Advanced Grazing School:
Increasing Yields by 15-20% with Plant Growth Regulators?

In this presentation, Dr. Dennis Hancock, Extension Forage Specialist, Crop and Soil Sciences – UGA, discusses the use of plant growth regulators to increase yields by 15-20%. Gibberellins, derived from the Gibberella fujikuroi fungus, are highlighted as key compounds in this context. The use of gibberellins in agriculture includes:

- Increasing sugar yield in sugarcane
- Stimulating barley-malting process in the beer-brewing industry
- Increasing size of seedless grapes
- Increasing fruit set and size in apples/pears
- Delaying fruit ripening
- Increasing foliage and forage yield?

Use of GAs for Forage Management is NOT New.

Review by Matthew et al., 2009 (NZ J. Ag Res.):
- 13 studies around the world
- Yield responses generally 8-20% increase in yield
- These studies included rates of 0.6 – 10 oz. GA₃/acre:
  - Current product recommended rate range: 0.3 – 1.0 oz./acre
  - Cost of producing GA₃ is much lower now.

GA₃ Available As:

- Yalent
- RyzUp
- SMARTGRASS
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Rye+Ryegrass Response to RyzUp (App Date = Dec. 6, 2011)

Rye+Ryegrass Response to RyzUp (App Date = Dec. 20, 2011)

Gainesville, GA
RyzUp SmartGrass
Untreated

An Early RyzUp Application (1/2/11) and Harvest 45 d later (2/12/11)

Two Application Dates (1/29/11, 3/5/11) and Three Harvests (2/12/11, 3/5/11, 3/12/11)

RyzUp Affected Forage Yield

Dr. Dennis Hancock
Extension Forage Agronomist
UGA Extension
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#### Response of Winter Annual Grass* to Early Season Application of RyZup Smartgrass®

<table>
<thead>
<tr>
<th>Harvest</th>
<th>RyZup</th>
<th>None</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 17, 2012</td>
<td>1429</td>
<td>1120</td>
<td>21.60%</td>
</tr>
<tr>
<td>Feb. 29, 2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr. 25, 2012</td>
<td>2090</td>
<td>1961</td>
<td>n.s.</td>
</tr>
<tr>
<td>Season Total</td>
<td>5186</td>
<td>4691</td>
<td>9.50%</td>
</tr>
</tbody>
</table>

* Averaged over rye, ann. ryegrass, and rye+ARG plots.
** Fall application made on Nov. 4, 2012 (plants were at 2-4 leaf stage).

#### Response of Winter Annual Grass* to Mid-Season Application of RyZup Smartgrass®

<table>
<thead>
<tr>
<th>Harvest</th>
<th>RyZup</th>
<th>None</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 29, 2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar. 15, 2012</td>
<td>2366</td>
<td>2286</td>
<td>n.s.</td>
</tr>
<tr>
<td>Apr. 25, 2012</td>
<td>2684</td>
<td>2366</td>
<td>11.80%</td>
</tr>
<tr>
<td>Season Total</td>
<td>4831</td>
<td>4454</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

* Averaged over rye, ann. ryegrass, and rye+ARG plots.
** Winter application made on Feb. 29, 2012.

#### Response of Winter Annual Grass* to Early and Mid-Season Application of RyZup Smartgrass®

<table>
<thead>
<tr>
<th>Harvest</th>
<th>RyZup</th>
<th>None</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 17, 2012</td>
<td>1390</td>
<td>1006</td>
<td>27.6%</td>
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<tr>
<td>Feb. 29, 2012</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar. 15, 2012</td>
<td>2217</td>
<td>1890</td>
<td>n.s.</td>
</tr>
<tr>
<td>Apr. 25, 2012</td>
<td>2300</td>
<td>1796</td>
<td>21.9%</td>
</tr>
<tr>
<td>Season Total</td>
<td>5445</td>
<td>4357</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

* Averaged over rye, ann. ryegrass, and rye+ARG plots.
** Fall application made on Nov. 4, 2012 (plants were at 2-4 leaf stage), winter application made on Feb. 29, 2012.

#### Possible Negatives to Using GAs for Forage Management

Matthew et al., 2009 (NZ J. Ag Res.):
- Yield lag in later cuttings (at very high rates)
- Reduction in root mass (at very high rates)
- Reduction in tiller number (at very high rates)
- No significant change in forage quality observed, but possible?
- Could increase need for moisture and N.

Matthew et al., 2009 (NZ J. Ag Res.):
- Really only works if inducing the plant to grow when it wouldn’t ordinarily (e.g., winter, late fall)
  - No benefit to adding if plant is already growing at max growth rate.
- Not all grass species respond similarly
  - Small grains > ann. ryegrass > tall fescue
- Reduces nodulation in legumes

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