Coreopsis tinctoria uses temporal gaps to avoid interspecific competition with a C₄ grass.

Texas Society for Ecological Restoration
14 November 2015
BS, Landscape Architecture
Purdue University, 1993

MS, Environmental Science
UTSA, 2013

Pima County
Coreopsis tinctoria
(Asteraceae)

Common names include:
• coreopsis
• goldenwave
• calliopsis
• golden tickseed
Distribution

*Coreopsis tinctoria* (Asteraceae)
Commonly found in:
• disturbed areas
• nutrient poor areas

Poor competitor against \( C_4 \) grasses.
Hypothesis

• *Coreopsis tinctoria* uses temporal gaps to avoid interspecific competition with $C_4$ grasses.

• Temporal gaps combined with spatial vegetation gaps offer a synergistic effect.

Test

- *De Wit Replacement Series*
- *Simulated Temporal Gaps*
## Simulated Temporal Gaps - February

<table>
<thead>
<tr>
<th>Gaps</th>
<th>+60</th>
<th>+30</th>
<th>+0</th>
<th>-30</th>
<th>-60</th>
<th>Mono</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="Orange Circles" /></td>
<td><img src="image" alt="Orange Circles" /></td>
<td><img src="image" alt="Orange Circles" /></td>
<td><img src="image" alt="Orange Circles" /></td>
<td><img src="image" alt="Orange Circles" /></td>
<td><img src="image" alt="Orange Circles" /></td>
</tr>
</tbody>
</table>
Simulated Temporal Gaps - March

Gaps:
- +60
- +30
- +0
- -30
- -60
- Mono
Simulated Temporal Gaps - April

Gaps

+60  +30  +0  -30  -60  Mono
Results

Mean total dry mass per pot (g)

Gap

Frequency Ratio

The University of Texas at San Antonio, One UTSA Circle, San Antonio, TX 78249
Results

The graph shows the percentage of maximum mean total mass produced for two species, *Coreopsis tinctoria* and *Bouteloua curtipendula*, across different gaps (+60, +30, 0, -30, -60).

- **Coreopsis tinctoria**
  - +60: 100%
  - +30: 70%
  - 0: 84%
  - -30: 38%
  - -60: 8%

- **Bouteloua curtipendula**
  - +60: 100%
  - +30: 68%
  - 0: 45%
  - -30: 38%
  - -60: 8%
Results

Mean total dry mass per pot (g)

Gap

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**Results**

![Graph showing mean total mass/pot (g) for *Bouteloua curtipendula* and *Coreopsis tinctoria* across different gaps.](image)

- **Mean total mass/pot (g)**

- **Graph Legend**
  - *Bouteloua curtipendula*
  - *Coreopsis tinctoria*

- **X-axis**
  - Gap (ranging from +60 to -60)

- **Y-axis**
  - Mean total mass/pot (g)

- **Data Points**
  - **E**
  - **DE**
  - **CD**
  - **C**
  - **DE**
  - **E**
  - **B**
  - **A**

- **Graph Labels**
  - **Coreopsis tinctoria**

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Additionally, the results table for the above graph is as follows:

<table>
<thead>
<tr>
<th>Gap</th>
<th>Bouteloua curtipendula</th>
<th>Coreopsis tinctoria</th>
</tr>
</thead>
<tbody>
<tr>
<td>+60</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>+30</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>+0</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>-30</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>-60</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

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The University of Texas at San Antonio, One UTSA Circle, San Antonio, TX 78249
• Suppression of coreopsis mass when sideoats grama has a head start support that coreopsis is not a good competitor.

• Avoids most interspecific competition effects with a 60 day growth advantage.

• Avoids competition by establishing in temporal gaps before environmental conditions favor growth of sideoats grama.

• Establishing in both temporal and vegetative gaps further decreases interspecific competition effects.
How does increased atmospheric CO$_2$ concentration affect plant competition?

- Shift in temporal gaps
- Change in spatial gaps
- *Thelesperma filifolium* (greenthread, C$_3$)
- *Bouteloua curtipendula* (sideoats grama, C$_4$)
- *Nassella leucotricha* (Texas wintergrass, C$_3$)
Thank you.
PHOTO CREDIT
All photos by Kevin Eddy, unless otherwise noted.

WORKS CITED


Correll D.S. and Johnston M.C. 1979. Manual of the vascular plants of Texas. The University of Texas at Dallas, Richardson, Texas.


Native Plant Information Network. 2009. Coreopsis tinctoria. Lady Bird Johnson Wildflower Center at The University of Texas, Austin, Texas.


