

Chemical Induction of Flowering in Tobacco

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Background Information

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- On rare occasions, premature flowering is observed in transplants that are treated with Terramaster, a fungicide registered for the control of pythium in float beds.
- **Flowering is at very low frequencies and is generally associated with high fungicide rates, transplants that are held for extended periods prior to transplanting, and occurs primarily around the perimeter of the float bed.**

Objective

- **To determine if high rates of Terramaster can be utilized to initiate premature flowering in tobacco**

Initial Study

- **Greeneville, TN and Lexington, KY**
- **Burley Breeding Lines TKF 2002 and TKF 7022**
- **Plants were seeded in flats, with 33 seedlings of each line transferred to 242 cell float trays 21 days after seeding**

Initial Study

- **Terramaster was added to the float water at 1X, 2X, 4X, 6X, 10X, 15X, 20X, 50X and 100X the labeled rate.**
- **Fertility at 100 ppm 20-10-20 was maintained throughout the study**

Initial Study Greeneville

- **Ambient light and minimum temperature of 5°C**
- **Seeded 1-29-09**
- **Seedlings transferred to float trays 21 days post seeding**
- **Terramaster treatments were added 28 days post seeding**

Initial Study

Lexington

- **Study was duplicated**
 - **A. Supplemental light from 1000 watt high pressure sodium bulbs provided from 6 a.m. – 8 p.m.**
Temperature maintained between 21 and 25°C
 - **B. Identical to A except plants were shaded with a double layer of a Continental brand plant bed cover**
- **Seeded 3-04-09**
- **Seedlings transferred to float trays 26 days post seeding**
- **Terramaster treatments were added 40 days post seeding**

Results

- **No premature flowering was observed at Greeneville, but stunting of plants was observed at rates higher than 4X**
- **Very low rate of premature flowering was observed in the shaded Lexington study, but stunting of plants was observed at rates higher than 4X**
- **Floral initiation was successful in the non-shaded Lexington study**

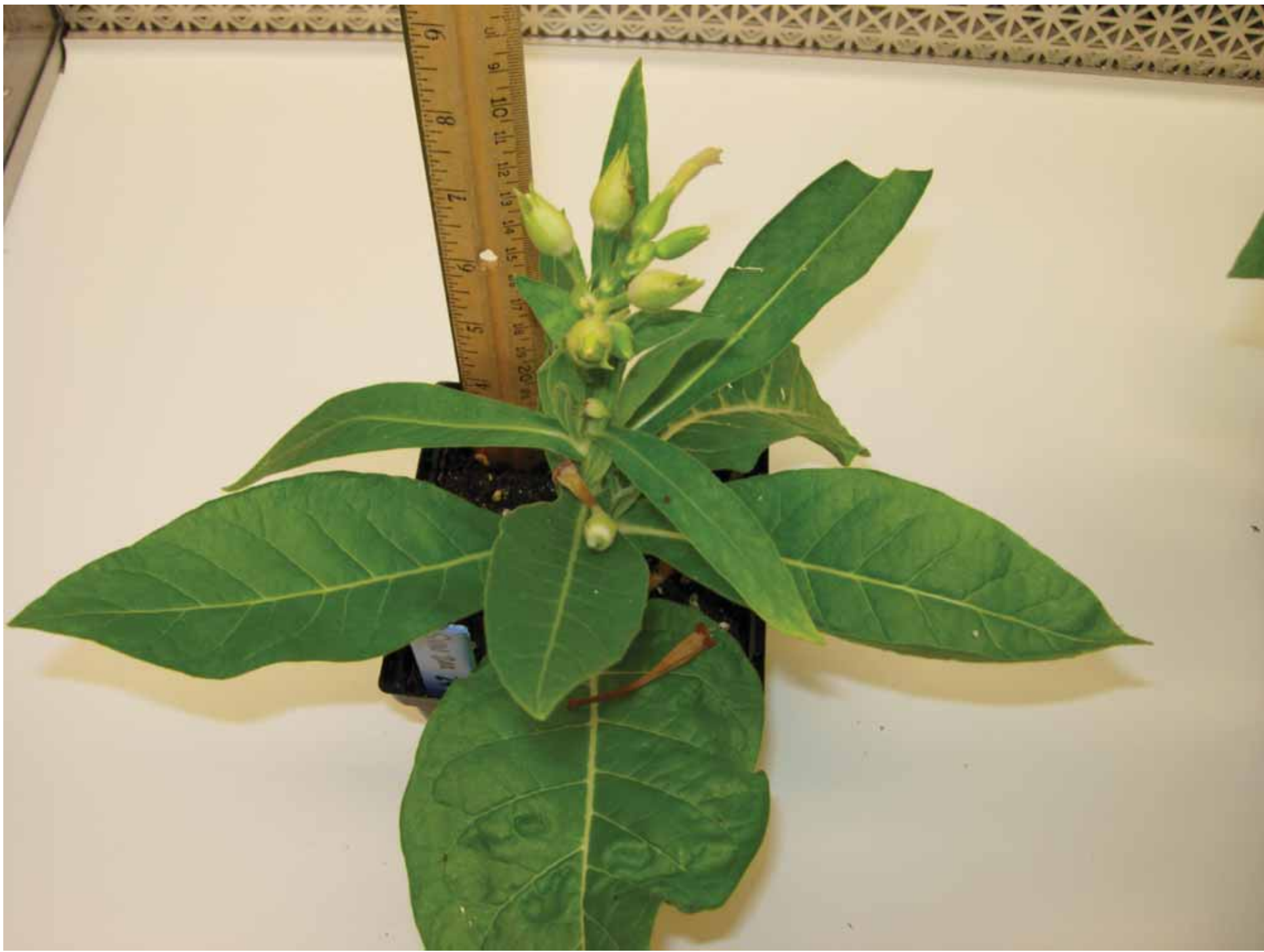
**Chemically Induced Floral Initiation
Concentration Response
Lexington, Non-Shaded**

Terramaster Concentration	Days From Seeding	TKF 2002		TKF 7022		Mean No Response
		Percent Bloom	No Response	Percent Bloom	No Response	
6X	70	6.3	93.8	9.4	90.6	92.2
	77	16.7	83.3	18.8	81.3	82.3
	88	46.9	53.1	65.6	34.4	43.8
10X	70	3.2	96.8	6.3	93.8	95.3
	77	12.9	87.1	15.6	84.4	85.7
	88	45.2	54.8	56.3	43.8	49.3
15X	70	3.0	97.0	6.3	93.8	95.4
	77	12.1	87.9	15.6	84.4	86.1
	88	33.3	66.7	65.6	34.4	50.5
20X	70	6.1	93.9	9.4	90.6	92.3
	77	15.2	84.8	18.8	81.3	83.0
	88	51.5	48.5	56.3	43.8	46.1
100X	70	0.0	100.0	3.2	96.8	98.4
	77	0.0	100.0	3.2	96.8	98.4
	88	0.0	100.0	6.5	93.5	96.8

Seeded: March 4, 2009

Terramaster: April 13, 40 days post seeding







**Terramaster
10 X Rate**
Sented - May 12, 2009
On chemical - June 10, 2009
First flower - July 20, 2009

**Terramaster
20 X Rate**
Sented - May 12, 2009
On chemical - June 10, 2009
First flower - July 20, 2009



Second Study

- **Greeneville, TN**
- **16 hours supplemental light, 21°C**
- **10X and 20X labeled rate for Terramaster**
- **50 PPM 20-10-20**
- **Tobacco Varieties K 326, NL Madole, TN 90LC, TKF 2002, and TKS 2002**
- **Four Replications, 128 cell trays**
- **16 plants of each line within each rep**

Chemically Induced Floral Initiation Effect of Variety and Terramaster Rate

Variety	Days From Seeding	10X Terramaster				20X Terramaster			
		Percent Pods	Percent Bloom	Percent Button	No Response	Percent Pods	Percent Bloom	Percent Button	No Response
K 326	77	0.0	62.5	12.5	25.0	0.0	50.0	21.9	28.1
	87	0.0	84.4	6.3	9.4	0.0	75.0	3.1	21.9
	104	89.7	6.9	0.0	3.4	93.1	6.9	0.0	0.0
NL Madole	77	0.0	56.3	31.3	12.5	0.0	40.6	34.4	25.0
	87	0.0	84.4	6.3	9.4	0.0	75.0	12.5	12.5
	104	86.2	10.3	3.4	0.0	82.8	13.8	3.4	0.0
TN 90	77	0.0	28.1	28.1	43.8	0.0	0.0	15.6	84.4
	87	0.0	50.0	15.6	34.4	0.0	37.5	15.6	46.9
	104	44.8	44.8	3.4	6.9	31.0	51.7	6.9	10.3
TKF 2002	77	0.0	6.3	9.4	84.4	0.0	25.0	15.6	59.4
	87	0.0	6.3	21.9	71.9	0.0	40.6	12.5	46.9
	104	0.0	55.2	10.3	34.5	44.8	34.5	6.9	13.8
TKS 2002	77	0.0	9.4	25.0	65.6	0.0	12.5	9.4	78.1
	87	0.0	21.9	25.0	53.1	0.0	25.0	18.8	56.3
	104	6.9	62.1	3.4	27.6	24.1	48.3	17.2	10.3

Seeded: September 4, 2009

Terramaster: October 1, 2009, 28 days post seeding

Chemically Induced Floral Initiation Effect of Terramaster Rate

Variety Maturity	Days From Seeding	10X Terramaster				20X Terramaster			
		Percent Pods	Percent Bloom	Percent Button	No Response	Percent Pods	Percent Bloom	Percent Button	No Response
K 326	77	0.0	59.4	21.9	18.7	0.0	45.3	28.2	26.5
and	87	0.0	84.4	6.3	9.3	0.0	75.0	7.8	17.2
NL Madole	104	88.0	8.6	1.7	1.7	88.0	10.4	1.7	3.4
	77	0.0	28.1	28.1	43.8	0.0	0.0	15.6	84.4
TN 90	87	0.0	50.0	15.6	34.4	0.0	37.5	15.6	46.9
	104	44.8	44.8	3.4	6.9	31.0	51.7	6.9	10.3
TKF 2002	77	0.0	7.8	17.2	75.0	0.0	18.8	12.5	68.8
and	87	0.0	14.1	23.4	62.5	0.0	32.8	15.6	51.6
TKS 2002	104	3.4	58.6	6.9	31.0	34.5	41.4	12.1	12.1

Seeded: September 4, 2009

Terramaster: October 1, 2009, 28 days post seeding

Chemically Induced Floral Initiation Effect of Variety and Terramaster Rate

Variety	Days From Seeding	10X Terramaster				20X Terramaster			
		Percent Pods	Percent Bloom	Percent Button	No Response	Percent Pods	Percent Bloom	Percent Button	No Response
K 326	78	0.0	20.8	16.7	62.5	0.0	18.8	20.8	60.4
	85	0.0	52.1	12.5	35.4	0.0	47.9	20.8	31.3
	100	50.0	20.8	12.5	16.7	33.9	26.8	10.7	14.3
NL Madole	78	0.0	10.9	15.6	73.4	0.0	14.1	15.6	70.3
	85	0.0	39.1	34.4	26.6	0.0	56.3	29.7	14.1
	100	34.4	42.2	15.6	7.8	39.1	48.4	12.5	6.3
TN 90	78	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
	85	0.0	1.6	1.6	96.9	0.0	1.6	1.6	96.9
	100	0.0	4.7	10.9	84.4	0.0	7.8	23.4	68.8
TKF 2002	78	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
	85	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
	100	0.0	1.6	4.7	93.8	0.0	3.1	15.6	81.3
TKS 2002	78	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
	85	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
	100	0.0	0.0	7.8	92.2	0.0	0.0	7.8	92.2

Seeded: October 7, 2009

Terramaster: October 27, 2009, 21 days post seeding

Chemically Induced Floral Initiation Effect of Terramaster Rate

Variety Maturity	Days From Seeding	10X Terramaster				20X Terramaster			
		Percent Pods	Percent Bloom	Percent Button	No Response	Percent Pods	Percent Bloom	Percent Button	No Response
K 326	78	0.0	15.9	16.2	68.0	0.0	16.5	18.2	65.4
and	85	0.0	45.6	23.5	31.0	0.0	52.1	25.3	22.7
NL Madole	100	42.2	31.5	14.1	12.3	36.5	37.6	41.6	10.3
	78	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
TN 90	85	0.0	1.6	1.6	96.9	0.0	1.6	1.6	96.9
	100	0.0	4.7	10.9	84.4	0.0	7.8	23.4	68.8
TKF 2002	78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
and	85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TKS 2002	100	0.0	0.8	6.3	93.0	0.0	1.6	11.7	86.8

Seeded: October 7, 2009

Terramaster: October 27, 2009, 21 days post seeding

Chemically Induced Floral Initiation Effect of Day Length on Percent Bloom

Variety Maturity	Days From Seeding	Seeded 9-04-09			Days From Seeding	Seeded 10-07-09	
		% Button or Later				% Button or Later	
		10X	20X			10X	20X
K 326	77	72.9	54.2		78	37.5	39.6
and	87	82.3	72.9		85	64.6	68.7
NL Madole	104	96.6	96.6		100	87.7	89.7
	77	56.2	15.6		78	0.0	0.0
TN 90	87	65.6	53.1		85	3.1	3.1
	104	93.1	89.7		100	15.6	31.2
TKF 2002	77	25.0	31.3		78	0.0	0.0
and	87	37.5	48.4		85	0.0	0.0
TKS 2002	104	69.0	87.9		100	7.0	13.2



















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- Premature floral initiation can be achieved using high rates of Terramaster

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- Premature floral initiation can be achieved using high rates of Terramaster
- Time of flowering appears to be delayed with decreasing day length
- Much more effective in flue-cured and dark tobacco (5X – 10X rate is sufficient)
- Less effective in burley tobacco, particularly with later maturing varieties (20X rate may be optimal)