Pesticides We Should Be Concerned With?

*All of them!*

Especially Triazines

- Atrazine
- Ametryn
- Metribuzin
Should we be concerned?

Triazines:

• Important class of herbicides for weed control in Florida sugarcane and sod production

• Commonly found in low concentrations in surface water sampling

• Usage of atrazine has been limited in other areas due to high levels in water
Atrazine (Aatrex, etc)

Widely used in Florida sugarcane production

- Cheap, effective, kills more weeds per $$ spent than most other herbicides
- Safe on cane .... no phyto-toxicity
- Both pre-emergence and post-emergence applications

According to the pesticide label:

- Sugarcane: Up to 10 lb ai/A of atrazine per season
- Sod (muck): Up to 6 lb ai/A of atrazine per season
- Sod (sand): Up to 3 lb ai/A of atrazine per season

Atrazine is applied to a large percentage of Florida sugarcane acreage
Ametryn (Evik)

Commonly used in Florida sugarcane production

• Post-emergence application
• Up to 1.5 lb/A per application (2 applications)

✓ Usually used at much lower rates
✓ Not as frequently used as atrazine
✓ Under certain conditions and at higher rates, can be phyto-toxic to sugarcane
Metribuzin (Sencor, etc)

Commonly used in Florida sugarcane production

- **Florida label**: Post-emergence application only!
  Pre- or Post-emergence when mixed with Atrazine

- **1 ⅓ lb/A – 2 ⅔ lb/A per application**
  ✓ up to 2 applications per year
  ✓ no more than 2 ⅔ lb/A per year

- Not as frequently used as atrazine

**SPECIAL PRECAUTIONS - Florida only**

Do not use on sand soils
Metribuzin Label

Ground Water Advisory Statement

• Metribuzin is a chemical which can travel (seep or leach) through soil and can contaminate ground water which may be used as drinking water

• Metribuzin has been found in ground water as a result of agricultural use

• Users are advised not to apply metribuzin where the water table (ground water) is close to the surface, and where the soils are very permeable, i.e., well drained soils such as loamy sands

Similar language on the Environmental Hazards Statement of Atrazine labels
Atrazine Chemical Characteristics

- Water solubility not particularly high (33 mg/L)
- Binding to soil organic matter not extremely strong  
  \[Koc = 128 \text{ ml/g}\]
- In-field half-life \(\approx 60\) days
- \(LD_{50} = 672\) mg/kg

Compared to ametryn:
- ✓ Atrazine is less water soluble
- ✓ Atrazine is less bound to soil
Ametryn Chemical Characteristics

- Water solubility **higher** than atrazine (194 mg/L)
- Binding to soil organic matter **stronger** than atrazine
  \[ K_{oc} = 362 \text{ ml/g} \]
- In-field half-life ≈ 60 days
- LD\(_{50}\) = 508 mg/kg

**Compared to atrazine:**
- Ametryn is more water soluble
- Ametryn is more bound to soil
Metribuzin Chemical Characteristics

- Water solubility much higher than atrazine and ametryn (1,050 mg/L)
- Binding to soil organic matter is weak
  \( K_{oc} = 41 \text{ ml/g} \)
- In-field half life \( \approx 60 \text{ days} \)
- \( LD_{50} = 2,200 \text{ mg/kg} \)

Compared to atrazine and ametryn:
- Metribuzin is much more water soluble
- Metribuzin is less bound to soil
Triazine Detection
EAA water sampling stations

• 20+ years data available

• Triazine herbicides are commonly detected in EAA water samples

• Triazine levels are generally very low

But they are often found!
Triazines - National Concern

• Historically Atrazine is the second most commonly detected pesticide in American waterways!

• 1974 - Congress passed the Safe Water Drinking Act

• Set the Maximum Containment Level for atrazine in drinking water at 3 ppb

✓ Strike 1 = Enhanced water sampling efforts
✓ Strike 2 = Mitigation plan
✓ Strike 3 = Ban from atrazine use in the watershed!
What Can We Do To Minimize Triazine Herbicides In Our Surface Waters?

- Minimize physical spray drift into bodies of water
- Use care when mixing and loading herbicides
  - Spills near water bodies can result in large amounts of concentrated product entering water
- **Alternative Herbicides**
  - Atrazine can provide effective weed control at lower rates when tank mixed with other herbicides
Follow Setback Requirements

- Follow all label requirements regarding setbacks
- Found on all atrazine labels!
  - DO NOT mix/load within 50 ft of any well, sinkhole, stream, river, or lake
  - DO NOT apply within 66 ft of where field runoff enters a stream or river
  - DO NOT apply within 200 ft of any lake or reservoir
Anti-Back-Siphoning

• Equipment used to supply water:
  ✓ Install devices that prevent back-siphoning from the spray/mix tank if the motor shuts off

• Always keep your fill hose above the level of your spray mix
What Can We Do To Minimize Triazine Herbicides In Our Surface Waters?

- **Do not apply to saturated soils**
  - More runoff of both water soluble herbicide, and soil particles with herbicide attached

- **Holding water**
  - Allows the herbicide to be absorbed by soil particles and settle out, or degrade
Nutrient BMPs Impact Herbicide Movement

Use BMPs that minimize sediment transport

✓ Herbicides are often bound to sediment particles

Vegetative buffers on field edges

✓ Can reduce movement of herbicides attached to soil particles
Take Home Message

Atrazine, Ametryn and Metribuzin

- These triazine herbicides are important for our weed control programs
- Good stewardship will minimize the amount of triazine pesticides that enter our surface waters

When YOU are out in the field, mixing or spraying; always remember to:

✓ Read and follow label directions
✓ Use common sense
✓ Follow all BMP principles
Weed Management in Sugarcane

D. C. Odero and J. A. Dusky

Successful weed control is essential for economical sugarcane production in Florida. Weeds can reduce sugarcane yields by competing for moisture, nutrients, and light during the growing season. Several weed species also serve as alternate hosts for disease and insect pests. Weed control is most critical early in the season prior to sugarcane canopy closure over the row middles. Heavy weed infestations can also interfere with sugarcane harvest by adding unnecessary harvesting expenses. A weed that is allowed to mature and produce seed will multiply weed control problems by being a source of seed bank replenishment and re-infestation in subsequent years. See Table 1 for available herbicidal options.

Crop Rotation
Crop rotation patterns will affect weed management of a sugarcane crop. Weed management must be intensified particularly in successive planting operations. Traditionally, the fallow period between final ratoon harvest and planting has effectively been used to manage troublesome perennial weeds such as Bermudagrass. This is accomplished primarily by a combination of mechanical cultivation and herbicide application. Flooding fallow fields also aids in weed control through the development of an anaerobic environment in which weed seed germination and seedling growth is inhibited. Under successive planting management, weed populations are not severely reduced between crops and weed pressure will increase if adequate control measures are not implemented.

Crop Competition
Crop competition for sunlight is one of the most important concepts to be utilized in effective weed control. A good stand of sugarcane that emerges rapidly and uniformly and

http://edis.ifas.ufl.edu/WG004
UF/IFAS Pesticide Info
http://pested.ifas.ufl.edu/

Latest EREC weather conditions
http://erec.ifas.ufl.edu/WD/Ewدمain.htm
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