01 April 2005
31st class meeting
(Miller Chapters 8, 11, 12)

Environmental Biology
ECOL 206
University of Arizona
spring 2005

Kevin Bonine, Ph.D.
Alona Bachi, Matthew Herron, Graduate TAs

Environmental Biology 206
- SE Chapter 8, Levidow, Rifkin
- SE Chapter 11, Gore, Colborn
- Climate Change, SE Chapter 12
- Optional Global Climate Change Readings
  - Running out of Space? Lomborg 2001

- Lab this week: meet at van, going to Los Reales Landfill
  - Lab next week: meet at van, going to Sweetwater Wetland
  - Readings on Lab Website

Thank Don Falk

206 Course Web Link:
The Clean Air Fair is a celebration held annually to promote actions that will lead to healthier air for our community. The goal of the event is to highlight bicycling, carpooling, walking, teleworking, and clean fuel vehicles during the Fair, and to encourage participants to incorporate these activities into their lifestyles after the Fair. Join us during the scheduled events, enter the contest, and win your share for cleaner air!

**Schedule:**

**Friday, April 1**

- **21 Days to Cleaner Air: Don't Kick It!** Take action for cleaner air over the next 21 days! Join us on April 1st, 2005, at 6:00 p.m. at the Pima County Fairgrounds, where we will share information and activities to help you reduce your carbon footprint.

- **Bike to Work Day**
  - 8:30 a.m. to 10:00 a.m.
  - Bike to Work Day is an opportunity to enjoy a healthy and active commute. Join us at the Pima County Fairgrounds to kick off the event.

- **Bike to Work Day**
  - 8:30 a.m. to 10:00 a.m.
  - Join us at the Pima County Fairgrounds to start your day on two wheels.

**Saturday, April 2**

- **Scavenger Hunt**
  - 10 a.m. to 2 p.m.
  - Join us at the Pima County Fairgrounds for a fun and challenging scavenger hunt.

- **Bike to Work Day**
  - 8:30 a.m. to 10:00 a.m.
  - Join us at the Pima County Fairgrounds to continue your day on two wheels.

- **Bike to Work Day**
  - 8:30 a.m. to 10:00 a.m.
  - Join us at the Pima County Fairgrounds to keep the momentum going.

**Sunday, April 3**

- **Clean Air Carpooling**
  - 10 a.m. to 2 p.m.
  - Join us at the Pima County Fairgrounds to learn more about carpooling and how it can benefit you and the environment.

- **Bike to Work Day**
  - 8:30 a.m. to 10:00 a.m.
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**Clean Air Fair Committee**

- Pima County Department of Transportation
- Pima County Environmental Services Department
- PAG Association of Governments (PAG)
- Sun Tran

**Pima County Board of Supervisors**

- David Kluch, Chair
- J. B. Magee, Vice Chair
- Pauld archive, Secretary
- Juan Hinojosa
- Sarah Simms

**PAG Regional Council Representatives**

- City of Tucson
  - Mayor and Council
  - Walter D. Harrah, Mayor
  - Jim Klein, Vice Mayor
  - Mark Engler, Council Member
  - Scott M. Edmiston, Council Member
  - Jennifer M. Wilson, Council Member
  - John E. Fowle, Council Member
  - Pima County
  - Supervisor
  - Craig L. cram, District 1
  - Mary Ann Gandy, District 2
  - John R. Lindsey, District 3
  - Paula S. Bednar, District 4
  - Douglas A. Scott, District 5

**Join the Clean Air Fair for healthier air!**
Pesticides and Pseudoestrogens

Fertility today, gone tomorrow

Thanks to Jessie Cable, EEB, 2004

Pesticides

• What are they?
  – “pest” = competes with us, destroys what we have/need, spreads disease
  – “-icide” = kill
• What is the ideal pesticide?
  – Target specific
  – Breaks down into harmless compounds
  – Genetic resistance doesn’t occur
Pesticides – the good, the bad, the ugly

- **GOOD**
  - Save human life against malaria, plague, typhus
  - Increase food supply, lower costs
  - Increase farmer profit
  - Fast acting, long shelf life, easily shipped
  - Newer pesticides are safer
  - Used at lower rates than before

- **BAD**
  - Accelerate genetic resistance of pests
  - Broad spectrum – kills predators of pests
  - Do not stay put – little of what is applied reaches the target
  - Harm wildlife and human health

Pesticides

- **Alternatives**
  - Change cultivation practices
    - Crop rotation, change planting time, polyculture
  - Genetic engineering
    - Pest-proof the plants
  - Biological pest control
    - Bacteria, viruses, parasites, natural predators
Pesticides

• **Alternatives**
  – Insect birth control
    • Sterilize males
  – Pheromones
    • Luring into traps
  – Irradiation

• **INTEGRATED PEST MANAGEMENT**
  • Evaluation of pests and crops on an individual basis
    (NOT a band aid for every situation)
  • Includes combination of methods (cultivation, biological, chemical)
  • Specifically timed
  • Pollution prevention
  • Successful in many countries
Pesticides: the ugly

Zeroing in On Male Infertility

Researchers have found the first direct evidence that chemicals in the air, water, and food - even the effect of the female sex hormone estrogen - may be feminizing the effects of male hormones. In addition to altering the sex hormones that control the development and function of the reproductive system, many of these chemicals also appear to feminize the effects of male hormones in the body. Some of these chemicals may also interfere with the development and function of the reproductive system.

Pseudoestrogens

Dr. Shane Snyder
R&D Project Manager
Southern Nevada Water Authority
Pseudoestrogens

• Endocrine disruptors
• Synthetic compounds that interfere with endocrine function
• Mimic hormones
• Can block receptors, attach to receptors to induce response
• Ultimately: feminization of males

Pseudoestrogens: Endocrine Disruptors

• Where are they found?
Pseudoestrogens: Endocrine Disruptors

• Where are they found?
  – Pesticides
  – Natural and synthetic hormones
  – Plant constituents
  – Plastics
  – Detergents
  – Environmental pollutants
  – Sewage effluent
Pseudoestrogens:
Endocrine Disruptors

<table>
<thead>
<tr>
<th>Males</th>
<th>Female</th>
<th>Wildlife</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased sperm counts or quality</td>
<td>breast cancer</td>
<td>infertility</td>
</tr>
<tr>
<td>testicular cancer</td>
<td>cardiovascular effects</td>
<td>sex-changes</td>
</tr>
<tr>
<td>descended tests</td>
<td></td>
<td>(imposed)</td>
</tr>
<tr>
<td>malformed penis</td>
<td>intelligence deficit</td>
<td>developmental abnormalities</td>
</tr>
<tr>
<td>neurological problems</td>
<td>intelligence deficit</td>
<td>thyroid dysfunction</td>
</tr>
<tr>
<td></td>
<td>neurological problems</td>
<td>behavioural abnormalities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dysfunctional immune system</td>
</tr>
</tbody>
</table>

Source: IEH, WWF

Pseudoestrogens

- **The Omens**: reproductive failure in wildlife
  - **Bald Eagles** - Florida 1952
    - Not interested in mating
  - **Otters** - England late 1950’s
    - Dieldrin pesticide suspected
  - **Mink** - Lake Michigan mid-1960’s
    - PCB contaminated food (fish)

From: Our Stolen Future Colborn et al.
Hypospadias occurs in about 4 of 1000 male births. There is some family risk, about a 20% chance of finding it in another family member.

Hypospadias is most commonly caused by failure of adequate or continuous hormone production during the development of a foetus from about 10 weeks into gestation. It can be detected by ultrasound or specialist inspection as often the foreskin will be malformed.

http://www.hypospadiashelp.fsnet.co.uk/What%20is%20hypospadias.html
Pseudoestrogens

• Herring Gulls – Lake Ontario 1970
  – Deformed/dead chicks, possible Dioxin contamination

• Western Gulls – Channel Islands, CA 1970’s
  – Females nesting together, thin shells

• Alligators – Lake Apopka, FL 1980’s
  – Low hatching rate, feminization of males

Pseudoestrogens

• Seals – Northern Europe 1988
  – 18,000 dead, pollution?, disease?

• Striped Dolphins – Mediterranean Sea 1990’s
  – >1,100 dead, PCB

• Human sperm – Copenhagen 1992
  – Abnormalities, global drop in sperm count
  – Increase in testicular cancer
  – Genital abnormalities
Pseudoestrogens

- **Big Picture of Problems?**
  - In each scenario
    - Defective sex organs
    - Loss of fertility
    - Abnormal mating behavior
    - Death of young
    - Huge die-offs

Rachel Carson, *Silent Spring*
Theo Colborn et al., *Our Stolen Future*
going LONG

Land surfing: Longboarders invade the UA

By Kyle A. Harmon
Daily Wildcat
March 29, 2005

The sudden idea of just riding a longboard was enough to prompt her to try it.

"I love trying new things," she exclaimed. "My first attempt was last year when I tried out a surfboard. I
wasn't very successful. I fell off a lot and got hurt a
few times."

But her love for the sport continues to grow.

"I really enjoy the challenge of learning new tricks and
improving my skills," she said.

Boarding is people too

Nadine Weller, a psychology major from Phoenix, has been
longboarding for four years.

"I couldn't give my mind off of snowboarding, so I
started longboarding. I started out with
longboards because they're easier to
ride and more forgiving."

Weller said she enjoys the
freedom and feeling of
being on the board.

"It's a great way to
exercise and have
fun," she said.

Longboard love

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