

GLYPHOSATE, IMAZAPYR AND ?? – HERBICIDES FOR GRASS CONTROL -

Greg MacDonald

Agronomy Dept. – University of Florida

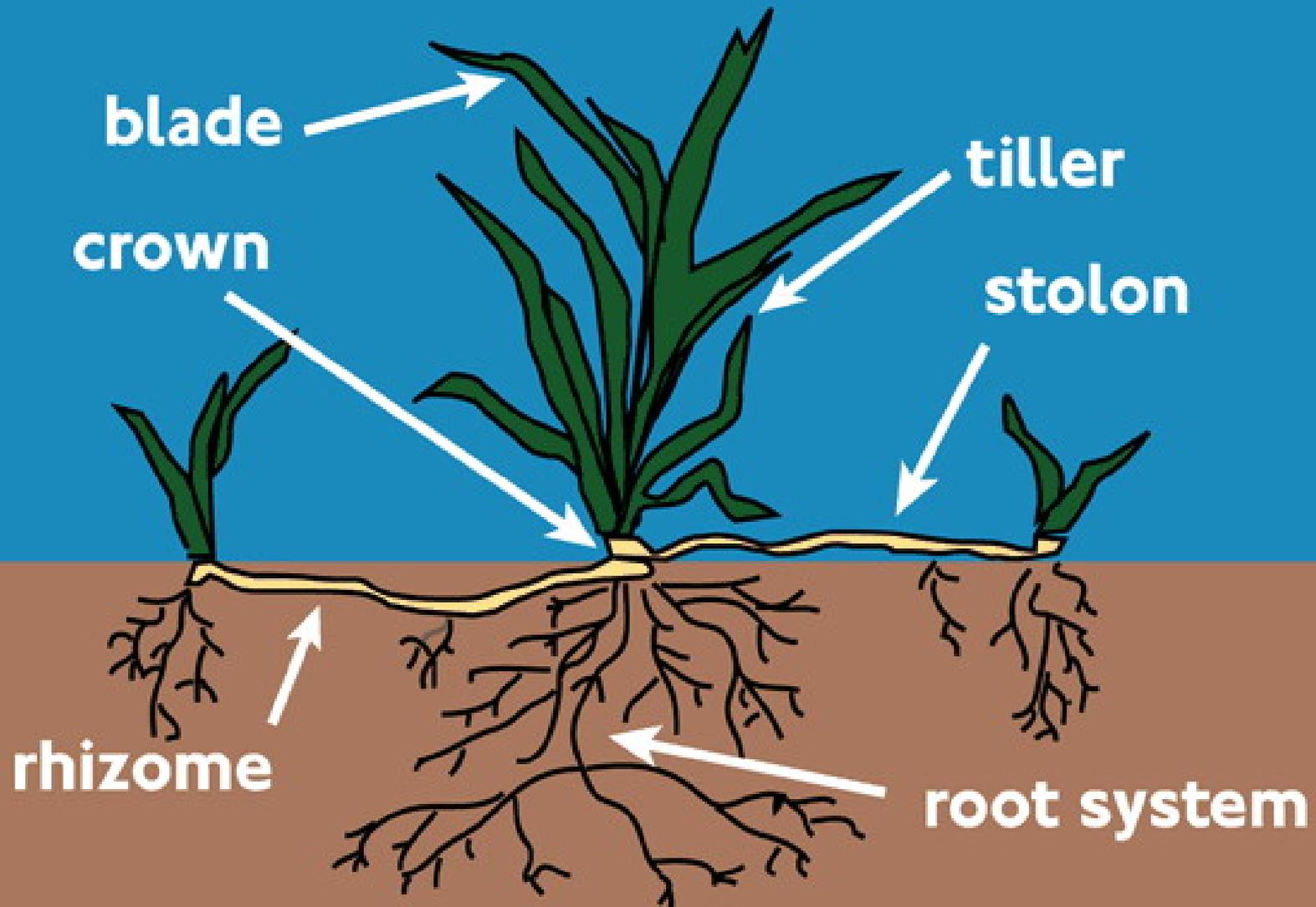


TYPES OF GRASSES

- Perennial or Annual
- Bunch or Spreading
- Stolons or Rhizomes
- Viable Seeds or Not-so Viable?



Structure of a Grass Plant



GRASSES

- Upland annual grasses
 - seed producing
- Upland perennial grasses
 - both seed and non-seed producing
- Aquatic perennial grasses
 - both seed and non-seed producing



Natalgrass



COGONGRASS



- Native to southeast Asia
- Highly adapted to poor soils, drought, pyrogenic ecosystems
- Extensive rhizomes
- Successful/persistent in low light



NEW 'OLD' PROBLEMS

- Bamboo – running and clumping types
- Elephantgrass
- Arundo
- Burma-reed
- Phragmites
- others?



TORPEDOGRASS



- Native to Africa and or Asia
- Introduced into Florida in late 1800's as a wetland forage grass
- Perennial, spreads through stolons and rhizomes
- Named for sharply pointed or 'torpedo-like' growing tips



MATURE PLANT

- Perennial grass, roots on shore and will extend several feet out into shallow water
- Will grow up thru the water column
- Forms dense monoculture along shoreline of lakes and ponds



PARAGRASS

- Semi-aquatic grass
- Stolons only
- 3 ft tall erect; up to 15 ft long
- Prefers water fluctuations



- Leaf sheath - dense stiff hairs
- Leaf flat 0.5 wide and 10-12 in. long
- Hairy and swollen nodes



Terminal spike flower - 8 in. long
with branches
Often purple-tinged

Seed produced but low
germination



LIMPOGRASS

- Semi-aquatic grass
- Stolons only
- 3 to 6 feet tall
- Introduced as a forage and still widely utilized



- Leaf sheath smooth, sometimes with fringe of hairs
- Often a red tinge
- Leaves 2 to 6 in. long; 0.25 wide



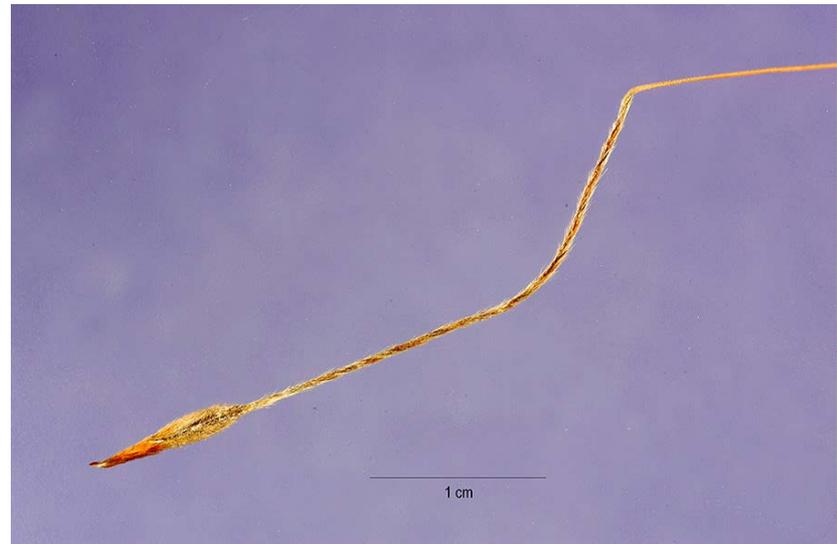
Single spike - 2 to 8 in.
long

Seed - Few produced,
but highly viable



NEW PROBLEMS?

- Luziola - Tropical American water grass
- Sweet tanglehead
- energy grasses?



MANAGEMENT STRATEGIES

Key Steps:

- 1) identification
- 2) control procedure/method*
level of infestation
location/ecosystem
- 3) monitor regrowth or reinfestation



METHODS OF MANAGEMENT

- Prevention
- Cultural
- Biological
- Mechanical
- Chemical – Herbicide Selection
 - Rate, Timing, Application Type
 - Glyphosate, Imazapyr, etc.



PREVENTATIVE AND CULTURAL

- How does it spread? *rhizomes or seed*
- Rhizomes moved through equipment, water (flood events), fill dirt, dredging
- Seed spread is more difficult, moved through same ways, but also animals, wind
- KEY is minimizing disturbance and maintaining a good cover of desirable species



BIOLOGICAL CONTROL

- Selectivity is the big issue



MECHANICAL



Plow or Disk

- deep enough to cut through (6-12 inch)
- multiple times, passes
- during dry seasons if possible
- if mechanical only, need 2 to 3 intervals of disking to ensure rhizome kill
- if integrating herbicides, allow for good regrowth ~ 12 to 18 inches
- if the grass spreads by seed, it may make the problem worst



FLOODING

- use water to aid in control
- time herbicide or mechanical control prior to water
- essentially drown the plants as they try to recover
- key is getting water above the foliage







BURNING



- very effective in removing dead thatch, leaves
- stimulates regrowth, depletes carbohydrate reserves
- generally results in better control with herbicides – must wait for good regrowth (12-18 inches)
- can be used with flooding also



HERBICIDES

NON-SELECTIVE – will control all species

Imazapyr (Arsenal, etc.)

- Use high rates – 1.5 to 4 pints/A (0.5 to 1% solution)
- Non-crop areas such as rights-of-way and fence rows
- Treated areas will be bare for 6 months to a year
- Be wary of off-target damage

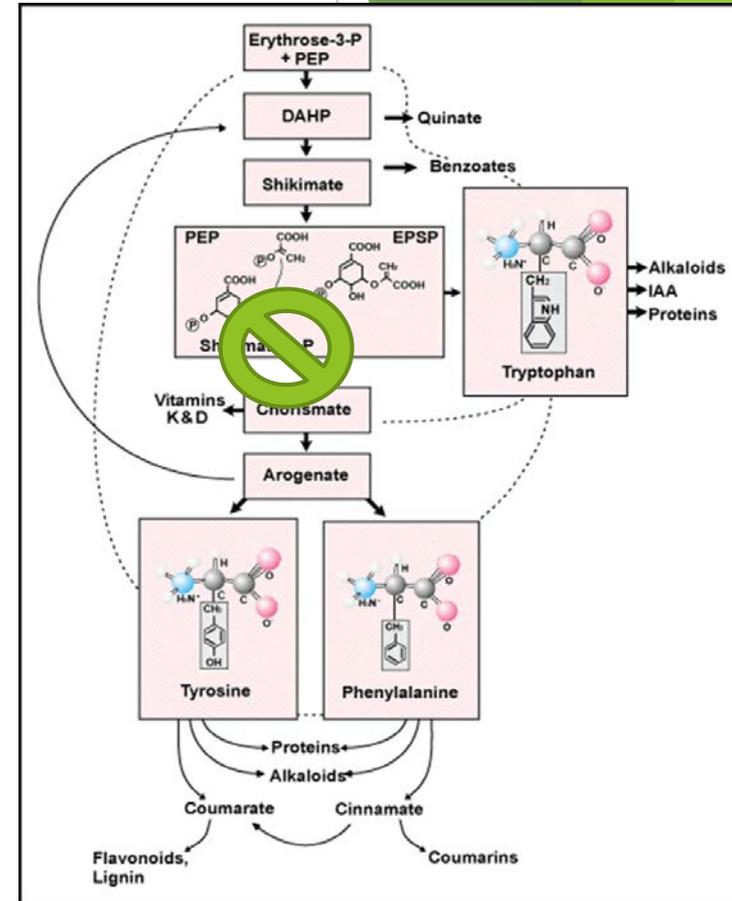
Glyphosate (Roundup, etc.)

- Use high rates 3-4 qt/A (2-4% solution)
- Multiple applications are needed
- No residual soil activity



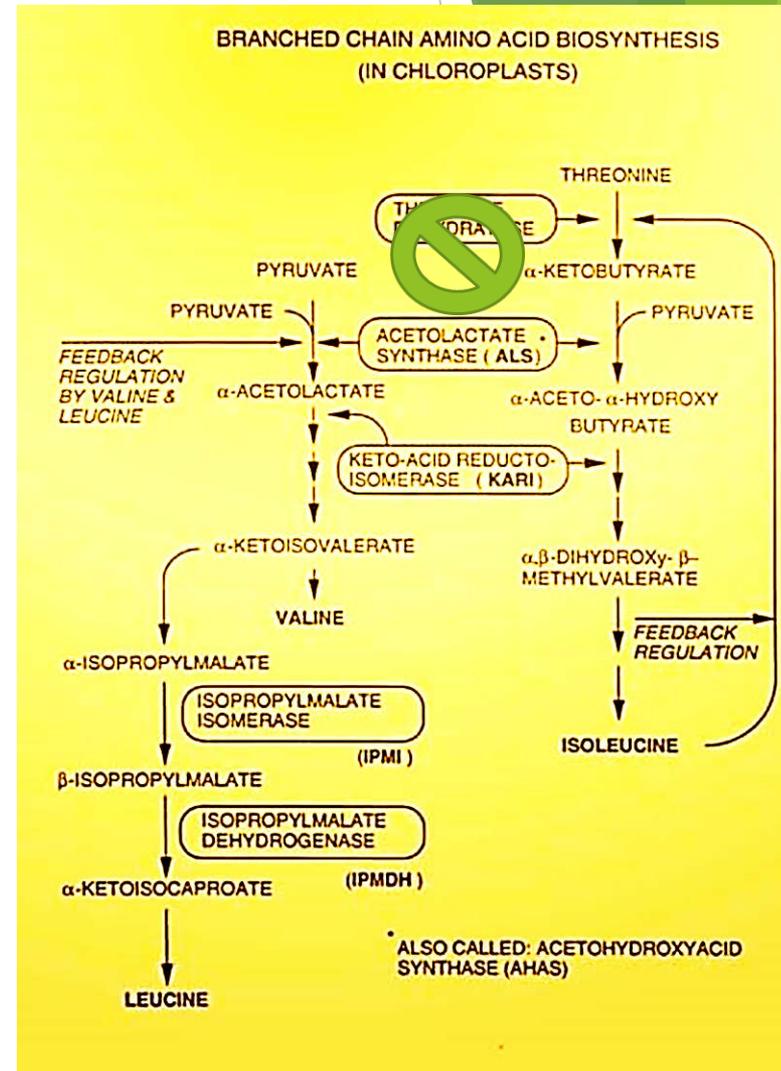
Glyphosate

- ▶ Rapidly absorbed by foliar/green tissues
- ▶ Translocated in phloem to areas of active growth
- ▶ Binds to the enzyme EPSP synthase
- ▶ Blocks the shikimate acid pathway
- ▶ Prevents aromatic amino acid synthesis
- ▶ Plant cannot make proteins, enzymes
- ▶ Growth stops, meristems die, plants die



Imazapyr and Imazapic

- ▶ Rapidly absorbed by foliar/green tissues and roots
- ▶ Translocated in phloem to areas of active growth
- ▶ Binds to the enzyme acetolactate synthase
- ▶ Blocks the ALS/AHAS pathway
- ▶ Prevents branched chain amino acid synthesis
- ▶ Plant cannot make proteins, enzymes
- ▶ Growth stops, meristems die, plants die



HERBICIDES

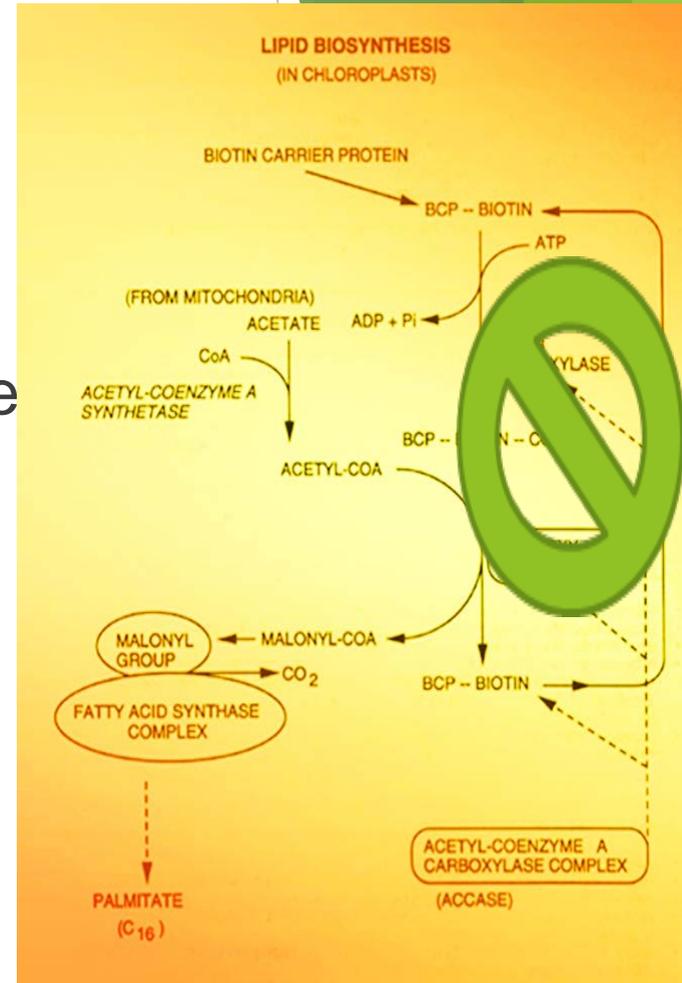
SELECTIVE TOWARDS GRASSES ONLY

- Grass control in natural/aquatic areas
- Recent registration - TIGR Herbicide - SePro
- Used in cropping systems since 1980's
- Good on annuals, moderate on perennials
- However, may provide suppression to allow desirable species to dominate
- Also evaluating **Fluazifop**



Sethoydim and Fluazifop

- ▶ Foliar active only, grasses only due to different form of target enzyme
- ▶ Rapidly absorbed by foliar/green tissues
- ▶ Translocated in phloem to areas of active growth
- ▶ Binds to the enzyme Acetyl-CoA carboxylase
- ▶ Blocks the fatty acid/lipid synthesis pathway
- ▶ Prevents fatty acid synthesis
- ▶ Plant cannot make lipids, cell membranes
- ▶ Growth stops, meristems die, plants die



Symptomology on Grasses



NEW OPPORTUNITIES

- Pre-emergence herbicide options
 - indaziflam (Esplanade), pendimethalin
 - Target those grasses that are prolific seeders
 - Provide control of germinating grass seedlings, but other seedlings as well
 - generally will not injure established plants
 - Timing is critical – need to understand germination phenology
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