# Determination of Growing Degree Days to Manage a Warm-Season Annual Weed in a Cool Season Pasture

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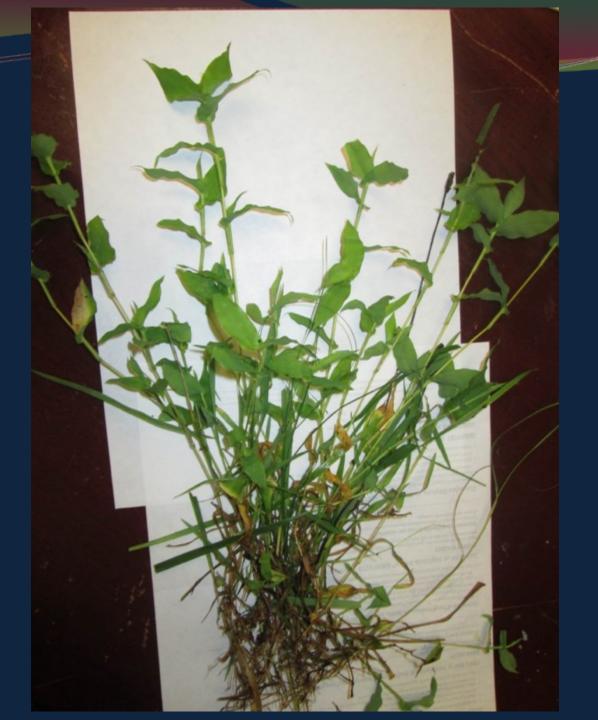
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## Introduction

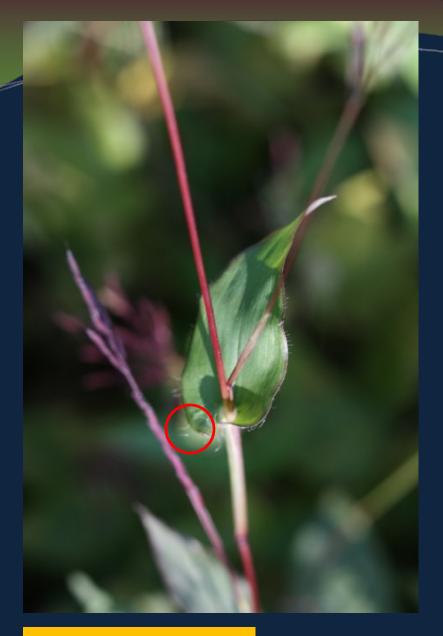
- Jointhead Arthraxon (Arthraxon hispidus (Thunb.)
   Makino)
- Synonyms: Small carpetgrass, jointhead grass
- Non-native annual grass
  - Introduced to USA from far east in late 1800s
  - Present in most mid-Atlantic and Southeastern states
- Considered unpalatable to livestock
- Displaces native forages in pasture
- Increasingly prevalent in the Appalachian region



Photo – C. Talbott







Jointhead arthraxon



Deer-tongue grass (*Dichanthelium clandestinum*)

# Objective

• Determine Growing Degree Days (GDD50) requirement of Jointhead Arthraxon germination to time the application of pre-emergence herbicide or other management efforts.

# **Experimental Details**

- Two field experiments at a producer's farm near Lost Creek, West Virginia (2016, 2017)
- Permanent cool-season pasture with history of problem weed during past 3-5 years
- Native forages Tall fescue, KY bluegrass, orchardgrass, and mixture of clovers

#### **Growing Degree Days**

$$GDD_{(50)} = (Mean temperature) - 50$$

E.g. 
$$Max temp = 70F$$
  
 $Min temp = 60F$ 

$$GDD_{(50)} = ((70+60)/2) - 50$$
  
= 65 - 50  
= 15

Determine the cumulative GDD<sub>(50)</sub> for the Julian Calendar (January 1<sup>st</sup>)

#### Growing Degree Days (Buckhannon, WV)

	GDD <sub>(50)</sub>				
Month	2016	2017	Avg. *		
January	0	13.5	0		
February	2.1	48	0		
March	87.2	62.5	0		
Till April 25 <sup>th</sup> (Cumulative)	207.3	217 (April 18 <sup>th</sup> )	8**		

<sup>\*</sup> Historic averages: http://www.weather.intellicast.com/Local/History.aspx?month=1

<sup>\*\*</sup>Note: Based on historic average, 207 GDD<sub>(50)</sub> was reached on May 22<sup>nd</sup>



April 25, 2016 (207 GDD)



April 12th, 2017 (157 GDD)



April 18th, 2017 (217 GDD)

#### Treatments 2016

- Pendimethalin 4.484 kg ai ha<sup>-1</sup> (4 lb ai A<sup>-1</sup>)
- Pendimethalin + glyphosate 1.12 kg ae ha<sup>-1</sup> (1.0 lb ae A<sup>-1</sup>)
- Glyphosate (Treated Control) 1.12 kg ae ha<sup>-1</sup> (1.0 lb ae A<sup>-1</sup>)
- Untreated Control
  - Four replications arranged as RCB



Pendimethalin + Glyphosate

Pendimethalin

Photo taken June 29, 2016; 2 MAT

### Jointhead grass Control

#### Visual Control

	Appl. Rate	May 23 (1 MAT)	June 29 (2 MAT)	Oct. 26 (6 MAT)
Treatment	- kg ai/ha -		%	
Pendimethalin	4.48	95	95	96
Pendimethalin + Glyphosate	4.48+ 1.12	98	98	99
Glyphosate	1.12	O	O	О
Control		O	O	0
LSD*		12	21	0.3

<sup>\*</sup> LSD – Least Significant Difference at *P*=0.05

## Jointhead grass Dry Matter Weight

Treatment		Dry Matter
	Appl. Rate	Oct. 26 (6 MAT)
	- kg ai/ha -	T/ha
Pendimethalin	4.48	0.6
Pendimethalin + Glyphosate	4.48+ 1.12	0.0
Glyphosate	1.12	23.71
Control		19.1
LSD*		0.2

<sup>\*</sup> LSD – Least Significant Difference at *P*=0.05





Photo taken 6 MAT

# **Concluding Remarks**

- Growing Degree Days (GDD50) requirement of Jointhead Arthraxon germination determined to be approximately 200
- Pendimethalin at 4.24 kg ai/ha applied PRE provided acceptable seasong-long control of jointhead Arthraxon in a cool-season pasture

## Acknowledgments

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BASF (for addressing a request from mid-Atlantic Agronomy Weed Scientists to secure a label for Prowl H2O in forages) Thank You!

Questions?