HERBICIDE MODE-OF-ACTION

SYMPTOMOLOGY, SELECTIVITY, & PHYSIOLOGY

WEED CONTEST PRACTICE

UNIVERSITY OF WISCONSIN-MADISON

2018

WHAT'S IN A NAME

AND

WHY SHOULD I CARE?

WHAT'S IN A NAME?

- WHAT DO MAD DOG, BUCCANEER, CORNERSTONE, DURANGO, RANGER, HONCHO, ETC…… HAVE IN COMMON?

- WHAT IF I ADDED ROUNDUP WEATHERMAX AND ROUNDUP POWERMAX TO THE LIST?

ALL ARE EPSPS INHIBITOR HERBICIDES, GROUP 9

AI & PRODUCT EXAMPLES

PRODUCT (TRADE NAME)	ACTIVE INGREDIENT (COMMON NAME)
ROUNDUP + MORE	GLYPHOSATE
AATREX, + MORE	ATRAZINE
RAPTOR	IMAZAMOX
PURSUIT	IMAZETHAPYR
LIBERTY 280	GLUFOSINATE

WAYS TO CATEGORIZE HERBICIDES

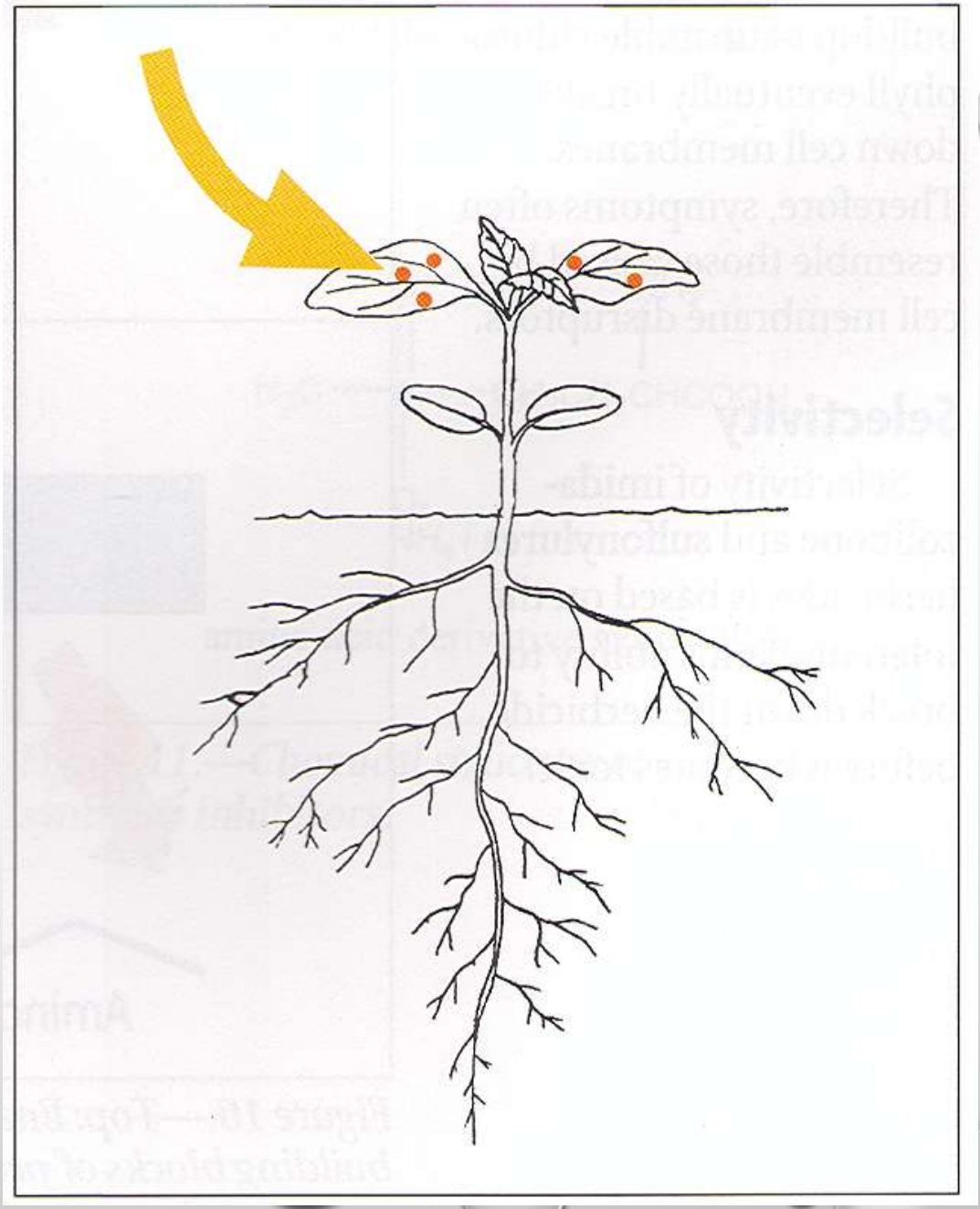
- SITE OF UPTAKE
- SOIL OR FOLIAR
- CONTACT VS. SYSTEMIC
- XYLEM VS. PHLOEM MOBILE
- NONSELECTIVE VS. SELECTIVE
- (BROADLEAF OR GRASS)
- MOA
- SOA
- CHEMICAL FAMILY

WAYS HERBICIDES MOVE IN PLANTS

- **CONTACT HERBICIDES**
  - NO MOVEMENT IN PLANT (GRAMOXONE, COBRA)
- **SYSTEMIC HERBICIDES**
  - WITHIN THE PLANT (PHLOEM MOBILE)
  - FROM SOIL TO TOP OF PLANT (XYLEM MOBILE)

CONTACT HERBICIDES

- ACTIVITY ONLY WHERE CONTACT PLANT TISSUE
- FOLIARLY APPLIED
- COVERAGE CRITICAL!
- EXAMPLES:
  - ✓PARAQUAT
  - ✓LACTOFEN



SYSTEMIC HERBICIDES

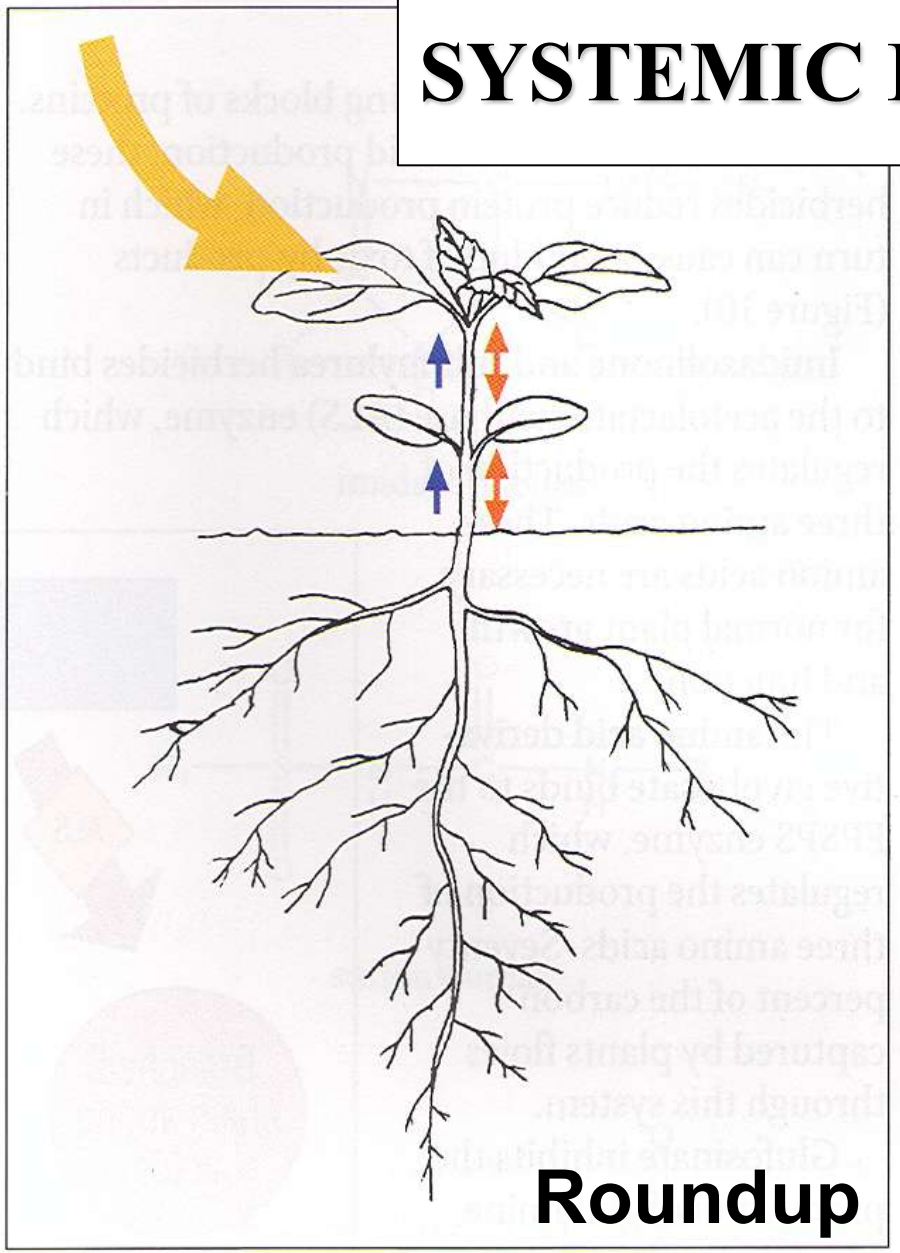


Figure 8.—Glyphosate: Uptake through leaves and transport through both phloem and xylem.

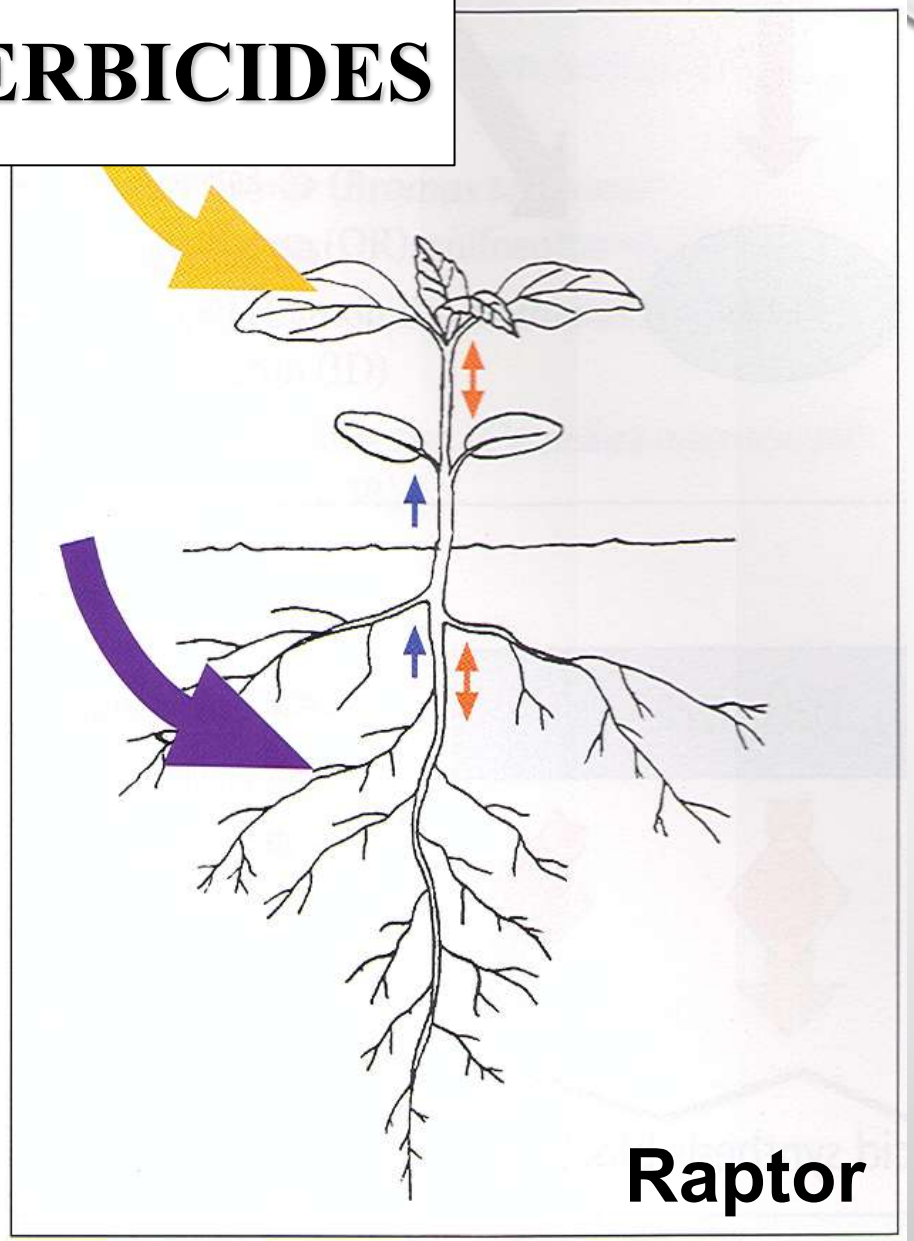


Figure 7.—Imidazolinones and sulfonylureas: Uptake through leaves and roots and transport through both phloem and xylem.

HERBICIDE TYPES – SELECTIVITY

❖NONSELECTIVE

- WILL INJURE ANY PLANT IT CONTACTS **IF ABSORBED**

❖SELECTIVE

- WON'T HARM GRASSES

OR

- WON'T HARM BROADLEAF SPECIES

OR

- RANDOM SELECTIVITY

HERBICIDE MODE AND SITE OF ACTION

- MODE OF ACTION
  - *HOW* THE HERBICIDE CONTROLS THE PLANT
- SITE OF ACTION
  - *WHERE* THE HERBICIDE ACTS WITHIN THE PLANT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SYMPTOMOLOGY

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **SYNTHETIC AUXIN**

  2,4-D, DICAMBA, QUINCLORAC, CLOPYRALID

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

ALS INHIBITORS

NICOSULFURON, HALOSULFURON, IMAZETHAPYR, CHLORIMURON-ETHYL

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **PHOTOSYSTEM II INHIBITOR SITE A OR B**
  ATRAZINE (A), METRIBUZIN (A), BROMOXYNIL (B)

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **MICROTUBULE ASSEMBLY INHIBITORS**

  PENDIMETHALIN;

- **VLCFA INHIBITORS**

  ACETOCHLOR, PYROXASULFONE

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **GLUTAMINE SYNTHETASE INHIBITOR**

  GLUFOSINATE

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **PHOTOSYSTEM I ELECTRON DIVERTER**

  PARAQUAT

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **EPSPS INHIBITOR**

  GLYPHOSATE


Extension

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **ACCASE INHIBITORS**

  CLETHODIM, QUIZALOFOP-P

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **PPO INHIBITORS**

  FOMESAFEN, LACTOFEN, CARFENTRAZONE-ETHYL, FLUMIOXAZIN, SULFENTRAZONE

MODE OF ACTION OF HERBICIDES

SYMPTOMOLOGY

- **HPPD INHIBITORS**

  ISOXAFLUTOLE, MESOTRIONE, TEMBOTRIONE

- **DOXP SYNTHASE INHIBITOR**

  CLOMAZONE

NARROWING DOWN YOUR CHOICES

QUESTIONS TO ASK?

- ARE PLANT CARCASSES PRESENT?
  - PRE VS. POST
- WHAT IS THE ACTIVITY OF THE HERBICIDE?
  - CONTACT
  - SYSTEMIC

Narrowing down your choices

- What is the activity of the herbicide?
  - Contact
  - Systemic