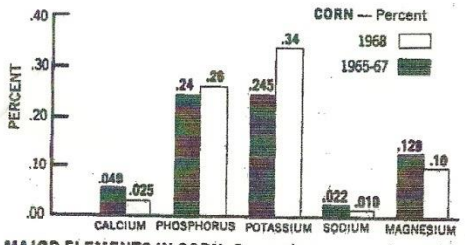
"This was a severe case and one that was easy to observe. Even in less severe cases, pigs may go off feed, or scour and generally fail to make the gains they would normally make."

There are two ways the individual farmer should handle trace mineral deficiencies, according to Rasmussen.

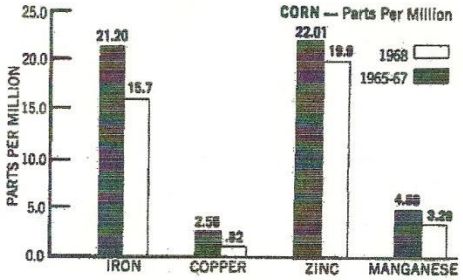
"You can have your soil tested and add back trace minerals when you fertilize. Work with the man who sells you your fertilizer.

"You should also have your grains and roughages analyzed for trace minerals. This not only will give you a check to see that your fertilization program is putting trace minerals back in the soil, but will tell you how much is actually showing up in your feedstuffs.

"When you know what is in your feedstuffs and what is lacking, you can supplement accordingly and thus avoid problems. Of course, if you buy feedstuffs off the farms, you have no control over the soil it was grown in, and spectrometer analysis becomes even more important."

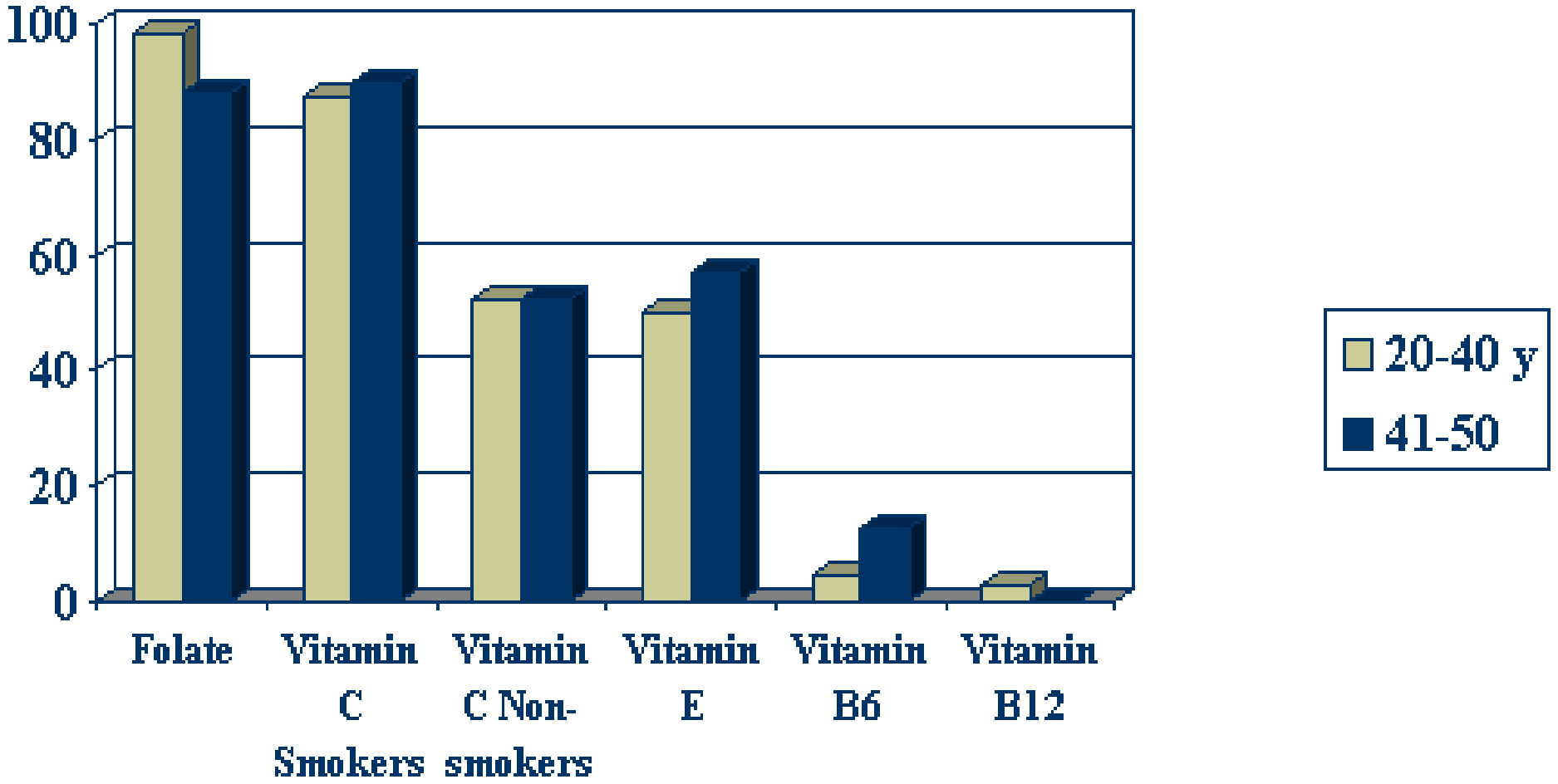



**MAJOR ELEMENTS IN CORN: Comparing average of samples tested in 1965-67 to average of samples tested in 1968.**




**TRACE ELEMENTS IN CORN: Comparing average of samples tested in 1965-67 to average of samples tested in 1968.**

Percent US Women consuming inadequate quantities of nutrieint




Arab L, Carriquiry A, Steck-Scott S, Gaudet MM. Ethnic differences in the nutrient intake adequacy of premenopausal US women: results from the Third National Health Examination Survey. *J Am Diet Assoc* 2003; 103:1008-14.

# Demineralization of our food

- **Rudolph Steiner** 1922 noted that people failed to grasp basic principles due to nutrient deficiency.
- **Charles Northern** 1936 read into U.S. Senate proceedings that GI disease caused by declining nutrient levels of food.
- **William Albrecht** 1940's recognized animal disease (Bangs) directly caused by soil imbalance.
  - Albrecht Papers an excellent start in soil education
- **Carey Reams** 1950's/60's recognizes human health directly caused by soil imbalance.

# SAD: Standard American Diet

- The SAD is GREAT for Disease!

# Cause of Disease

- Fundamentally it is a deficiency of nutrition
  - quantity and quality
- Misbelief that good religion makes up for defiling the temple of God with the SAD
- Misbelief that a good diet means eating home made foods, organic, grass fed, natural things
- Misbelief that fermented low brix foods somehow gain in nutrition by the fermentation process - junk in=junk out
- Misbelief hearty American breakfast of bacon, eggs, pancakes, biscuits and gravy, hash brown fried potatoes, a glass of pasteurize OJ and a cup of coffee is everything but disease causing
  - that the 16 ounce steak, baked potato and a few withered, overcooled low brix green beans with a tall glass of iced sweet tea dinner and supper are healthful, body building and downright patriotic meals.

# Cause of Disease

- It’s really all about belief, mis- or otherwise rather than nutritional science.
- It’s about perpetuating agricultural commodity industry cash flow and subsequent disease treatment cash flow.
- It’s about a belief in a MYTH!

# Myth Busting

- Getting on the road to health starts with myth busting
  - recognize that the SAD is a myth based lifestyle
  - recognize that one can choose differently
  - recognize that choosing differently may create uncomfortableness and make one an outcast
    - how dare you challenge the white flour, sugar laced milk chocolate chip cookies and milk fellowship gathering

# Myth Busting

- Recognize that busting the myth may mean fundamental changes to your business
  - growing food rather than tobacco
  - growing food rather than dairy animals
    - harvesting only the cream and recycling the rest

# Myth Busting Paradigm

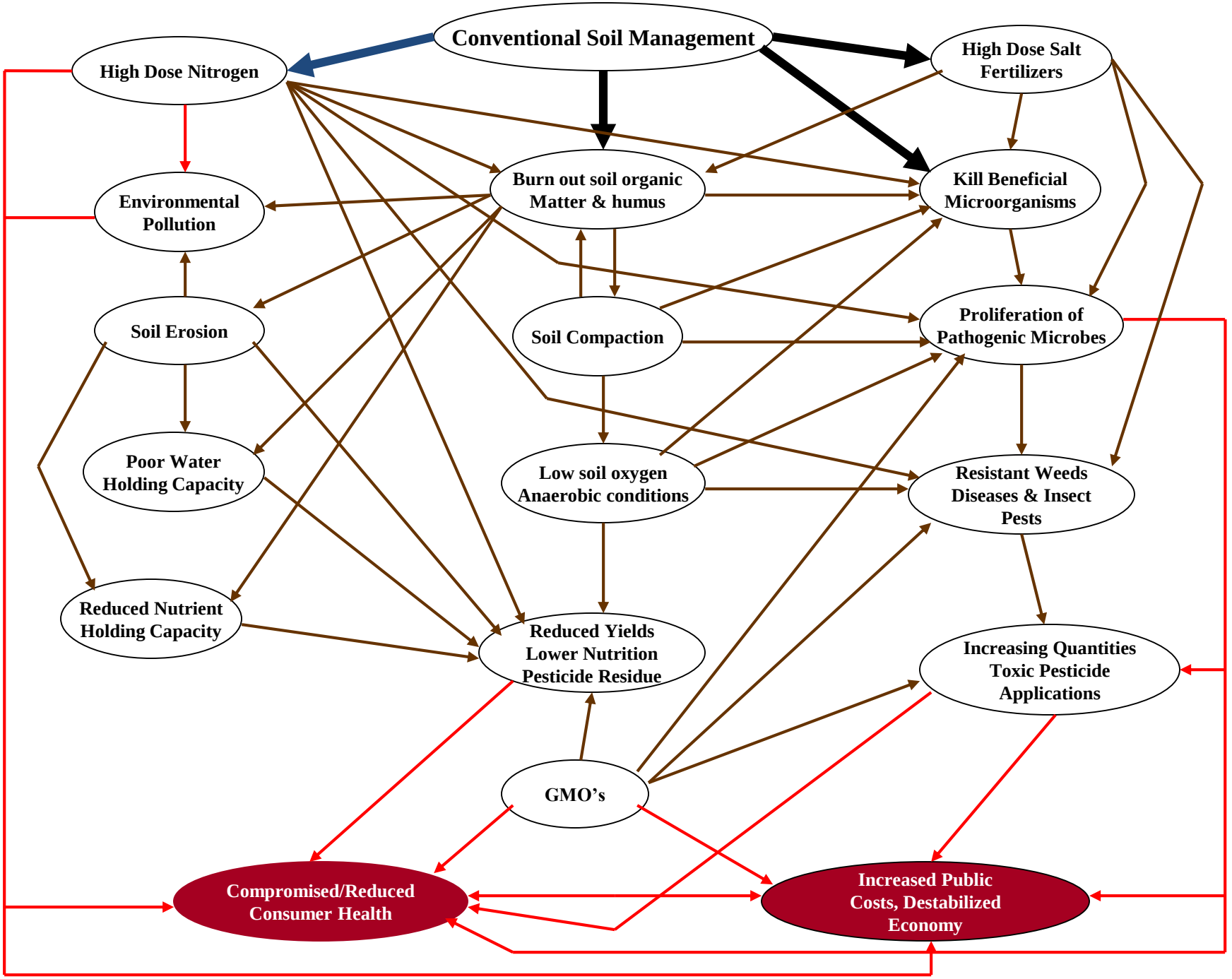
- Myth busting is not for everyone
  - some choose disease over health
  - some choose community disease over individual health
  - some can’t conquer their own inner addictions
  - some are more committed to their current income stream than their long term health, the health of their families
    - these people fail to grasp just how much their future expenditures will be as a result of staying committed to the disease myth

# The Way

- Food choices and nutrition are the way into and the way out of disease
- The SAD is disease causing
  - either at pre-disease waiting for disease to strike
  - at disease wondering what to do and hoping God will miraculously bail you out without your having to do anything for yourself
    - miracle new drug, instantaneous healing, lots of sympathy from your social sect

# What is soil health?

- Ability or status of the soil to sustain crop/food production indefinitely without needing rescue chemistry to protect the crop from nature's recycling crew.
- Characteristics measured/observed:
  - Soil tilth, compactability, erodability, structure, water infiltration, pH, water holding capacity/humus level, color, odor, conductivity, temperature, microbial census, production capacity


Conventional Soil Management
High Dose Nitrogen
High Dose Salt Fertilizers
Environmental Pollution
Burn out soil organic Matter & humus
Kill Beneficial Microorganisms
Soil Erosion
Soil Compaction
Proliferation of Pathogenic Microbes
Poor Water Holding Capacity
Low soil oxygen Anaerobic conditions
Resistant Weeds Diseases & Insect Pests
Reduced Nutrient Holding Capacity
Reduced Yields Lower Nutrition Pesticide Residue
Increasing Quantities Toxic Pesticide Applications
GMO's
Compromised/Reduced Consumer Health
Increased Public Costs, Destabilized Economy

# What is food quality?

- Ability/status of crops/foods to deliver all necessary nutrients (over 60 known) to mammalian consumers sufficient to sustain full health and satiation.
- Characteristics measured/observed:
  - Brix, nutrient density, flavor, color, odor, shelf-life, digestibility, satiation, shape, degradability (discoloring in air), freedom from insect pests and disease organisms without the need for chemical intervention

# Food Quality: Nutrients & Poisons

- Nutrients are key to the hormone molecules themselves (Iodine for thyroid) and to the enzymes necessary to manufacture and utilize the hormones (selenium for thyroid)
- Nutrients determine the ability of the body to balance hormones and metabolic pathways: sex hormones, thyroid, adrenals, insulin, cortisol, etc.
- Poisons disrupt, block and replace vital nutrients leading to endocrine disruption, cancers, miscarriages, infertility and birth defects.

# Insect reality…

- Insect behavior is deliberate and designed to eliminate weak, deformed, nutritionally deficient/unbalanced plants
- Insect pests avoid healthy plants!

# Insect Science…

- Francis Chaboussou: Trophobiosis
  - Nutrition Theory
    - Insects attack only sick plants having incomplete proteins, free or fragmented nutrients which insects are able to digest
  - *Sante des Cultures, Une Revolution Agronomique*, Paris, 1985, ISBN: 2-7066-0150-7
- Philip S. Callahan: Tuning Into Nature

# Current Mindset on Pests…

- Everyday the farmer arises out of bed in the morning and goes to war, wondering what he/she is going to “have” to kill today and by what means.
- This is the “warring mentality” or paradigm of the “green revolution”
- It spreads death and destruction everywhere in the wake of its path

# *Healthy Crops*
# by Francis Chaboussou

- Chaboussou cites nearly 300 peer reviewed journal articles substantiating the fact that insects do not attack healthy plants, only plants with an imbalance of nutrition particularly with **free nitrogen, amino acids and reducing sugars**.
- Insects and pathogens seek soluble, free nutrients which corresponds to a state in the plant of the inhibition of protein and complex carbohydrate synthesis. This state of susceptibility in the plant corresponds to nutritional deficiency or imbalance caused by negligent fertilization or by insecticides, herbicides and fungicides.
- "… numerous organophosphates inhibit protein synthesis (in plants). This is the cause of the plant's increased susceptibility, not only to sucking insects,… but also to diseases, fungal and otherwise…" p.55
- "… in this case (as in all other cases where the plant's resistance is undermined) the parasite proliferates where protein breakdown predominates in the host plant's metabolism." p. 48

# Healthy Crops
# by Francis Chaboussou

- "…**a plant will only be attacked when its biochemical state corresponds to the nutritional (trophic) needs of the parasite in question." "…soluble nitrogen compounds are the main nutritional factors promoting the development of the various infections**." p. 31

# Insects and Nitrogen

- Levels of amino acids and amides in the roots of nematode-infected plants are always higher (from 17% to 316%) than those in healthy plants (Hanks and Feldman, 1963). … especially since the intensive use of herbicides began.
- Fertilizers, particularly those over-rich in nitrogen, lead to an increase in damage caused by parasites.
    - Chaboussou, p. 153

# Plant “Resistance”

- Loss in plants of ‘resistance’ to insects and disease can be explained through the availability of improved nutrition for the parasites. This occurs through inhibition of protein synthesis, as well as through enrichment of the tissues with soluble substances (amino acids and reducing sugars).

# Root exudation (bleeding) of organic compounds from cotton, wheat and apple with different Zn levels

| Zn Treatment | Amino acids | Sugars | Phenolics |
|---|---|---|---|
| | ($\mu g\ g^{-1}$ root $6h^{-1}$) | | |
| | | **COTTON** | |
| **-Zn** | **165** | **751** | **161** |
| **+Zn** | **48** | **375** | **117** |
| | | **WHEAT** | |
| **-Zn** | **48** | **615** | **80** |
| **+Zn** | **21** | **315** | **34** |
| | | **APPLE** | |
| **-Zn** | **55** | **823** | **350** |
| **+Zn** | **12** | **275** | **103** |

Cakmak and Marschner, 1988, J. Plant Physiol.

# Aphid as a vector for virus

- Miller and Coon (1964) researching aphid behavior and virus infection in crops concluded the following:
  - If the aphids, presumed to be vectors, gravitate towards plants already infected with viral diseases in preference to healthy ones, to what extent are they responsible for the initial infection?
  - Aphids like all insects seek plant tissue enriched in soluble nitrogen, particularly free amino acids and reducing sugars.
    - Chaboussou, p.127

# Sap Testing NovaCropControl

- Sap analysis of total nitrogen, nitrate nitrogen and ammonia nitrogen.
- Aphids attack the plant when the percent of nitrate nitrogen to total nitrogen in the sap reaches 55%.

# Pesticide Effect

- Maxwell and Harwood (1960) are perhaps the first to have looked at the relation between plant fecundity (ability to reproduce) and physiology on the one hand, and the effects of pesticides on the other.
  - Leaf analysis has shown that where aphid development is greatest, most notable is the rations of free amino acids; increases in free alanine, serine, and glutathione.
  - DDT causes increases in tissue non-proteic nitrogen and disaccharides eight to fifteen days after application.
  - As a result of the alteration of the foliage by the pesticide, the aphids are likely to reproduce much earlier; the result is the appearance of an additional generation of aphids when they are fed on foliage treated with mevinphos.
    - Chaboussou, p. 120, 121

# Apple Scab

- Williams and Boone (1963) recorded that susceptible varieties to Venturia inaqualis, contain asparagine levels of 1.969 (an amino acid necessary for the growth of pathogenic fungi), while the resistant variety on has 0.756.
- Regarding the genetics of varieties:
  - The gene can only express itself in relation to other factors in the environment.
  - Genetic factors are only one element and their action can be thwarted by a whole series of others, most importantly by the effects of chemical pesticides.
    - Chagoussou, p. 82

# COLORADO MALT BARLEY
# SAMPLE # 3 BLACK POINT DISEASE

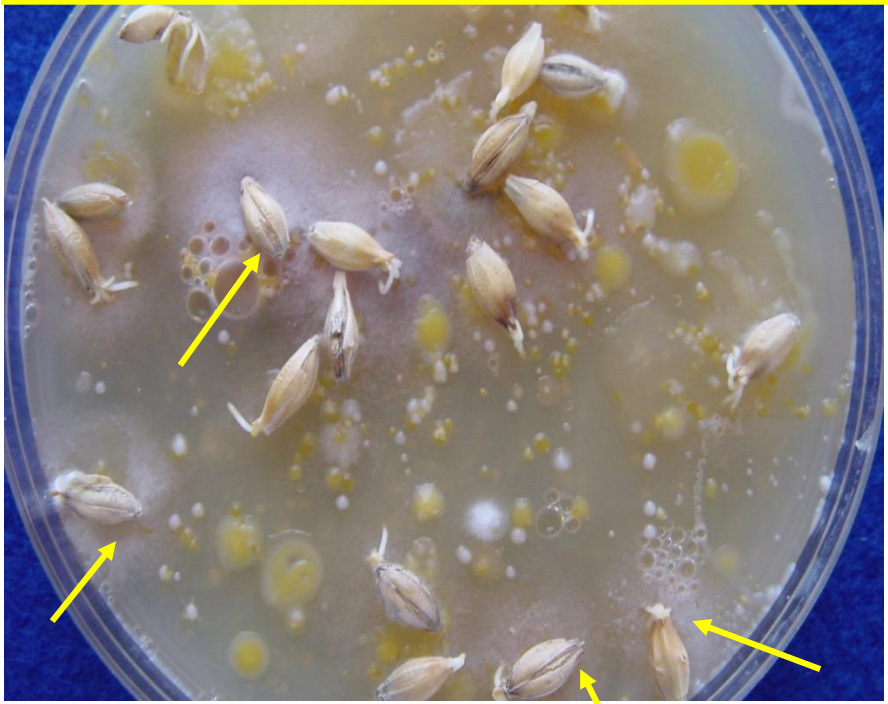
**PLANTING DATE-1-29-02**
**PHOTO DATE------2-2-02**

**CONTROL PLATE**

**FUNGAL DISEASE GROWTH**

**AROUND SEED**

**POOR SEED GERMINATION**



**LIQUID BIO #1 + DRY TMT**

**+ PLATE & SEED TMT**

**NO FUNGAL DISEASE GROWTH**

**GOOD SEED GERMINATION**

# COLORADO MALT BARLEY

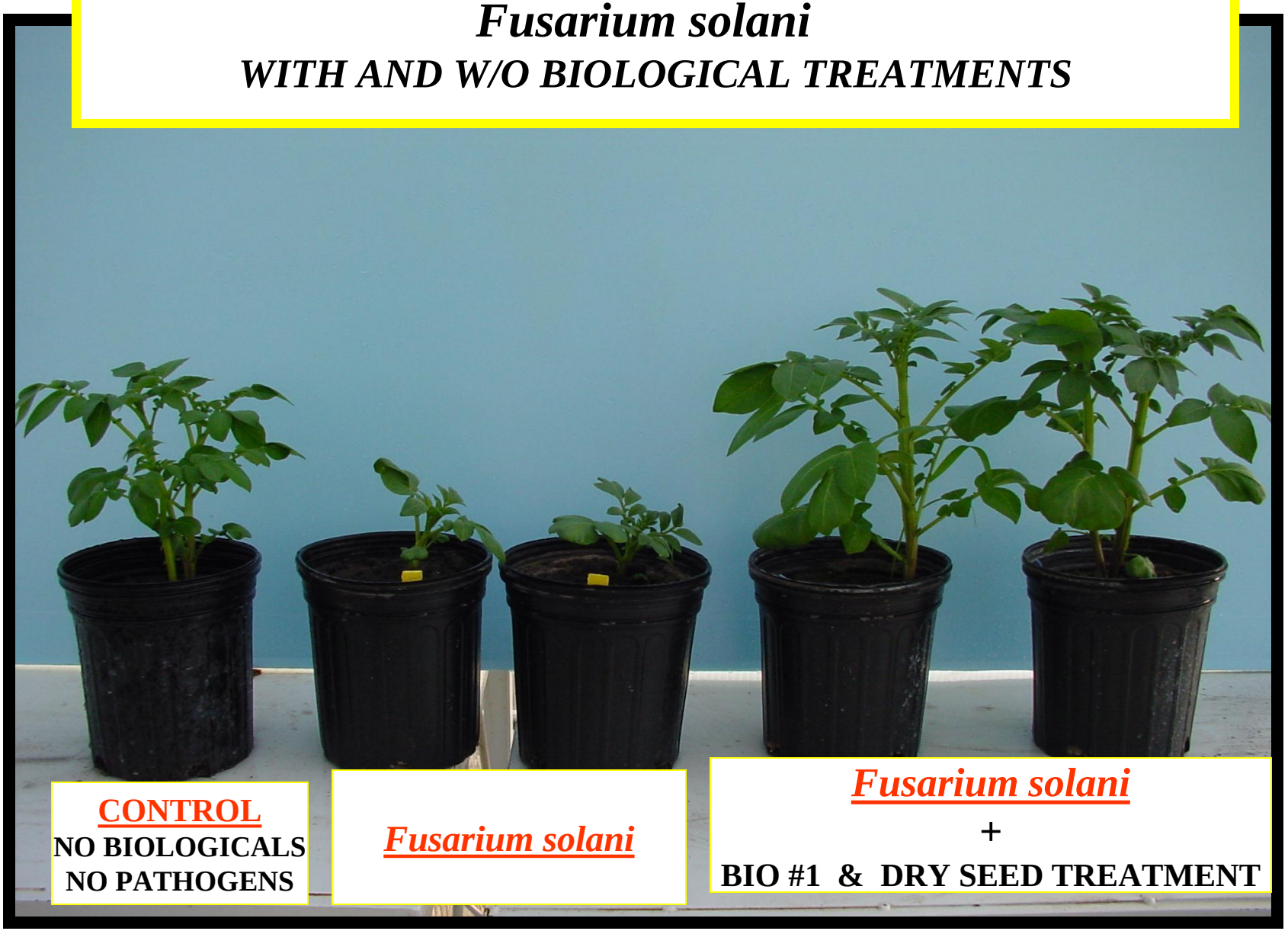
**SAMPLE #102**

**PLANT DATE: 1-29-02 PHOTO DATE: 2-2-02**

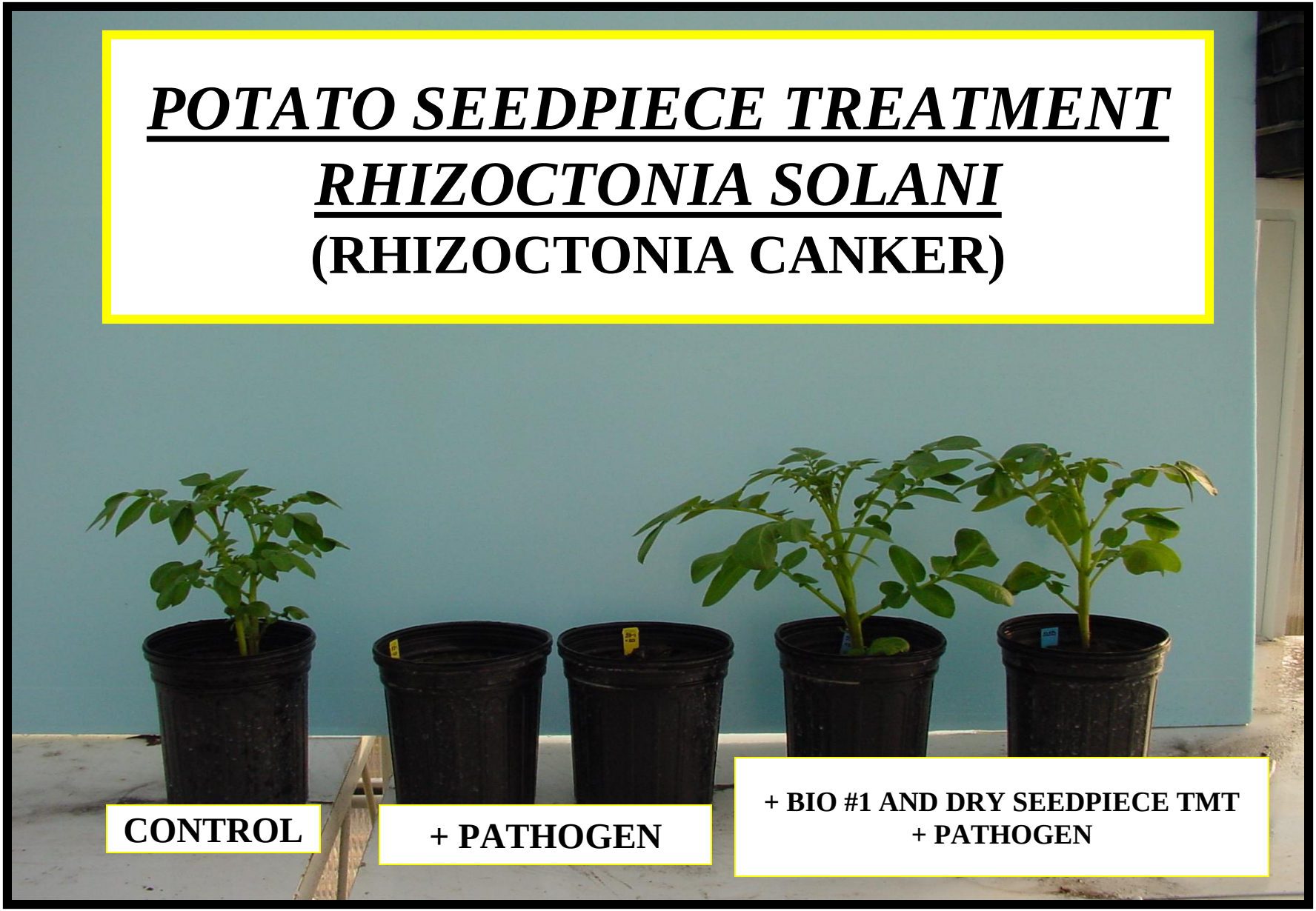
## POTATO DEXTROSE AGAR PLATES

**LIQUID & DRY TREATMENTS ON SEED AND AGAR MEDIUM** **NO TREATMENT**

# *POTATO SEEDPIECE TREATMENT*
## *Fusarium solani*
### *WITH AND W/O BIOLOGICAL TREATMENTS*



# ***POTATO SEEDPIECE TREATMENT***
# ***RHIZOCTONIA SOLANI***
# (RHIZOCTONIA CANKER)

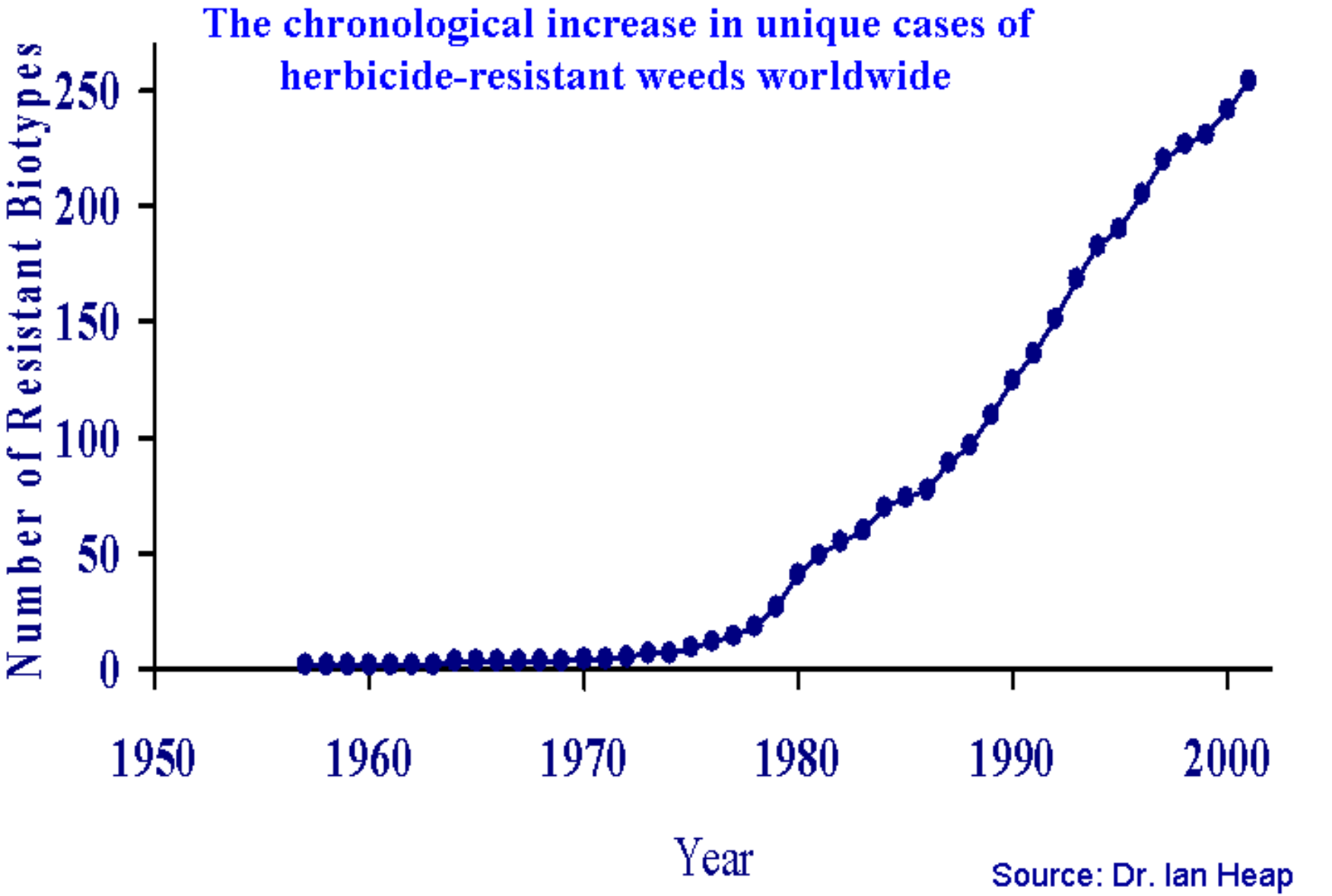


# Chemicals cause fungal disease

- “We have observed an impact of organo-chemicals on the development of fungal diseases in apple trees and grapevines, … Dithiocarbamic acid used over four years to control Phytophthora in potatoes also provokes an increase of other diseases, especially viroses.”
- Chaboussou, p. 112.

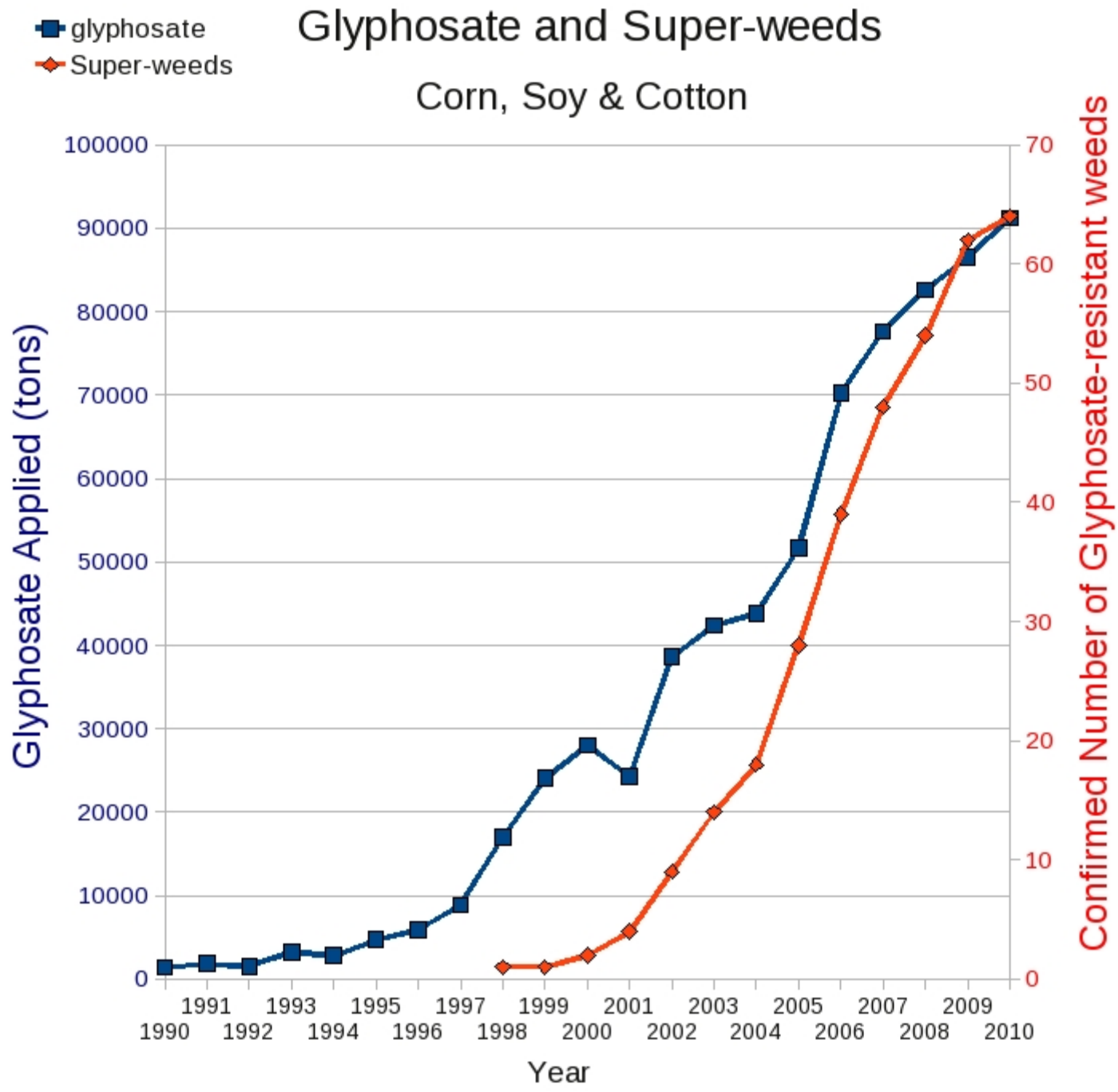
# Herbicides: War on weeds

- Farmers have been brainwashed to believe that fertile soils grow weeds and their domesticated crops equally well
- Farmers believe that weeds detract from their crop, steal water and nutrients and ruin the “clean techno-farm” image
- Name one herbicide, just one since 1950 that has solved the weed problems in farming.


The chronological increase in unique cases of herbicide-resistant weeds worldwide
Number of Resistant Biotypes
0
50
100
150
200
250
1950
1960
1970
1980
1990
2000
Year
Source: Dr. Ian Heap
www.weedscience.com

# There's more…

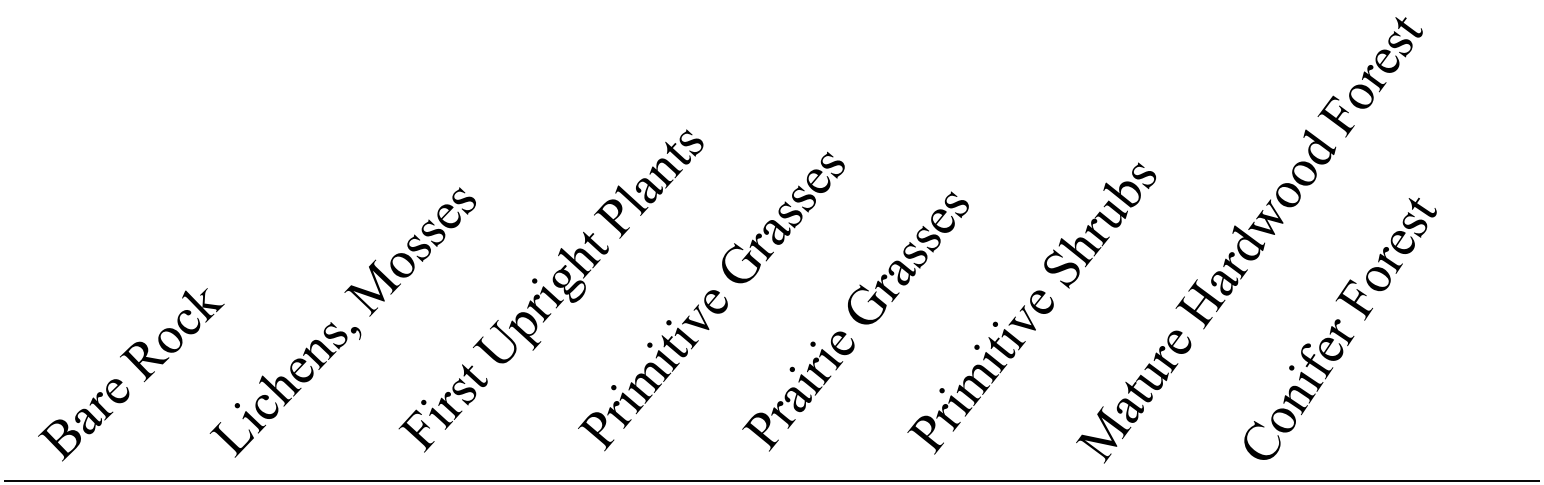
- Roundup inhibits steroidogenesis by disrupting steroidogenic acute regulatory (StAR) protein expression – blocks progesterone production; pesticide-induced infertility/hormone disruption
  - RR crops are the most common GM crops
- Insecticides: Organochlorine Lindane and Organophosphate Dimethoate directly inhibit steroidogenesis
  - Walsh, et al. Environ Health Perspect 108:769-776 (2000) by NIH grant HD17481 and T32-HD07271


glyphosate
Super-weeds
Glyphosate and Super-weeds
Corn, Soy & Cotton
Glyphosate Applied (tons)
Confirmed Number of Glyphosate-resistant weeds
Year
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
70
60
50
40
30
20
10
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

# Weed Reality…

- Domesticated crops have a higher evolutionary order than do weeds
- Crops have different desired rhizosphere microbial communities than do weeds
- Weeds indicate the soil has been converted to a lower, more primitive evolutionary environment

# Plant:Biology Relationships




# Successional Time Line

(E. Ingham)

# Weeds are NOT equal to crops

- Consider Scandanavian geo succession studies and greenhouse studies on microbes and weeds
- Pennanen, Taina, Rauni Strommer, Annamari Markkola, Hannu Fritze, Microbial and Plant Community Structure Across a Primary Succession Gradient. Scandinavian Journal of Forest Research. 16:1: 37-43, January 2001

- Batten, Katherine M., Kate M. Scow and Erin K. Espeland, Soil Microbial Community Associated with an Invasive Grass Differentially Impacts Native Plant Performance, microbial Ecology, SpringerLink, June 27, 2007

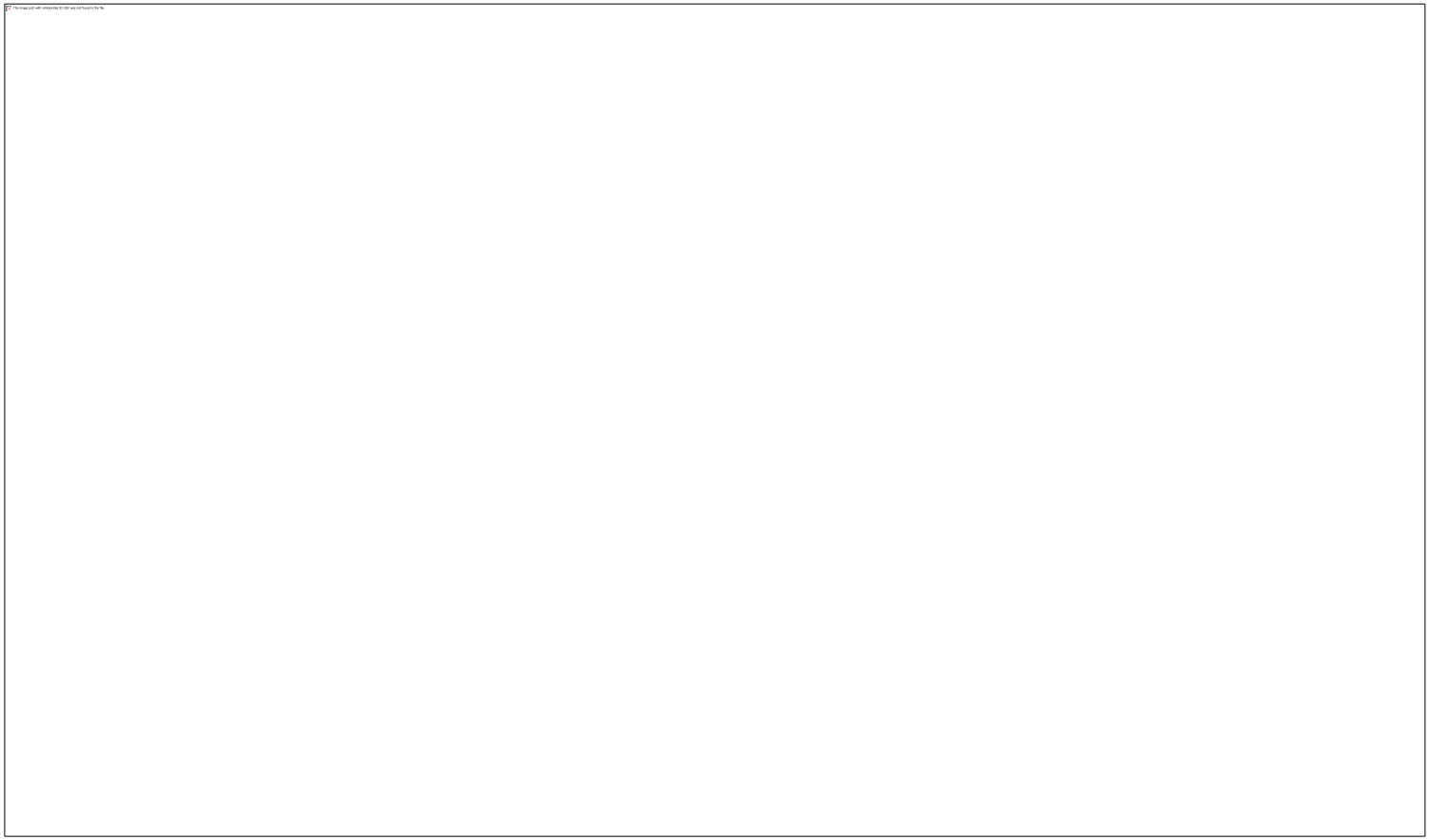
# To Review:Reduce herbicide costs

- Ohio Ag Research & Devel Ctr (OARDC)
  - Soil biology indirectly prop to insect pressure
    - More egg masses/pressure on conv fert corn
  - Soil bio-active carbon indirectly prop to broadleaf pressure
  - C:N indirectly prop to broadleaf pressure
    - Improved bio-active carbon to N from 25:1 to 75:1 reduced broadleaf weeds as much as 75%
    - Grass weeds not affected as much
    - My Note: Seen often in organic programs – the calcium issue is not adequately addressed because pH is used as the indicator for calcium applications. Calcium is the key to controlling grass weeds.

# Weed susceptibility is nutrition based

- Effect of soil pH on herbicide activity
- Soil pH (top 1 in) Fall Panicum(lb/ac)
- 5.6 1517
- 6.4 820
- 6.9 749
- 7.2 349
- *atrazine 1 lb/A, cyanazine 2 lbs/A
- Crop Production Systems. Lee Schweitzer, Dept. of Agronomy, Purdue University 2012/2013

# Seralini, et al *Food and Chemical Toxicology* 19 Sept. 2012



2 year feeding study in rats given either NK603 Roundup-tolerant genetically modified maize, cultivated with or without Roundup, and Roundup alone, at levels permitted in drinking water and GM crops in the United States.

# Australian Study: GM feed causes IBS in pigs

- "GMO feeds v. non-GMO feeds for 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 (p=0.004)."

  - Carman, Judy A. et al. "A long-term toxicology study on pigs fed a combined genetically modified (GM) soy and GM maize diet" *Journal of Organic Systems*, 8(1), 2013

# Horizontal Gene Transfer

- “Higher organisms including human beings are even more susceptible… than bacteria….”
- “DNA and RNA are now known to be actively secreted by living cells in a nucleic acid intercommunication system. The profile of circulating nucleic acids changes per states of health and disease.  Cancer cells use this system to spread cancer around the body.”
- GM DNA and RNA are more dangerous because they are rogue, unaccounted for and uncontrollable by normal cellular controls.

# Horizontal Gene Transfer: Proof in Humans

- U.K. researchers fed human volunteers GM soybean.
- Transgene DNA of Roundup Ready soybean was recovered from the colostomy bag in 6 or 7 subjects after a single meal at levels up to 3.7% of intake.
- 3 of 7 subjects showed gut bacteria cultured from the colostomy bag contents were positive for the GM soybean transgene.

  – Ho, Mae Won. Science In Society. Issue 59. Autumn 2013. p. 16.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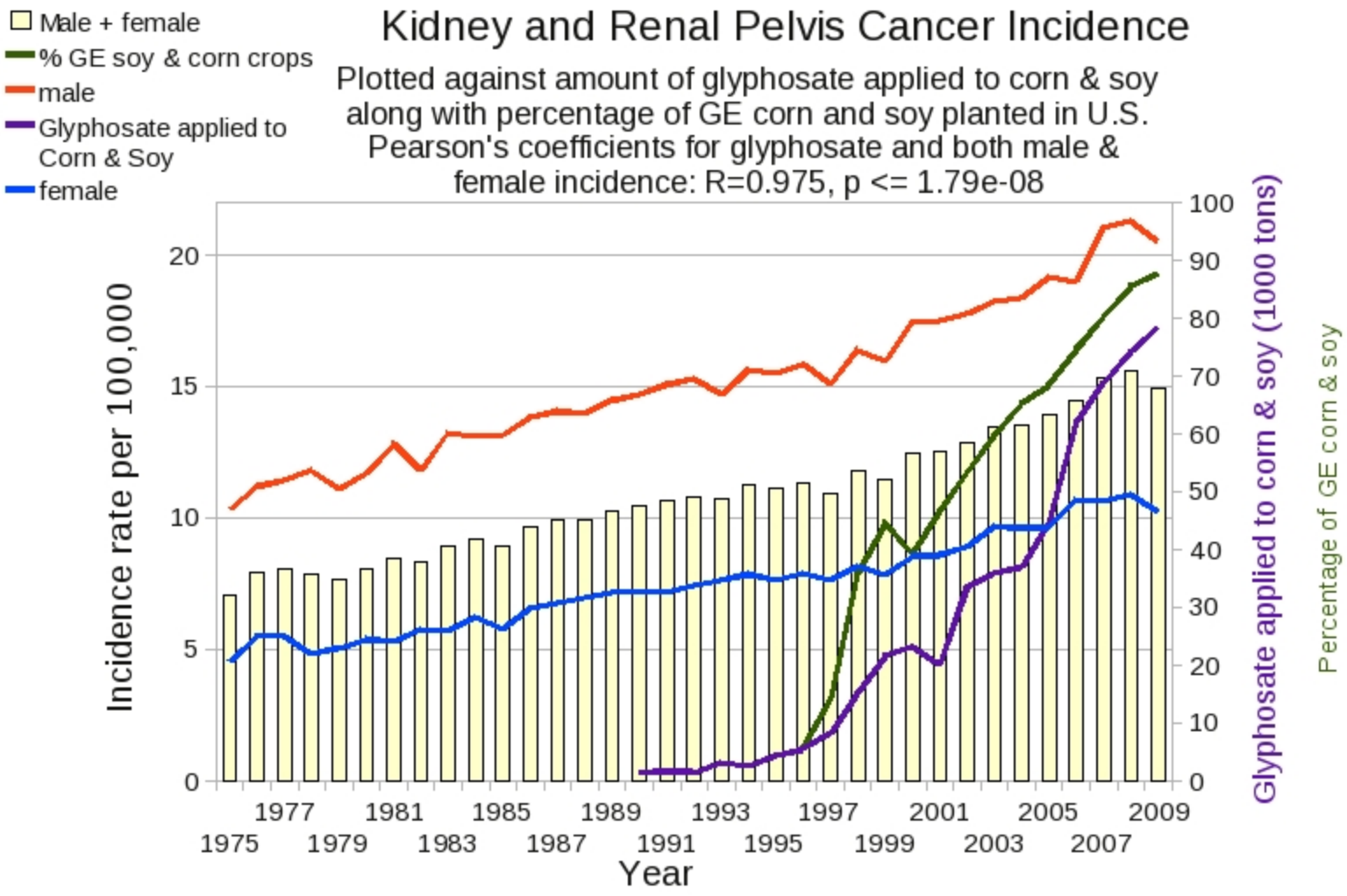
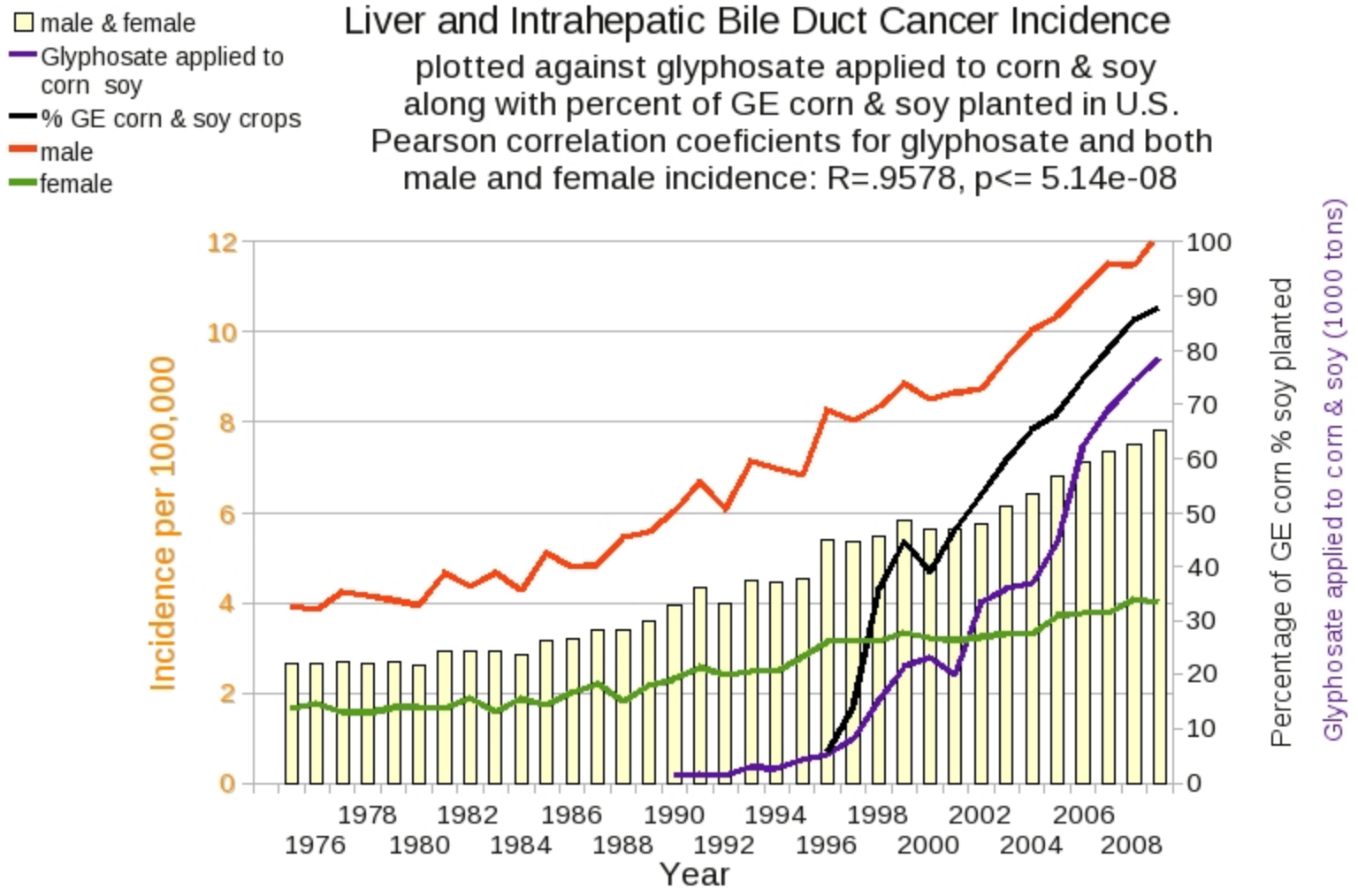
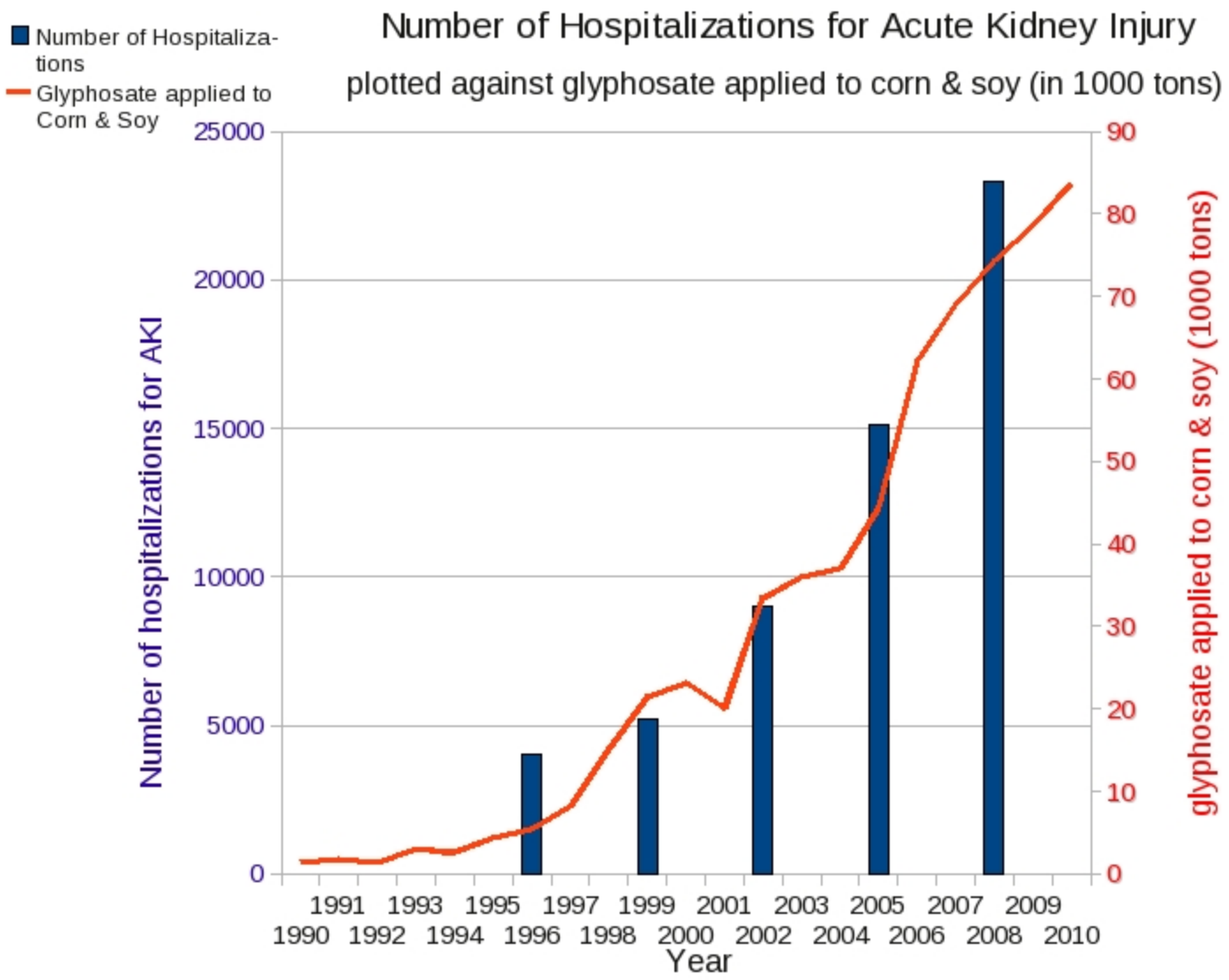
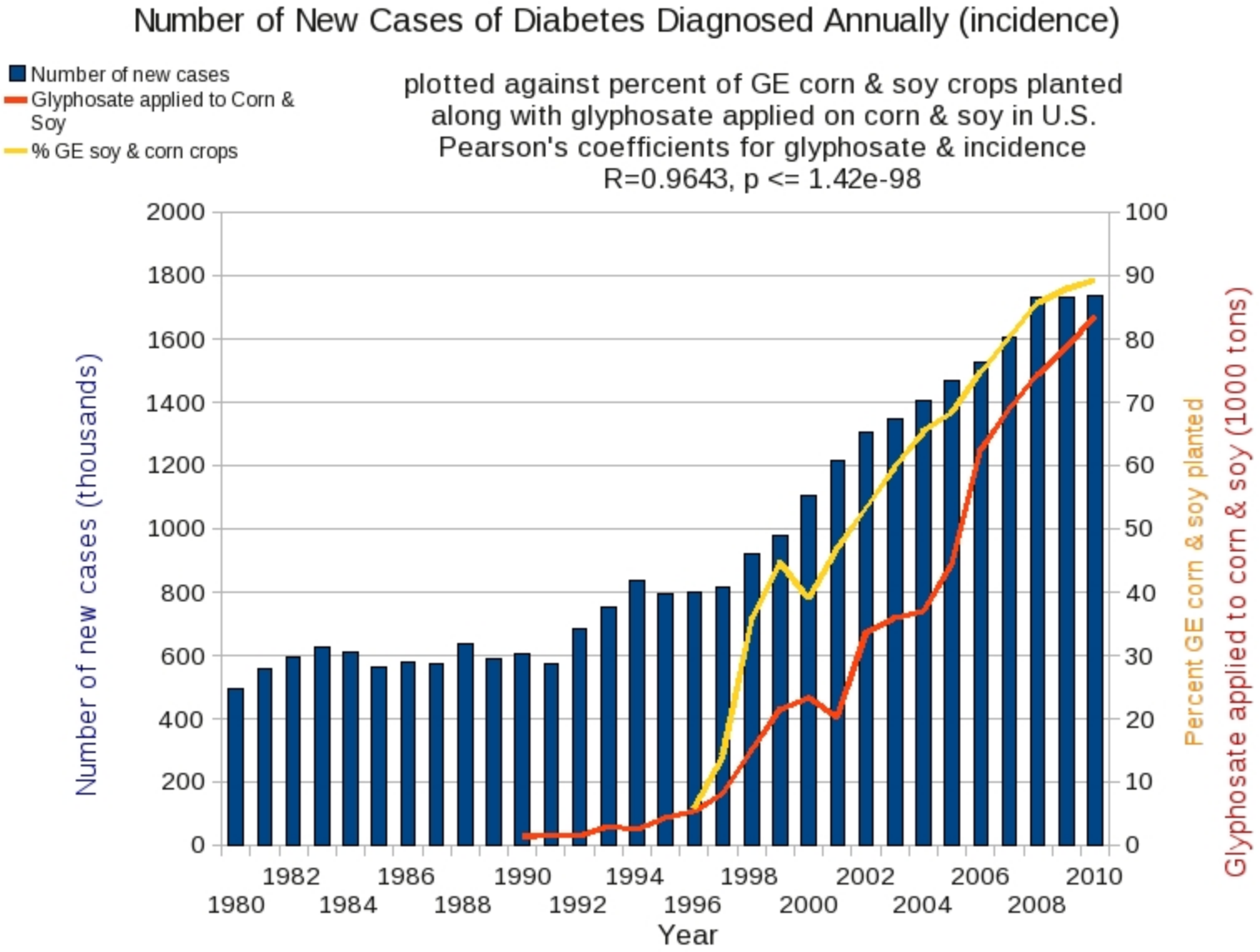
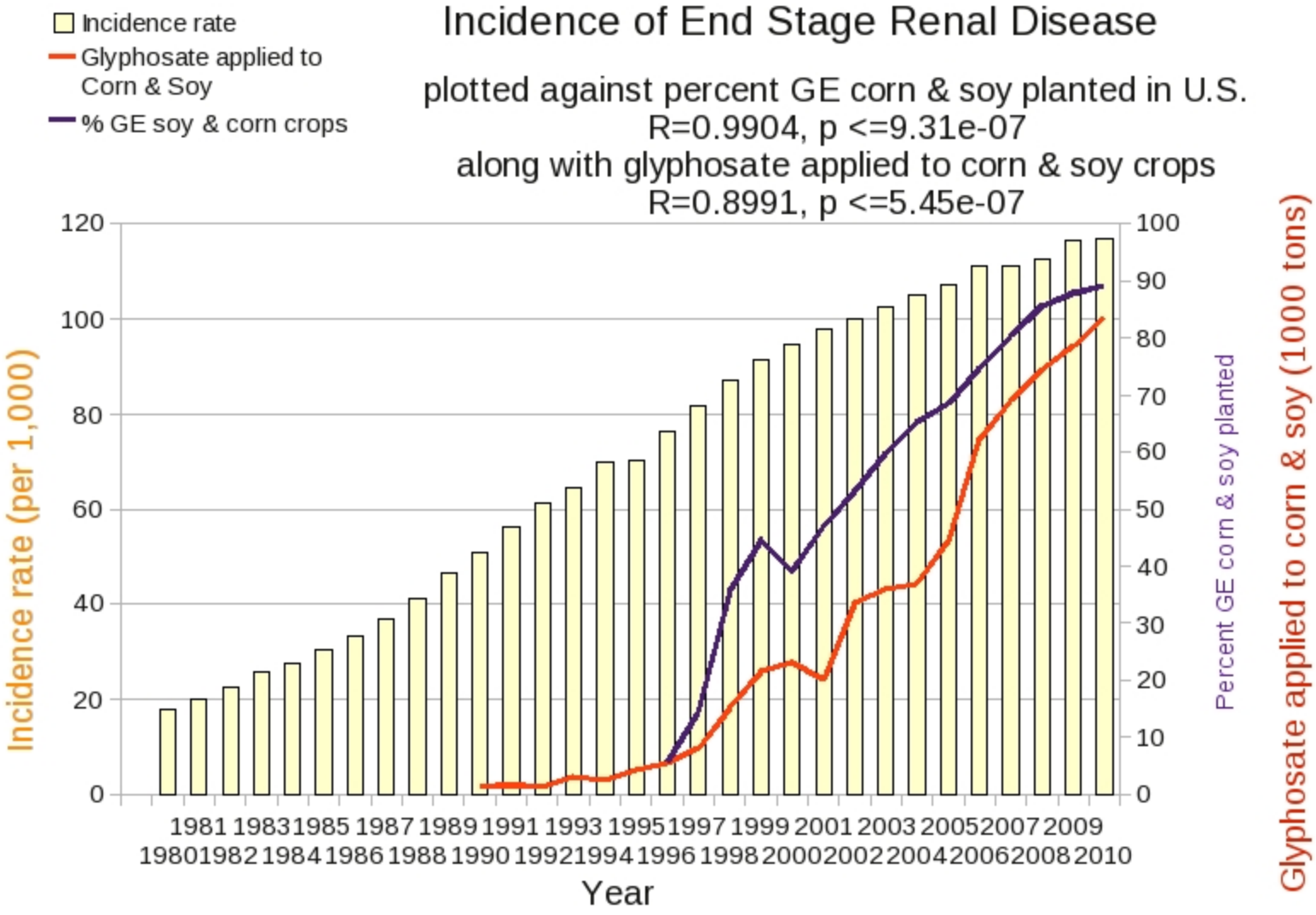
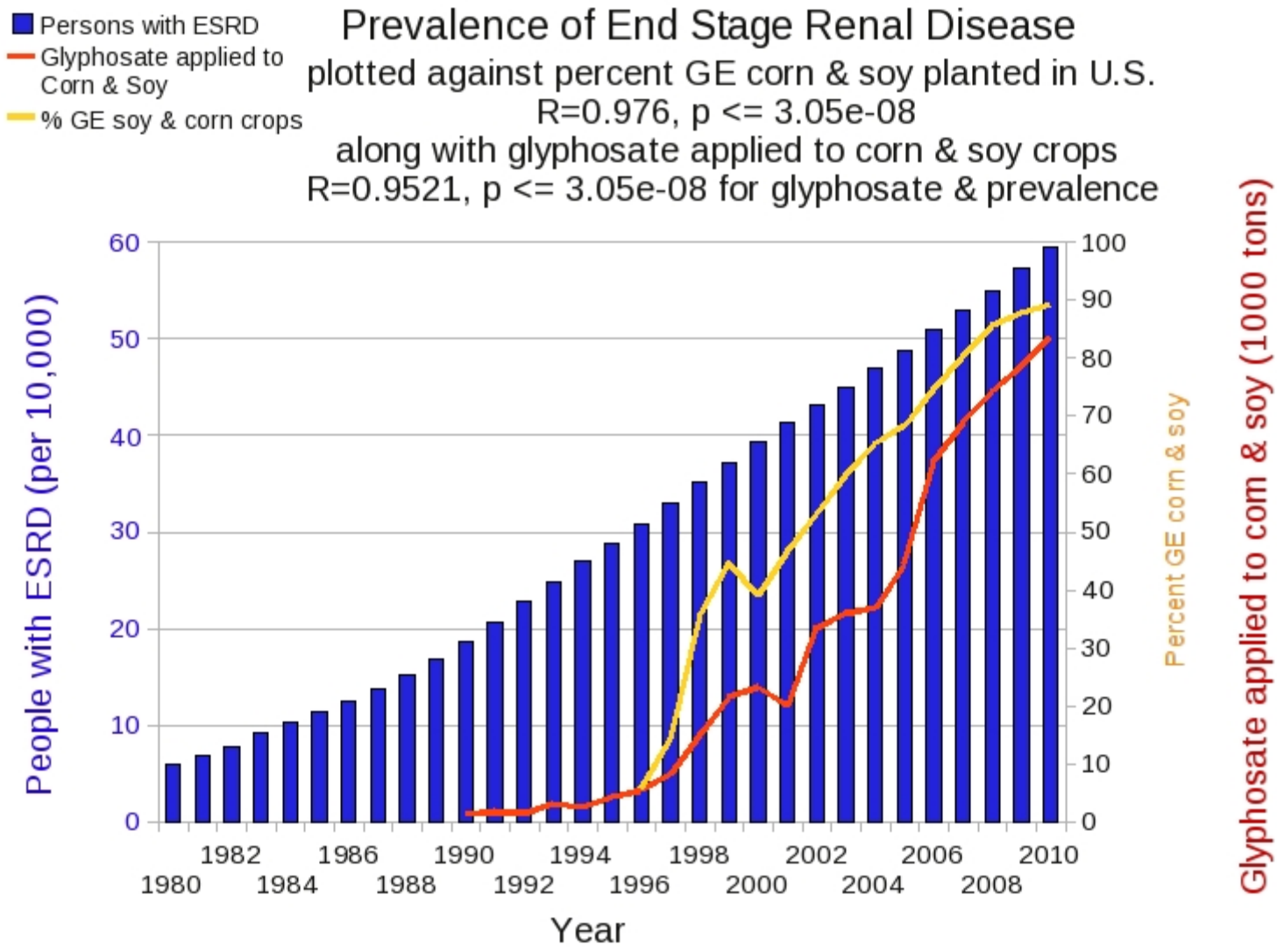

Male + female
% GE soy & corn crops
male
Glyphosate applied to Corn & Soy
female
Kidney and Renal Pelvis Cancer Incidence
Plotted against amount of glyphosate applied to corn & soy along with percentage of GE corn and soy planted in U.S.
Pearson's coefficients for glyphosate and both male & female incidence: R=0.975, p <= 1.79e-08
Incidence rate per 100,000
Glyphosate applied to corn & soy (1000 tons)
Percentage of GE corn & soy
Year
0
5
10
15
20
0
10
20
30
40
50
60
70
80
90
100
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009

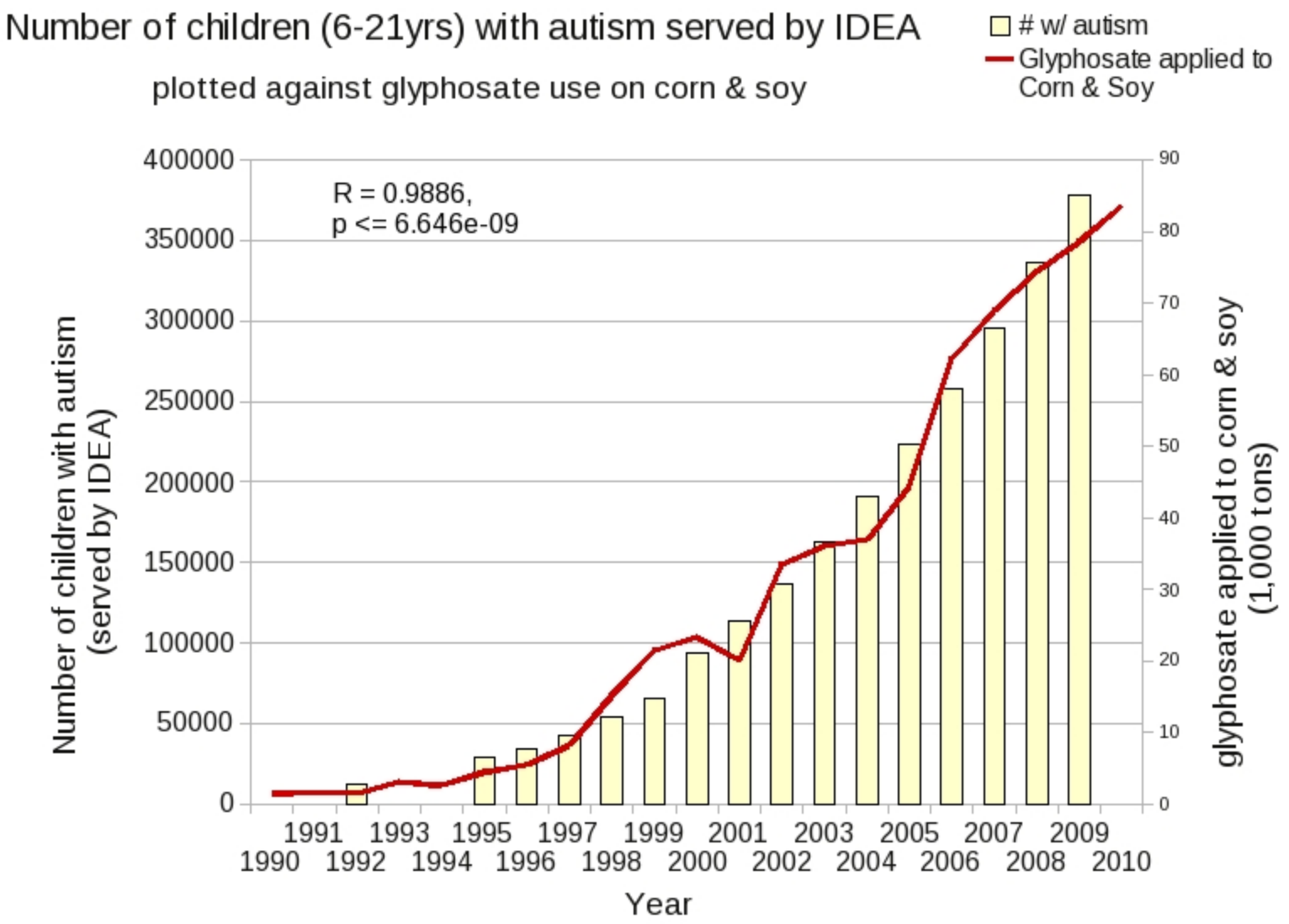

male & female
Glyphosate applied to corn soy
% GE corn & soy crops
male
female
Liver and Intrahepatic Bile Duct Cancer Incidence
plotted against glyphosate applied to corn & soy along with percent of GE corn & soy planted in U.S.
Pearson correlation coeficients for glyphosate and both male and female incidence: R=.9578, p<= 5.14e-08
Incidence per 100,000
Percentage of GE corn % soy planted
Glyphosate applied to corn & soy (1000 tons)
Year
0
2
4
6
8
10
12
0
10
20
30
40
50
60
70
80
90
100
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008


Number of Hospitalizations for Acute Kidney Injury
plotted against glyphosate applied to corn & soy (in 1000 tons)
Number of Hospitaliza-tions
Glyphosate applied to Corn & Soy
Number of hospitalizations for AKI
glyphosate applied to corn & soy (1000 tons)
25000
20000
15000
10000
5000
0
90
80
70
60
50
40
30
20
10
0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Year


Number of New Cases of Diabetes Diagnosed Annually (incidence)
Number of new cases
Glyphosate applied to Corn & Soy
% GE soy & corn crops
plotted against percent of GE corn & soy crops planted along with glyphosate applied on corn & soy in U.S.
Pearson's coefficients for glyphosate & incidence
R=0.9643, p <= 1.42e-98
Number of new cases (thousands)
Percent GE corn & soy planted
Glyphosate applied to corn & soy (1000 tons)
Year
0
200
400
600
800
1000
1200
1400
1600
1800
2000
0
10
20
30
40
50
60
70
80
90
100
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010


Incidence rate
Glyphosate applied to Corn & Soy
% GE soy & corn crops
Incidence of End Stage Renal Disease
plotted against percent GE corn & soy planted in U.S.
R=0.9904, p <=9.31e-07
along with glyphosate applied to corn & soy crops
R=0.8991, p <=5.45e-07
Incidence rate (per 1,000)
Percent GE corn & soy planted
Glyphosate applied to corn & soy (1000 tons)
0
20
40
60
80
100
120
0
10
20
30
40
50
60
70
80
90
100
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Year


Persons with ESRD
Glyphosate applied to Corn & Soy
% GE soy & corn crops
Prevalence of End Stage Renal Disease
plotted against percent GE corn & soy planted in U.S.
R=0.976, p <= 3.05e-08
along with glyphosate applied to corn & soy crops
R=0.9521, p <= 3.05e-08 for glyphosate & prevalence
People with ESRD (per 10,000)
Percent GE corn & soy
Glyphosate applied to corn & soy (1000 tons)
Year
0
10
20
30
40
50
60
70
80
90
100
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010


Number of children (6-21yrs) with autism served by IDEA
plotted against glyphosate use on corn & soy
# w/ autism
Glyphosate applied to Corn & Soy
R = 0.9886,
p <= 6.646e-09
Number of children with autism (served by IDEA)
glyphosate applied to corn & soy (1,000 tons)
Year
400000
350000
300000
250000
200000
150000
100000
50000
0
90
80
70
60
50
40
30
20
10
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

# RoundUp/GMO Corn Trial

- **In females, all treated groups died 2–3 times more than controls, and more rapidly. Females developed large mammary tumors almost always more often than and before controls**, the pituitary was the second most disabled organ; the sex hormonal balance was modified by GMO and Roundup treatments.
- **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.** 76% of the altered parameters were kidney related.

# Antibiotic resistance marker gene used in genetically modified crops found in bacteria isolated from China's rivers.

- …**6 out of 6 major urban rivers** (the Sungari, Haihe, Yellow, Yangtze, Huangpu and Pearl Rivers) …bacteria carrying a **synthetic version of the blá gene** …**confers resistance** to the most common class of antibiotics called ß-lactams, which includes besides **ampicillin (a beta-lactam), the penicillin derivatives (penams), cephalosporins (cephems), monobactams, and carbapenems**.
- Sequencing of the gene responsible, the blá gene, shows it is synthetic version … This suggests to the researchers this to be due to the **synthetic plasmid vectors from genetic engineering applications**.
    - http://www.i-sis.org.uk/GM_antibiotic_resistance_in_Chinas_rivers.php

# European Food Safety Authority

- EFSA scientist discovers Gene VI, an independent **virus gene overlapping** with naked cauliflower mosaic virus (CaMV) 35S promoter (commonest virus for driving gene expression in GM crops)
- 1999 CaMV 35S shown to enhance horizontal gene transfer/recombination, thus, **create new viruses, activate old ones and trigger CANCER in animal and human cells**

# GE Bt toxin and RoundUp

- **Cry1Ab can induce cytotoxic effects via a necrotic mechanism …Roundup is cytotoxic by inhibition of mitochondrial respiration activity, far below agricultural dilutions (around 200 times less) with an LC50 of 57.5 ppm**.
- **Roundup is antiandrogenic from 0.5 ppm, below toxic levels and close to human serum levels** (0.1–0.2 ppm in Acquavella et al., 2004).


- R. Mesnage,a,b E. Clair,a,b S. Gress,a,b C. Then,c A. Székácsd and G.-E. Séralinia,b* Cytotoxicity on human cells of Cry1Ab and Cry1Ac Bt insecticidal toxins alone or with a glyphosate-based herbicide. J. Appl. Toxicol. 2012. (wileyonlinelibrary.com) DOI 10.1002/jat.2712

**Glyphosate's Suppression of Cytochrome P450 Enzymes and Amino Acid Biosynthesis by the Gut Microbiome: Pathways to Modern Diseases**

- "…glyphosate enhances the damaging effects of other food borne chemical residues and environmental toxins. Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body. Here, we show how interference with CYP enzymes acts synergistically with disruption of the biosynthesis of aromatic amino acids by gut bacteria, as well as impairment in serum sulfate transport. Consequences are most of the diseases and conditions associated with a Western diet, which include gastrointestinal disorders, obesity, diabetes, heart disease, depression, autism, infertility, cancer and Alzheimer's disease. We explain the documented effects of glyphosate and its ability to induce disease, and we show that glyphosate is the "textbook example" of exogenous semiotic entropy: the disruption of homeostasis by environmental toxins."

  – Anthony Samsel and Stephanie Seneff. *Entropy* 2013, *15*, 1416-1463; doi:10.3390/e15041416

# Nutrient Density of GMO & Non-GMO Corn, Iowa 2012

| Nutrient | GMO | Non-GMO | Nutrient | GMO | Non-GMO |
|---|---|---|---|---|---|
| Glyphosate | 13 | 0 | Mn | 2 | 14 |
| **Formaldehyde** | **200** | **0** | Fe | 2 | 14 |
| Test Wt. | 57.5 | 61.5 | Zn | 2.3 | 14.3 |
| Brix | 1 | 20 | Cu | 2.6 | 16 |
| N | 7 | 46 | Co | 0.2 | 1.5 |
| P | 3 | 44 | Mo | 0.2 | 1.5 |
| K | 7 | 113 | B | 0.2 | 1.5 |
| Ca | 14 | 6130 | Se | 0.6 | 0.3 |
| Mg | 2 | 113 | Cl | 10 | 1 |
| S | 3 | 42 | | | |

# Medical Management Guidelines, Formaldehyde

- Concentration in GMO corn (Iowa) = 200 ppm
- Formaldehyde is highly toxic to all animals and absorbed well by the GI tract
  - It is carcinogenic, toxic, and allergenic
  - Contributes to reproductive problems
    - Drops sperm counts in men
    - Causes spontaneous abortion (miscarriage)
- EPA limit in air of new buildings = 0.016 ppm
- Maximum conc. in workplace = 0.3 ppm
- Maximum emis. from wood products = 0.09 ppm
- Symptoms at (0.5 - 3 ppm). Respiratory damage,
  - Chronic fatigue, irritation, GI tract injury, cancer,
  - Central nervous system, disrupts metabolism,
  - Suppressed immune system, vomiting, genotoxic,
  - Abdominal pain, ulceration, dizziness, death

# Glyphosate in Human Urine (Urbanites) & Dairy Cows

| City | No. | Male | Female |
|---|---|---|---|
| 1 | 44 | 10.3* | 6.1 |
| 2 | 22 | 16.0 | 2.7 |
| 3 | 19 | 60.1 | 8.3 |
| 4 | 22 | 23.5 | 13.8 |

*ppm glyphosate

| Dairy | Glyp*. | Dairy | Glyp. |
|---|---|---|---|
| A | 9 | E | 37 |
| B | 21 | F | 38 |
| C | 22 | G | 46 |
| D | 25 | H | 102 |

*ppm, herd average

**Permitted in cereals, soybean, corn = 20 ppm**
**Permitted in alfalfa = 400 ppm  Corn silage = 100 ppm**
**Toxicity to beneficial GI flora = 0.1 ppm**
**Long-term toxicity to liver, kidney, etc. tissues = 0.1 ppbillion**
**Long-term carcinogenicity = 0.1 ppb**
**Antibiotic to beneficial enteric bacteria = 0.1 ppm**

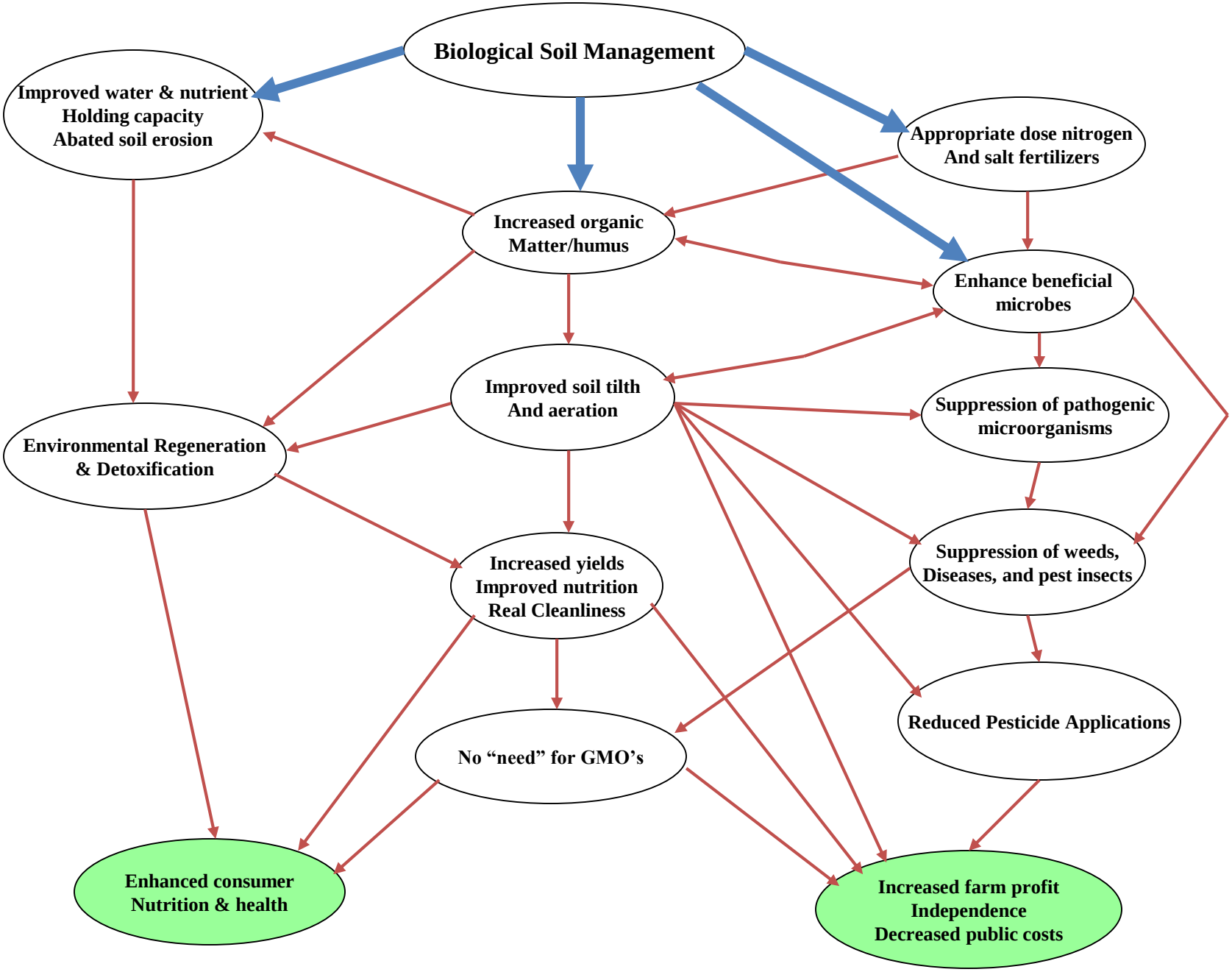
# Direct Toxicity of Glyphosate

| Rate (ppm) | System affected | Reference |
|---|---|---|
| 0.5 | Human cell endocrine disruption | Toxicology 262:184-196, 2009 |
| 0.5 | Anti-androgenic | Gasner et al, 2009 |
| 1.0 | Disrupts aramatase enzymes | Gasnier et al, 2009 |
| 1-10 | Inhibits LDH, AST, ALF enzymes | Malatesta et al, 2005 |
| 1-10 | Damages liver, mitochondria, nuclei | Malatesta et al, 2005 |
| 2.0 | Anti-Oestrogenic | Gasnier et al, 2009 |
| 5.0 | DNA damage | Toxicology 262:184-196, 2009 |
| 5.0 | Human placental, umbilical, embryo | Chem.Res.Toxicol. J. 22:2009 |
| 10 | Cytotoxic | Toxicology 262:184-196, 2009 |
| 10 | Multiple cell damage | Seralini et al, 2009 |
| 10 | Total cell death | Chem.Res.Toxicol. J. 22:2009 |
| All | Systemic throughout body | Andon et al, 2009 |
| 1-10 | Suppress mitochondrial respiration | Peixoto et al, 2005 |
| | Parkinson's | El Demerdash et al, 2001 |
| | POEA, AMPA even more toxic | Seralini et al, 2009 |

EPA Federal Resister Listing: 13ppm for animal feed as of May 2011; sweet corn 3.5ppm and poultry meat at 0.1ppm.

# What do we do to turn this trend around?

- Look at the holistic perspective
  - Soil health ultimately determines human health
- Learn the basic sciences
  - Why we have insects, diseases and weeds
- Set the goal: high brix, nutrient dense
- Implement a plan to achieve the goal

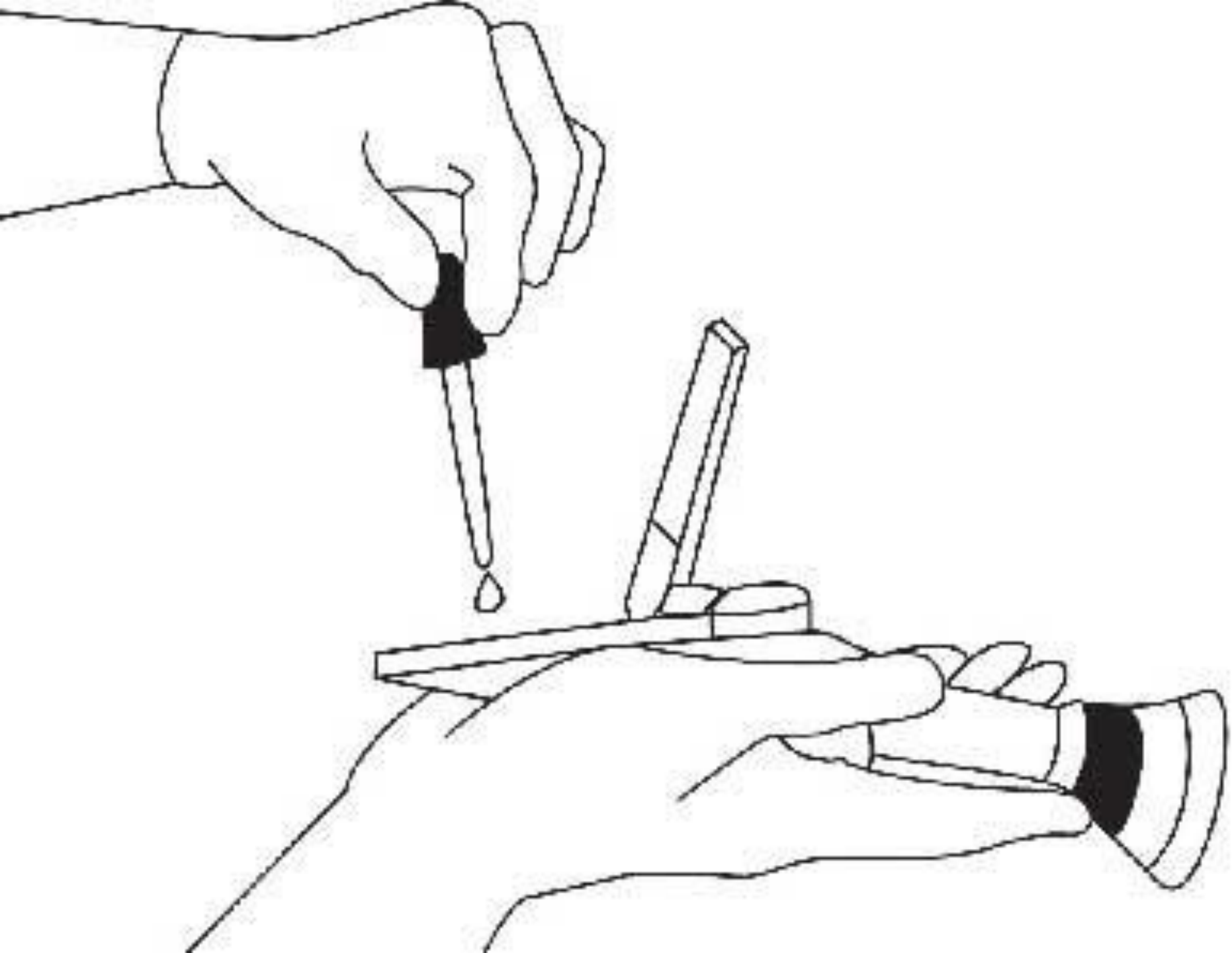

Biological Soil Management
Improved water & nutrient
Holding capacity
Abated soil erosion
Appropriate dose nitrogen
And salt fertilizers
Increased organic
Matter/humus
Enhance beneficial
microbes
Improved soil tilth
And aeration
Suppression of pathogenic
microorganisms
Environmental Regeneration
& Detoxification
Suppression of weeds,
Diseases, and pest insects
Increased yields
Improved nutrition
Real Cleanliness
Reduced Pesticide Applications
No “need” for GMO’s
Enhanced consumer
Nutrition & health
Increased farm profit
Independence
Decreased public costs

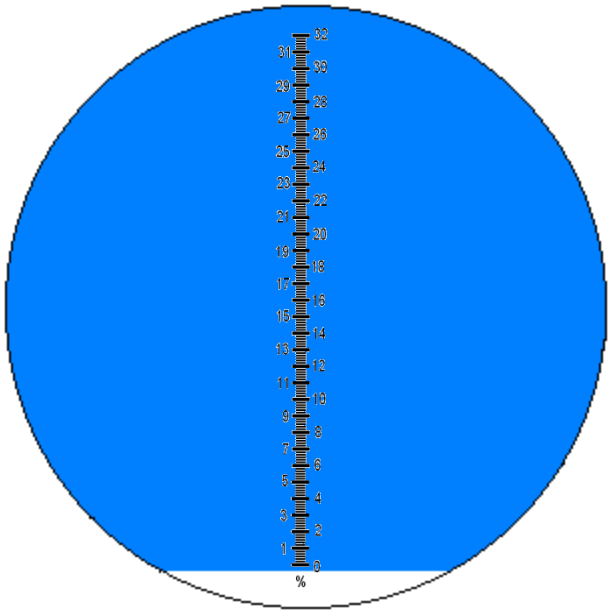
# First and foremost testing tool

- The refractometer
  - Test everything you get your hands onto
    - Plant sap
      - Leaf, stalk/stem, root, fruit
    - Milk
    - Fruits and veggies
  - Generally speaking (75%) the higher the brix the healthier the plant, the higher the yield, the fewer the insects and diseases, the higher the nutritional value.
    - 25% is operator error, dehydration, inappropriate test site
  - If you follow the Albrecht program, that is a great start from chemical to biological farming. If you stop there, you will hit a wall and will fail to get the brix readings to come up to 12 or above at the weakest point in the plant.

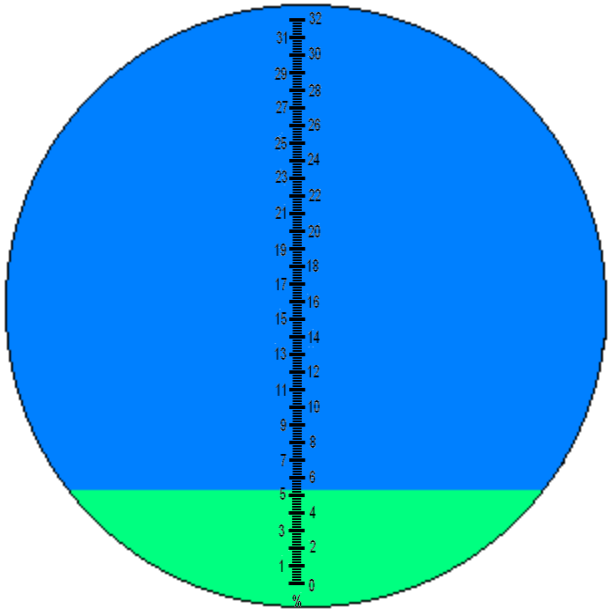
# Refractometer and Food Quality

- Refractometer calibrated to % brix with refractive index of sucrose as the standard
- 12 Brix is the minimum desired level
- Sugar production is the fundamental purpose of photosynthesis
- 75% of the time, higher brix correlates to higher nutritional level in the plant/crop
  - 25% there is dehydration, operator error, abberancy purely in looking at brix of one part of plant: sweet corn ear v. stalk
- Learn some basic chemistry: H2O is not H2O2 any more than CH3OH is (CH3)2OH





*Water on Lens*



*Refractometer Lens Simulation with plant sap: Plant likely to be attacked by insects and or disease*

# Fundamentals of Brix

- Plant growth is about taking CO2 and H2O in the presence of a plant and sunlight and generating SUGAR, NOT protein, NOT fiber, NOT anything other than SUGAR, SUGAR, SUGAR.
- This SUGAR is then CONVERTED to everything you call “crop” and harvest.
- The lower the sugar the less the YIELD.
- Measure sugar with a refractometer and get a reading in BRIX.

# SUGAR (REFRACTOMETER)
# LITERATURE REFERENCES


AG JOURNAL 1952 pp. 610-614

CROP SCIENCE 1969 pp. 831-834

CROP SCIENCE 1970 pp. 625-626

CROP SCIENCE 1984 pp. 913-915

CROP SCIENCE 1988 pp. 861-863

CANADIAN JOURNAL OF PLANT SCIENCE
1964 pp. 451-457

CANADIAN JOURNAL OF PLANT SCIENCE
1972 pp. 363-368

PHYTO-PATHOLOGY 1966 pp. 26-35

# Brix Chart: Tree Fruit

| Crop | Poor | Average | Good | Excellent |
|---|---|---|---|---|
| Apples | 6 | 10 | 14 | 18 |
| Avocado | 4 | 6 | 8 | 12 |
| Cherries | 6 | 8 | 14 | 16 |
| Grapes | 8 | 12 | 16 | 20 |
| GpFruit | 6 | 10 | 14 | 18 |
| Lemons | 4 | 6 | 8 | 12 |
| Mangoe | 4 | 6 | 10 | 14 |
| Orange | 6 | 10 | 16 | 20 |
| Papaya | 6 | 10 | 18 | 22 |
| Pears | 6 | 10 | 12 | 14 |

# Preliminary Findings

- High brix fruit does not raise the blood sugar to the degree that low brix fruit does
  - Has significant ramification regarding diabetes, glycemic index, insulin resistance and nutritional value for the body
- New Zealand research shows higher pasture brix correlates directly to higher profit per acre

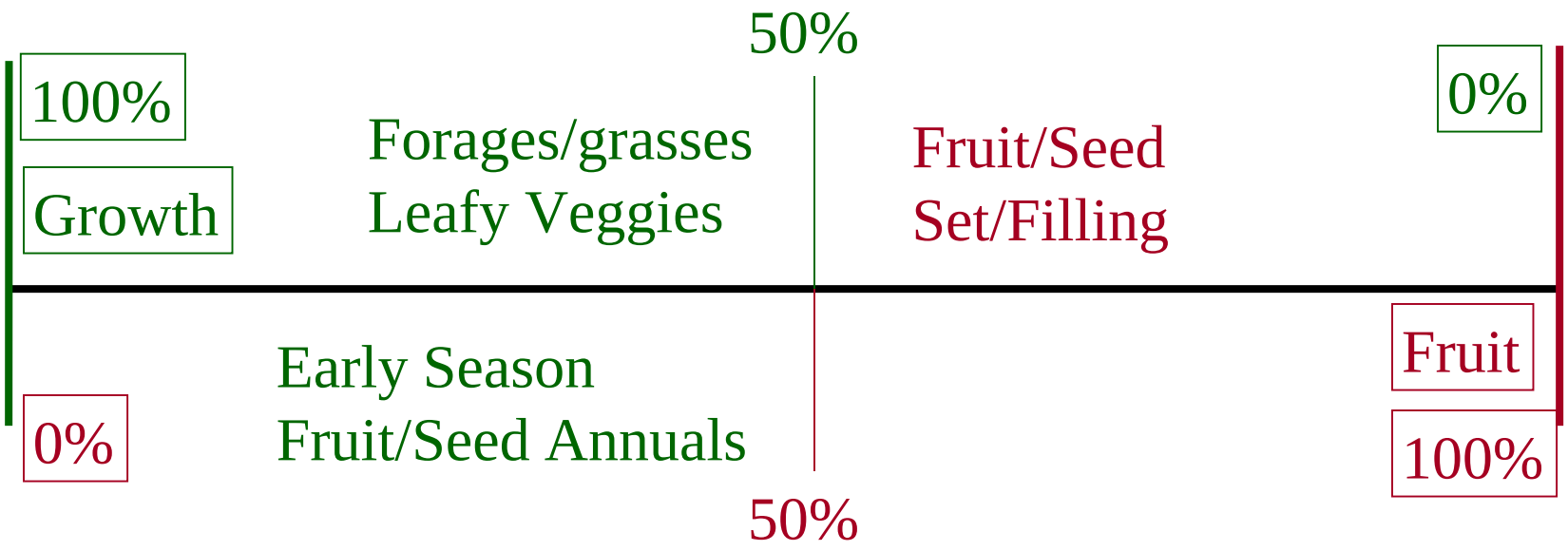
# The Brix Guide

- If your program is consistently raising crop brix readings, continue along your path,
  - If not change course until the brix readings rise

# “Boys” and “Girls”

- A fundamental principle every farmer/grower must learn is the difference between the sexes and what it means for crop production.

# Fruit v. Growth Continuum

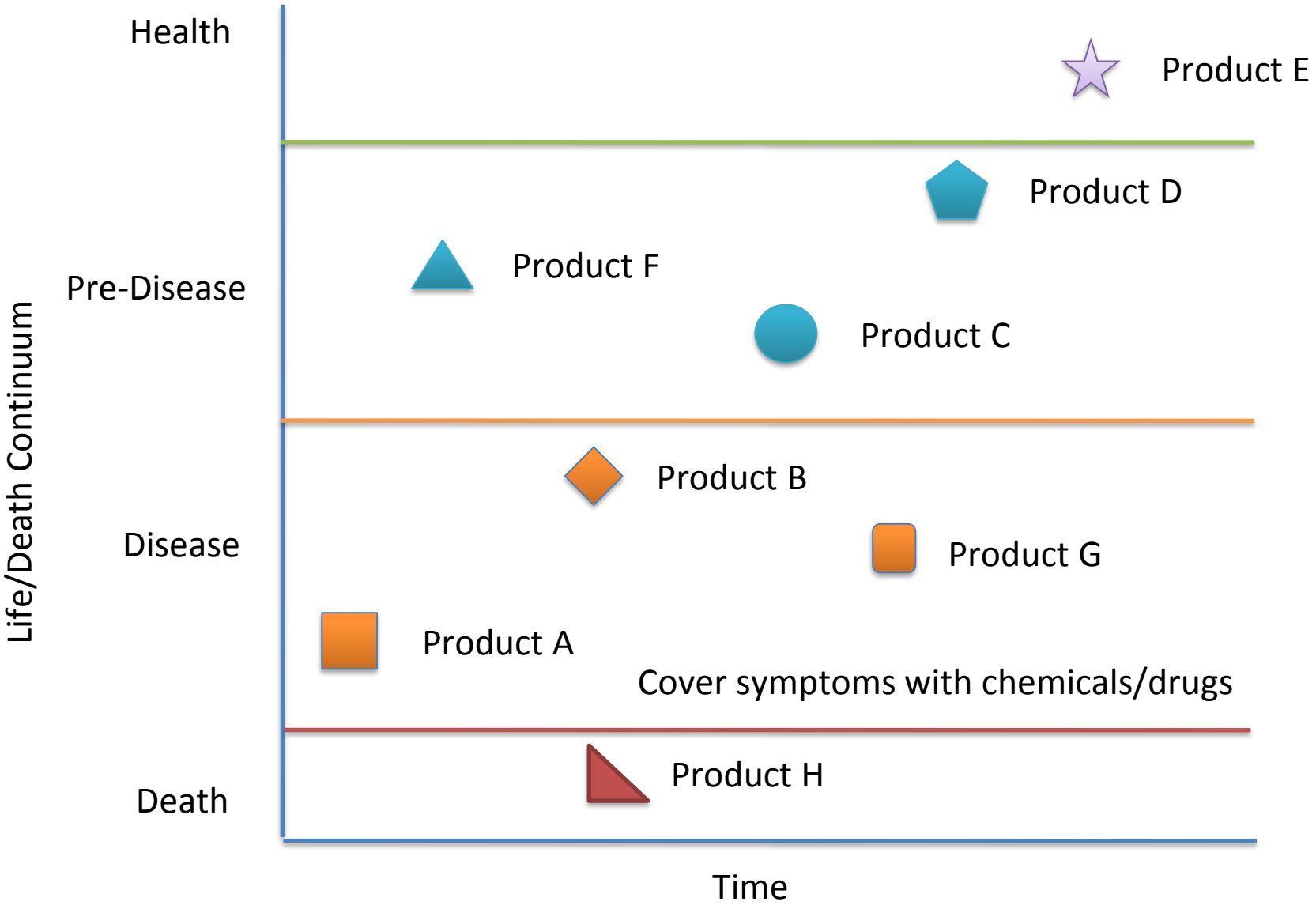



Calcium – CaO>Ca(OH)2>CaCO3
Potassium
Nitrate N (NO3)
Chlorine
Testosterone

S>SO4
Phosphorous
Acids incl. vinegar
Ammonium N (NH4)
All other nutrients
Estrogen

# Synergistic Farming Approach

- Mineralization
  - calcium, magnesium, potassium, phosphorous, nitrogen, sulfur, traces
  - fundamental to building the soil, addressing tilth, compaction, weeds, building bio-carbon reserves
- Building Carbon - microbial inoculants, microbial foods, humus formation
- Finishing crops - foliar nutrients, esp. traces
  - Direct conversion to consumer nutrient intake
- Residue management - getting residues converted to humus
  - Direct effect on water management, tilth, erosion, nitrogen and carbon sequestration


Health
Pre-Disease
Disease
Death
Life/Death Continuum
Time
Product E
Product D
Product F
Product C
Product B
Product G
Product A
Cover symptoms with chemicals/drugs
Product H

# Back to Ag-Human Link

- There are no accidents
  - health, pre-disease, disease and death are consequences of our choices
  - food quality has declined over the decades because farmers have failed to sufficiently mineralize and appreciate the direct link from farm to consumer health

# Soil-Human Health Mirror

- Soil
  - Fertilizers
    - minerals
  - Amendments
  - Crops
    - root exudates
  - Foliar Sprays
  - Inoculants

Human Health

Diet

Mostly plant based

Approp. fats/oils

Fiber

Digestive enzymes

Therapeutic vit/min

Probiotics

# Soil-Human Health Mirror

- The fertilizers used determine soil microbial makeup and health of the plant
  - The diet one consumes determines the gut micro biome and health of the person
- Foliar sprays supplement especially the minerals, which in turn alter root exudates, and move plant health from status quo to superior - follow the brix
  - The supplements one takes much be at therapeutic levels, in ratios that are synergistic and in forms that are most helpful to the body

# Centurion Diet

- Moderation and exercise
- If they eat dairy, 4 ounces per week not 8-16 ounces per DAY
- If they eat meat, 2-4 ounces per week or less not 8-16 ounces per day
- If they eat grains, whole grain in sour dough not demineralized white flour in yeast

# Okinawa Centurians

- Most scientific study ever done on longevity - public records since 1870's
- Modern times community
- Other research is interesting but no age verifications
  - Weston A. Price - early 20th Century
  - Abkhazia tribesmen in Russia
  - Armenian Ebkanian
  - Titica Indians in Peru
  - Vicalbama Indians in Ecuador
- Hadza hunter-gatherers - Africa
- Hunsa Western Himalayas

# Okinawan Diet

- <2000 calories per day - consistent with all "healthy" tribe peoples
- lower blood pressure, lower cholesterol, daily exercise, low psychosocial stress - practice spiritual life, martial arts, high vegetables/fruits consumption, higher intake of good fats (omega-3, mono-unsaturated fat), high fiber diet, high flavonoid intake, low body fat level, and high level of physical activity.

# Therapeutic Supplementation

- Therapeutic v. nominal
  - threshold dynamics
    - below gives you insect pests, disease and weeds; infections, poor performance in energy, milk production, hormone imbalance and chronic disease
    - above gives you health and longevity
  - don’t blame God because you get sick

# Health Program

- Comprehensive Lifestyle
- Healthful attitude - personal responsibility and action; not blaming God, genes…
- Diet: largely plant based, <2000 calories, plenty of water, clean, whole foods, great variety
- Exercise - movement, oxygenation
- Stress relief - dance, yoga, martial arts, prayer, tai chi

# Supplementation

- Theory, political correctness, religious misinformation, “naturalness”, industry rhetoric all fill news time, but fail to help the consumer make appropriate health decisions.
  - multilevel miracles, mineral waters
- USDA and various commodity counsels are motivated purely by sales promotion

# Biochemical Balancing

- Optimal Daily Allowance multi 4 – twice daily
    - rated top in North America by NutriSearch
- Omega-3 2000 – 4000 mg
- Gastrogest/Pancreatin digestive enzymes 2/meal
- Additional specifics per individual need
    - comprehensive program for those with CA, Parkinson's, MS, Kidney failure would be roughly $1200 per month

# Without Supplementation

- 1970 Breast cancer 1:10, today 1:8
- Prostate cancer today 1:8+
- Colon cancer today 1:20
- Non-Hodgkins today 1:50
- All Cancers today 1:2.5
- 1975-2010 annual increase in pediatric cancers by 0.6% per year.
- Most doctors tell patients that supplements just make expensive urine
  - some do just that
  - Ignorance perpetuates more disease

# “Natural” Approach

- Many patients will comment that they want to use their favorite multilevel products because they are “natural”
  - what’s “natural”?
  - If it doesn’t provide therapeutic levels of nutrition you will still be left with your
    - “natural” cancer, “natural” diabetes, “natural” fibromyalgia, “natural” hot flashes, night sweats and misery, “natural” IBS, “natural” kidney failure, “natural” infertility, miscarriages and morning sickness
  - OTC’s are not allowed therapeutic doses allowed professional products
    - At best raise health from low pre-disease incrementally higher but still in pre-disease or from disease to low pre-disease, still not health.
  - Many “consultants” will disparage bioidentical hormones, medicines and blood testing because they don’t have the license necessary to prescribe them.

# Natural Approach

- Still others will insist that one can get healthy just by using only foods and taking just “food based supplements”
- Ignorance is the bride of failure
  - pre-disease is not health
  - until one gets high brix foods, eliminates environmental intoxication and significantly reduces stress, foods don’t supply adequate nutrition for comprehensive change
    - can move up the pre-disease scale but not achieve health


Artisana
ORGANICS
RAW WALNUT
NUT BUTTER WITH CASHEWS
ORIGINAL
LILY'S
DARK CHOCOLATE
STEVIA SWEETENED
55% Cocoa
Non GMO
No Sugar Added!
FAIRTRADE
Net Weight: 3oz (85g)

# Above all …

- Farming is about producing food for people.
- Health is about nutrition.
- Brix/nutrient density are the ultimate and final judge/determinant of food quality.
- Finally, farming is about delivering nutrients, via food, to the consumer's table.
  - All else is just rhetoric for marketing/convenience
  - Farming this way, by default, solves the other issues so often debated in various groups

# The Farm-Human Health Link

- Environment & lifestyle habits determine genetic expression and also largely our genes
- Environment includes air, water, home, office and food
- Lifestyle habits include food choices, thoughts, stress responses, exercise, relaxation, spirituality and relationships
- Our body's ability to overcome toxic air, water, home and office is determined by one's food, which in turn, directly affects one's biochemistry including one's thoughts (neurotransmitters) and vice versa
- Agriculture/farming determines food quality - nutrient density, toxic residue and pathogenic residue
- Agriculture/farming largely impacts water quality and air quality

# Farming at the Center of our Universe

- Agriculture/farming is fundamentally THE most determinant industry or factor of human health and thought
- Your are what you have eaten and thought about for the last sever years!


YOU FOOL
YOU FOOL
THANK YOU
THANK YOU

Food is supposed to be life giving. It is supposed to be "our daily bread". Sadly, modern farming practice has converted food production into a cesspool of poison and genetically engineered "franken-foods" scientifically proven to cause human suffering including cancer, environmental pollution and resistant strains of infections, weeds and insect pests. From A1 milk to farm-raised fish, artificial hormones to antibiotics and pesticides in the feed, "modern farming" has created the Food Plague. We have the technology to solve all these problems and feed many times the world population. Farmers could increase yields 5 to 6 times using present day non-GMO seed and appropriate technology, without ANY of the toxic side effects while sequestering carbon and regenerating the soil.

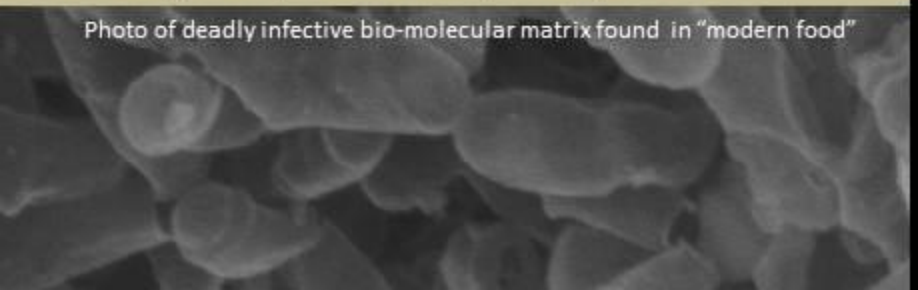
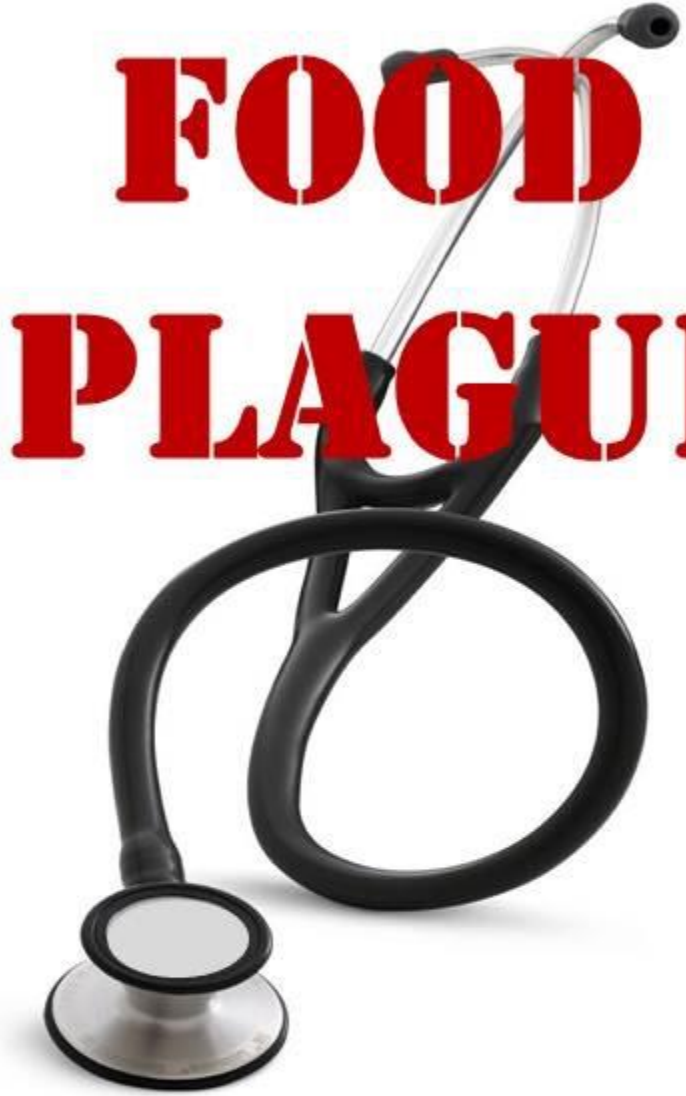


Photo of deadly infective bio-molecular matrix found in "modern food"

FOOD PLAGUE ARDEN ANDERSEN Holographic Health Press

# FOOD PLAGUE



## Could our daily bread be our most life threatening exposure?

**Arden Andersen, D.O., M.S.P.H., Ph.D.**