Evaluating Concise™ Liner Dip Rates for Growth Regulation of Difficult-to-Control Perennials

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OBJECTIVE

The objective of this experiment was to evaluate hard to control perennials for response to Concise applied as a liner dip.

METHODS

- **Plant species:**
  - Miscanthus sinensis ‘Gracillimus’
  - Calamagrostis x acutifolia ‘Karl Foerster’
  - Phlox paniculata ‘David’
  - Coreopsis ‘Stairway to Heaven’
  - Rudbeckia ‘Goldsturm’
  - Gaillardia ‘Goblin’
- **Treatments**:
  - Liner dip: (medium “dry”, dip 2 min, single application)
  - Treatment time: Afternoon (sunny, low %RH)
- **Chemicals:**
  - CONCISE (uniconazole-P, 0.5 mg a.i./ml, Fine Americas) applied as a liner dip at 0, 1, 2, 3, 4, or 5 ppm

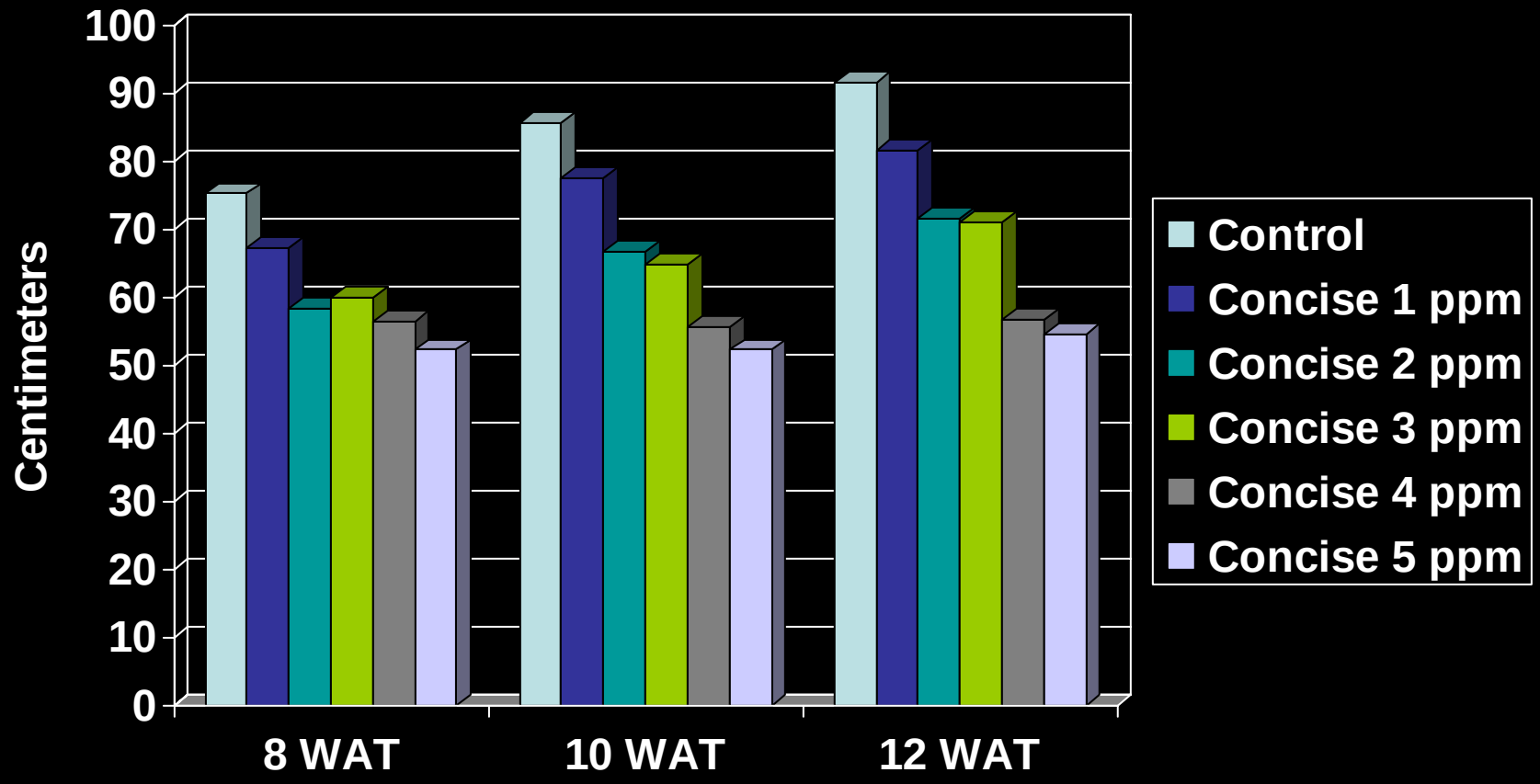
METHODS

- **EXPERIMENTAL DESIGN:**
  - Each species was set up as an individual experiment with plants arranged in a completely randomized design with 6 single plant replications.
- **DATA COLLECTED:**
  - At 2 week intervals after treatment (WAT): plant height and width (grasses, height only), flowering status.
- **TIMEFRAME:**
  - Plants received: April 27, 2006; grasses received 4/10/06
  - Set-up/treatment application: May 1, 2006
  - Potting: May 2, 2006 (except grasses)
  - Data collections: Day 0 and subsequently 2, 4, 6, 8, 10, 12 WAT

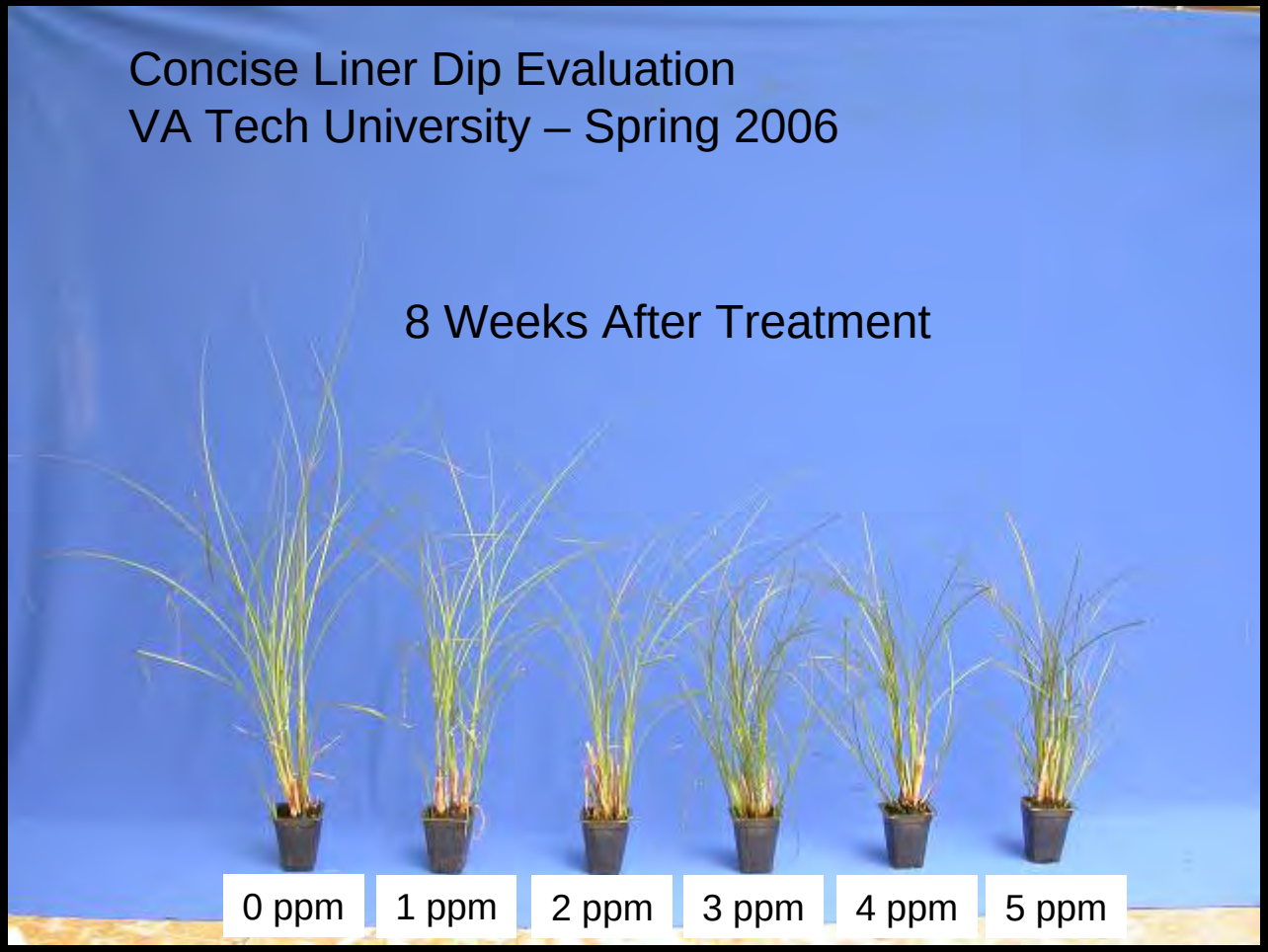
Miscanthus sinensis ‘Gracillimus’

Liner dip	Plant Height (cm)						
Rate (ppm)	**0 WAT**	**2 WAT**	**4 WAT**	**6 WAT**	**8 WAT**	**10 WAT**	**12 WAT**
0	22.3	43.4	57.3	61	75.3a	85.7a	91.7a
1	21.7	43.5	55.8	58	67.3ab	77.5ab	81.7ab
2	23.6	45.7	54.8	53.8	58.5bc	66.7bc	71.7b
3	21.9	42.1	50.2	52	60.0bc	65.0c	71.0b
4	23.8	47	53.8	54.7	56.5c	55.8cd	56.7c
5	22.9	43.8	51	51.5	52.3c	52.3d	54.7c
Main Effect	0.1108	0.5737	0.5616	0.2578	0.0013	<.0001	<.0001
LSD	1.7774	5.8169	9.0124	9.0201	10.394	11.041	11.266
Regression	0.1760L	0.6118L	0.1004L	0.0248L	<.0001L	<.0001L	<.0001L
r2	0.0532	0.0077	0.0774	0.1396	0.4149	0.6268	0.6605

Miscanthus sinensis ‘Gracillimus’



Miscanthus sinensis ‘Gracillimus’



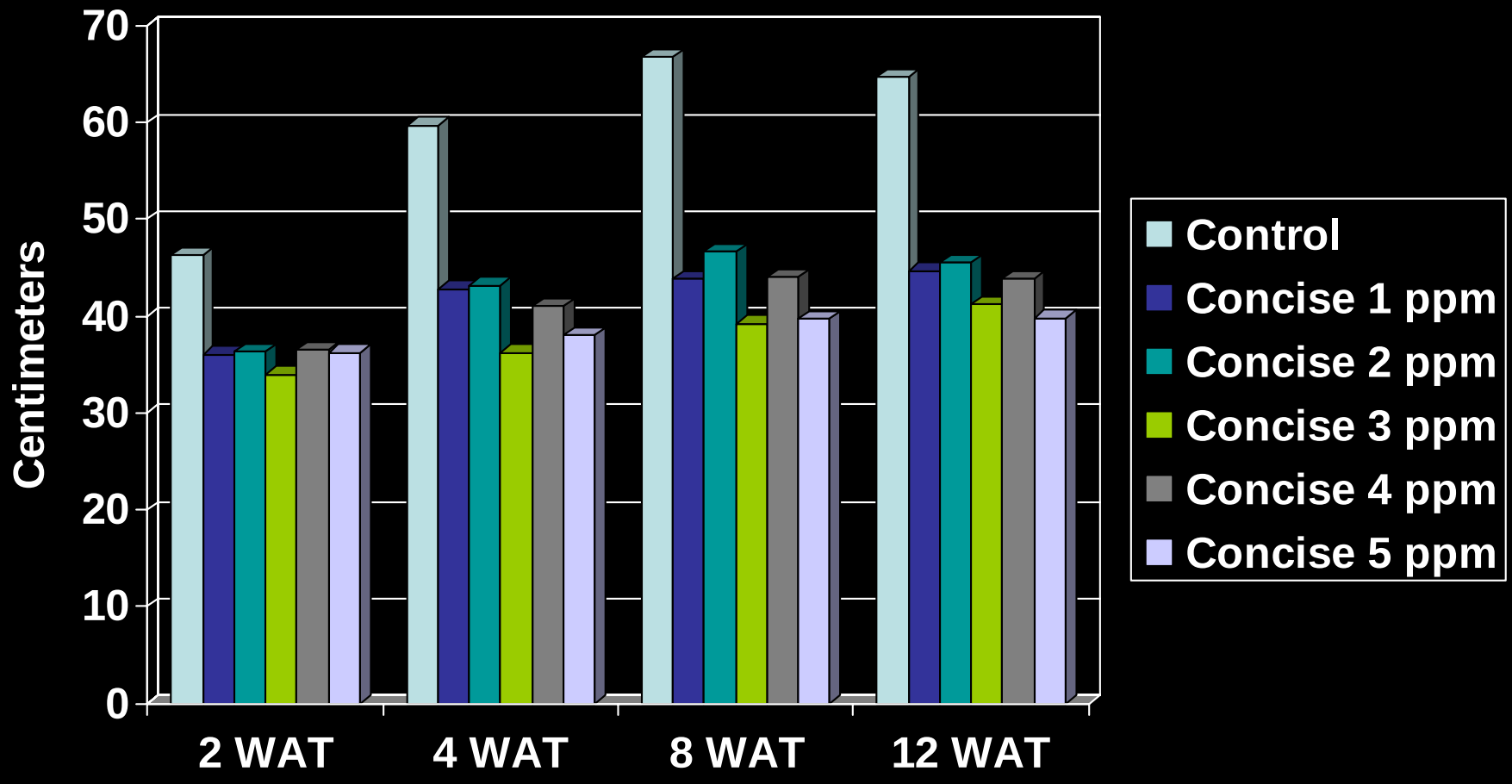
RESULTS
Miscanthus sinensis ‘Gracillimus’

Concise significantly reduced height of *Miscanthus* but the results were not apparent until 6 WAT by which time the plants had more than doubled in height. The linear regression of height over rate was significant at 6 WAT and each measurement after that. Plants treated with the higher rates, 4 and 5 ppm were essentially shut down at about 4 WAT and did not grow out of the treatment over the remaining measurement period. Recommended liner dip rates would be 1 or 2 ppm Concise. The *Miscanthus* did not flower during the experimental period.

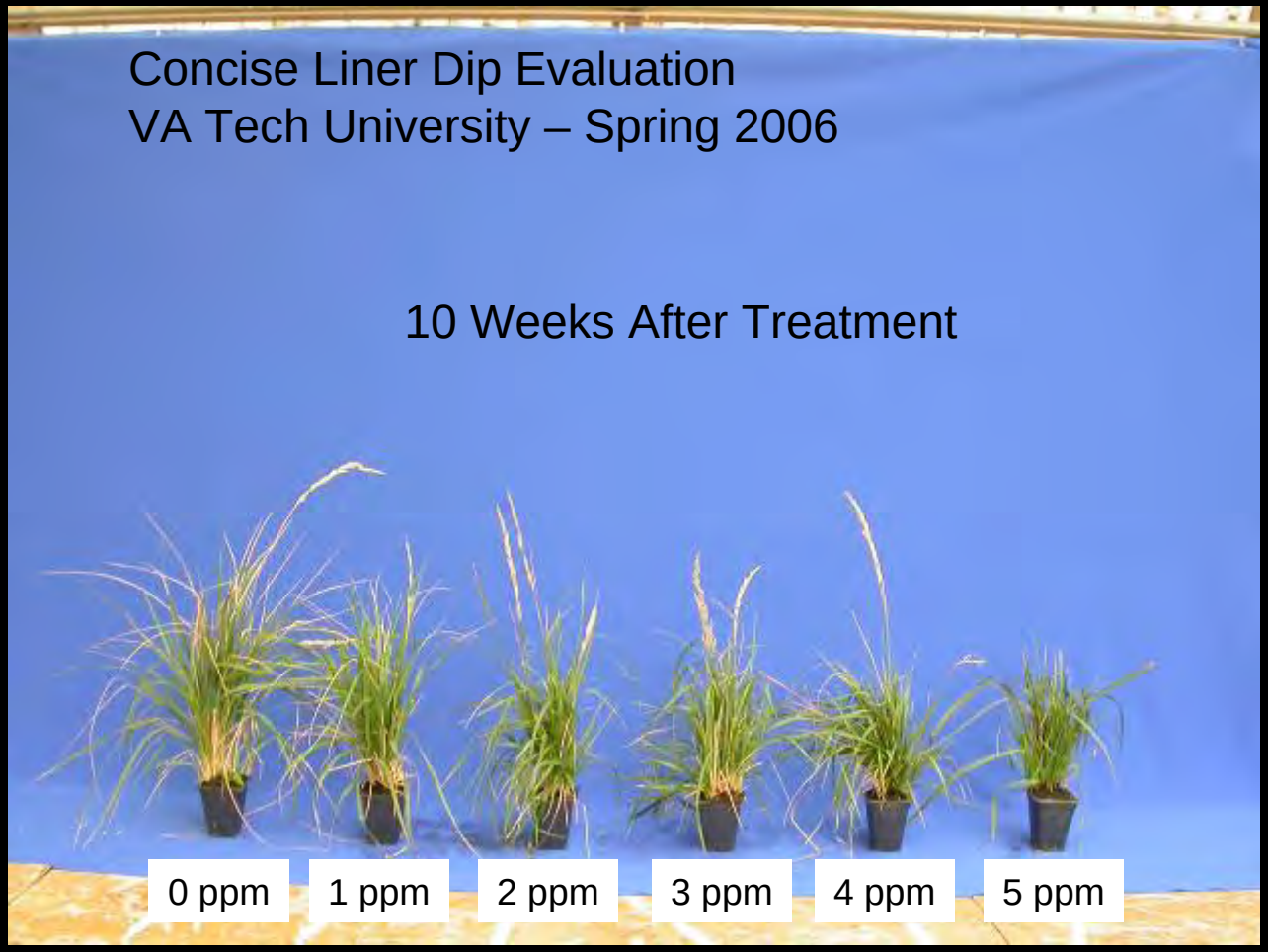
Calamagrostis x *acutifolia* ‘Karl Foerster’

Liner dip	**Plant Height (cm)**						
Rate (ppm)	0 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT
0	24.5	46.3a	59.7a	65.0a	66.8a	61.3a	64.7a
1	23.3	36.0b	42.8b	46.5b	43.8b	53.2ab	44.7b
2	23.8	36.3b	43.2b	45.7b	46.7b	46.2bc	45.5b
3	24.2	34.0b	36.2b	37.0b	39.2b	40.0c	41.2b
4	24.9	36.5b	41.0b	43.5b	44.0b	44.0bc	43.8b
5	25.3	36.2b	38.0b	37.7b	39.7b	39.7c	39.8b
Main Effect	0.6473	<.0001	0.0002	0.0002	<.0001	0.0083	0.0002
LSD	2.5611	3.7074	9.2388	10.964	10.403	12.423	9.8102
Regression	0.2061L	<.0001Q	0.0070Q	0.0146Q	0.0078Q	0.0004L	0.0121Q
r2	0.0466	0.5403	0.4537	0.4657	0.4515	0.3165	0.4418

Calamagrostis x *acutifolia* ‘Karl Foerster’



Calamagrostis x *acutifolia* ‘Karl Foerster’



RESULTS

Calamagrostis x *acutifolia* ‘Karl Foerster’

Calamagrostis was very responsive to the liner dips with significant reductions in plant height evident at 2 WAT with all rates. The rate response appeared to be saturated at the 1 ppm rate with the growth response quadratic except for 10 WAT. For production purposes, I would recommend liner dip rates less than 1 ppm.

Phlox paniculata 'David'

Liner dip	Plant Height (cm)					Average Width (cm)				
Rate (ppm)	0 WAT	2 WAT	4 WAT	6 WAT	8 WAT	0 WAT	2 WAT	4 WAT	6 WAT	8 WAT
0	7.1	9.8	14.1a	19.3a	28.0a	8.8	11.6a	16.8a	20.3a	20.8a
1	7.5	9	13.3a	19.0a	27.7a	8.8	10.8ab	13.3b	16.5b	15.8b
2	7.1	8.5	10.5b	14.0b	19.8bc	8.1	9.6c	12.3bc	16.1b	18.3ab
3	7.7	8.2	10.3b	14.9b	20.2b	8.3	9.6c	11.5c	15.2b	18.2ab
4	7	8.6	9.7b	14.1b	19.2bc	8.2	9.9bc	11.2c	14.3b	16.1b
5	7	7.8	9.1b	12.1b	15.8c	8.6	10.6b	11.7c	14.3b	16.3b
Main Effect	0.7808	0.0855	<.0001	0.0006	<.0001	0.5186	0.0005	<.0001	0.0002	0.0282
LSD	1.184	1.4157	2.0075	3.4609	4.2222	1.0061	0.9176	1.5101	2.4471	2.9865
Regression	0.6925Q	0.0050L	<.0001L	<.0001L	<.0001L	0.4021Q	<.0001Q	<.0001Q	0.0338Q	0.0098L
r2	0.0047	0.2099	0.5255	0.4154	0.5679	0.0207	0.4854	0.7145	0.5103	0.1807

Phlox paniculata ‘David’

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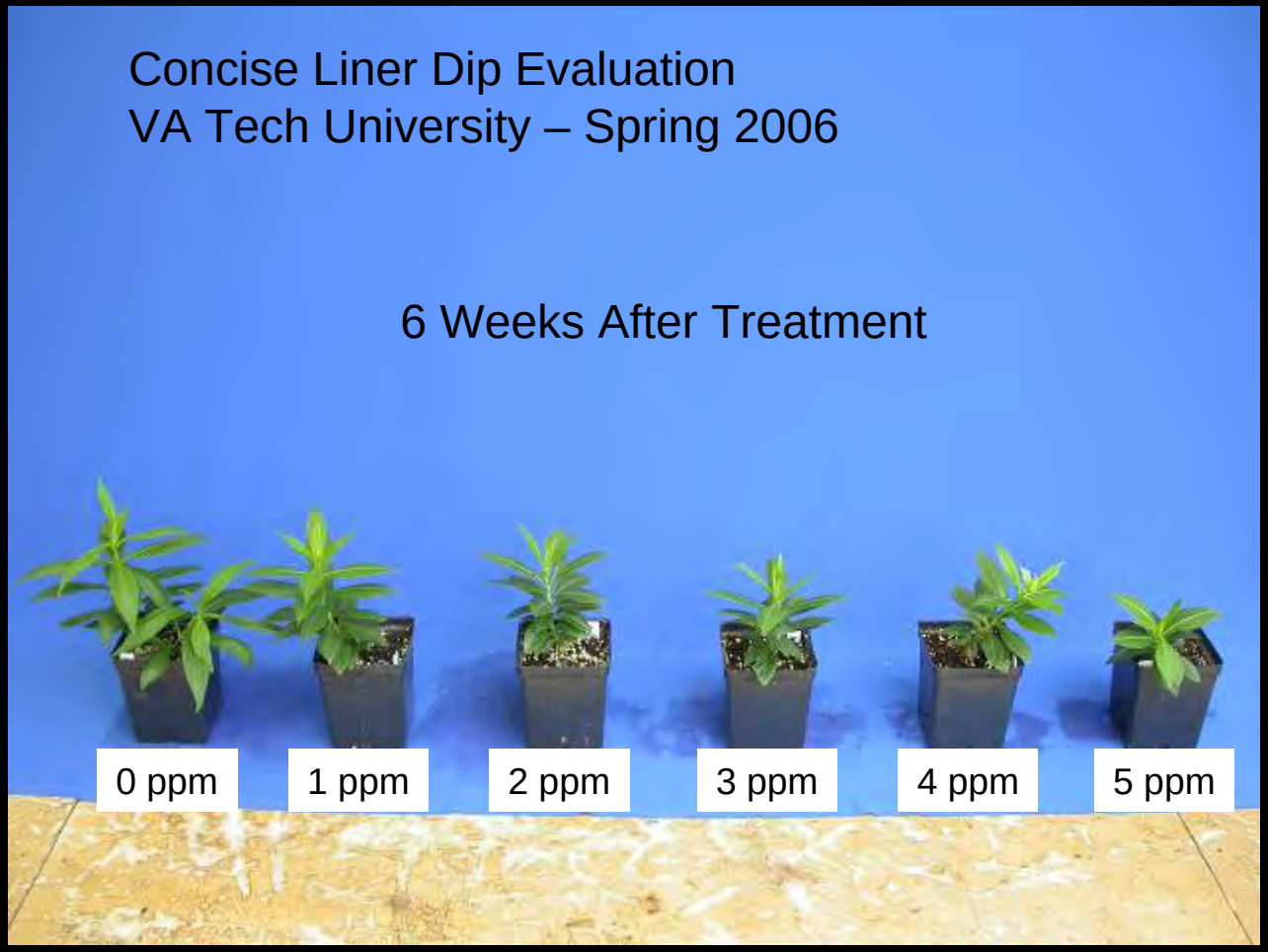


RESULTS

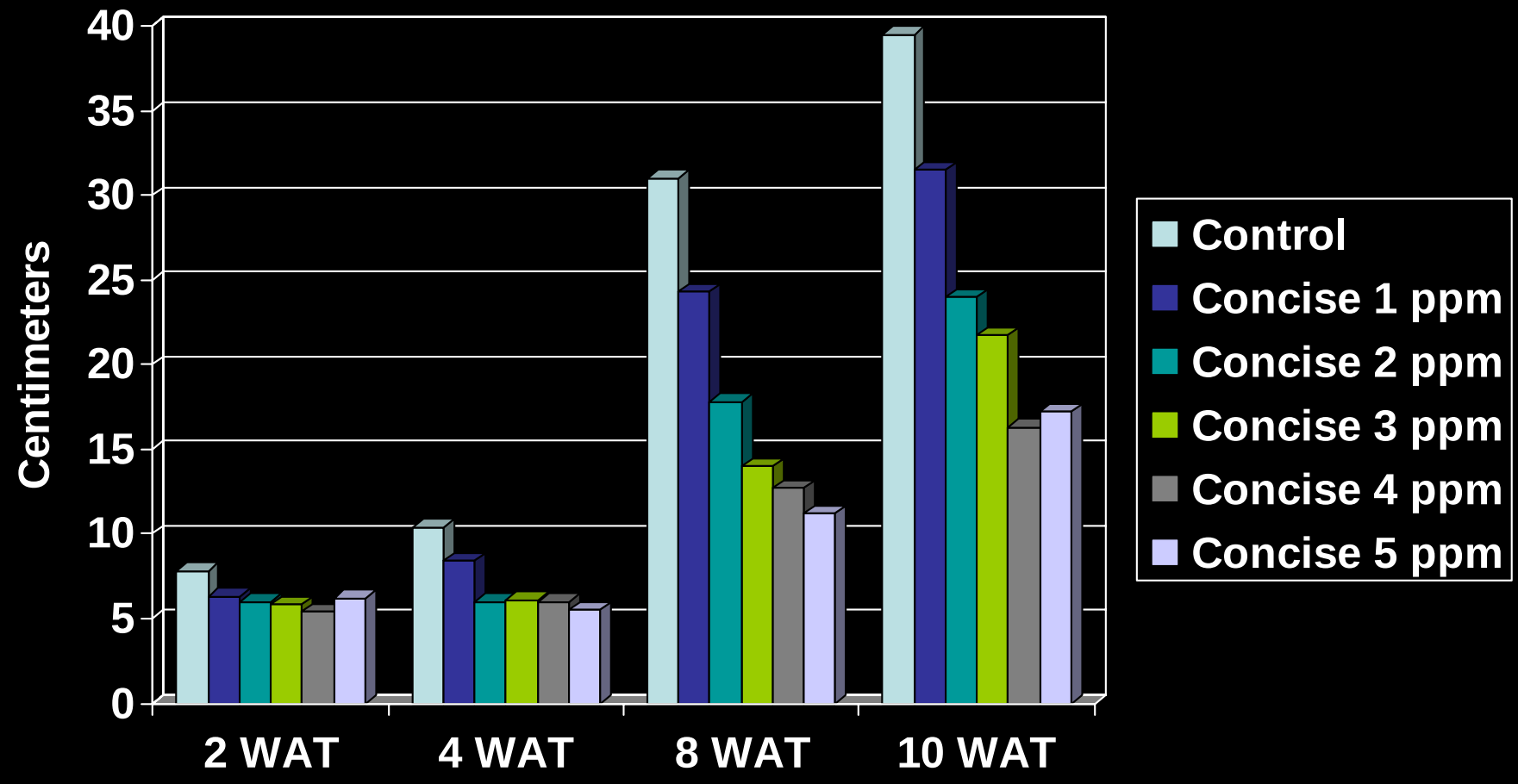
Phlox paniculata ‘David’

Phlox paniculata has typically been one of the most consistently hard to control perennials. However, it was responsive to a 2 ppm or higher liner dip with both height and width reductions at and after 4 WAT. The response was saturated at 2 ppm. Therefore, I would recommend starting with a lower liner dip rate such as 1.25 or 1.5 ppm for production use.

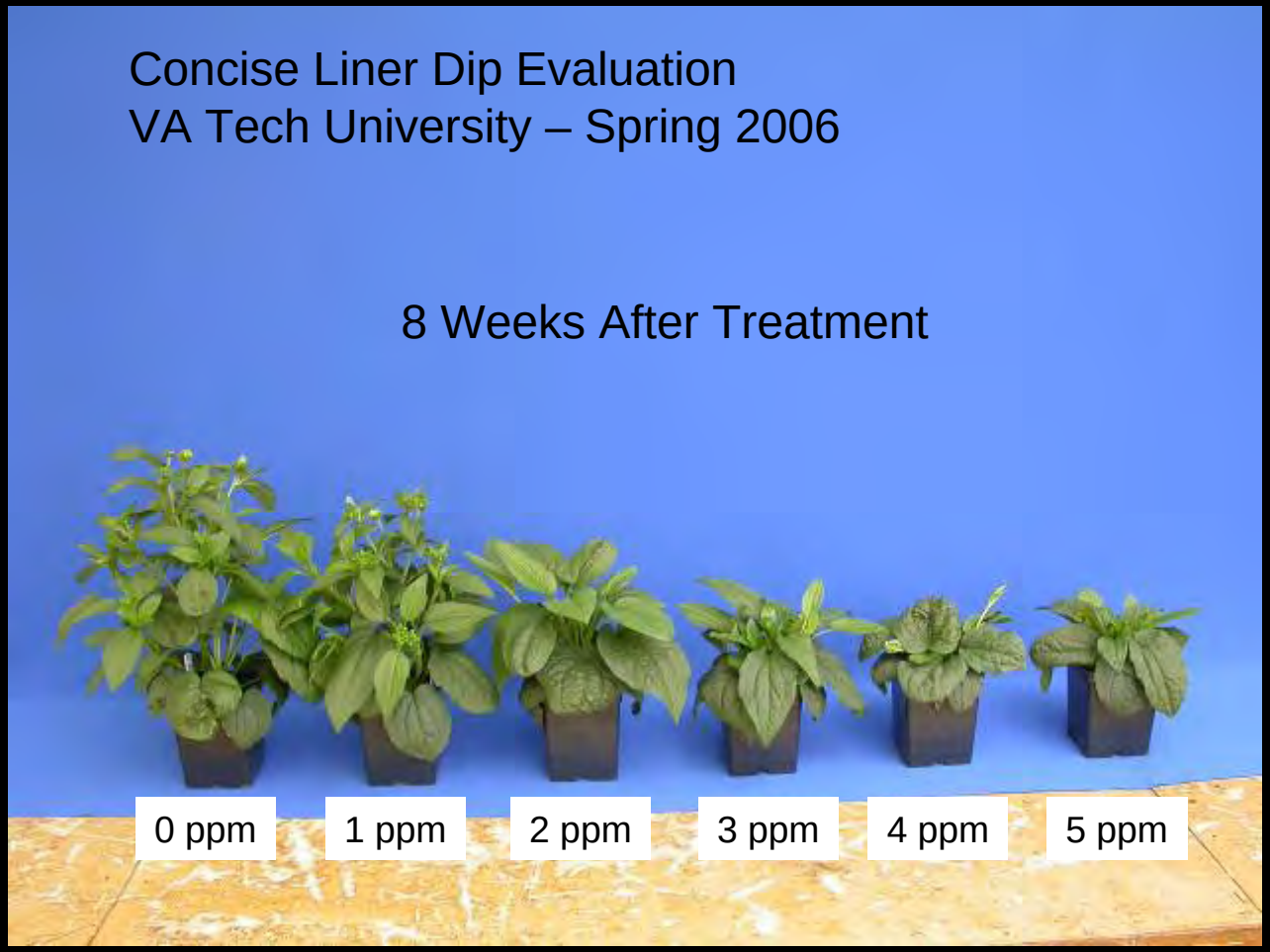
Rudbeckia fulgida var. *sullivantii* ‘Goldsturm’

Liner Dip Rate (ppm)	0 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT	12 WAT (Flower)
0	7.8	7.8a	10.4a	22.8a	31.0a	39.5a	42a
1	7.4	6.3b	8.4b	13.7b	24.3b	31.5b	33.3b
2	6.8	6.0b	6.0c	9.6c	17.8c	24.0c	26.2c
3	7	5.8b	6.1c	9.3c	14.0d	21.7c	23.0cd
4	7.2	5.4b	6.0c	7.9cd	12.7d	16.3d	13.0e
5	7.3	6.2b	5.5c	6.9d	11.2d	17.2d	18.2de
Main Effect	0.7694	0.0009	<.0001	<.0001	<.0001	<.0001	<.0001
LSD	1.3979	0.9767	1.2667	2.1648	3.2672	4.1437	0.7656

Rudbeckia fulgida var. *sullivantii* ‘Goldsturm’



Rudbeckia fulgida var. *sullivantii* ‘Goldsturm’



RESULTS

Rudbeckia fulgida var. *sullivantii* ‘Goldsturm’

Rudbeckia is fairly responsive to uniconazole sprays but was very responsive to the Concise liner dip treatments. Both plant height and width were reduced by 4 WAT. Growth responses were quadratic in most cases indicating that the response was saturated at the higher rates. The 1 ppm rate gave significant control of plant height without excessive reductions in plant width, and flower height was not adversely affected. Higher rates, especially 4 and 5 ppm, caused excessive reductions in flower stalk elongation which in some plants resulted in flowers opening below the foliage height. The 1 ppm liner dip rate should work well in production greenhouses.

Gaillardia x *grandiflora* ‘Goblin’

Liner dip	Plant Height (cm)					Average Width (cm)				
Rate (ppm)	0 WAT	2 WAT	4 WAT	6 WAT	8 WAT	0 WAT	2 WAT	4 WAT	6 WAT	8 WAT
0	7.6	9.3	12.8	18.0	21.2	11.3	23.7	31.1a	39.1	40.0
1	7.9	8.0	13.8	17.9	22.8	12.1	22.5	33.8a	41.4	42.3
2	8.3	8.4	13.1	17.1	22.3	11.0	21.5	31.3ab	41.0	41.8
3	7.3	6.8	11.0	16.1	23.3	10.8	20.5	30.6b	38.3	39.7
4	7.2	8.7	13.7	17.4	21.7	10.8	21.1	30.3b	36.2	37.6
5	7.4	7.4	12.5	16.0	21.8	11.6	20.5	29.6b	38.6	40.4
Main Effect	0.6889	0.066	0.2488	0.6698	0.8934	0.8193	0.0844	0.0137	0.2045	0.179
LSD	1.4863	1.6939	2.4474	3.1516	4.0418	2.2264	2.4879	2.9369	4.4551	3.7411
Regression	0.3466L	0.0870L	0.5908L	0.1629L	0.9416L	0.6631L	0.0041L	0.0002L	0.1200L	0.2213L
r2	0.0261	0.0837	0.0086	0.0565	0.0002	0.0056	0.2179	0.3324	0.0696	0.0437

Gaillardia x *grandiflora* ‘Goblin’

Gaillardia x *grandiflora* ‘Goblin’

RESULTS

Gaillardia x *grandiflora* ‘Goblin’

In previous tests, *Gaillardia* ‘Goblin’ was unresponsive to uniconazole spray applications. However, it is also unresponsive to the liner dip even at the 5 ppm rate. It would be interesting to pursue its mechanism of non-response.

CONCLUSIONS

- We found that the grasses, *Miscanthus* and *Calamagrostis* were more responsive to the liner dips than to spray applications in previous tests. This gives growers a viable option for maintaining height control, especially during the plug stage where they seem to be more concerned with height. Sensitivity to Concise did vary with grass species, with Calamagrostis being more responsive to lower rates than Miscanthus. Rates from less than 1 ppm up to 2 ppm would be suggested for grass plugs depending on species and desired length of control.
- *Phlox paniculata* 'David' was more responsive to the liner dip than to spray applications in previous tests. With the large number available, it would be of value to test additional cultivars. Rates around 1.25 or 1.5 ppm should be tested for production use.
- *Rudbeckia* 'Goldsturm' was very responsive to liner dips. A 1 ppm rate gave moderate control of plant height without excessive reductions in plant width, and without adverse affects on flower height.
- *Gaillardia* 'Goblin' did not respond to even the highest liner dip rate of Concise. These results are consistent with previous response to spray applications.

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