



***2010 Louisiana Agricultural  
Technology & Management  
Conference***

**FMC**

**Emerging Technologies  
Session II**

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# ***Broadhead™ Herbicide***

- New pre-emergent soil applied / post-emergent pre-flood rice herbicide for control of tough grass and broadleaf weeds of rice.
- Registered U.S. EPA September 23, 2009.
- Crop segment: MidSouth rice.
- Unique combination of 2 long-trusted and valuable weed control tools.
  - carfentrazone (Aim®)
  - quinclorac (Facet®, Quinstar®)
- carfentrazone/quinclorac premix
  - F7275
  - 1:16.7 ratio
  - 70 DF formulation



# ***Multiple Modes of Action For Resistance Management***

## **Broadhead™ Active Ingredient**

## **Chemistry Class**

## **Mode of Action**

Carfentrazone

Trazolinone

PPO-Inhibitor

Quinclorac

Quinolincarboxylic Acid

Auxin Disruption in broadleaf weeds  
 . Cell Wall Biosynthesis Inhibitor in grass weeds.

**Broadhead Controls Propanil Resistant Barnyardgrass in addition to Susceptible Barnyardgrass.**



Untreated  
6-20-09 – Pre-Flood



Broadhead 8 oz/A +  
COC 1% v/v  
Applied 6-10-09  
Photo 6-20-09 Pre-Flood



Untreated  
6-30-09- Post Flood



Broadhead 8 oz/A +  
COC 1% v/v  
Applied 6-10-09  
Photo 6-30-09 Post Flood



# ***Broadhead™ Herbicide***



## **Application Timing:**

- **Dry-seeded rice**
  - **Pre-emergent**
  - **Delayed pre-emergence (prior to crop emergence)**
  - **Post-emergence (2-leaf rice or greater)**
- **Water-seeded rice**
  - **Post-emergence (2-leaf rice or greater)**
- **Ground (minimum of 10 GPA) or air (minimum of 5 GPA)**



# ***Broadhead™ Herbicide***



## **Pre-emergent Soil Application:**

- Apply before, during or after planting but prior to rice emergence in dry-seeded production
- Do not apply pre-emergent in water-seeded system
- Moist soil is required for activation
- Weed control reduced under dry soil conditions
- Rates based on soil texture



# **Broadhead™ Herbicide**

## **Pre-emergence Use Rates**



### **Pre-emergence application rates per soil type in dry-seeded rice culture**

<b>Soil Texture</b>	<b>BROADHEAD (lb ai/a)</b>	<b>BROADHEAD (oz. product per acre)</b>
Sand or loamy sand	DO NOT USE	
Sandy loam	0.175 – 0.35	4.0 to 8.0
Loam, silt loam, silt, or sand clay or sandy clay loam	0.35 – 0.47	8.0 to 10.7
Silty clay loam, clay loam, clay loam or clay	0.47 – 0.53	10.7 to 12.1
Do not use pre-emergence in water-seeded rice systems		



# ***Broadhead™ Herbicide***



## **Post-emergent Pre-flood Application:**

- Use rates range of 4.0 – 12.1 oz/a
- Rate based on weed size
  - Target weeds less than 2 inches tall: 4.0 – 12.1 oz/a
  - Target weeds 3-4 inches tall: 8.0-12.1 oz/a
- Apply to rice at 2 leaf stage or larger but prior to flooding
- Adjuvant requirement
  - NIS 0.25% v/v (1 qt per 100 gallon spray solution)
  - COC at 0.5 to 1.0 % v/v (2-4 qts per 100 gallon spray solution)





# Broadhead™ Product Composition by Rates

## Equivalent Product Mix Chart

Broadhead 70 DF	carfentrazone	Aim 2 EC	quinclorac	quinclorac 75 DF
oz/A	lb ai/A	oz/A	lb ai/A	oz/A
4.0	0.010	0.6	0.17	3.5
5.0	0.012	0.8	0.21	4.4
6.0	0.015	0.9	0.25	5.3
7.0	0.017	1.1	0.29	6.2
8.0	0.020	1.2	0.33	7.1
9.0	0.022	1.4	0.37	7.9
10.0	0.024	1.6	0.41	8.8
11.0	0.027	1.7	0.45	9.7
12.0	0.029	1.9	0.50	10.6





# Weeds Controlled By the Broadhead™ Herbicide Per Approved Labeling



## BROADLEAVES

- Cocklebur, common
- Purslane, common
- Cutleaf ground-cherry
- Eclipta
- Sesbania, hemp
- Copperleaf, Hophornbeam
- Jointvetch species
- Morningglory species
- Smartweed, Pennsylvania
- Pigweed species
- Redweed
- Spreading dayflower
- Water hyssop



## GRASSES

- Barnyardgrass
- Broadleaf signalgrass
- Junglerice
- Large crabgrass



# Weed Control



	University of Arkansas – Rowher, AR 2009 (Data courtesy Dr. Ken Smith)		University of Arkansas – Lonoke, AR 2009 (Data courtesy Dr. Bob Scott)	
Treatment	Hemp Sesbania Control (%)	Morningglory Control (%)	Northern Jointvetch Control (%)	Smartweed Control (%)
Untreated	0	0	0	0
Broadhead™ 8 oz/A + COC 1% v/v	87	91	94	95
Broadhead™ 10.2 oz/A + COC 1% v/v	98	100	96	100
Facet® 75DF 10.6 oz + COC 1% v/v	78	68	95	100
AIM® EC 1.8 oz/A + COC 1% v/v	87	95	75	100

*All of the above applications were made postemergence to rice 2-5 leaf stage prior to flood. A pre-emergence Command® 3ME application was made ahead of the above treatments.*



# Weed Control



	MSU – Stoneville, MS 2009 (Data courtesy Dr. Jason Bond)		LSU – Crowley, LA 2009 (Data courtesy Dr. Eric Webster)	
Treatment	Hemp Sesbania Control (%) 12 DAT	Morningglory Control (%) 12 DAT	Indian Jointvetch Control (%) 35 DAT	Texasweed Control (%) 35 DAT
Untreated	0	0	0	0
Broadhead™ 8 oz/A + COC 1% v/v	96	97	70	90
Broadhead™ 10.2 oz/A + COC 1% v/v	98	98	65	90
Facet® 75DF 10.6 oz + COC 1% v/v	79	95	80	80
AIM® EC 1.8 oz/A + COC 1% v/v	98	96	40	73

*All of the above applications were made postemergence to rice 2-5 leaf stage prior to flood. A pre-emergence Command® 3ME application was made ahead of the above treatments.*



# **2009 Data Summary – Broadleaf weed control data in Clearfield Rice**

<b>Treatment</b>	<b>Rate</b>	<b>Timing</b>	<b>5 Location % Control SEBEX (14 DAT)</b>	<b>5 Location % Control IPOSS (14 DAT)</b>
1. Newpath® 2L	4 oz/A	3-4 leaf	10	70
2. Newpath® 2L	4 oz/A	1-3 leaf	94	93
+ Broadhead™ 70 WG	8 oz/A	1-3 leaf		
3. Newpath® 2L	4 oz/A	1-3 leaf	95	94
+ Broadhead™ 70 WG	16 oz/A	1-3 leaf		
4. Newpath® 2L	4 oz/A	3-4 leaf	55	89
+ Facet ® 75 WG	0.67 lb /A	3-4 leaf		
5. Newpath® 2L	4 oz/A	3-4 leaf	98	91
+ Aim® 2 EC	1.56 oz/A	3-4 leaf		
6. Newpath® 2L	4 oz/A	1-3 leaf	96	94
+ Stam® M-4 4 EC	3 lb/A	1-3 leaf		
+ Facet® 75 WG	0.44 lb ai/A	1-3 leaf		
7. Untreated	0	-	0	0

\*All treatments had a pre application of Command 3ME at 12.8 oz/A (0.3 lb ai/A ),except for the untreated. Treatments # 1 -4 & 6 had a COC @ 1.0% v/v for each post timing. Treatment 5 had a COC @ 1.0% v/v for first post timing and a NIS 0.25% V/V for the second post timing. Treatments 1,4 & 5 had a early post application of

# Crop Response

Treatment	Percent Rice Injury (Average of three trials)	
	8-13 DAT	23-35 DAT
Untreated	0	0
Broadhead™ 8 oz/A + COC 1% v/v	5	0
Broadhead™ 10.2 oz/A + COC 1% v/v	5	2
Facet® 75DF 10.6 oz + COC 1% v/v	1	0
AIM® EC 1.8 oz/A + COC 1% v/v	5	2

*All of the above applications were made postemergence to rice 2-5 leaf stage prior to flood. A pre-emergence Command® 3ME application was made ahead of the above treatments.*



# 2009 Results

*Crop Response data in Conventional Rice, average of 5 locations\**

Treatment	Rate	Timing	% Crop Phyto 7 -14 DAT
1. Broadhead™ 70 WG + NIS	4 oz/A	3-4 leaf	0.8
2. Broadhead™ 70 WG + NIS	8 oz/ A	3-4 leaf	1.0
3. Broadhead™ 70 WG + NIS	12 oz/A	3-4 leaf	0.6
4. Broadhead™ 70 WG + COC	4 oz/A	3-4 leaf	1.0
5. Broadhead™ 70 WG + COC	8 oz/ A	3-4 leaf	1.2
6. Broadhead™ 70 WG + COC	12 oz/A	3-4 leaf	2.0
7. Broadhead™ 70 WG + COC	24 oz/A	3-4 leaf	2.2
8. Command® 3 ME	11 oz/A	PRE	1.4
9. Facet® 75 WG + COC	0.67 lb/A	3-4 leaf	1.2
10. AIM® 2 EC + COC	2 oz/A	3-4 leaf	1.3
11. Untreated	0	-	0

•All treatments above except for 8 + 11 received a base PRE treatment of Command ® 3ME at 11 oz/A (0.25 lb ai /A). Only two location of five showed any insignificant crop phyto response.



# 2009 Data Summary

**Crop Response data in Clearfield Rice, average of 6 locations\***

Treatment	Rate	Timing	% Crop Phyto 6 -14 DAT
1. Newpath® 2L	4 oz/A	3-4 leaf	2.8
2. Newpath® 2L	4 oz/A	1-3 leaf	7.2
+ Broadhead™ 70 WG	8 oz/A	1-3 leaf	
3. Newpath® 2L	4 oz/A	1-3 leaf	8.2
+ Broadhead™ 70 WG	16 oz/A	1-3 leaf	
4. Newpath® 2L	4 oz/A	3-4 leaf	3.3
+ Face®t 75 WG	0.67lb /A	3-4 leaf	
5. Newpath® 2L	4 oz/A	3-4 leaf	2.2
+ Aim® 2 EC	1.56 oz/A	3-4 leaf	
6. Newpath® 2L	4 oz/A	1-3 leaf	3.9
+ Stam® M-4 4 EC	3 lb/A	1-3 leaf	
+ Facet® 75 WG	0.44 lb /A	1-3 leaf	
7. Untreated	0	-	0

\*All treatments had a pre application of Command® 3ME at 12.8 oz/A (0.3 lb ai/A) ,except for the untreated. Treatments # 1 -4 & 6 had a COC @ 1.0% v/v for each post timing. Treatment 5 had a COC @ 1.0% v/v for first post timing and a NIS 0.25% V/V for the second post timing. Treatments 1,4 & 5 had a early post application of Newpath at 4 oz/A.





**BROADHEAD™**  
HERBICIDE



University of Arkansas SEREC – Rowher,  
AR Trial HRI-31109, Dr. Ken Smith

Treatment 1

**UNTREATED**

101, 204, 307, 409



University of Arkansas SEREC – Rowher,  
AR Trial HRI-31109, Dr. Ken Smith

Treatment 3

COMMAND 3ME	0.25 lbs ai /A	10.7 oz/A	PRE	A 5-1-09
F2275-2	0.35 lbs ai /A	8 oz/A	1-2 Leaf Rice	B 5-29-09
COC		1 % v/v	1-2 Leaf Rice	B 5-29-09







**Untreated**

University of Arkansas, ARS - Station  
4811 Hwy 261, Stuttgart, AR 72470  
Treatment 1  
**UNTREATED**  
FMC



**Broadhead™**

**Command® 3 ME @ 0.25 lb ai/a  
fb  
Broadhead™ 70 DF @ 8.0 oz/a**

University of Arkansas, ARS - Station  
4811 Hwy 261, Stuttgart, AR 72470  
Treatment 2  
FMC



# ***Broadhead™ Herbicide***



## **Restrictions:**

- **60 day PHI**
- **Do not apply more than 12.1 oz/a per season**
- **Do not apply more than 0.5 lb ai/a quinclorac product per season**
- **Do not apply more than 0.138 lb ai.a carfentrazone product per season**
- **Do not apply to heading rice**
- **Do not apply to precision-cut fields until the second rice crop**



# Broadhead™ Herbicide Value

## Grower Expectations

*“Innovative herbicide technology that controls tough grasses and broadleaf weeds - improving yield and grain quality.”*

### Broadhead Features

- **Clearfield® rice growers:**
  - Controls key weed species that escape NewPath®, with two complementary, non-ALS actives.
  - Contact and residual control of grasses, excellent control of hemp sesbania, morningglories, jointvetch species, smartweed and other broadleaves.
  - Minimizes dockage from contamination by black seeded weeds.
- **Conventional rice growers:** An economical base herbicide program with the proven active ingredients providing control of the widest variety of grass and broadleaf weeds.

### Broadhead Advantages

- Multiple non-ALS modes of action for herbicide resistance rotation.
- Rapid, dual-action control of barnyardgrass, broadleaf signalgrass, hemp sesbania (coffeebean) and morningglories with good crop safety.
- Controls broadleaves that escape stand-alone applications of NewPath herbicide, or the quinclorac brands, Facet® and Quinstar®.
- Recommended following a full-rate pre application of Command® 3ME Herbicide, or with the 2nd shot in a Command split application program.



BROADHEAD<sup>®</sup>  
HERBICIDE

## ***Conclusion***

Broadhead™ will be an excellent Mid-South rice herbicide for control of key annual grasses and more broadleaf's than propanil or quinclorac. Applied at the 2 leaf stage or later, it rapidly controls yield-robbing weed competition with excellent crop safety.



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**BROADHEAD.**  
HERBICIDE

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Thank You

***Rusty Mitchell***

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