

# Weed Control Options

- Water Management
- Flaming
- Cultivation
- Mulches
- Bio-control
- Organic Herbicides







**Just prior  
to flaming**



**5 minutes  
after flaming**

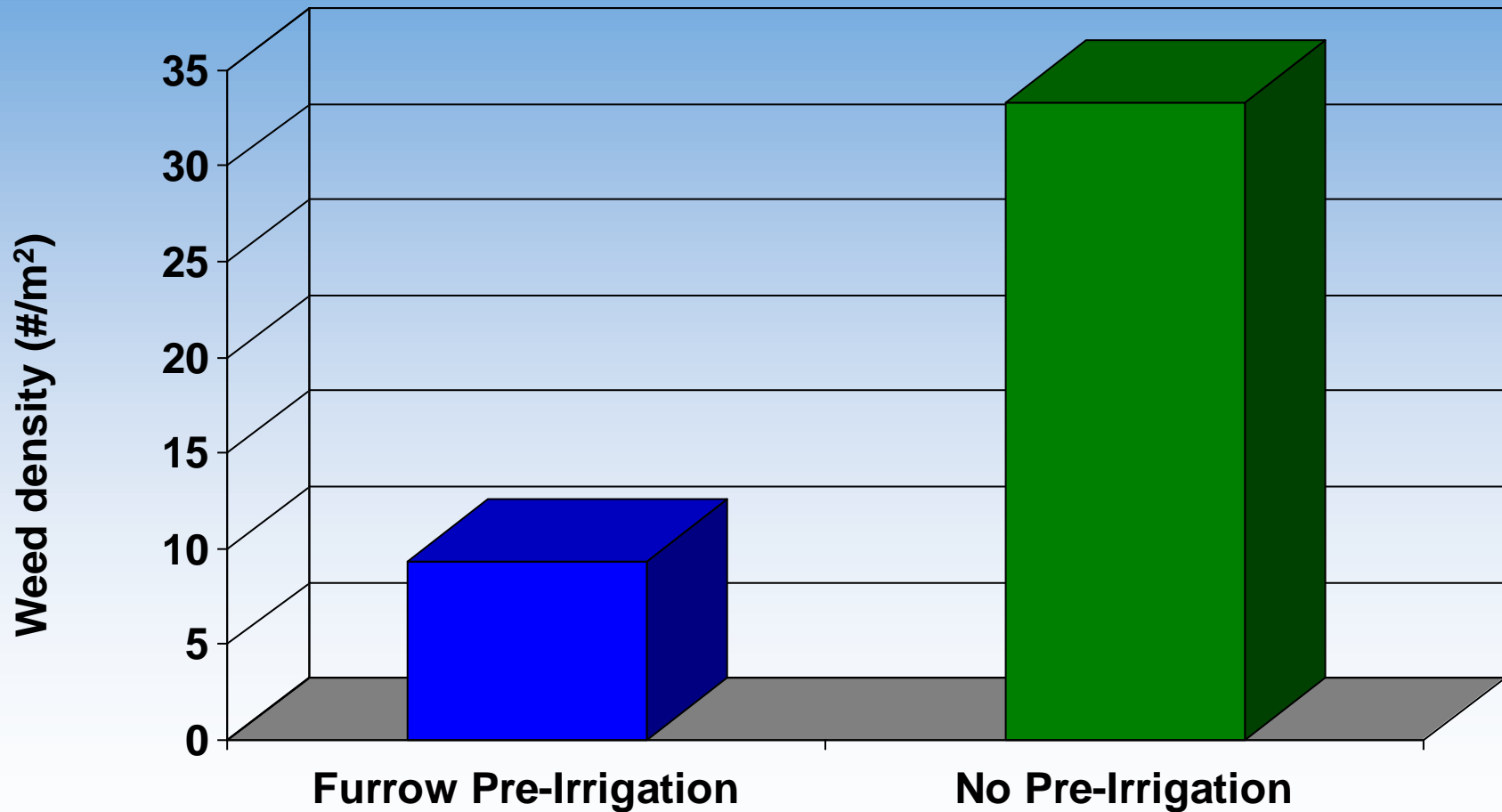




**10 minutes  
after flaming**



# Weed Density 18 days after Tomato planting as Affected by Preirrigation





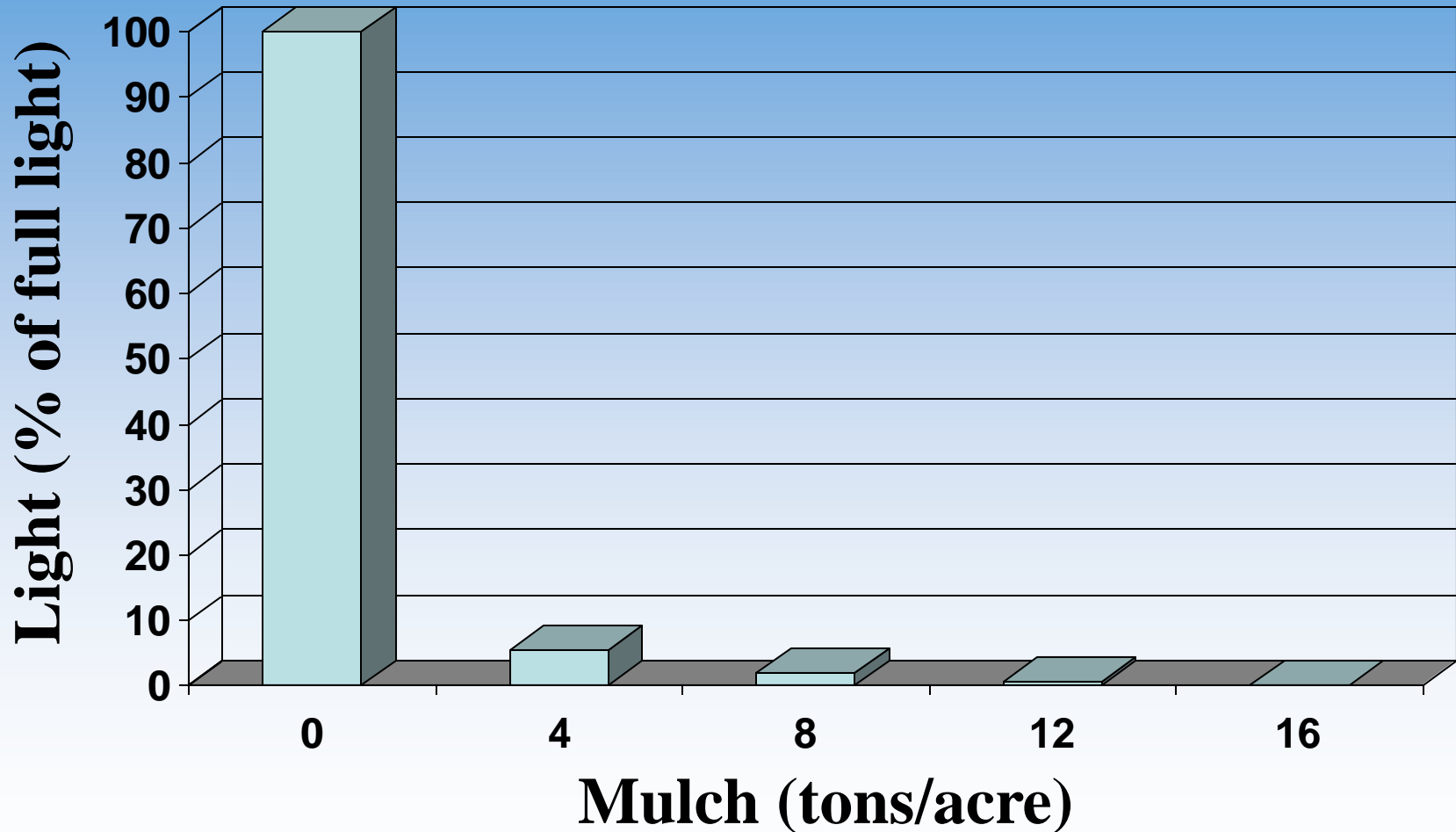


# Mulches

- **Act by blocking light**
- **Numerous organic and synthetic materials can be used for this purpose**



# Light (%) under various amounts of straw mulch



**Aug. 4, 2004**





**Nov. 11, 2004**







**May 17, 2005**







**March 9, 2004**







**March 9, 2004**





**May 17, 2005**





**String trimmer damage??  
Rodents???**







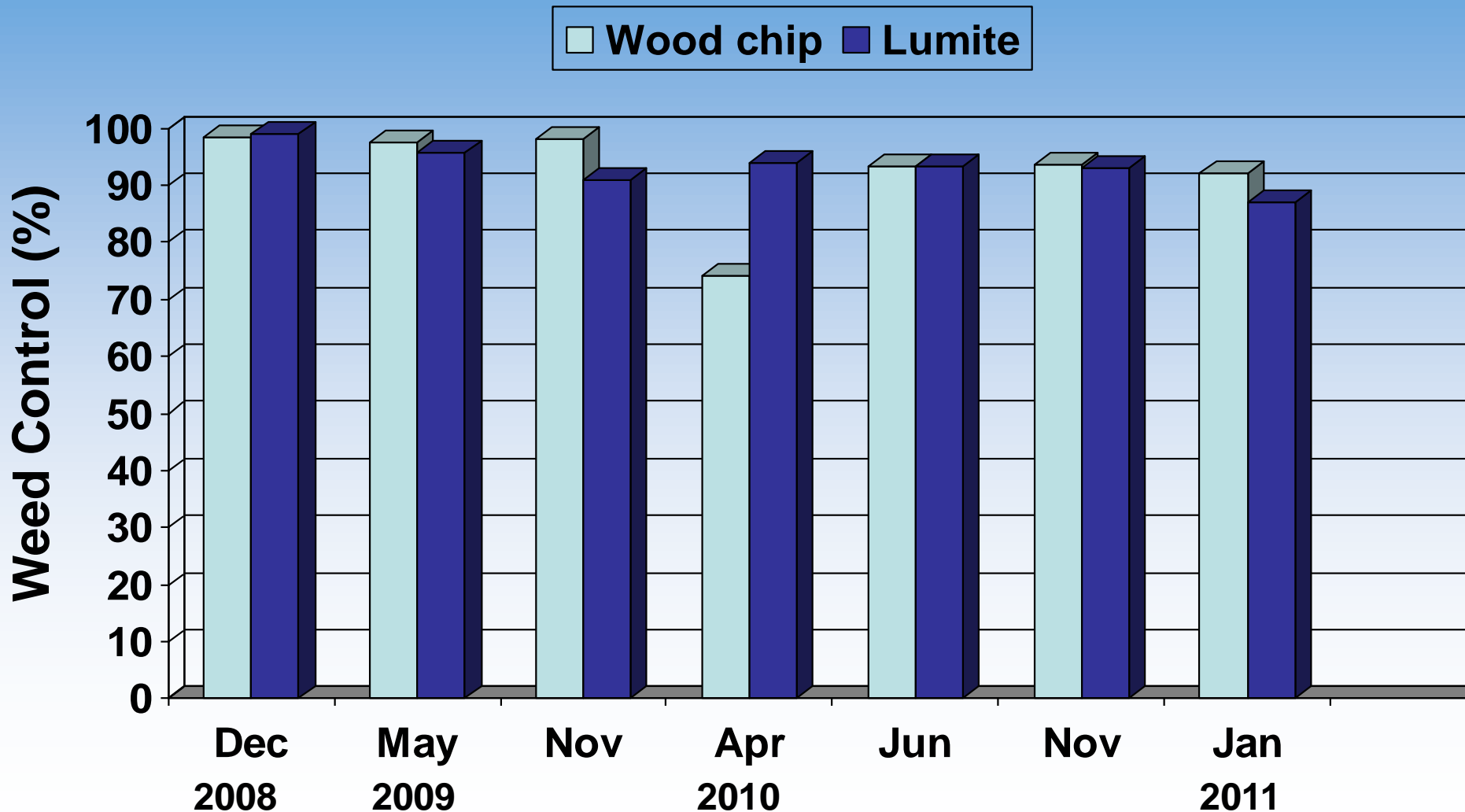








# Effect of Mulches on Weed Control in Organic Bosc Pears













# Mulches

- Effectively control most weeds
- Need some maintenance to prevent weed invasion

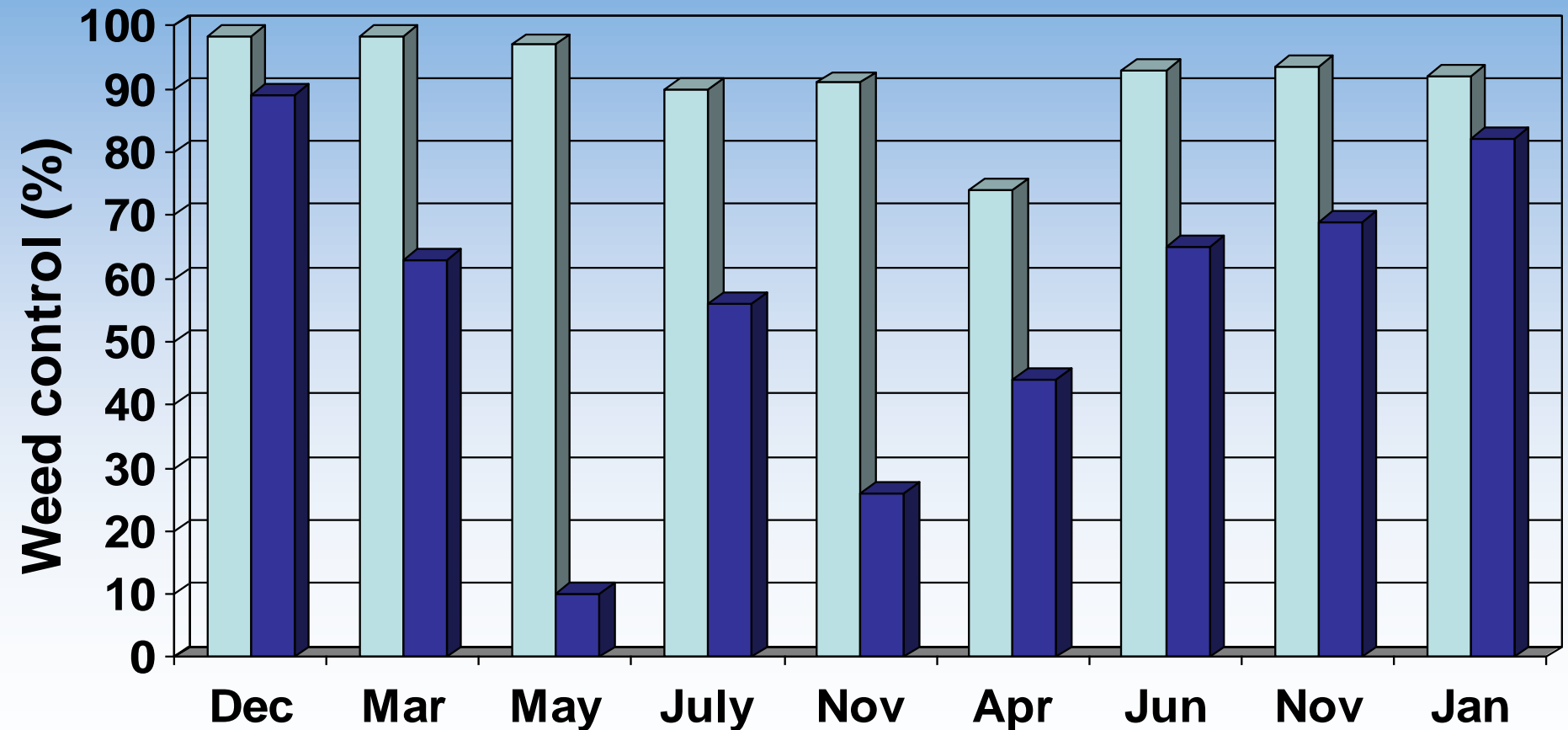






# Weed Control with Organic Herbicides vs. Mulches

wood chip Weed Pharm





# Organic Herbicides

- C-Cide
  - GreenMatch
  - Matran EC
  - Weed Pharm
  - Weed Zap
  - Racer
  - GreenMatch EX
- Experimental**
- Biolink

**All are contact type herbicides – no residual activity**





**THE ALL-NATURAL VITAMIN-C BASED HERBICIDE**  
**IS AN ALL-NATURAL, NON-HAZARDOUS PRODUCT**

BIOLOGICAL SOLUTIONS GUARANTEES THAT THE FORMULATION  
MEETS THE STANDARDS FOR EXEMPTION UNDER FIFRA 25(B)  
THIS PRODUCT IS EFFECTIVE AT CONTROLLING  
UNWANTED PLANT & WEED GROWTH.

**KEEP OUT OF REACH OF CHILDREN.**

8.59 LBS • 1 GALLON • 128 FL OZ.

poison ivy, poison oak, poison sumac,  
garden weeds, indian grass,  
straw grass and more.

**PRECAUTIONARY STATEMENTS:**

Latex Gloves are Recommended.  
Goggles are Recommended.

**CAUTION:**

Causes moderate eye irritation. Avoid contact with eyes.

Wash thoroughly with soap and water after  
handling.

**FIRST AID:**

**If In Eyes:** Flush eyes with water for at least  
15 minutes. Contact physician. Remove contact  
lenses, if present, after the first 5 minutes, then  
continue rinsing eye. Call a Poison Control Center  
or doctor for treatment advice. Have the product  
container or label with you when calling a Poison  
Control Center or doctor, or going for  
treatment. You may also contact 1-866-842-1708  
for Emergency Medical Information.

**ACTIVE INGREDIENT:**

CITRIC ACID..... 5%

**INERT INGREDIENT:**

ASCORBIC ACID..... 1%  
OCTANOIC ACID SODIUM SALT..... 10%  
SOAPBARK (QUILLAJA SAPONIN)..... 2%  
WATER..... 82%  
TOTAL..... 100%

**MANUFACTURED BY**



**Biological Solutions, LLC**  
900 East Liberty St.  
Sumter, SC 29153  
1.803.775.8643





## Marrone Bio-Innovations

Active Ingredient:

**d-limonene 70%**

New formulation is called GreenMatch

**d-limonene 55%**



# GreenMatch<sup>TM</sup> EX

Burndown Herbicide



FOR ORGANIC PRODUCTION



- For Control of Grasses and Broadleaf Weeds in Crop and Non Crop Areas
- CONCENTRATED EMULSION
- NO REENTRY INTERVAL
- Ingredients in this product meet the requirements of the USDA National Organic Program

Active Ingredient: Lemon grass oil ..... 50%

Other Ingredients:\* ..... 50%

Total: ..... 100%

\* Water, Corn Oil, Glycerol Esters, Potassium Oleate and Lecithin

**KEEP OUT OF REACH OF CHILDREN**

**CAUTION**

See Inside Booklet for Additional Precautionary Statements and directions for use.

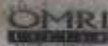
This product has not been registered by the US Environmental Protection Agency. Marrone Organic Innovations represents that this product qualifies for exemption from registration under the Federal Insecticide, Fungicide, and Rodenticide Act.



Matratec

# MATRAN® EC

NON-SELECTIVE, POST EMERGENCE HERBICIDE FOR AGRICULTURE, FRUITS,  
NUTS & VEGETABLE CROPS



- EMULSIFIABLE CONCENTRATE
- NO REENTRY INTERVAL

Ingredients in this product meet the requirements of the USDA National Organic Program

Active Ingredients:

Clove Leaf Oil	50.00%
Other Ingredients*	50.00%
Total	100.00%

\*Wintergreen Oil, Butyl Lactate, and Lecithin

## KEEP OUT OF REACH OF CHILDREN CAUTION - PRECAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.) See booklet for additional precautionary statements.

Use only according to label instructions. Read the entire label before using this product.

This product has not been registered by the US Environmental Protection Agency. EcoSMART represents that this product qualifies for exemption from registration under the Federal Insecticide, Fungicide, and Rodenticide Act.

### First Aid

**IF IN EYES:** Flush with water for at least 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician if irritation persists.

**IF ON SKIN:** Wash exposed area with plenty of soap and water for at least 15 minutes. Remove contaminated clothing. Get medical attention if irritation persists.

**IF INHALED:** Remove person to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

**IF SWALLOWED:** Rinse mouth out with water. Call a doctor or get medical attention as soon as possible. Do not induce vomiting. Do not give anything by mouth to an unconscious person. Avoid alcohol.

Chemical Safety Information: Call 1-800-535-5053 Anytime (InfoTrac Chemical Response System).



EcoSMART  
Technologies, Inc.

NET CONTENTS:  
2.5 GALLONS

## PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

### CAUTION

Avoid contact with eyes, skin, and clothing. Avoid breathing vapors or spray mist. Harmful if swallowed. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Persons applying this product should wear:

- Long sleeve shirts and long pants, shoes and socks
- Protective eyewear
- Chemical resistant gloves made of neoprene, nitrile or natural rubber.

### User Safety Recommendations

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing immediately if the product gets inside. Wash thoroughly and put on clean clothing. Remove PPE after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothes.

### Physical or Chemical Hazards

Do not use, pour, spill or store near heat or open flames. Store only in original container.

### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. It also contains specific instructions and exceptions pertaining to statements on this label about personal protective equipment (PPE). The requirements of this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not reenter field until residue is dry.

PPE required for early entry to treated areas that are permitted under the Worker Protection Standard and involves contact with anything treated such as plants or soil is: Long sleeve shirt, long pants, shoes and socks, chemical resistant gloves.

### DIRECTIONS FOR USE:

SHAKE WELL BEFORE USING.

MATRAN® EC is intended for non-selective weed control in and around all crop areas. Only protected handlers may be in the application area. Do not apply this product in a way that will contact workers or other persons either directly or through drift. To prevent crop damage, apply MATRAN® EC directly to weeds.



# PHARM SOLUTIONS WEED PHARM

[www.pharmsolutions.com](http://www.pharmsolutions.com)



**FAST  
ACTING  
WEED &  
GRASS  
KILLER**

Ready-to-use

**A FOOD GRADE  
ORGANIC ACID**  
For Non-Selective  
Control of Herbaceous  
Broadleaf Weeds and  
Weed Grasses on  
Residential, Non-Crop,  
Right-of-Way, and  
Industrial Land Sites

**1 Gallon**

**Active Ingredients by wt.**

Acetic Acid . . . .	20.0%*
Other ingredients . . .	80.0%
TOTAL . . . . .	100.0%

\*Equivalent to 200 grain  
vinegar by titration

**First Aid**

**If in Eyes**  
Hold eyelids open and flush  
with a steady, gentle stream of  
water for 15-20 min. Remove  
contact lenses, if present,  
after first 5 min., then continue  
rinsing eye.

If in Eyes: Call poison  
center or doctor for advice.  
**Pharm Solutions Inc.**  
2023 E. Sims Way.  
Suite #358  
Port Townsend, WA 98365







# WEED ZAP<sup>®</sup>



**A NON-SELECTIVE HERBICIDE FOR ANNUAL GRASSES AND WEEDS**

## General Information

WEED ZAP is a contact, non-selective, broad spectrum, foliar-applied herbicide. This product will only control actively growing emerged green vegetation. It controls both annual and perennial broadleaf and grassy weeds. This product does not translocate. It will affect only those plants that are coated with the spray solution.

### ACTIVE INGREDIENTS:

Clove Oil	45%
Cinnamon Oil	45%
Inert Ingredients:	10%
Lactose and Water:	
<b>TOTAL</b>	<b>100%</b>

This product is exempt from registration with the Federal EPA under section 25 (b) of FIFRA. WEED ZAP has not been registered with the Environmental Protection Agency. JH Biotech, Inc. represents that this product qualifies for exemption from registration under the Federal Insecticide, Fungicide and Rodenticide Act.

**International & United States Patents Pending**

## APPLICATION RATE TABLE

Mix 3 gallons of WEED ZAP concentrate per 100 gallons of spray water. Apply enough WEED ZAP to cover the entire surface of the weed. Spray to the point of run off. The use of a spreader/sticker such as JH Biotech's Natural Wet<sup>®</sup> may increase contact and efficacy of treatment.

### FINAL MIX VOLUME

1 Gallon	4
5 Gallons	20
10 Gallons	40
25 Gallons	100

Repeat application as necessary. Coverage is essential to establish control.

## CAUTION KEEP OUT OF REACH OF CHILDREN

### PRECAUTIONARY STATEMENTS

Off target application of WEED ZAP will result in damage to growing plants. Do not apply this product through the irrigation system.

Avoid contact with skin, eyes or clothing. In case of contact, immediately flush eyes or skin with plenty of water. Get medical attention if irritation persists.

### STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED	-Call a Physician or Poison Control Center. -Drink one or two glasses of water. -Do not induce vomiting. -If person is unconscious, do not give anything by mouth or induce vomiting.
IF IN EYES	-Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. -Get medical attention if irritation persists.
IF ON SKIN	-Wash with plenty of soap and water. -Get medical attention if irritation persists.

### LIMITED WARRANTY

Manufacturer or seller makes no warranty, whether expressed or implied, concerning the use of this product other than for the purposes indicated on the label. Neither manufacturer nor seller shall be liable for any injury or damage caused by this product due to misuse, mishandling or any application not specifically described on the label.

Manufactured By: JH Biotech, Inc. P.O. Box 3530, Yorba, CA 93098

### NET CONTENTS:

- ☐ 1 Pint (0.47 liter)
- ☐ 2.5 Gallons (9.45 liters)
- ☐ 2 x 2.5 Gallons (18.9 liters)
- ☐ 5 Gallons (18.9 liters)
- ☐ 55 Gallons (207.9 liters)



# AllDown

**AllDown** is a new Green Chemistry, non-selective weed and grass herbicide that is a breakthrough in environmentally responsible vegetation management. AllDown is made of a special blend of synergistic components containing no harsh chemicals that will dehydrate unwanted top growth foliage. Within less than an hour you will notice wilting of plants caused by desiccation. In some cases a repeat application may be required to perennial weeds. Weed management is an important component of cultural practices in agriculture. Weeds compete with crops affecting their yield and quality.

**Approved for the production of certified organic food and fiber crops**

*Uses:*

Organic agriculture  
Reclaim land for agriculture or grazing or that has been taken over by weeds  
In vegetable gardens and flowerbeds  
Along fence lines and foundations  
Around trees and shrubs  
On patios, driveways and sidewalks

*Application Instructions:*

Apply only to areas that you want to knockdown. For large agricultural areas, it is recommended that SummerSet AllDown be applied under spray hoods to protect desirable row crop foliage from coming in contact with the spray solution.

Do not dilute. Apply to target vegetation at a rate sufficient to saturate the leaves to a point where droplets begin to appear.

Apply when skies are mostly sunny and no rainfall is predicted within 4 hours of application.

Apply when the air is calm and temperatures are between 65° and 90° F.

*Guaranteed Product Analysis:*

Active Ingredients:

Citric acid .....	5.0 %
Garlic .....	0.2 %
Other Ingredients: vinegar, water .....	94.8 %





GREENERGY

# Blackberry & Brush Block



**OMRI**  
Listed  
Organic Materials Review Institute

FOR ORGANIC PRODUCTION

**Attacks blackberries, brush,  
star thistle, deep-rooted weeds  
& woody plants**

KEEP OUT OF  
REACH OF CHILDREN

**CAUTION**

READ ALL  
PRECAUTIONARY  
STATEMENTS

CONTENTS 128 Fl.Oz. ( 1 Gal. ) 3.785 Liters

GREENERGY

## Blackberry & Brush Block

- Blackberries
- Poison Oak
- Star Thistle
- Deep Rooted Weeds
- Horsetail
- Dandelions
- Scotch Broom
- Tansy along fence rows,  
roadsides, non crop areas  
& residential sites

**WARRANTY STATEMENT:**

All statements concerning this product are to be applied only when used as directed. The manufacturer makes no warranties, expressed or implied concerning this product or its use, which extend beyond the direction for uses description on the label. Read all directions carefully. Buyer assumes all responsibility for safety and use not in accordance with directions.

**CAUTION**

Harmful if swallowed or absorbed through the skin. Causes eye irritation. Avoid contact with eyes, skin or clothing. Wash thoroughly after handling. Wear protective eyewear and gloves when handling, mixing and applying this product. In case of a spill of concentrate product, leave area and do not return for an hour. Do not spray pets or humans. Avoid contamination of foodstuffs.

**STATEMENT OF PRACTICAL TREATMENT**

**IF SWALLOWED:** Call a physician at the poison control center immediately.

**IF INHALED:** Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

**IF IN EYES:** Flush with plenty of water. Get medical attention if irritation persists.



Active Ingredients	
Citric Acid.....	20%
Inert Ingredients	
Water.....	80%
Total.....	100%

www.greenenergyinc.com

of the tap roots to dry up on weeds. Spray this product around the bottom of the plants where roots are located as well as leaves and any new shoots. **IMPORTANT:** Do not apply this product in a manner that will contact near by desirable plants or crops including soil within their drip line or root zone.

GREENERGY, INC. PO Box 6569 Brookings, OR 97415





GREENERGY

# BRUSH-WEEDS & GRASS HERBICIDE for ORGANIC PRODUCTION



**Attacks blackberries, brush,  
Star thistle, deep-rooted weeds  
& woody plants**

**CONTENTS 128 Fl. Oz. (1 Gal.) 3.785 Liters  
+ 55 Gal. Drums**

KEEP OUT OF  
REACH OF CHILDREN

**CAUTION**

READ ALL  
PRECAUTIONARY  
STATEMENTS

**CERTIFIED ORGANIC MATERIALS**

**CAUTION**

Harmful if swallowed or absorbed through the skin. Causes eye irritation. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling. Wear protective eyewear and gloves when handling, mixing and applying this product. In case of a spill of concentrate product, leave area and do not return for an hour. Do not spray pets or humans. Avoid contamination of foodstuffs.

## STATEMENT OF PRACTICAL TREATMENT

**IF SWALLOWED:** Call a Physician at the poison control center immediately.

**IF INHALED:** Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

**IF IN EYES:** Flush with plenty of water. Get



**GREENERGY  
BRUSH-WEEDS  
& GRASS  
HERBICIDE  
for ORGANIC  
PRODUCTION**

- Blackberries
- Poison Oak
- Star Thistle
- Deep Rooted Weeds
- Horsetail
- Dandelions
- Scotch Broom
- Tansy along fence rows, roadsides, non crop areas & residential sites

## WARRANTY STATEMENT:

All statements concerning this product are to be applied only when used as directed. The manufacturer makes no warranties, expressed or implied concerning this product or its use, which extend beyond the direction for uses description on the label. Read all directions carefully. Buyer assumes all responsibility for safety and use not in accordance with directions.

UPC

ACTIVE INGREDIENTS	
(CERT.ORGANIC) CITRIC ACID	20%
INERT INGREDIENTS	
(CERT.ORGANIC) VINEGAR	4%
(CERT.ORGANIC) SURFACTANT	1%
WATER	75%
TOTAL	100%



## BioLink Herbicide

Active Ingredient: Fatty Acids, .....8.00%

Inert Ingredients: Lactic acid, glycerol, soapbark  
Acid.....92.0%

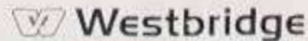
### Directions For Use

#### SHAKE WELL BEFORE USING

Use 6 gallon of BioLink Herbicide per 100 gallons of water.  
Agitate during application of spray.

**DANGER:** KEEP OUT OF REACH OF CHILDREN. Do not get in eyes or on clothing. Wear protective eyewear (goggles or face shield). Wash thoroughly with soap and water after handling and before eating, drinking or chewing gum. Remove contaminated and wash clothing before reuse.

Store in cool dry place out of direct sunlight. Avoid freezing and extreme heat.



1260 Avenida Chelsea, Vista, CA 92081

Tel. 760-599-8855

Net Content: 1 quart

**Experimental product**





**0.25% v/v Natural Wet  
35 GPA spray volume**





**16 Days after treatment**





**organic herbicides tested  
provided only temporary  
suppression of grasses**



# GreenMatch EX





# GreenMatch EX







NoFilm 17.0.1

NoFilm 17.0.25

NoFilm 17.0.

NoFilm 17.0.



# Greenhouse Conclusions

- Higher concentrations and spray volumes increased weed control across all products
- Spray volume has a greater impact on weed control than concentration
- Adjuvant use improved control across all products – use high rates
- Grasses are much harder to control than broadleaf weeds



# Field testing





# Methods for Weed Size study

- Entire trial area cultivated to remove existing weeds
- Field irrigated to germinate weed seeds
- Field divided into three segments, with each section treated at a different time
- Treatments applied at 14, 21 or 28 days after the initial irrigation
- All treatments applied at 70 GPA and 1% Natural Wet adjuvant added to each treatment

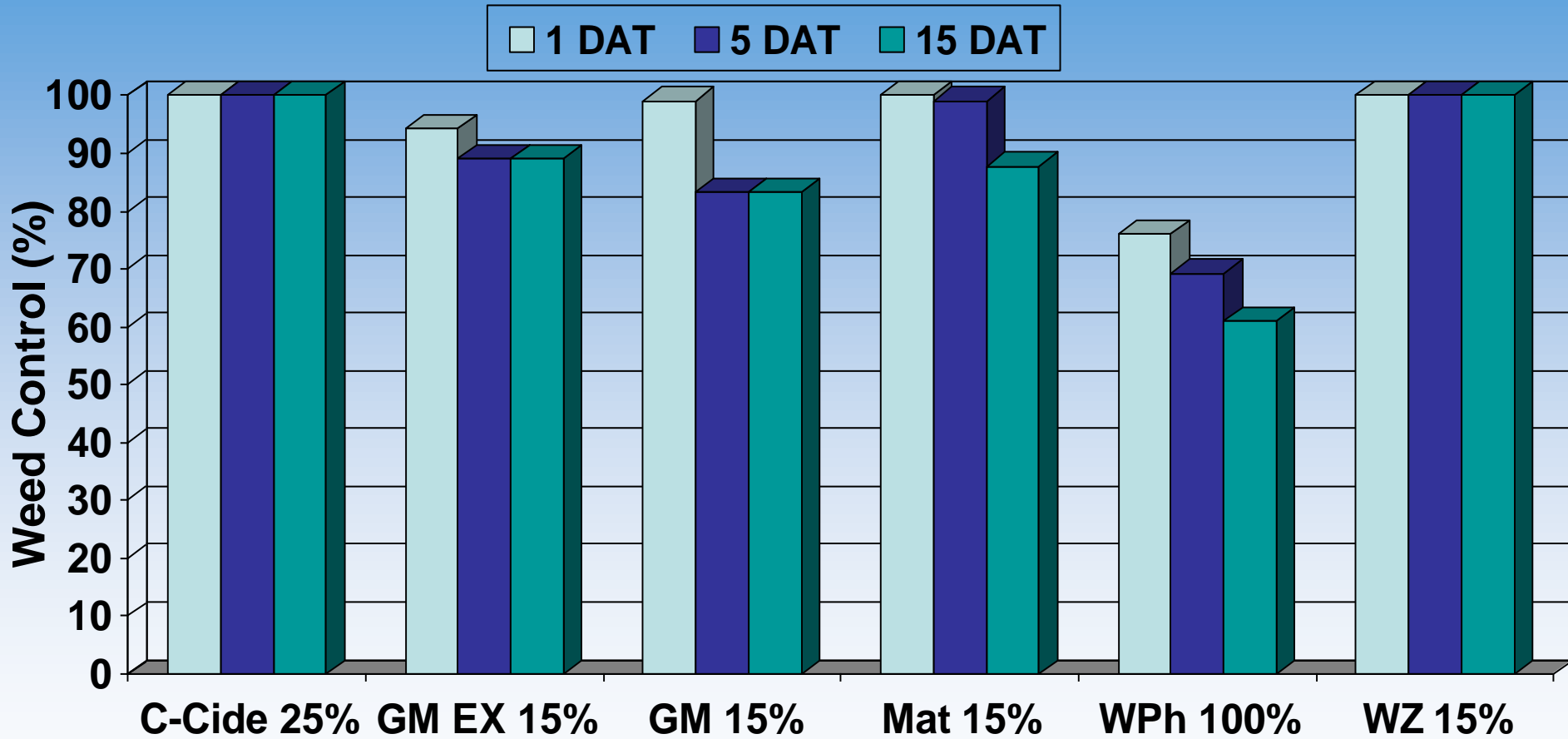


# Concentrations used in Field testing

- C-Cide – 25 to 50% v/v (1.25 to 2.5% citric acid)
- GreenMatch – 7.5 to 15% v/v (4.1 to 8.25% d-limonene)
- GreenMatch EX 10 to 15% v/v  
(5 to 7.5% lemongrass oil)
- Matratec 7.5 to 15% v/v (3.75 to 7.5% clove oil)
- Weed Zap – 7.5 to 20% v/v  
(6.3 to 18% clove + cinnamon oil)
- Racer – 6 to 10% v/v (2.4 to 4%  $\text{NH}_4$  nonanoate)
- Weed Pharm – 100% (20% acetic acid)
- Biolink – 3 to 9% v/v (0.24 to 0.72% fatty acids)



# Broadleaf Weed Control (%) at 1, 5 and 15 days after application

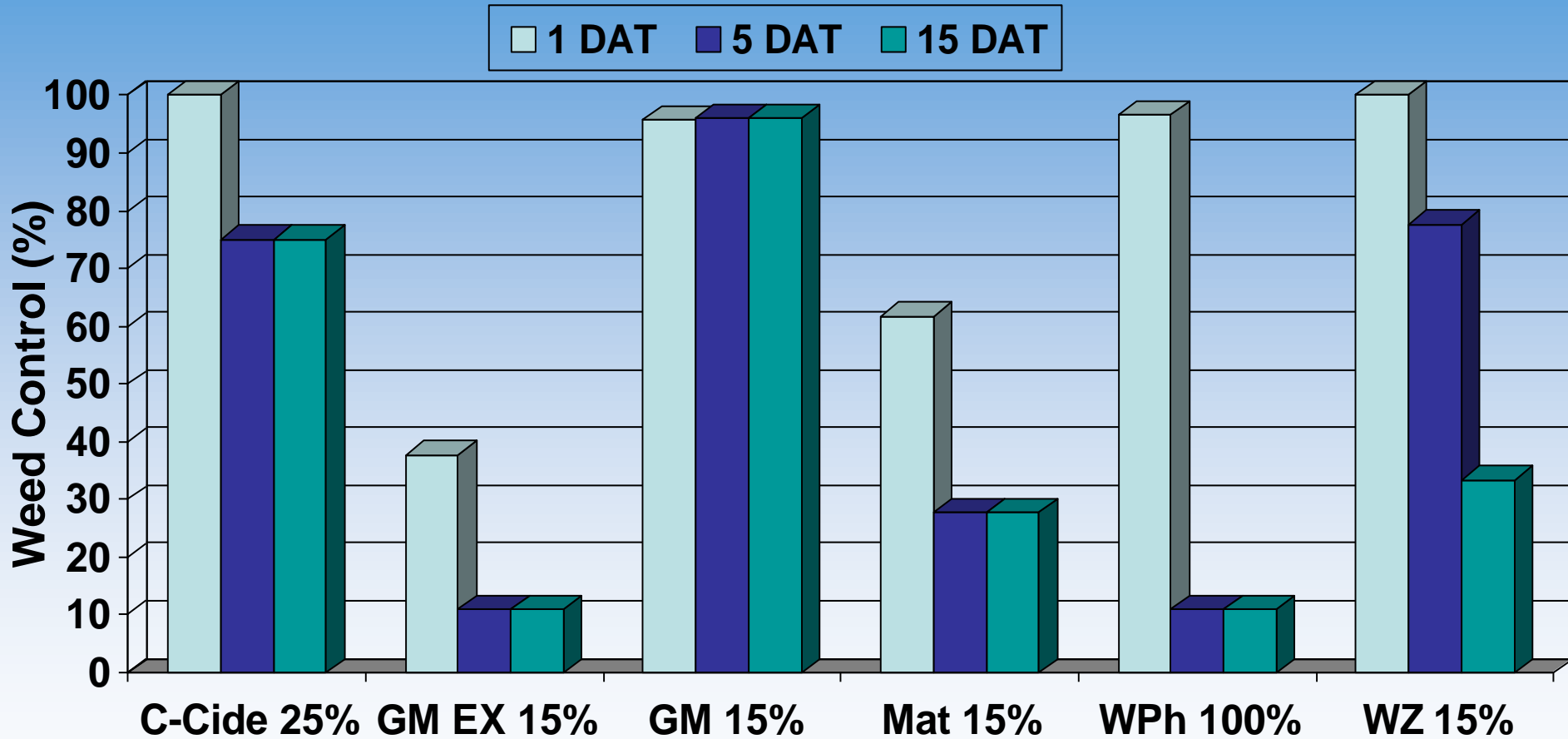


Broadleaf weeds = purslane, pigweed, black nightshade

Applic. – June 15, 2009



# Broadleaf Weed Control (%) at 1, 5 and 15 days after application

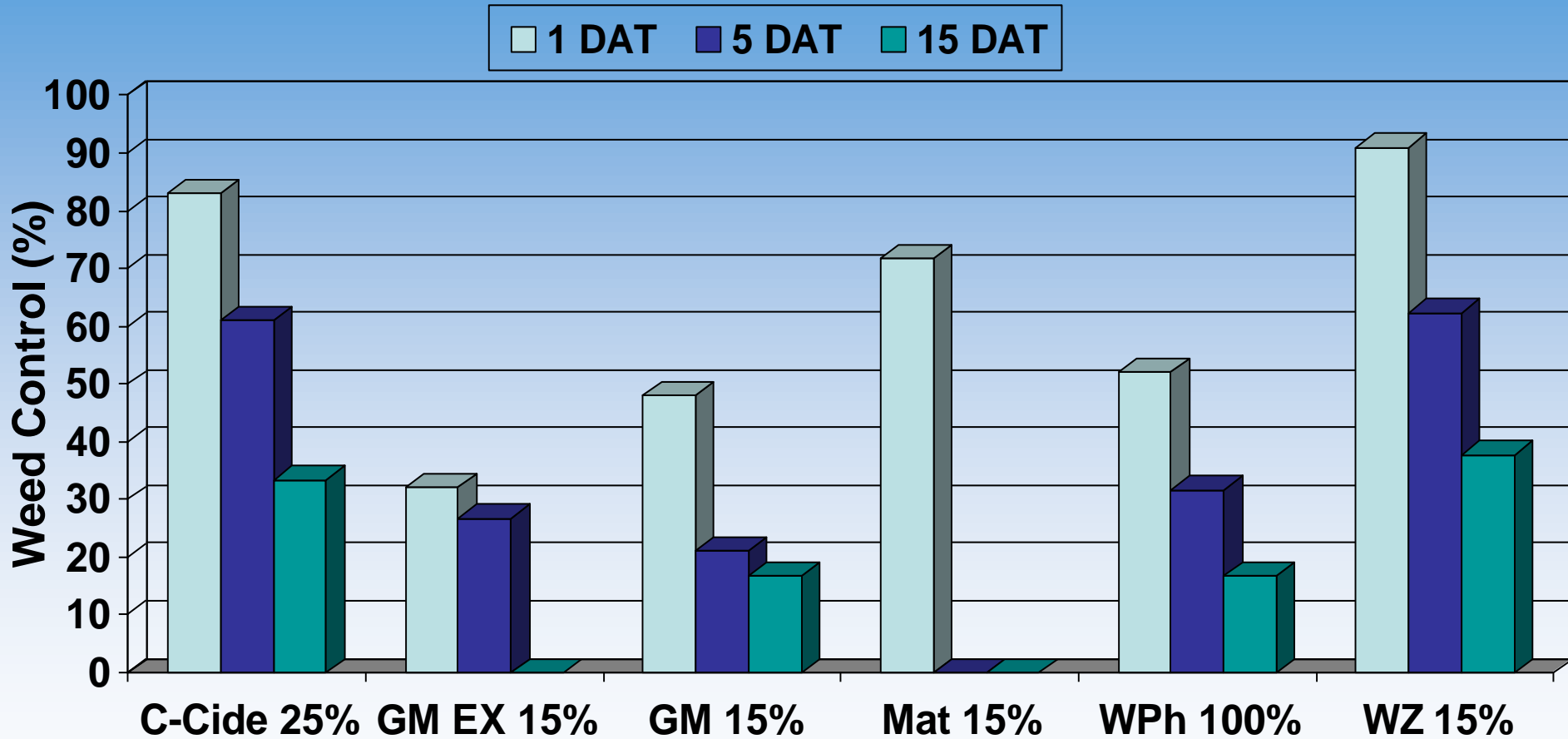


Broadleaf weeds = purslane, pigweed, black nightshade

Applic. – June 22, 2009



# Broadleaf Weed Control (%) at 1, 5 and 15 days after application

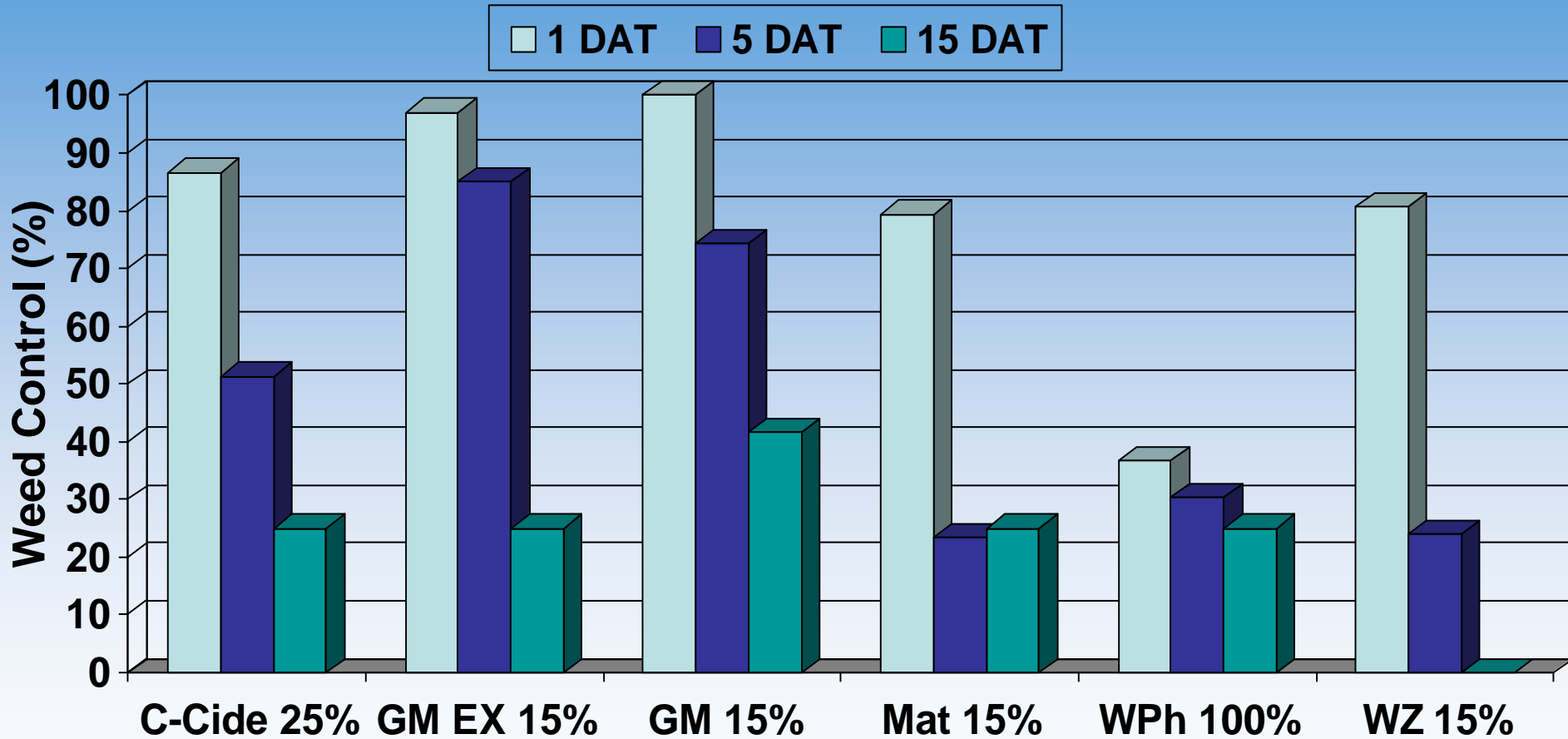


Broadleaf weeds = purslane, pigweed, black nightshade

Applic. – June 29, 2009



# Grass Weed Control (%) at 1, 5 and 15 days after application

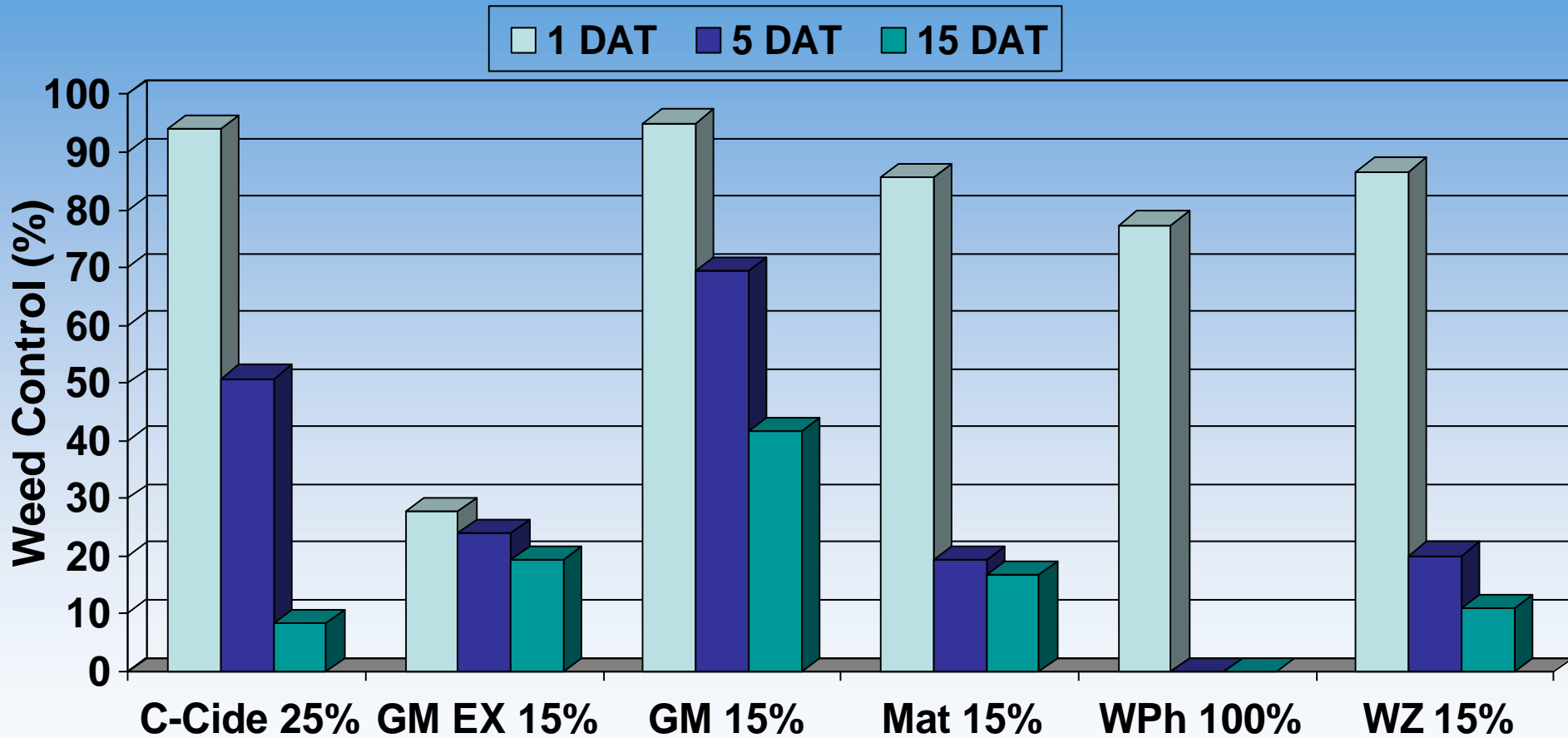


Grass weeds = crabgrass and barnyardgrass

Applic. – June 15, 2009



# Grass Weed Control (%) at 1, 5 and 15 days after application

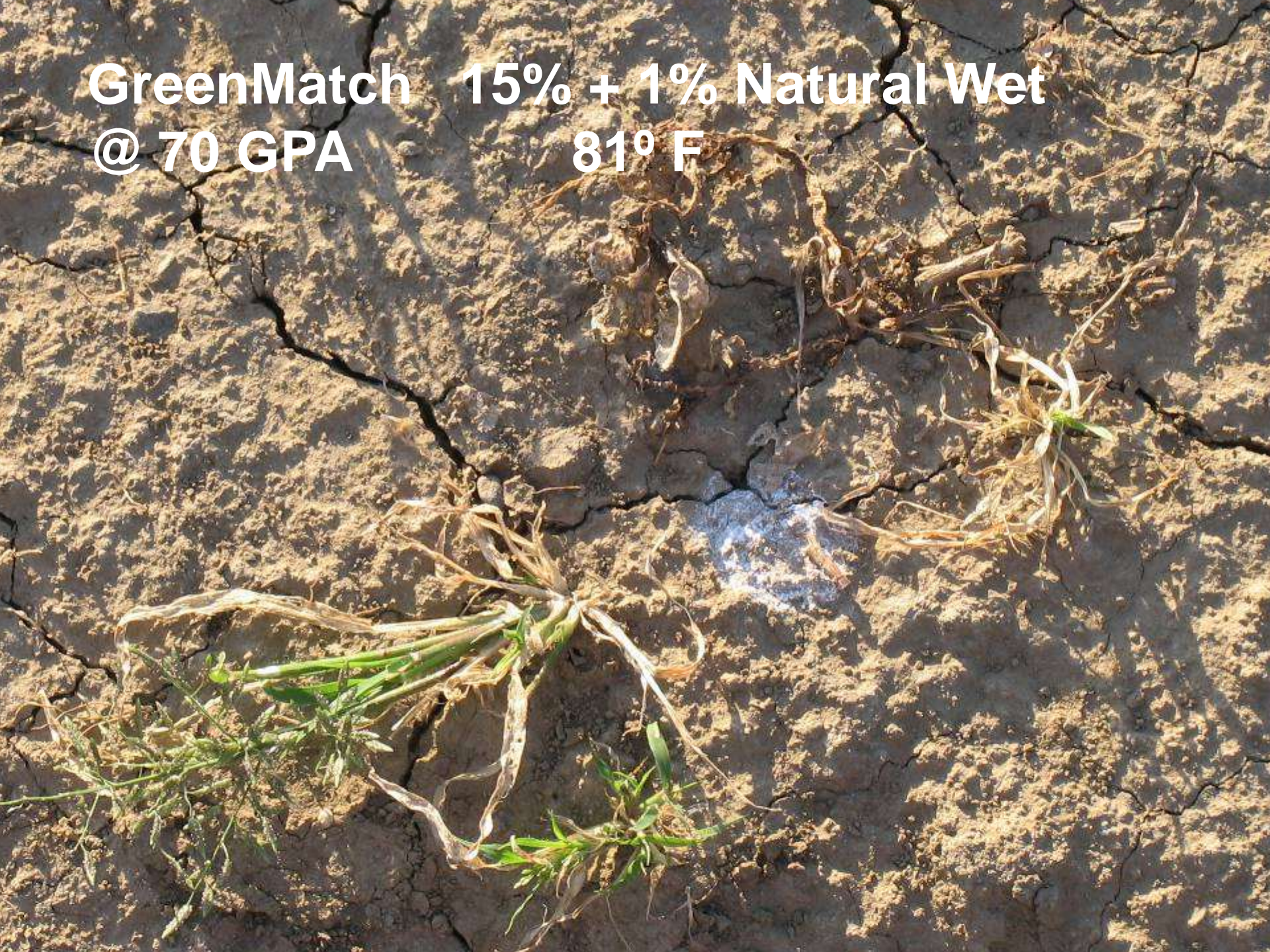


Grass weeds = crabgrass and barnyardgrass

Applic. – June 22, 2009



**GreenMatch 15% + 1% Natural Wet**  
**@ 70 GPA 81° F**





**GreenMatch 15%+ 1% Natural Wet  
@ 70 GPA - treated twice**







**Matran EC**

**14 DAT**

**5% v/v + 2.5% humasol**

**35 GPA spray volume**



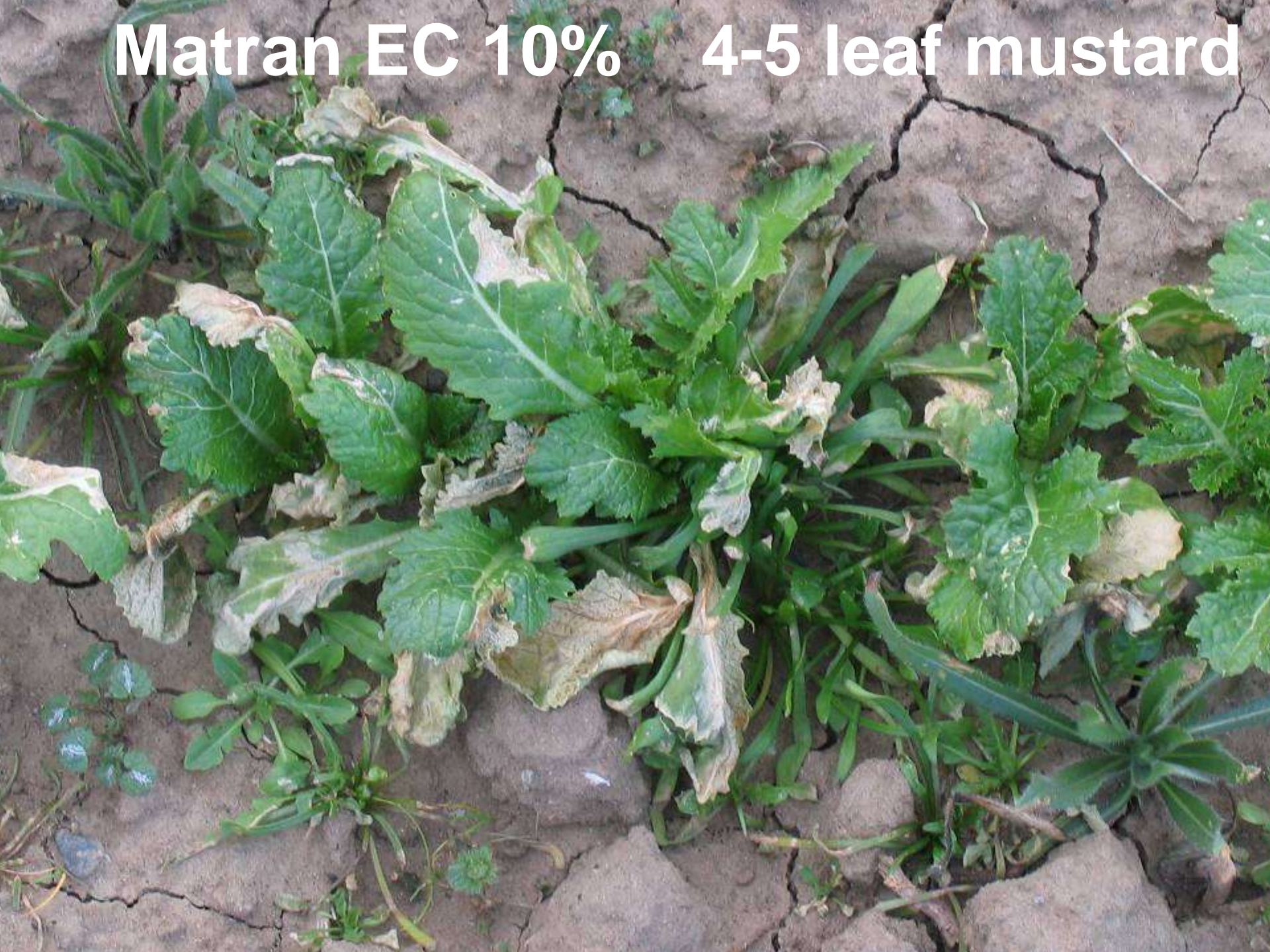
A photograph of dry, cracked soil with several small green plants growing in the cracks. The soil is a light brown color and the cracks are deep and irregular. The plants are small and have green leaves, some of which are slightly wilted.

**Matran EC**

**14 DAT**  
**10% v/v + 2.5% humasol**  
**35 GPA spray volume**

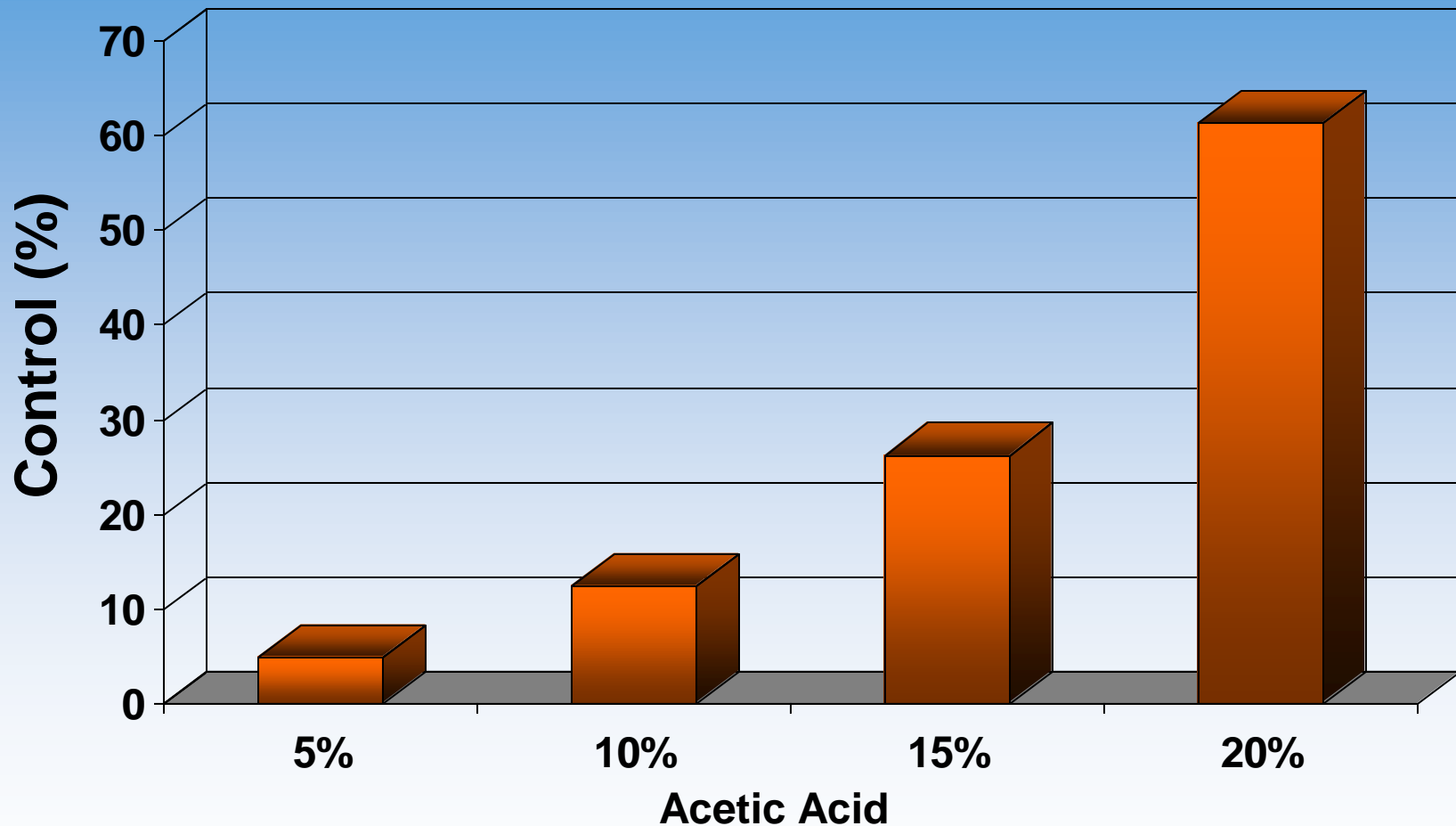


**Matran EC 10% 4-5 leaf mustard**






# Mustard Control with Acetic Acid (70 GPA)



14<sub>1</sub> DAT Treated Dec 20, 2006  
2-3 leaf mustard

0.1% Yucca extract added to all trmts

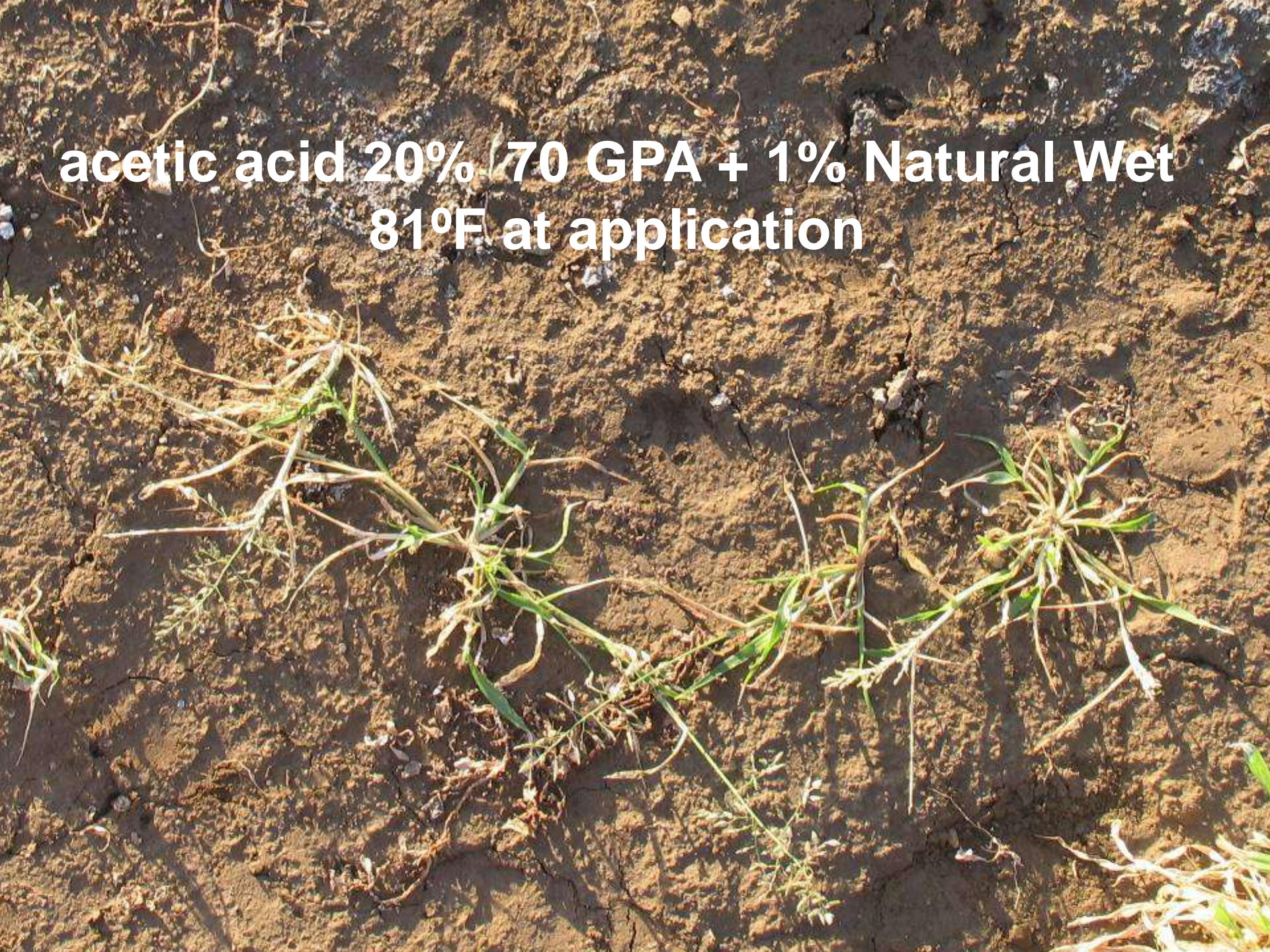




**Acetic acid 20% + 1% NuFilm P  
@ 70 GPA Treated twice**



**acetic acid 20% 70 GPA + 1% Natural Wet**  
**81°F at application**



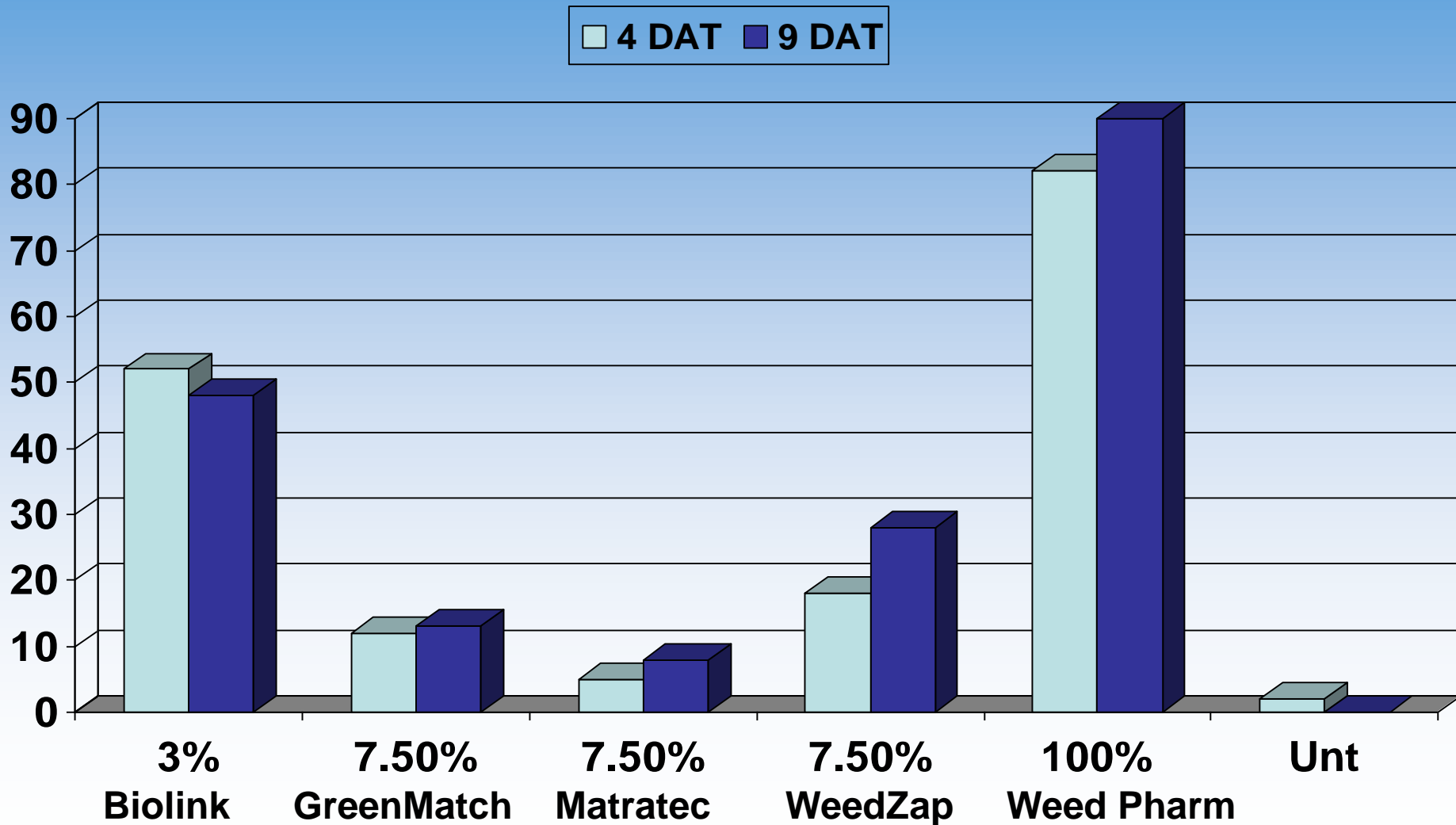


The background image shows a close-up of dry, cracked soil. The soil is dark brown and black in some areas, with numerous fine cracks running across it. Several clumps of dead, yellowish-brown grass are scattered on the surface, particularly on the left side. The text is overlaid in the upper right quadrant.

**WeedZap 10% 70 GPA  
+ 0.5% Natural wet**

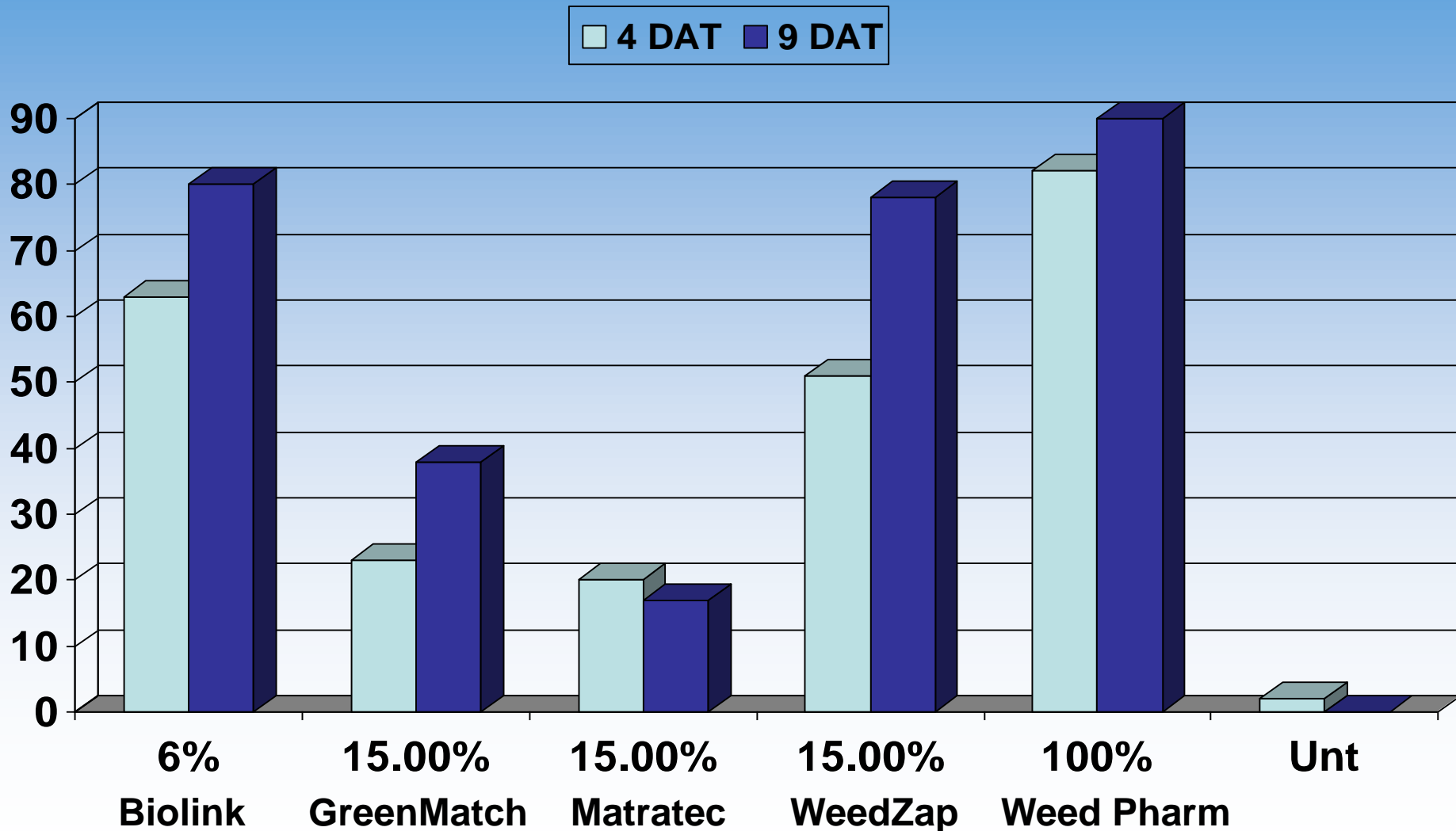


# Plantain Control with Organic Herbicides





# Plantain Control with Organic Herbicides





A close-up photograph of the ground surface. It shows a mix of green, low-growing plants with small, rounded leaves and numerous brown, dried, and curled leaves. The plants are growing in a dark, moist-looking soil. The overall appearance suggests a natural or semi-natural ground cover, possibly after a rain event or in a shaded area.

**Biolink 3 % v/v – 9 DAT**





Biolink 6 % v/v – 9 DAT





**GreenMatch 7.5% v/v – 9 DAT**





GreenMatch 15% v/v – 9 DAT





Matratec 7.5 % v/v – 9 DAT





**Matratec 15% v/v – 9 DAT**





WeedZap 7.5 % v/v – 9 DAT





**WeedZap 15 % v/v - 9 DAT**





Weed Pharm 100% - 9 DAT





Untreated





Organic adjuvants



**Matran 10% - 2 DAT**





**Matran 10% + Organic Adjuvant 1% - 2 DAT**







**GreenMatch**



**Matran**



**Weed Zap**



# Organic Herbicides

- Good spray coverage is essential – 70 GPA
- Work better in warm weather (25°C)
- Organic adjuvants improve weed control
- Small weeds easier to control
- Repeat applications are needed for larger weeds



# Questions?

