

Ministry of Higher Education
Salahaddin University
College of Agricultural Engineering Sciencis
Plant Protection Department



Weeds and Weed Control
Second Grade
Spring Semester (2021-2022)
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Lecture 6

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Mode of action

Herbicides kill or suppress plants by interfering with essential plant processes such as photosynthesis. All of the interactions between an herbicide and a plant from application to the final effect are referred to as the *mode of action*..

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Understanding the mode of action of an herbicide is essential in selecting the proper herbicide, diagnosing herbicide injury symptoms, preventing herbicide resistance problems, and avoiding non-target environmental impacts.

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Mode of action

• The mode of action involves:

1- Contact and absorption: - Herbicides must contact the plant surface to be effective. Herbicides with limited mobility that are effective at the site where they contact the plant are known as **contact herbicides**.

Herbicides that must be absorbed and translocated to the site of action to be effective are called **systemic herbicides**.

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Mode of action

Contact herbicides typically affect only the portion of the plant with which they come into physical contact. Contact herbicides are fast acting, and injury symptoms can appear within hours of application. Conversely, injury symptoms from systemic herbicides can take from several days to weeks to appear, but the entire plant may eventually be killed.

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Mode of action

Soil-applied herbicides are applied to the top few inches of the soil and eventually absorbed through root tissue, whereas *foliar-applied* herbicides are applied to leaves or stems.

Most contact herbicides are foliar-applied, whereas systemic herbicides can be either soil- or foliar-applied.

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Mode of action

Choosing the appropriate herbicide depends upon **target species biology, herbicide selectivity, application method, and site conditions**. It is important to understand these factors to ensure that an effective herbicide is selected.

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- It is important to understand these factors to ensure that an effective herbicide is selected. For example, contact herbicides are most effective against annual invasive plants and in situations in which plant regrowth is not a concern.
- Conversely, systemic herbicides are more effective on perennial invasive plants and can limit regeneration of treated plants.

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Mode of action

Soil-applied herbicides are most effective on seedlings or germinating plants prior to their emergence above the soil. Established plants may require a foliar-applied herbicide for effective control. Mature plant tissues absorb herbicides less easily than young plant tissues due to thickening of the outer tissues in older plants.

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Mode of action

2- Translocation: - movement of the herbicide to the site of action. Systemic herbicides move, or translocate, from the point of application to the site of action through either the phloem (tissue that transports sugars from the leaves to the roots), xylem (tissue that transports water from the roots to the leaves), or through both. Some herbicides move more easily and farther within plants than others.

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Mode of action

3- Site of action: - Specific location within the plant where the herbicide exerts toxicity at the cellular level. To be effective, an herbicide must reach the site of action. An herbicide binds to a specific location within the plant, typically a single protein, and as a result disrupts a physiological process essential for normal plant growth and development.

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Mode of action

4- Mechanism of action: - specific biochemical or biophysical process that is affected by the herbicide.

Classification by Mode of Action:

- Photosynthesis Inhibitors
- Plant Growth Regulators
- Amino Acid Biosynthesis Inhibitors
- Growth Inhibitors
- Pigment Inhibitors
- Membrane Disrupters

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