# Efficacy of Drip-applied Herbicides in Tomato in Puerto Rico

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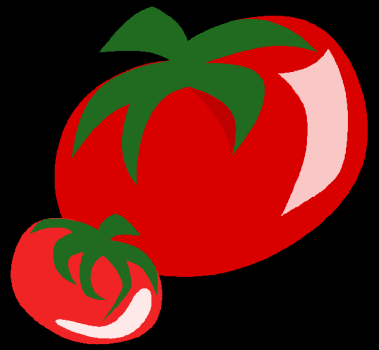
# Introduction

- Weed management in mulched tomato is a challenging task.
- Methyl bromide (MBr) has been effectively used to control weeds.
- MBr is being phased-out because is an ozone depleter.

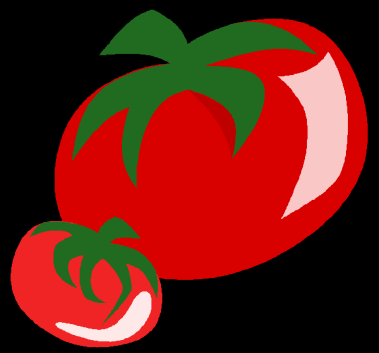



Control
MBr + Pic

# Introduction

- **Variable MBr alternative efficacy.**
  - *1,3-dichloropropene + chloropicrin,*
  - *Metam sodium and metam potassium,*
  - *Methyl iodide.*

- **Control might be improved by adding herbicides.**
  - *Pebulate,*
  - *Halosulfuron,*
  - *Metolachlor,*
  - *Trifluralin.*



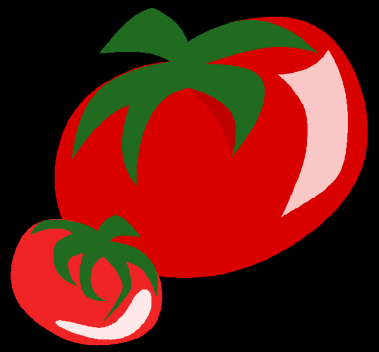
Non-treated control

Telone C-35 + Tillam
+ Devrinol

- These herbicides are applied PPI or PRE.
- Uniform distribution on the planting beds is critical to obtain acceptable weed control.

# Introduction

- **Many fumigants are drip-applied.**
  - *Vapam (metam Na),*
  - *K-Pam (metam K),*
  - *Inline (1,3-D + Pic),*
  - *SEP (sodium azide).*
- **Applying herbicides through the drip lines:**
  - *Reduced application costs,*
  - *Reduced personnel poisoning risks.*



7% moisture



20% moisture

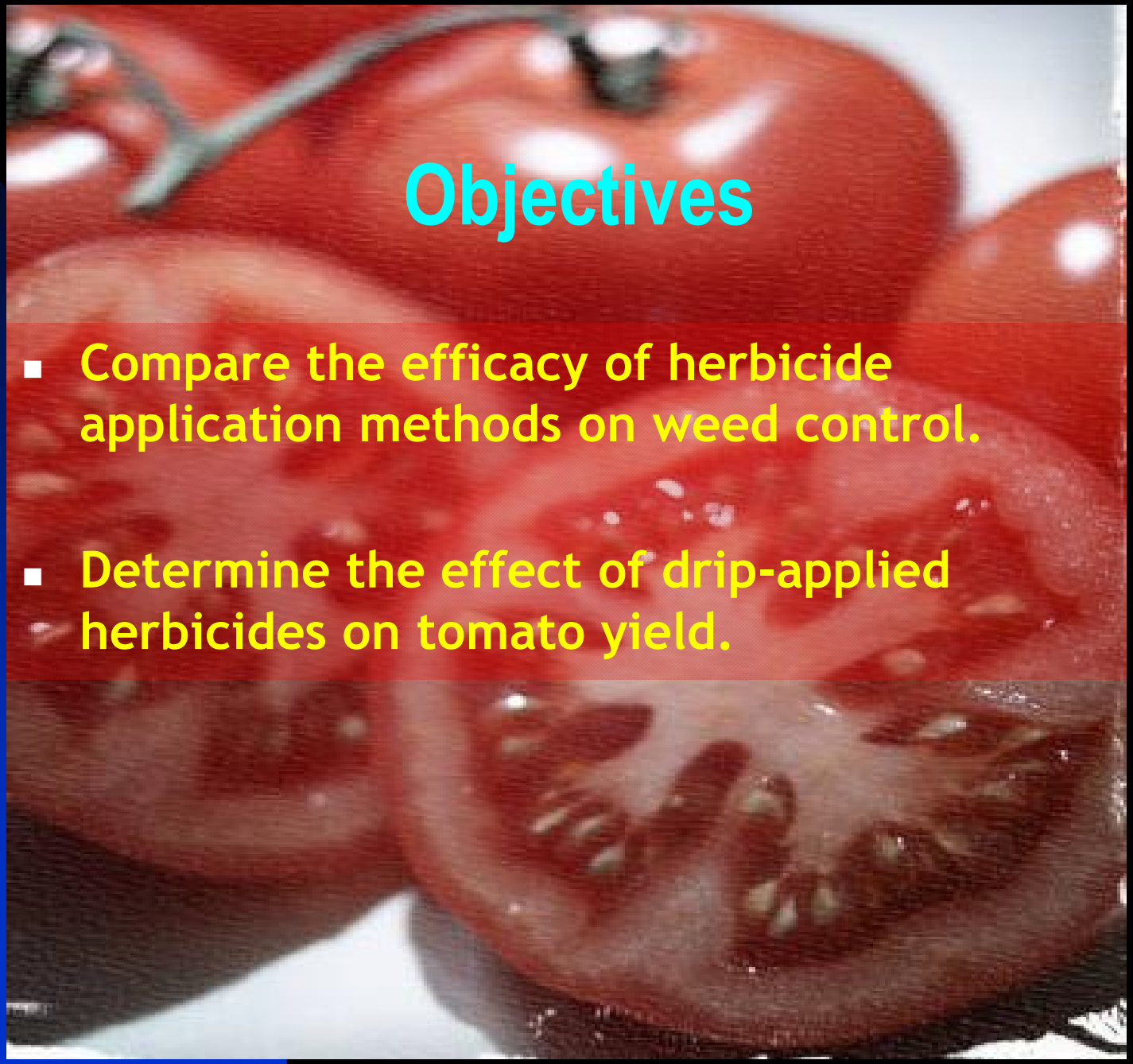
# Introduction

- In the tropics, weeds can grow all-year long.
- Grasses, broadleaves and nutsedges.

*Digitaria*

*Amaranthus*

*Cyperus*



# Objectives

- Compare the efficacy of herbicide application methods on weed control.
- Determine the effect of drip-applied herbicides on tomato yield.

# Materials and Methods

- Gurabo, Puerto Rico.
- Heavy soils and high temperatures.
- ‘Sunny’ tomato.
- Tractor-operated sprayers.
- Crop management according to local practices.

| Treatments | Rate ai/ha | Application method |
|---|---|---|
| Herbicide | | |
| Nontreated control | ---- | ---- |
| Metolachlor | 1.1 kg | PRE |
| Napropamide | 2.2 kg | PRE |
| Pebulate | 4.5 kg | PPI |
| Trifluralin | 0.8 kg | PPI |
| Metolachlor | 1.1 kg | Drip |
| Napropamide | 2.2 kg | Drip |
| Pebulate | 4.5 kg | Drip |
| Trifluralin | 0.8 kg | Drip |

- Split-plot design with 6 replications.
- Herbicides in main plots.
- Drip application with 1 acre inch of water (100 $m^3$).


18 3 2004

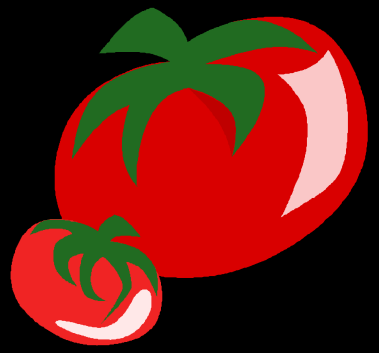

18 3 2004


15 4 2004


15 4 2004

# Materials and Methods

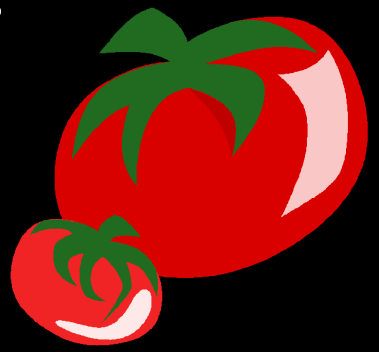
- **Weed density per species:**
  - *7 and 12 WAT.*
- **Fruit number and weight:**
  - *Category and total (12 and 15 WAT).*
- **ANOVA.**
- **LSD 5%.**



# Results

There was no significant effect of the herbicide application method on the variables.

- Surface spraying = drip.
- Only herbicide effects.



# Weed Density (7 WAT)



| Treatments | ----------plants/$m^2$---------- | | |
|---|---|---|---|
| Control | 8.9 bc | 6.2 a | 2.7 |
| Metolachlor | 3.4 d | 0.3 b | 2.3 |
| Napropamide | 4.3 cd | 1.0 b | 6.3 |
| Pebulate | 13.8 a | 3.9 ab | 4.0 |
| Trifluralin | 10.3 ab | 5.5 a | 5.1 |
| *Significance* | * | * | *NS* |

# Weed Density (12 WAT)



| Treatments | ----------plants/$m^2$---------- | | |
|---|---|---|---|
| Control | 8.8 a | 7.8 | 0.6 |
| Metolachlor | 1.6 c | 2.6 | 11.3 |
| Napropamide | 5.3 b | 5.8 | 9.0 |
| Pebulate | 8.2 ab | 5.2 | 0.0 |
| Trifluralin | 6.6 ab | 5.3 | 8.4 |
| *Significance* | * | *NS* | *NS* |

# Fruit Number

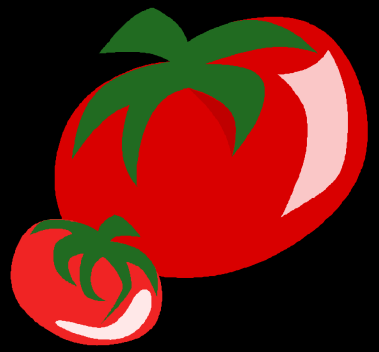
| Treatments | XL | Total |
|---|---|---|
| | ----Number x 1000/ha---- | |
| Control | 34 c | 79 b |
| Metolachlor | 56 a | 113 a |
| Napropamide | 42 bc | 93 ab |
| Pebulate | 39 bc | 88 ab |
| Trifluralin | 47 ab | 105 ab |
| *Significance* | * | * |

# Fruit Weight

| Treatments | XL | Total |
|---|---|---|
| | ----------t/ha---------- | |
| Control | 7.2 b | 13.4 c |
| Metolachlor | 12.4 a | 20.8 a |
| Napropamide | 8.8 b | 15.9 bc |
| Pebulate | 8.2 b | 14.9 bc |
| Trifluralin | 11.4 a | 19.5 a |
| *Significance* | * | * |

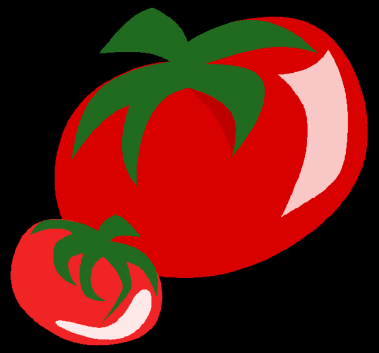
# Conclusions

- Tomato fruit yield was improved with metolachlor and trifluralin.
- Applying herbicides through the drip lines is a viable alternative in mulched tomato.



# What's Next?

- Weed management program combining certain soil fumigants and drip-applied herbicides.
- Testing the system in heavy-populated nutsedge fields in Florida.




Thank you!!!