



# ***Weed Management in Vegetables***

Feb 19, 2018

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**Ramdas Kanissery**

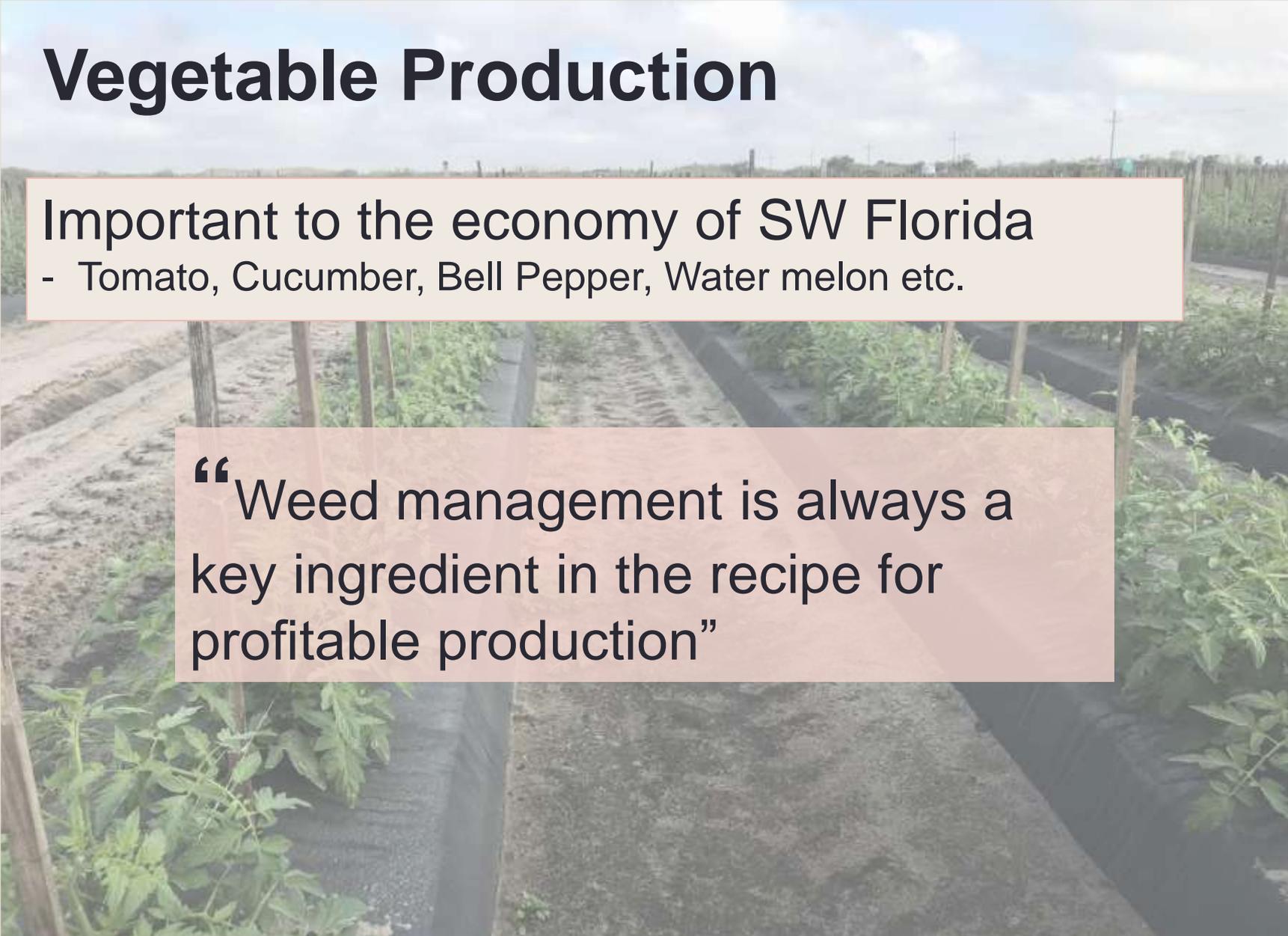
Assistant Professor - Weed Scientist

Southwest Florida Research and Education Center  
Immokalee, FL

**UF | IFAS**  
UNIVERSITY of FLORIDA



# Vegetable Production

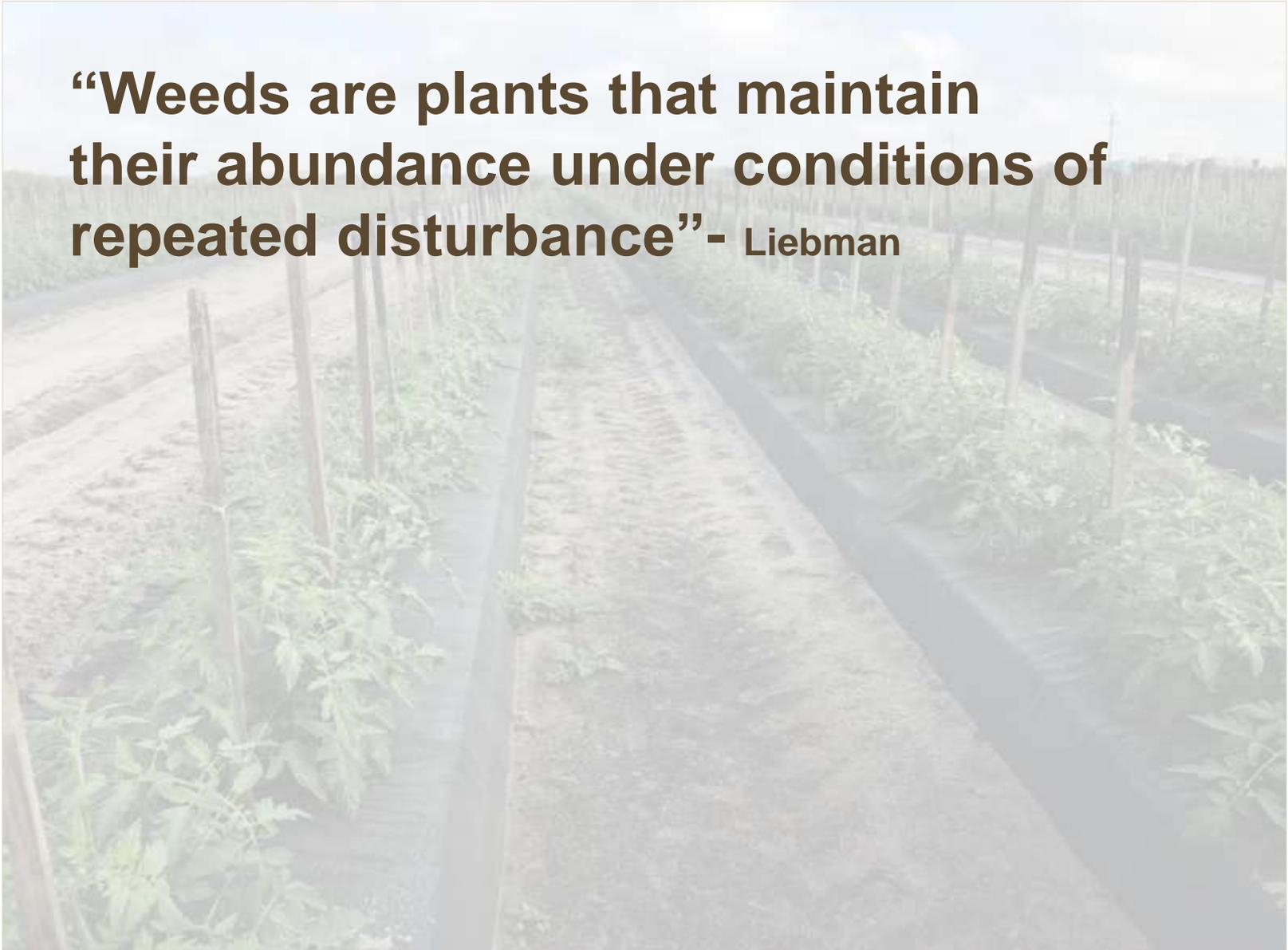


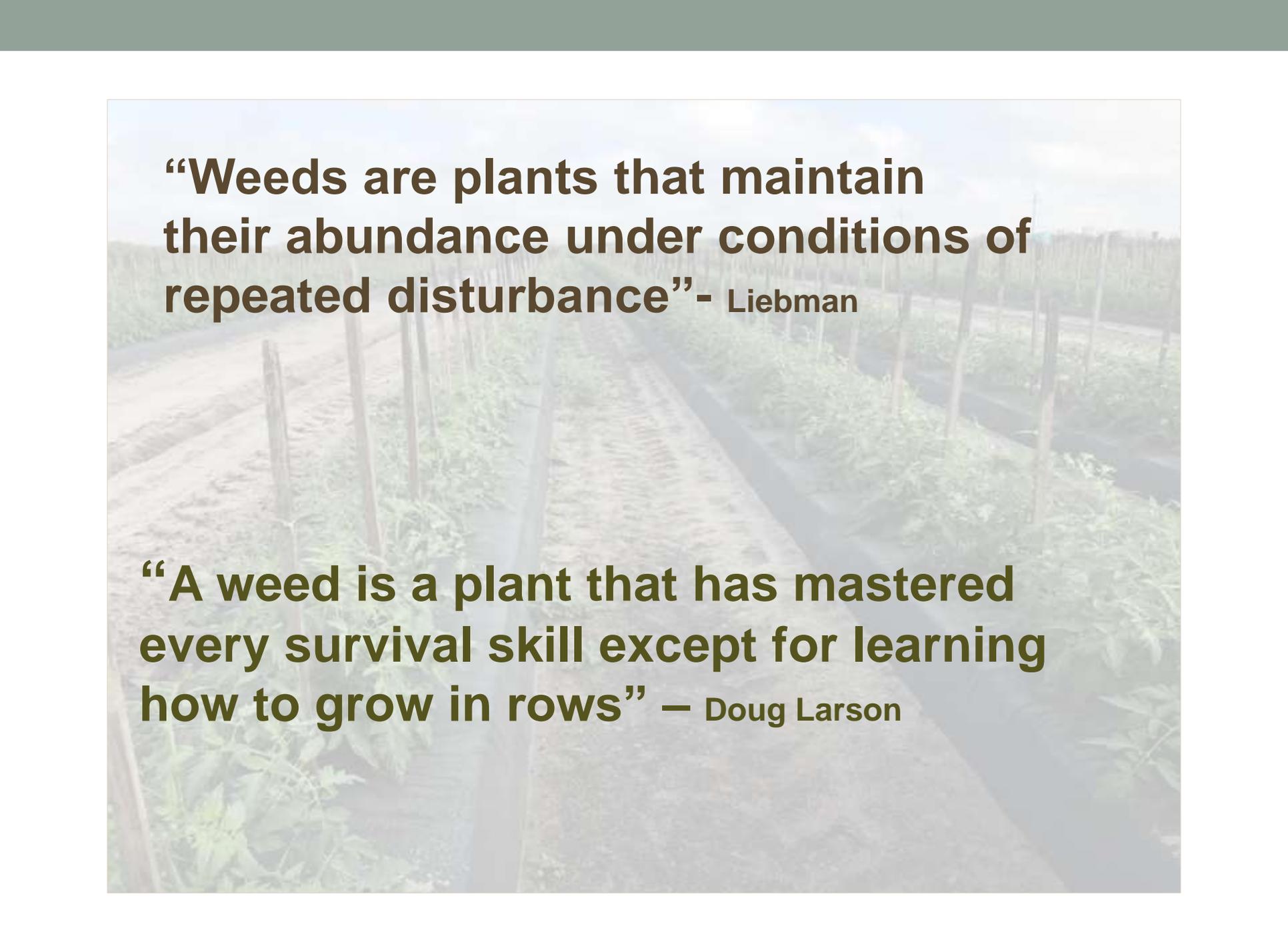
Important to the economy of SW Florida

- Tomato, Cucumber, Bell Pepper, Water melon etc.

“Weed management is always a key ingredient in the recipe for profitable production”

**“Weeds are plants that maintain their abundance under conditions of repeated disturbance” - Liebman**



A photograph of a vegetable garden with rows of plants in raised beds, overlaid with text. The garden is filled with various green plants, and the beds are separated by dark mulch. The background shows a fence and a clear sky.

**“Weeds are plants that maintain their abundance under conditions of repeated disturbance” - Liebman**

**“A weed is a plant that has mastered every survival skill except for learning how to grow in rows” — Doug Larson**

# What are weeds doing in my farm?



Weedy row-middle in sweet corn  
SWFREC Veg Farm

Compete for  
light, nutrients,  
moisture and  
space

What are weeds doing in my farm?



Compete for  
light, nutrients,  
moisture and  
space

**Giant Amaranth or Pig weed**  
Immokalee, FL

# What are weeds doing in my farm?



Interfere with  
harvesting

## Giant Foxtail in snap beans

Figure credit: Mark Schonbeck, Virginia  
Association for Biological Farming.

# What are weeds doing in my farm?



Source of pest  
and diseases

- Alternate host for pests and diseases

Figure credit: Mark Schonbeck, Virginia Association for Biological Farming.

# What are weeds doing in my farm?



Source of pest  
and diseases

- Alternate host for pests and diseases

Weeds growing adjacent to the crop row providing a moist and favorable environment for fungal growth on the tomato foliage



**“Agricultural weeds can hurt crop yields or increase costs of production”**

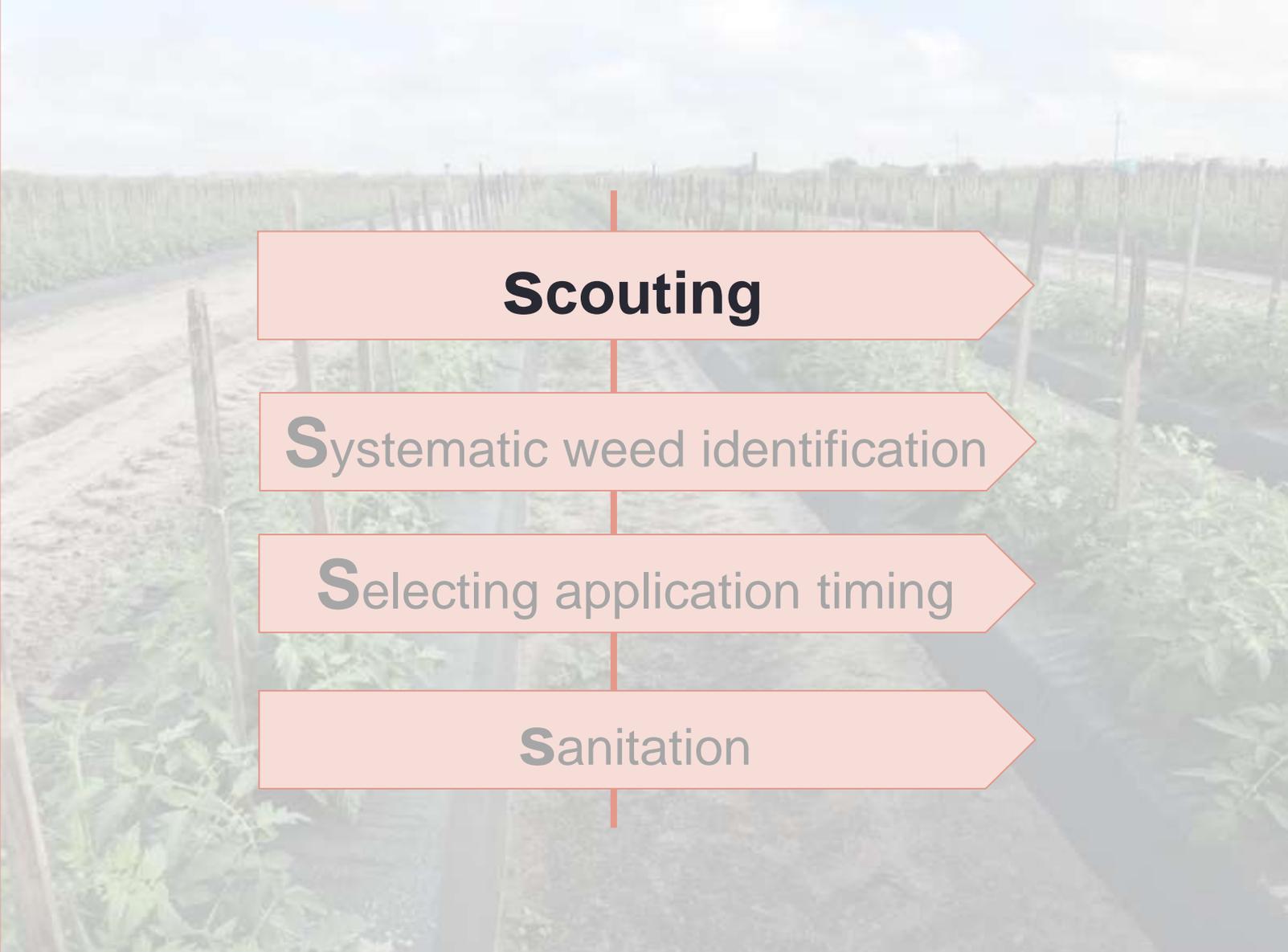
# “Four **S** of veg weed management”

**S**couting

**S**ystematic weed identification

**S**election of application timing

**S**anitation



## **Scouting**

**S**ystematic weed identification

**S**electing application timing

**S**anitation

# SCOUTING – the first step

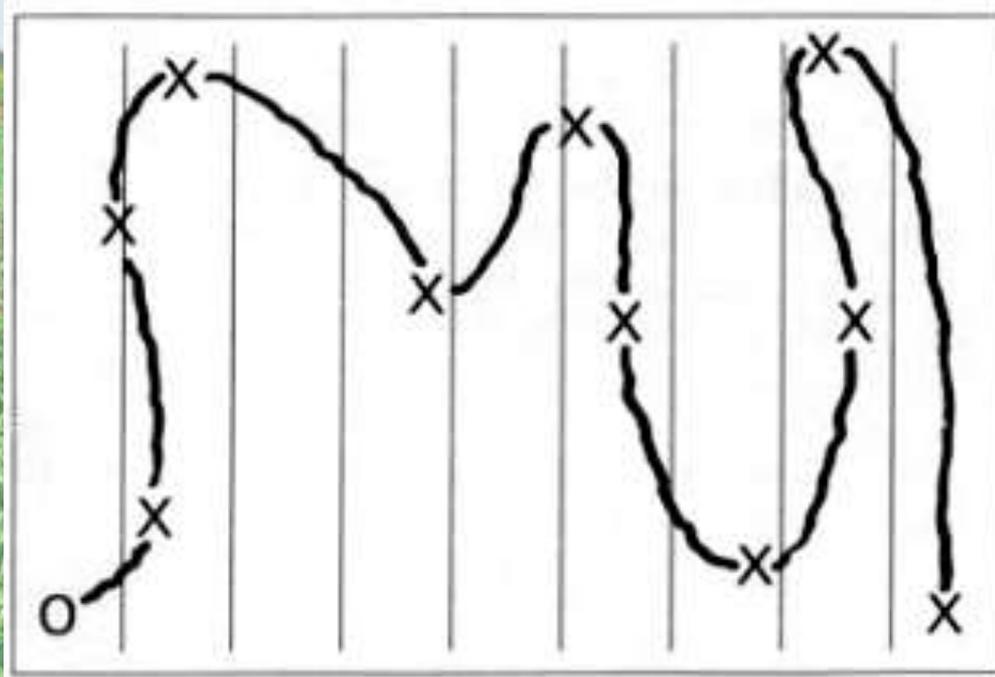


# SCOUTING – the first step

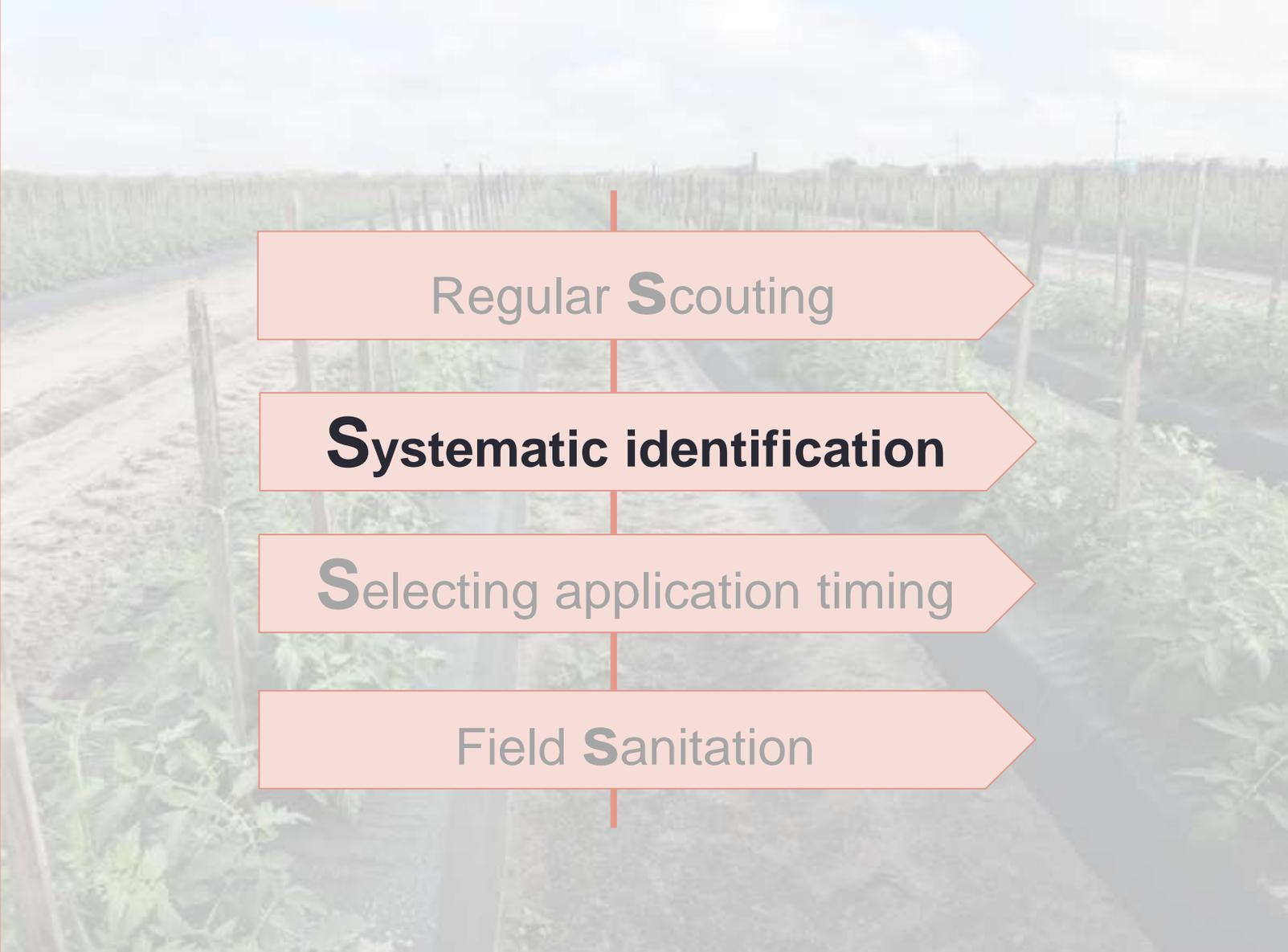
- **E**arly in the production year - more competition with crops
- **F**requent scouting
- **G**reater scouting at hot spots
  - e.g., edges of field



# SCOUTING – the first step



**Zig-zag pattern of scouting across the field – entire length**



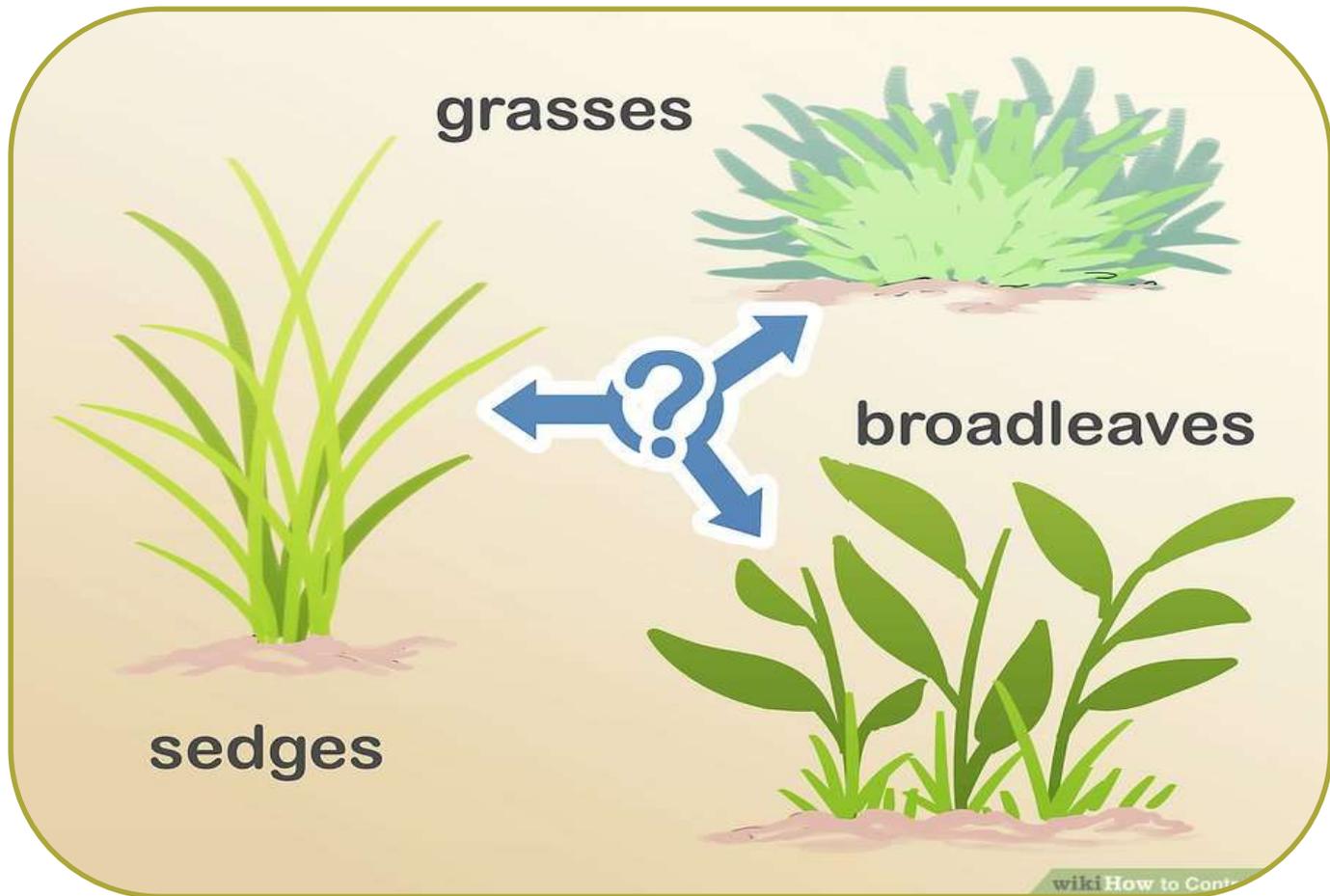
Regular **S**couting

**S**ystematic identification

**S**electing application timing

Field **S**anitation

## Get the correct weed identification



## Get the correct weed identification



**Seed head color**

**Yellow v/s Purple  
Nutsedge**

**Purple**

**Yellow**



**Purple  
Nutsedge**

**Yellow  
Nutsedge**

Purple

Yellow



Purple

Yellow



Seed head color

Yellow v/s Purple Nutsedge

Leaf tip

# Get the correct Id

Parthenium



Ragweed



Sweet clover



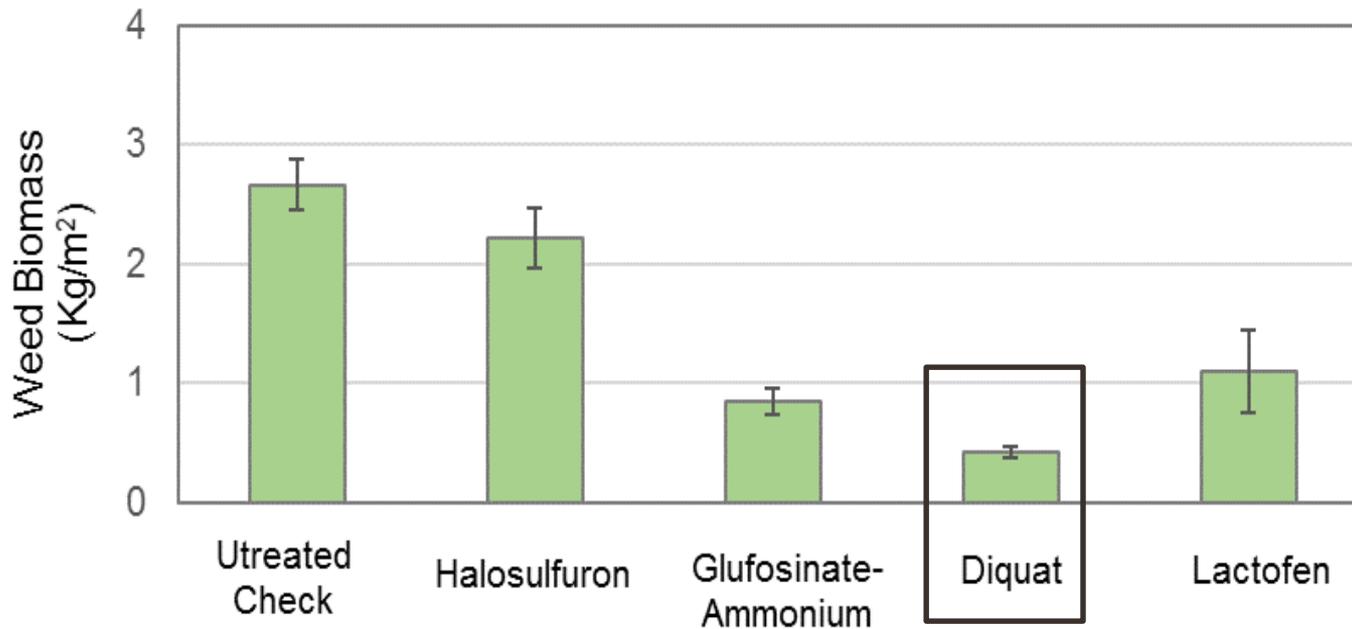
Parthenium



## 2017 Trial in Immokalee, FL

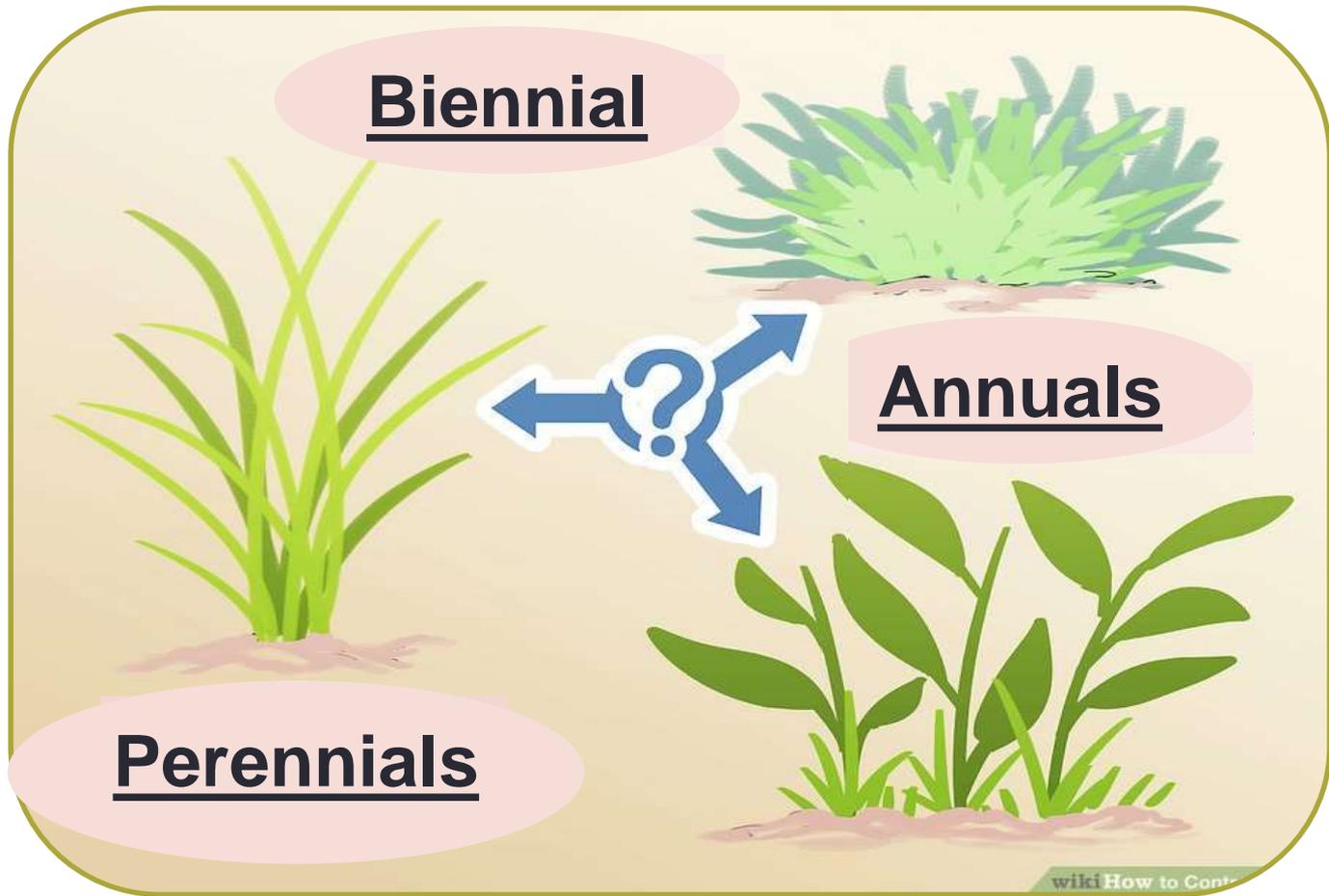
Post-emergent Parthenium control

■ 14 DAT Weed Biomass



*Diquat :  
effective  
against heavy  
Parthenium  
infestation*

# Life-cycle of weeds



# Life-cycle of weeds

## Annuals



**Amaranth**



**Crab grass**



**Pusley**

# Life-cycle of weeds

Biennial



Cut leaf evening primrose

# Life cycle of weeds

## Perennials



**Nut sedge**

- Produce vegetative structures
- Eg., stolons, rhizomes, tubers, or large roots



**Creeping beggar weed**

**“Weed garden at  
SWFREC  
Immokalee”**



**KNOW YOUR WEEDS**

Please visit our

**Weed Garden**

**EDUCATIONAL DISPLAY OF  
DIFFERENT TYPES OF WEEDS**

**UNIVERSITY OF FLORIDA  
SOUTHWEST FLORIDA REC - WEED SCIENCE**

2685 STATE ROAD 29 N, IMMOKALEE, FL 34142

# “Four **S** of veg weed management”

**S**couting

**S**ystematic weed identification

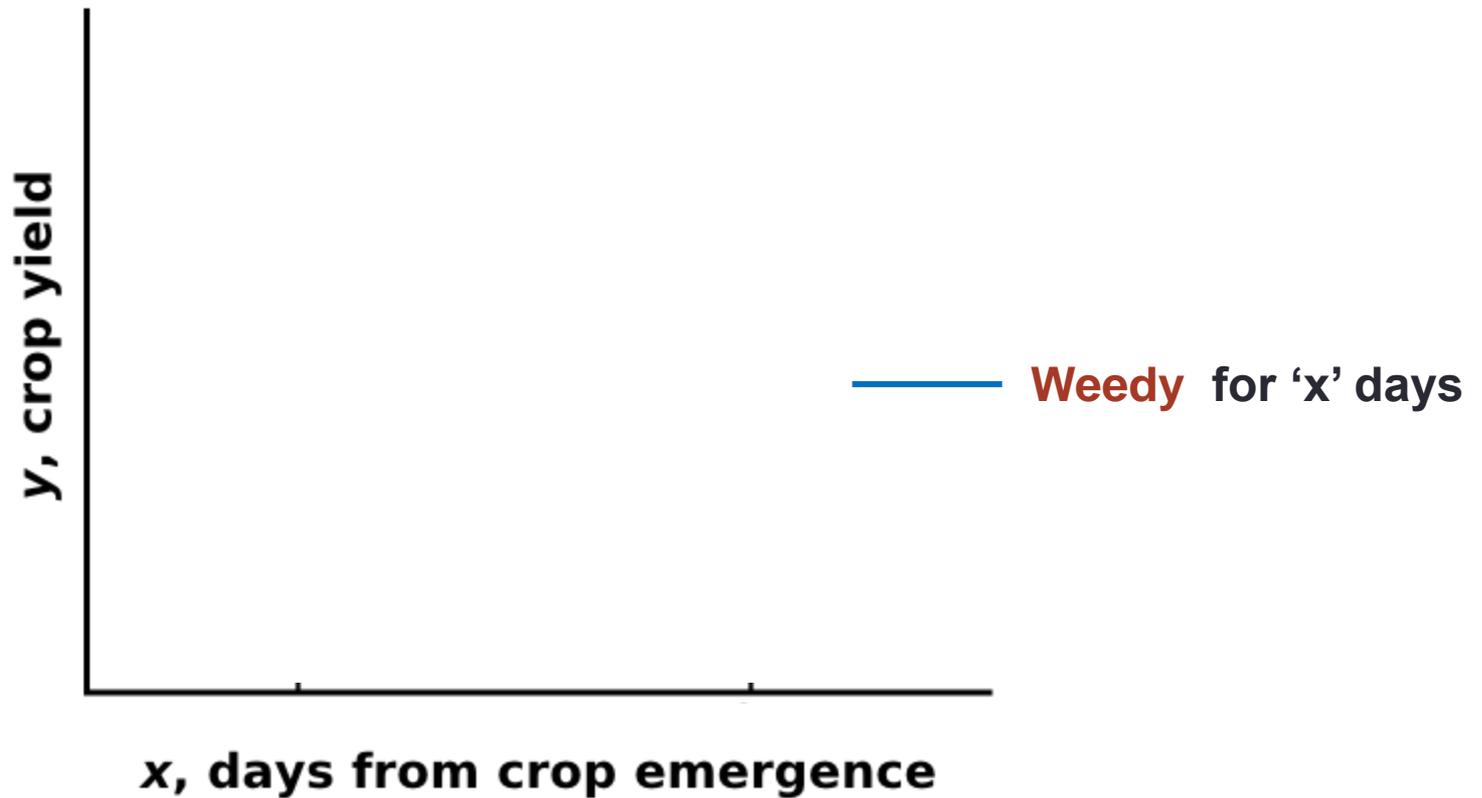
**S**electing application timing

**S**anitation

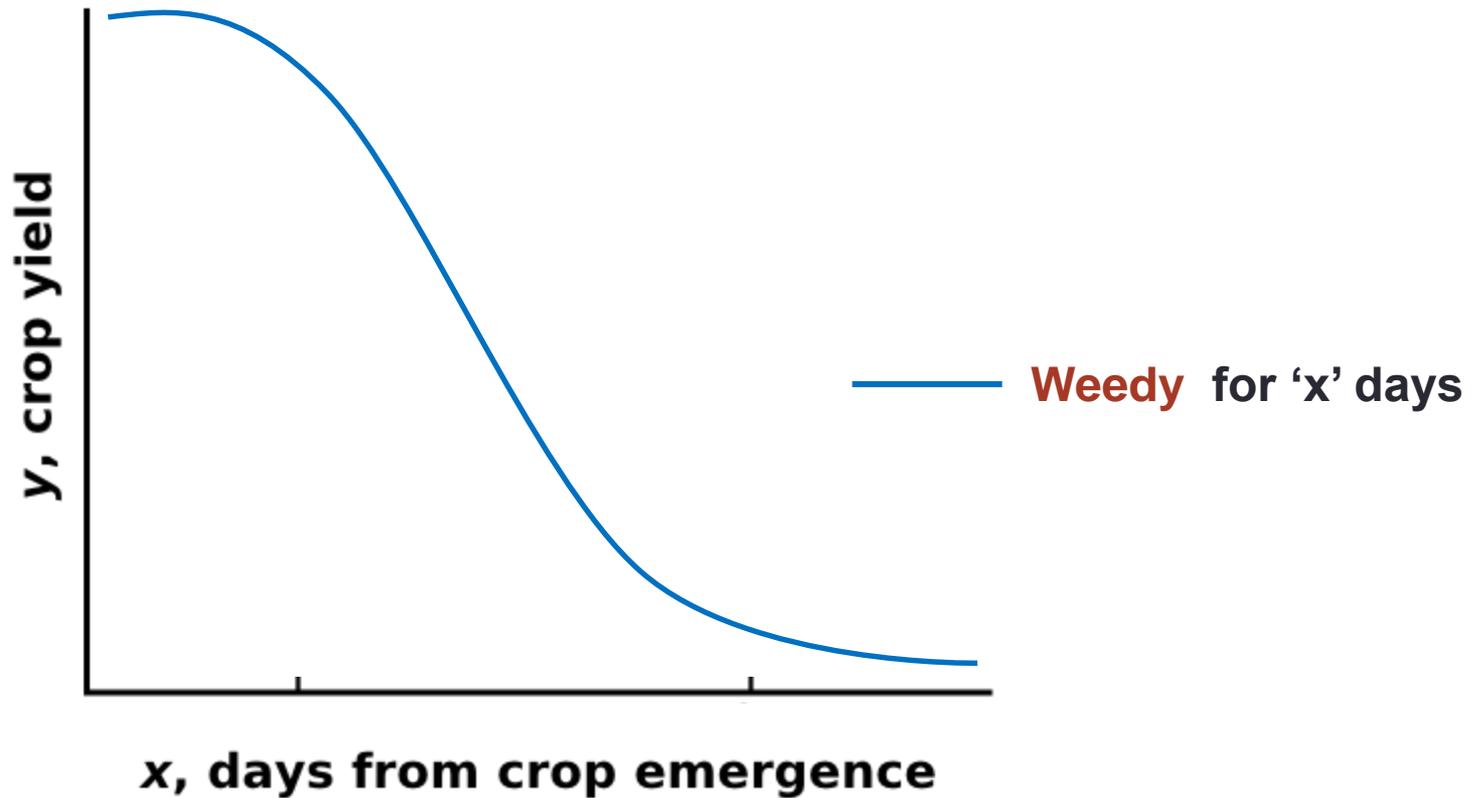


“Does timely weed management helps in increasing an economic yield?”

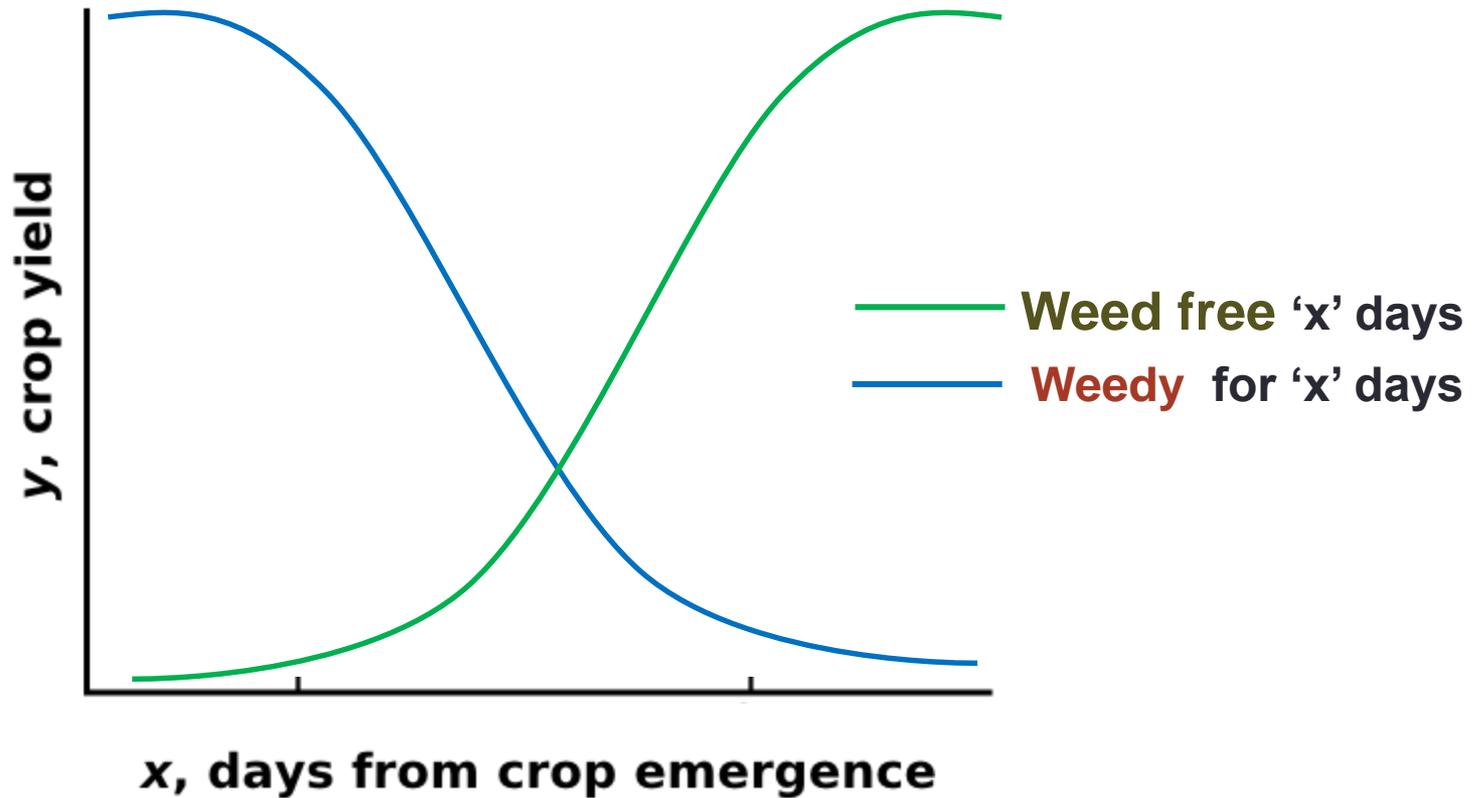
# Example of yield response to weed interference



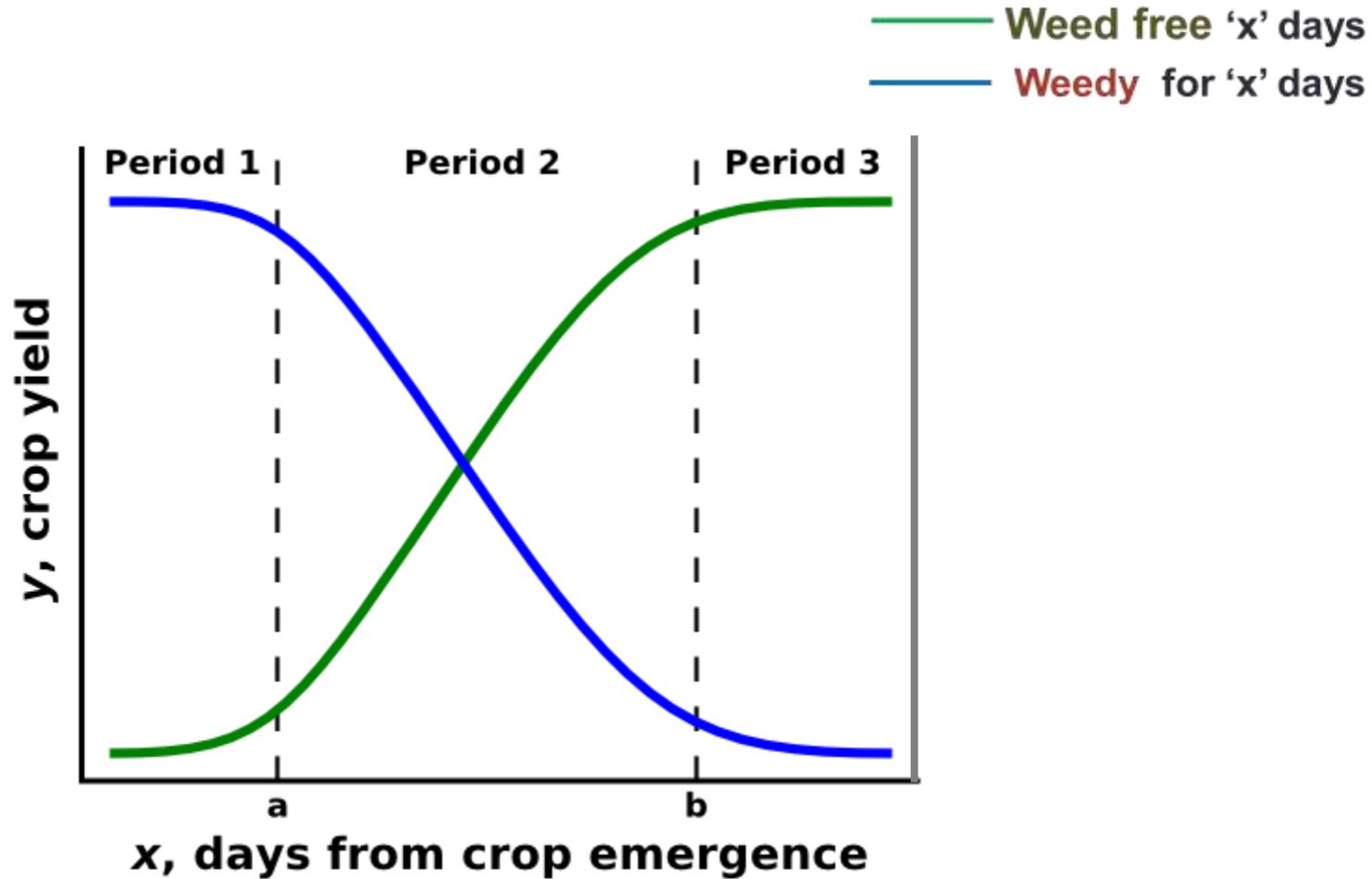
## Example of yield response to weed interference



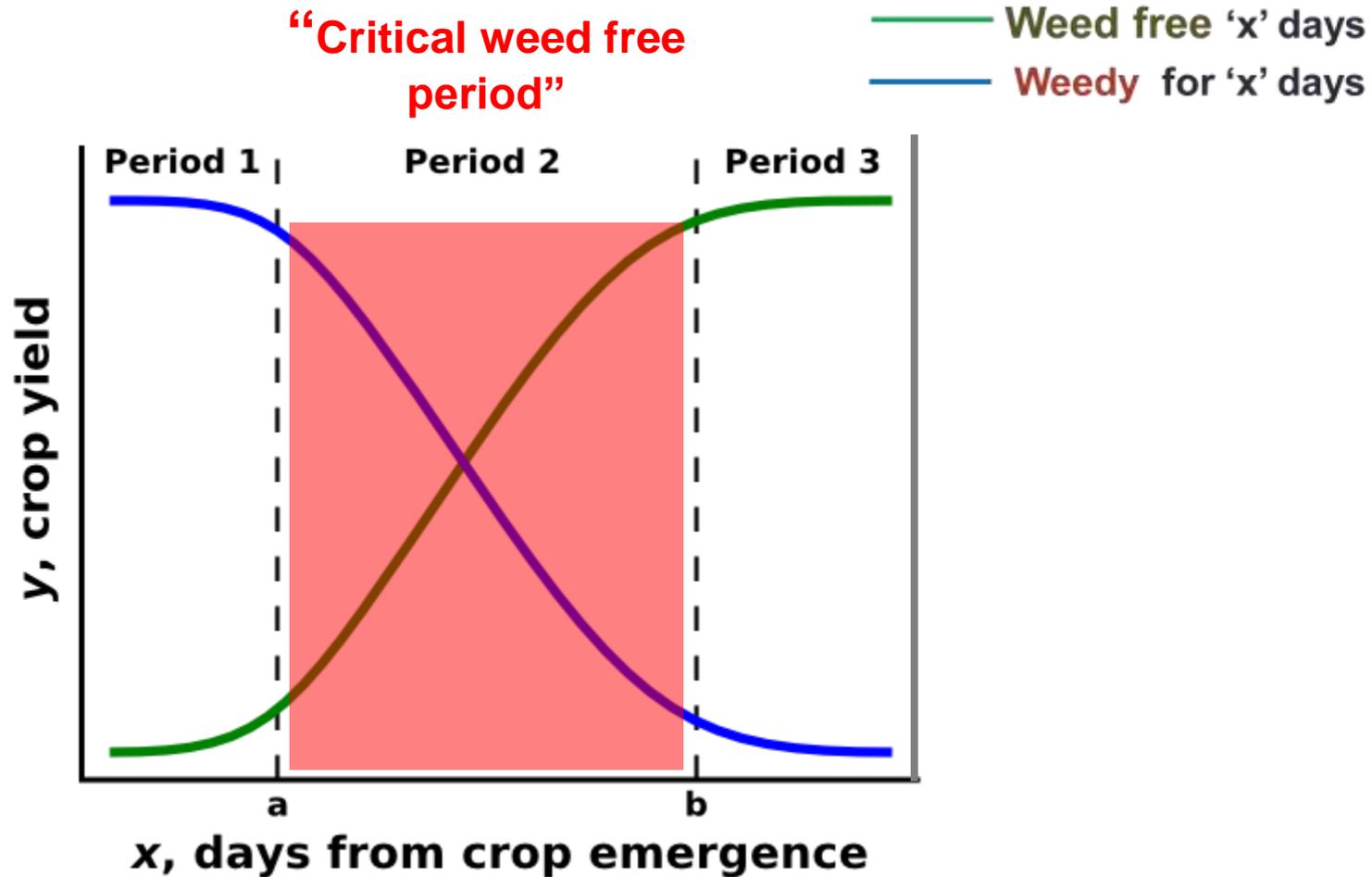
# Example of yield response to weed interference



# Concept of Critical Weed Free Period



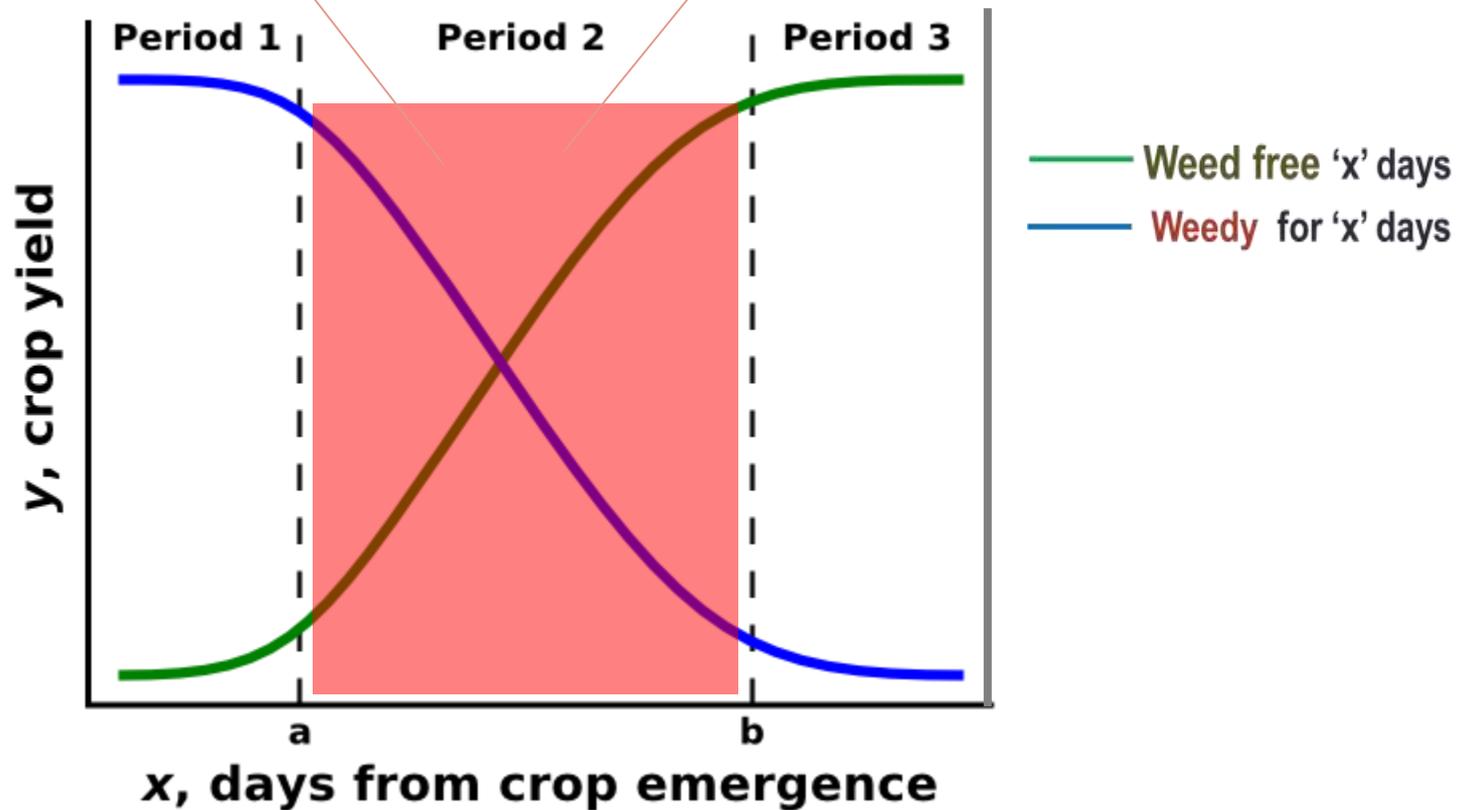
# Concept of Critical Weed Free Period



# Concept of Critical Weed Free Period

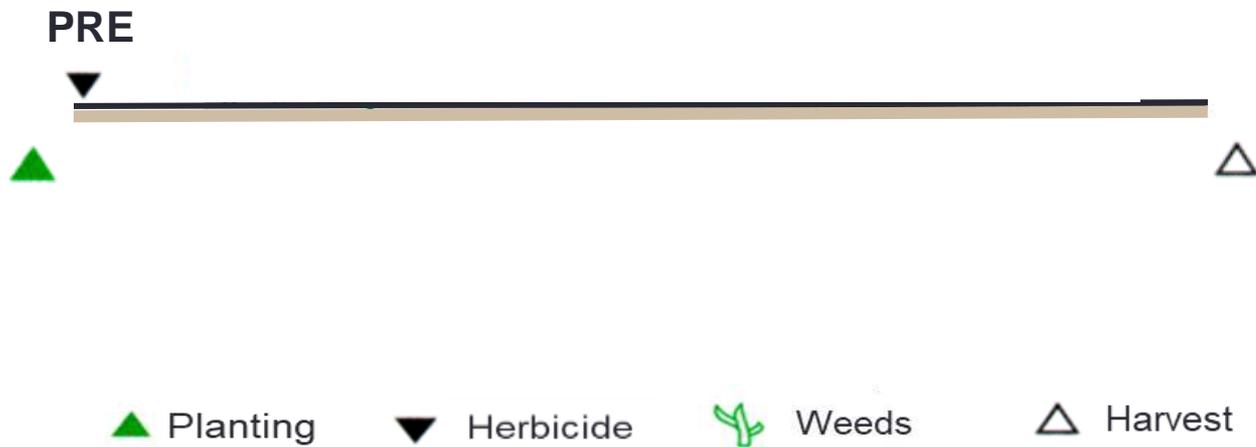
Tomato: 0 to 9 weeks after planting

Watermelon: 0 to 6 weeks after planting



Source: Diane (Report in Growing produce)

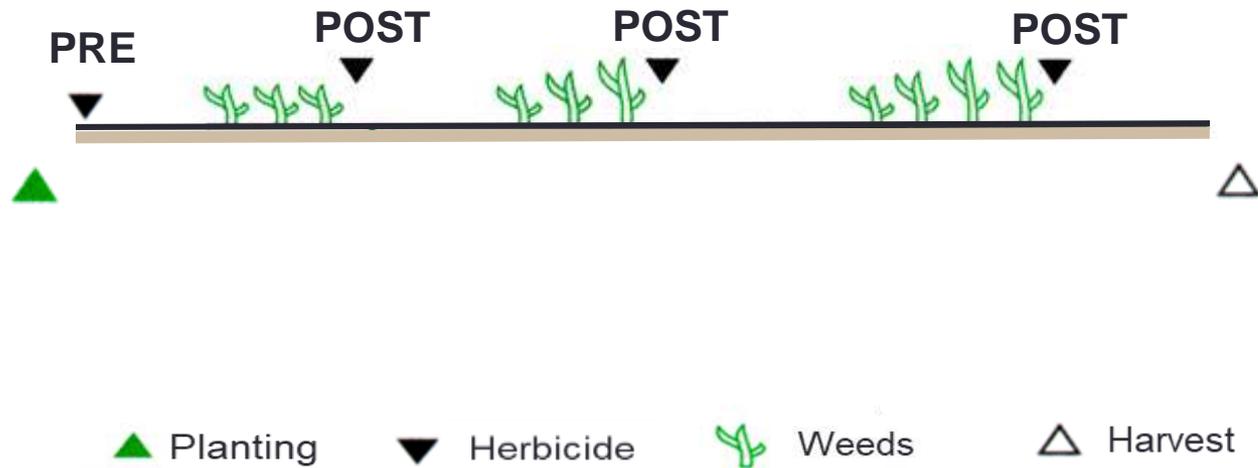
# Application timing

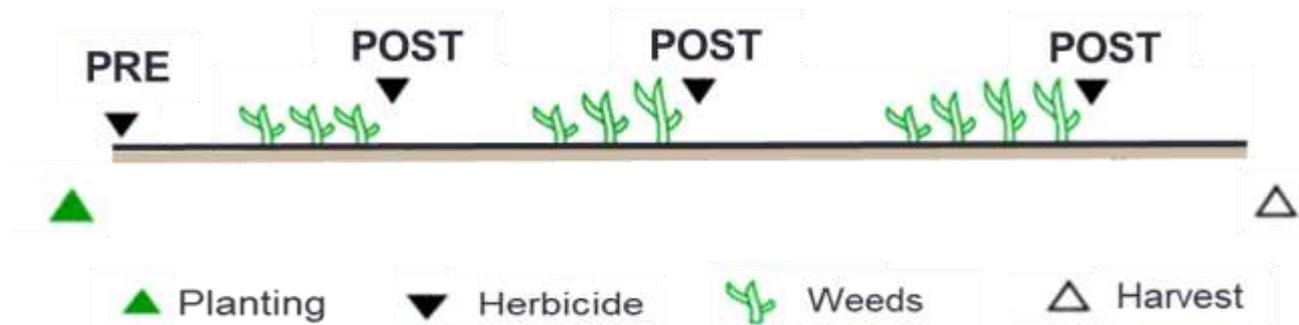


# Application timing



# Application timing





Product	Active ingredient	PRE/POST
Dual Magnum, Brawl	S-metolachlor	PRE
Chateau	Flumioxazin	PRE
Prowl	Pendimethalin	PRE
Roundup	Glyphosate	POST
Reglone	Diquat	POST
Aim	Carfentrazone	POST

“Not a complete list....”

**For more information refer to:**

# Vegetable

PRODUCTION HANDBOOK *of* FLORIDA

2017-2018



# Herbicide Spraying Considerations....



## Herbicide Spraying....



- **Read the label – It's the law**
- **Use surfactants with POST sprays**
- **Record the application**
- **Be cautious about crop injury**

## Herbicide Spraying....



- Read the label – It's the law
- Use surfactants with POST sprays
- Record the application
- **Crop injury**



**Glyphosate injury  
on tomato**

**Cat facing in tomato possibly from herbicide injury during pre-bloom or post-bloom stage**





Regular **S**couting

**S**pecific weed identification

**S**electing application timing

**Sanitation**

## **Prevent** weed problems before they **start**

You may have a clean row middle in the farm...



“How about the farm perimeter areas?”

“How about the perimeter areas?”

**Ditch banks**



“How about the perimeter areas?”

**Road Sides**



## **Prevent** weed problems before they **start**

### **Ragweed**

“Weeds found in farm perimeter areas are potential source of infestation into the cropping area”



**Prevent** weed problems before they **start**

## White Sweet clover

“Weeds found in farm perimeter areas are potential source of infestation into the cropping area”



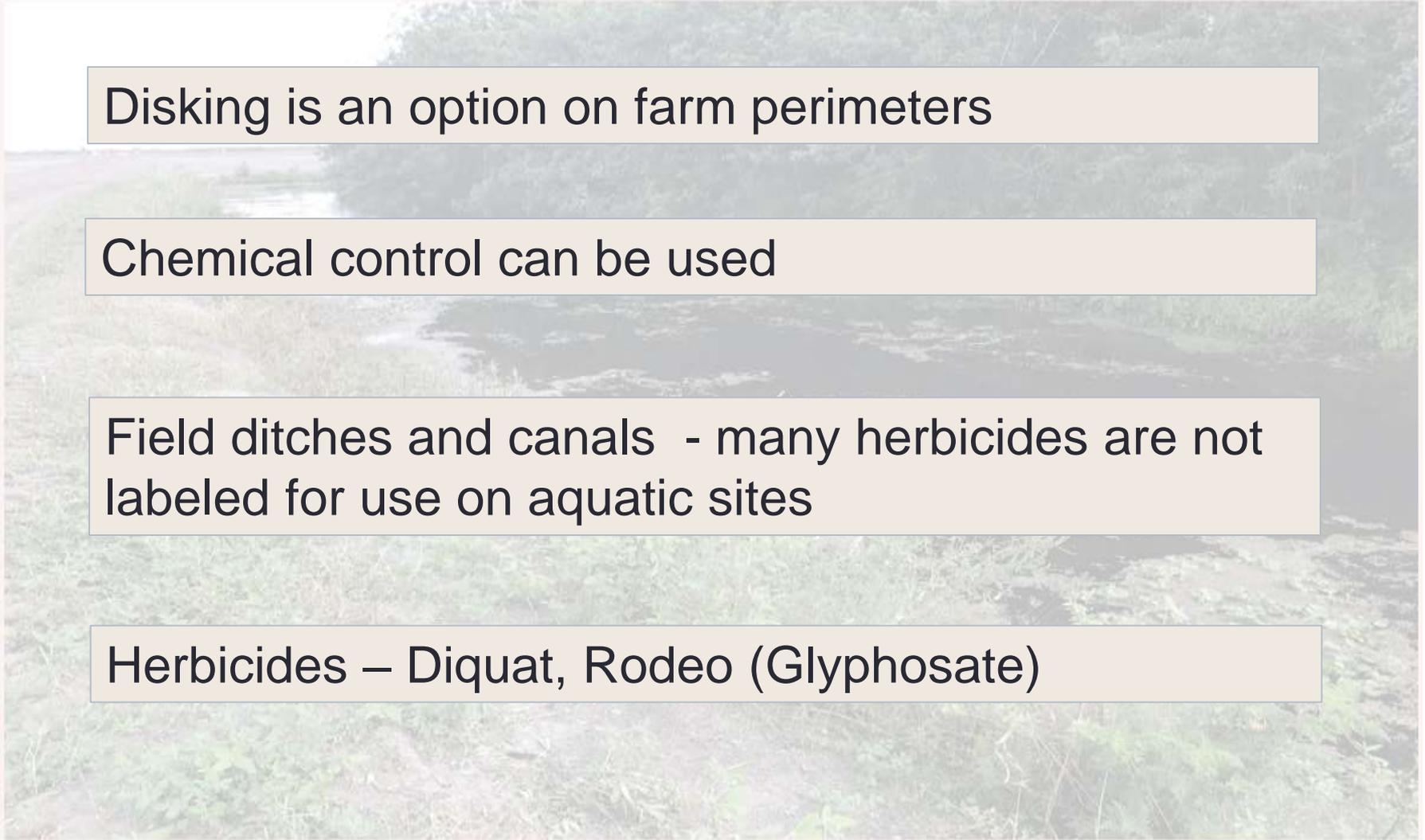
## Ditch Bank and road side maintenance

Disking is an option on farm perimeters

Chemical control can be used

Field ditches and canals - many herbicides are not labeled for use on aquatic sites

Herbicides – Diquat, Rodeo (Glyphosate)



## Volunteer Tomatoes



“Usually grow from the seed left in the field from a previous crop”

Could be hosts to

- Pests e.g., white flies

Potential source of inoculum for

- Bacterial spots
- Viruses

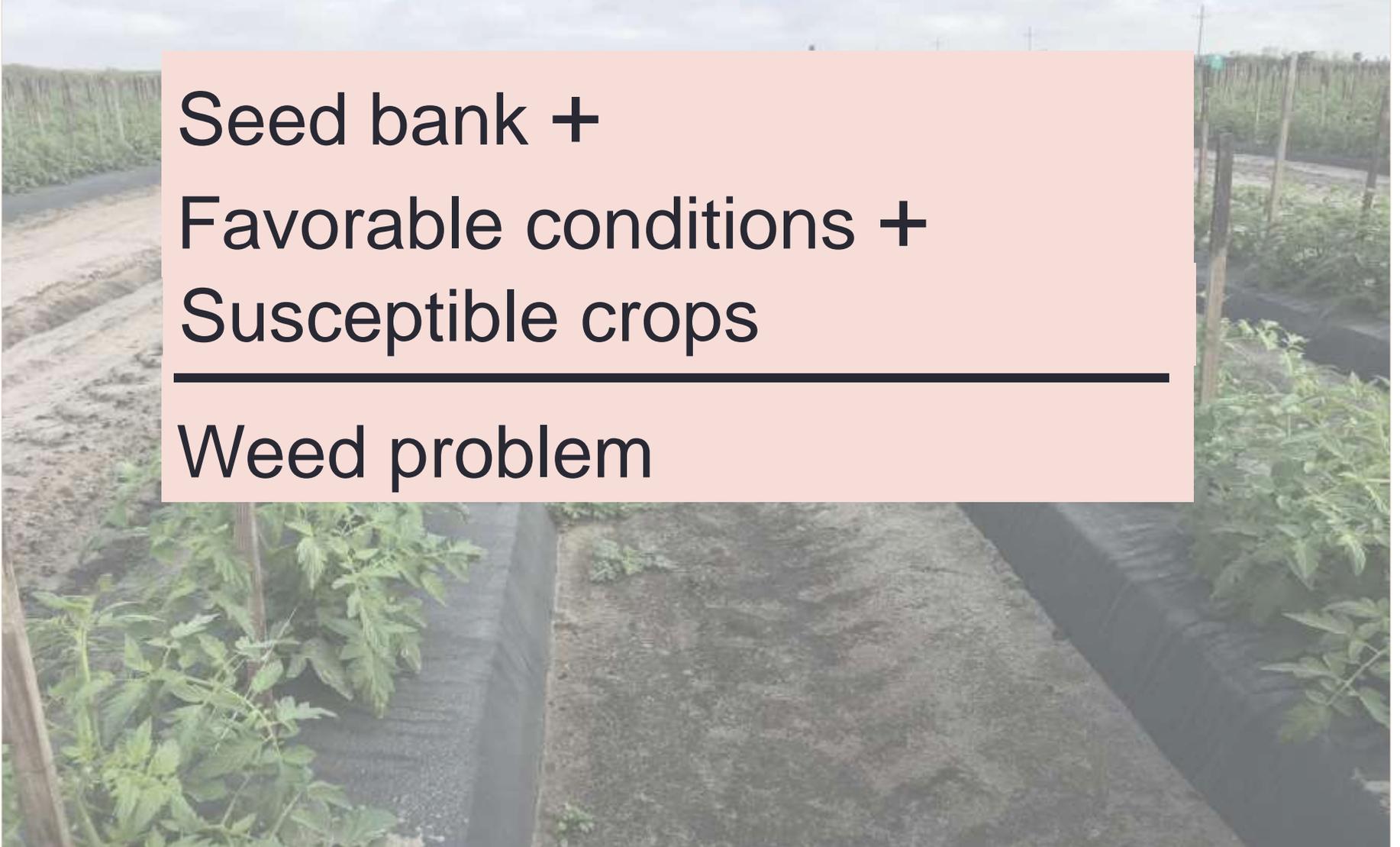
Bacterial spot pathogen can live up to **30 weeks on crop debris** but less than 30 days just in soil.

# Recipe for weed outbreak in your farm

Seed bank +  
Favorable conditions +  
Susceptible crops

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Weed problem



# Recipe for weed outbreak in your farm

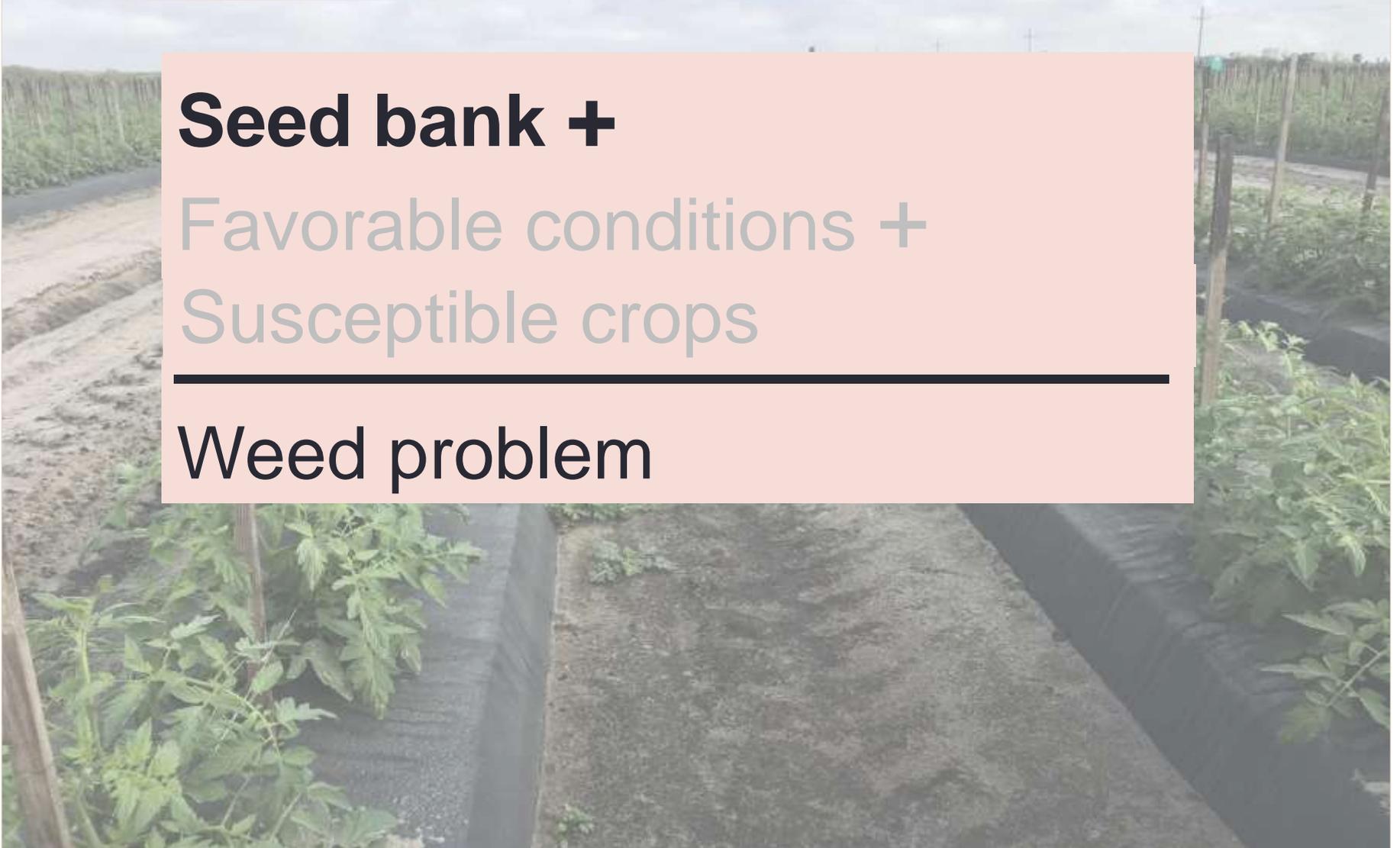
**Seed bank +**

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**Weed problem**



# Seed Bank

**2,000,000**

**800,000**

**200,000**

# Seed Bank

## Examples of Weed Seed Production per Plant\*

**2,000,000**

**Purslane**

**800,000**

**Black Nightshade**

**200,000**

**Amaranth**

\*Data collected by researchers across the globe WSSA

# Seed Bank

## Examples of Weed Seed Production per Plant\*

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# Seed Bank

**2,000,000**



**Common Purslane**



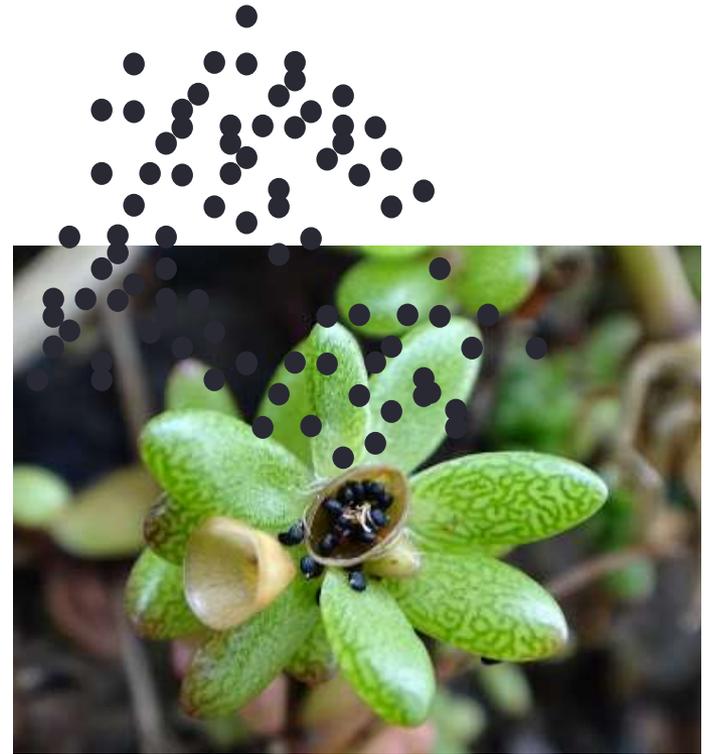
- *capsular fruits 'pops off'*

# Seed Bank

2,000,000



Common Purslane



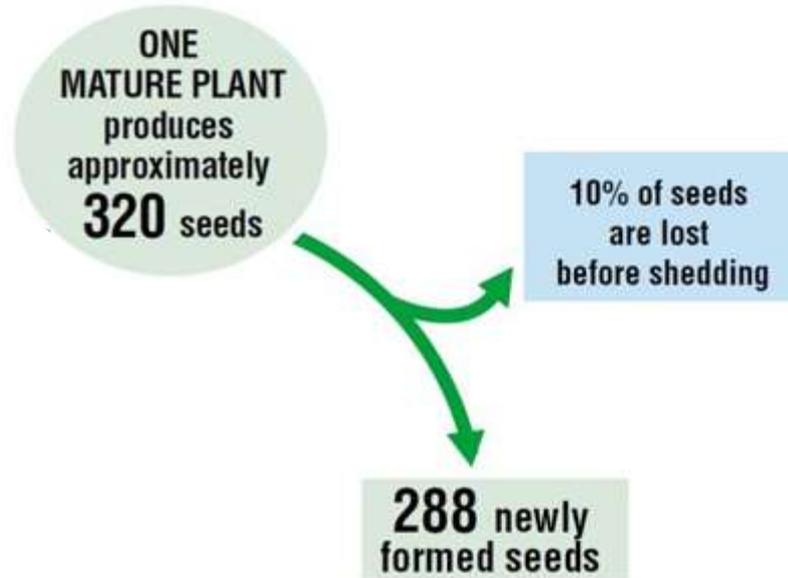
- *capsular fruits 'pops off'*
- *seeds are then spread*

# Seed Bank

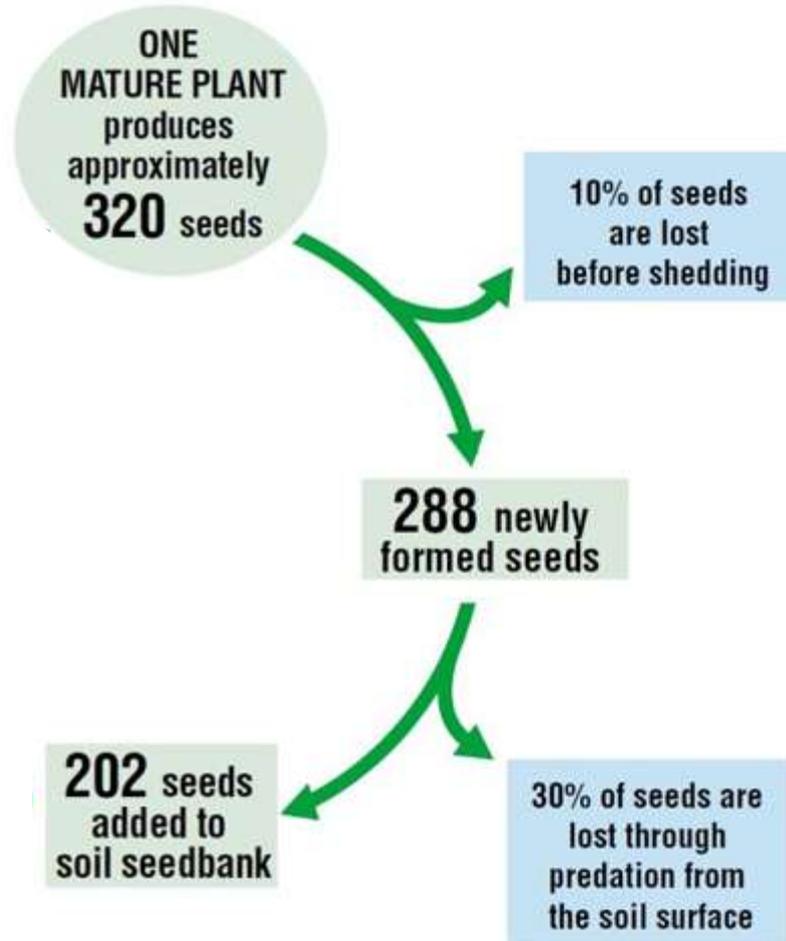


ONE  
MATURE PLANT  
produces  
approximately  
**320** seeds

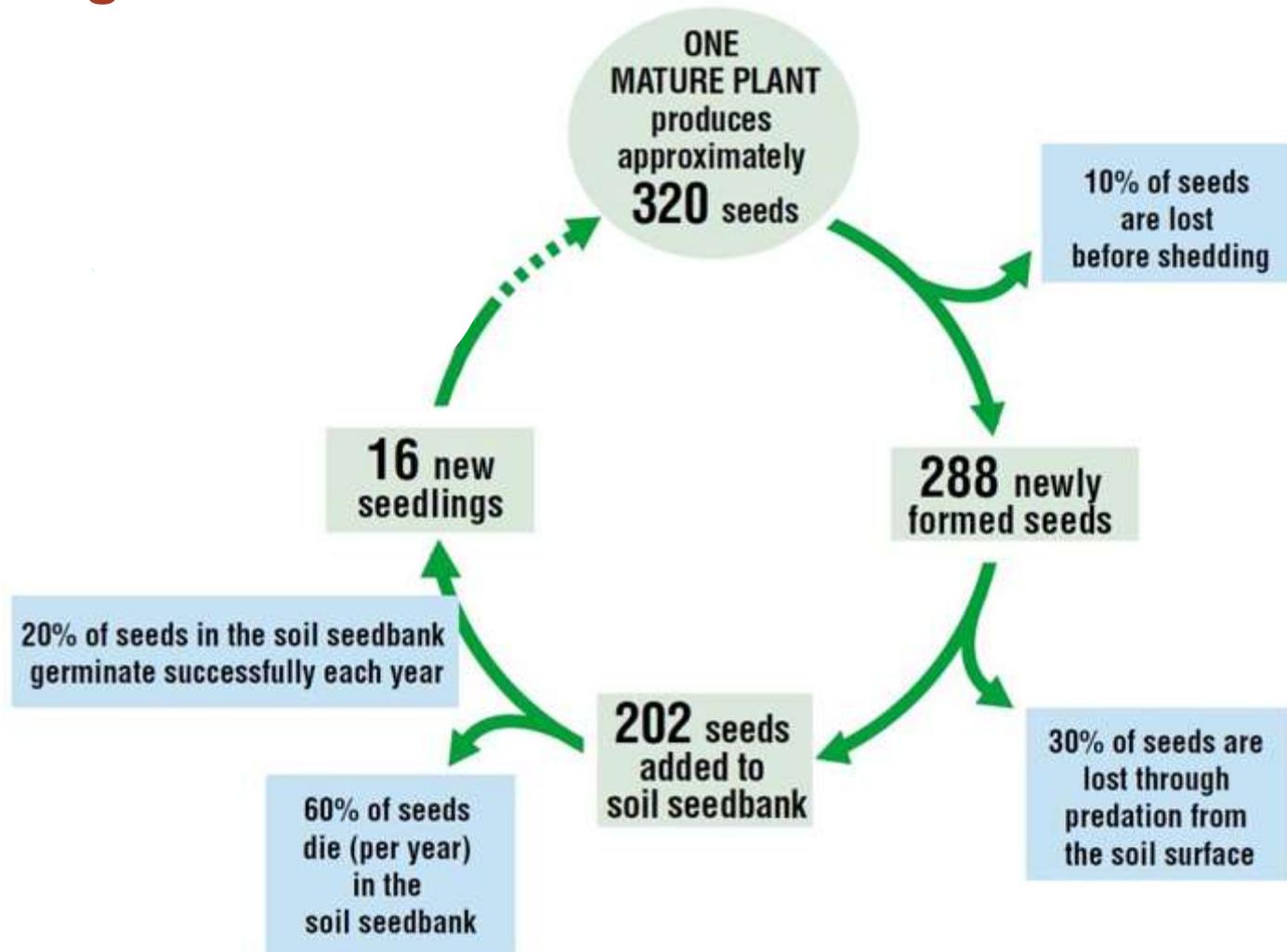
# Seed Bank



# Seed Bank



“Approx. 5% of weed seeds successfully emerge as new seedling”



# Important strategy to prevent weed outbreak in your farm



**“NEVER LET ‘EM SET SEED”**

# Strategies for Seedbank Reduction



- Spray before seed setting

“Early spray programs before flowering and seed setting will help reducing the weed proliferation in the upcoming seasons”

# Seedbank Reduction



- Spray before seed setting

- Fallow field program

“Deplete perennial weeds that has rhizomes and tubers”

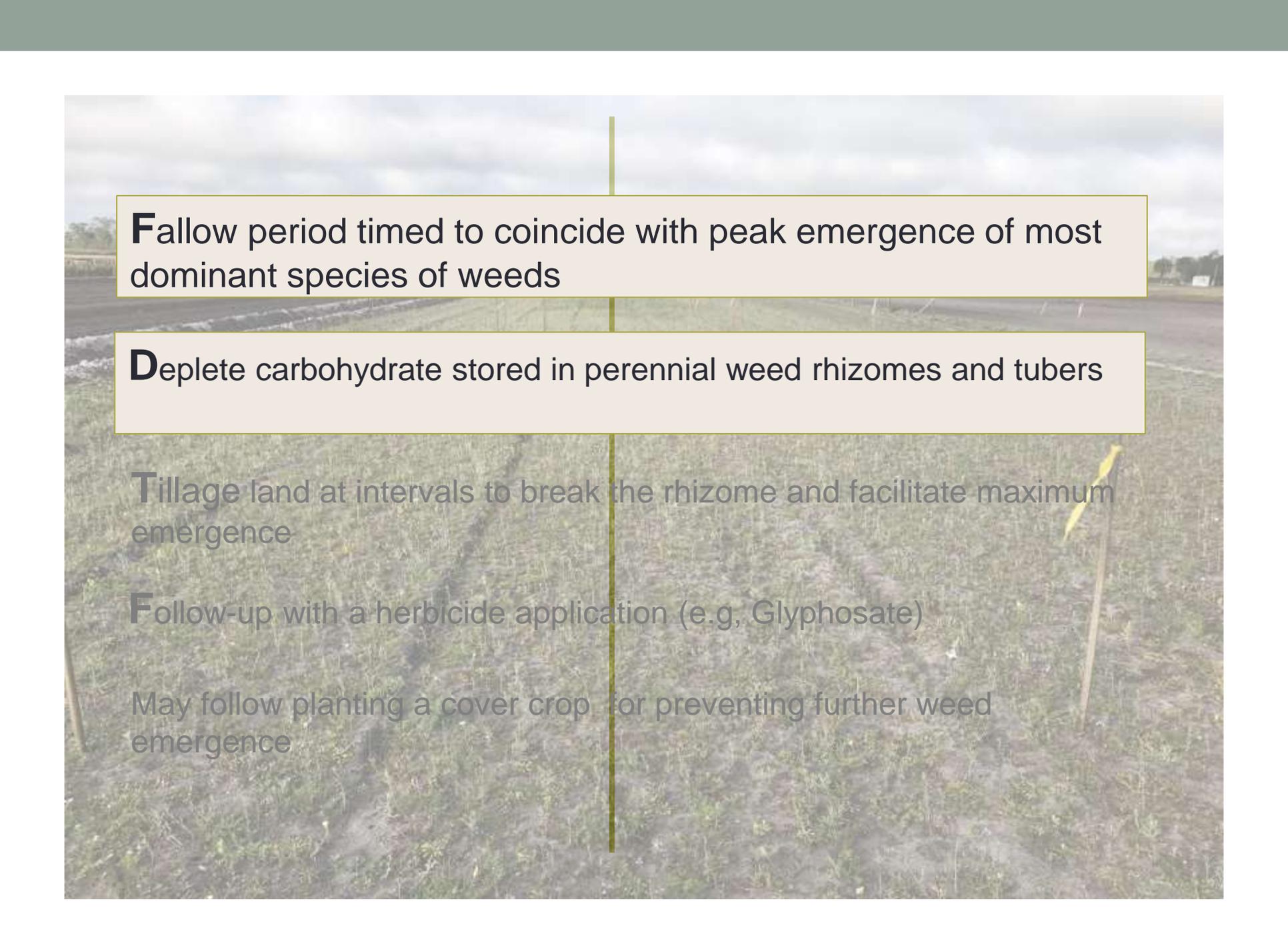
# Seedbank Reduction

Large weed seedbanks  
can be depleted by:



**“ Purposely keeping farm out of  
production during the growing  
season”**

**Fallow field program**



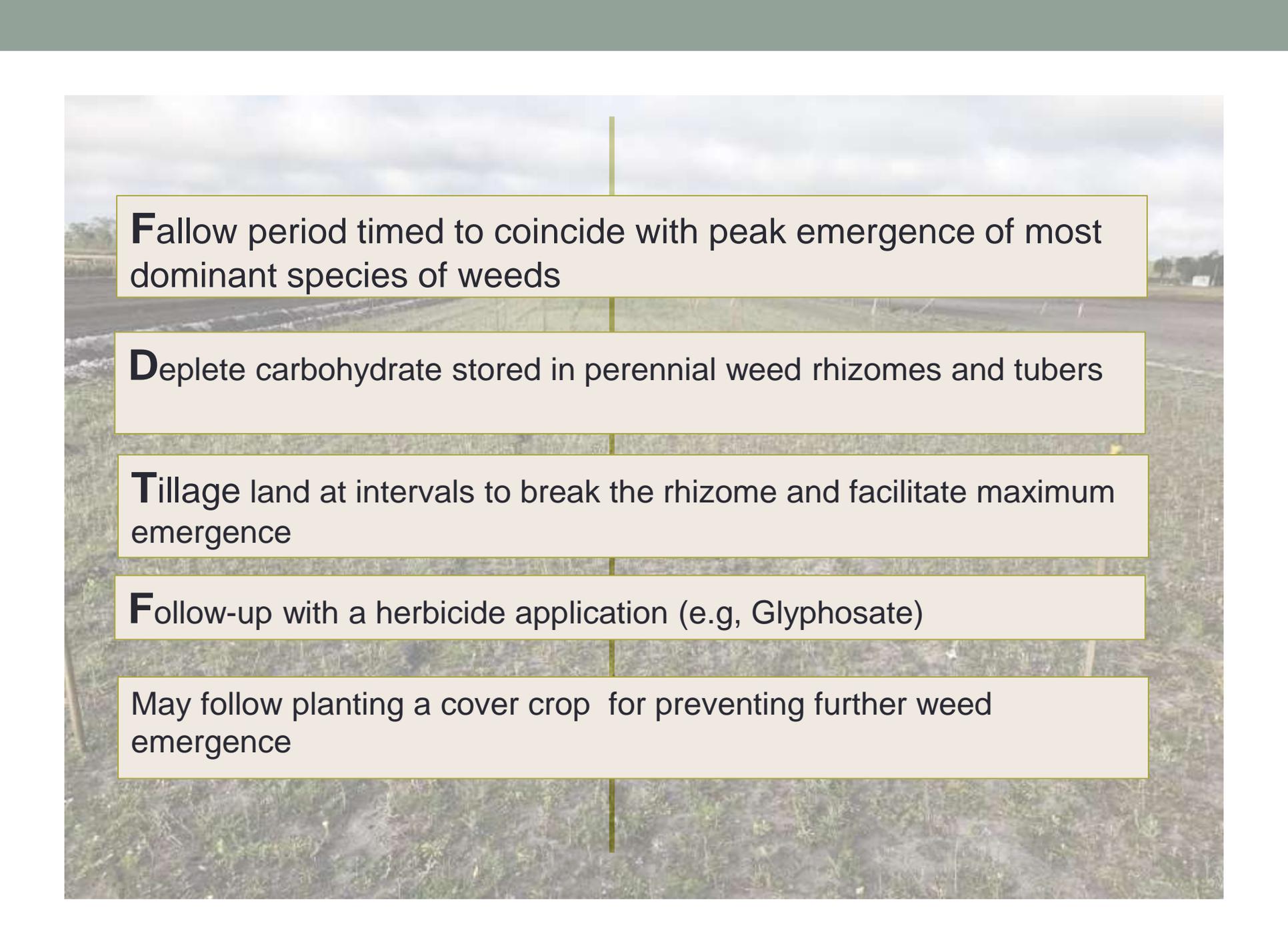
**F**allow period timed to coincide with peak emergence of most dominant species of weeds

**D**eplete carbohydrate stored in perennial weed rhizomes and tubers

**T**illage land at intervals to break the rhizome and facilitate maximum emergence

**F**ollow-up with a herbicide application (e.g, Glyphosate)

May follow planting a cover crop for preventing further weed emergence

The background image shows a field with a vertical line running through the center. Five text boxes are overlaid on the image, each containing a different agricultural strategy. The text boxes are arranged vertically and are connected by a thin vertical line.

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# Recipe for weed outbreak in your farm

Seed bank +

**Favorable conditions +  
Susceptible crops**

---

Weed problem



## Additional Thoughts.....

Help the crops to compete with the weed

- Use healthy transplants
- Proper nutrition
- Prevent nutrient leaching into row-middles

Choke them out – never let weeds to adapt

- Rotate crops
- Rotate herbicide chemistry, if possible

## Additional Thoughts.....

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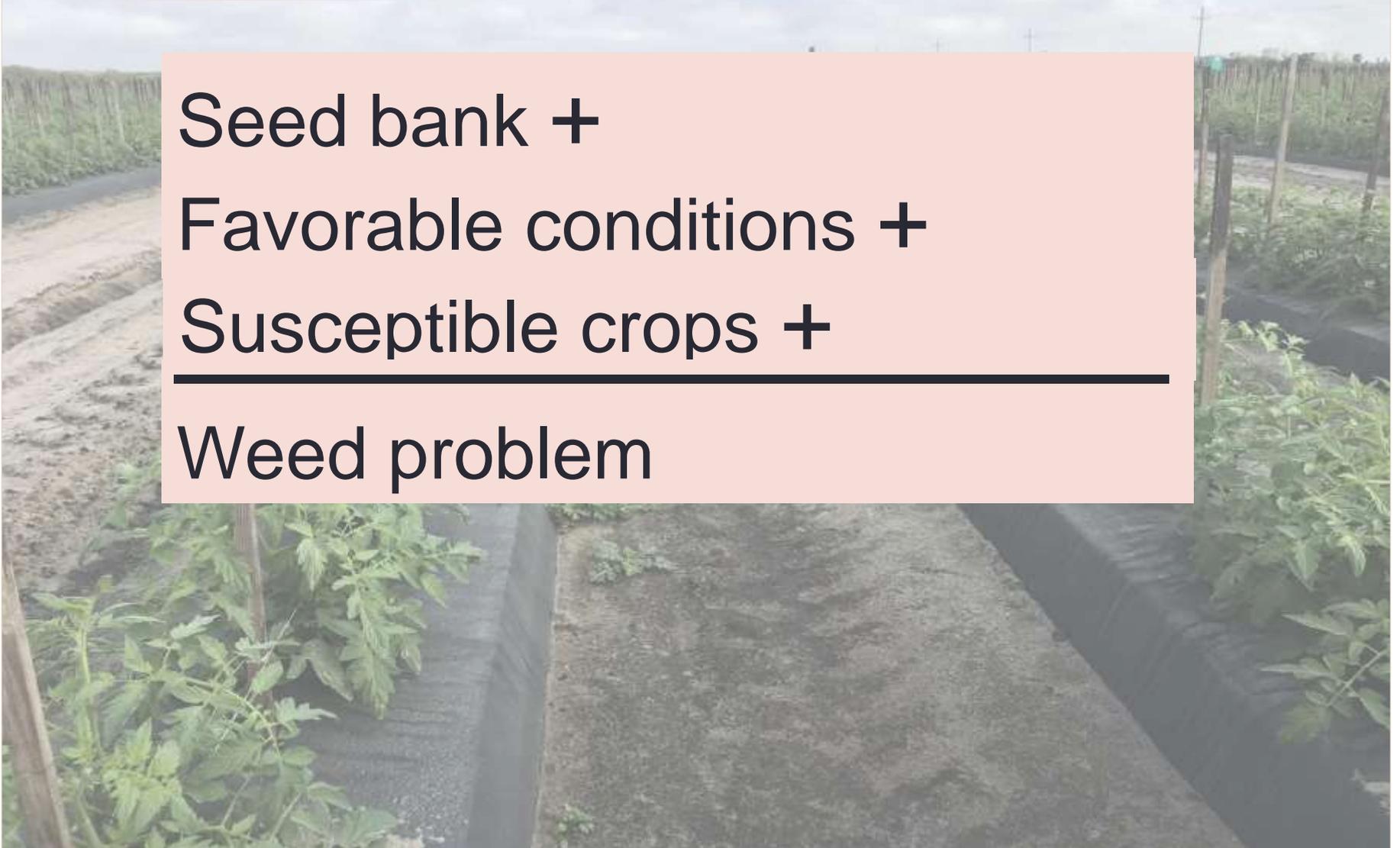
Seed bank +

Favorable conditions +

Susceptible crops +

---

Weed problem



# Recipe for weed outbreak in your farm

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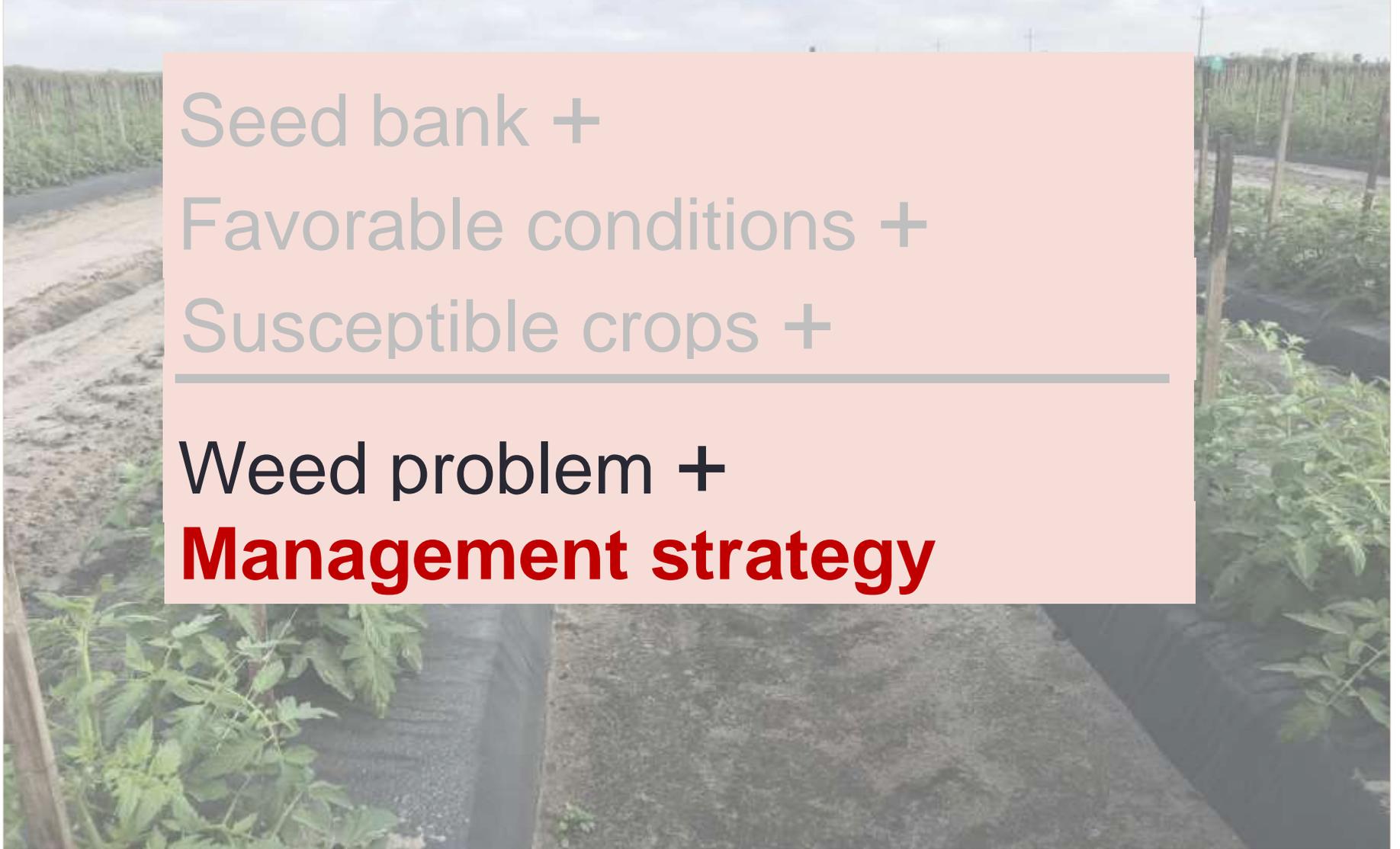
Favorable conditions +

Susceptible crops +

---

Weed problem +

**Management strategy**



# Management strategy



## ■ Scouting

- Early and Frequent

## ■ Systematic weed identification

- Correct weed id
- Lifecycle

## ■ Selecting application timing

- Critical weed free period
- Herbicide spraying
- Seed bank depletion

## ■ Sanitation

- Perimeter areas
- Volunteers

# Management strategy



- **S**couting
  - Early and Frequent
- **S**ystematic weed identification
  - Correct weed id
  - Lifecycle
- **S**electing application timing
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# Recipe for weed outbreak in your farm

Seed bank +

Favorable conditions +

Susceptible crops +

---

Weed problem +

**Management strategy**

---

**Healthy crop and good yield**

A photograph of a vegetable field with rows of plants, likely tomatoes, supported by wooden stakes. The plants are growing in raised beds. A speech bubble is overlaid on the left side of the image, containing the text: "What are the top three most problematic weeds on your farm?".

**“What are the top  
three most  
problematic  
weeds on your  
farm?”**



**“What are the top three most problematic weeds on your farm?”**

**“Every weed on the planet”**

# Thank you...



**SWFREC weed science team**

## Contact

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