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# FACTORS AFFECTING FLORET FERTILITY IN PERENNIAL RYEGRASS



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# AGENDA

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- Yield components
- Growth regulation
- Floret position
- Results
- Discussion



# YIELD COMPONENTS

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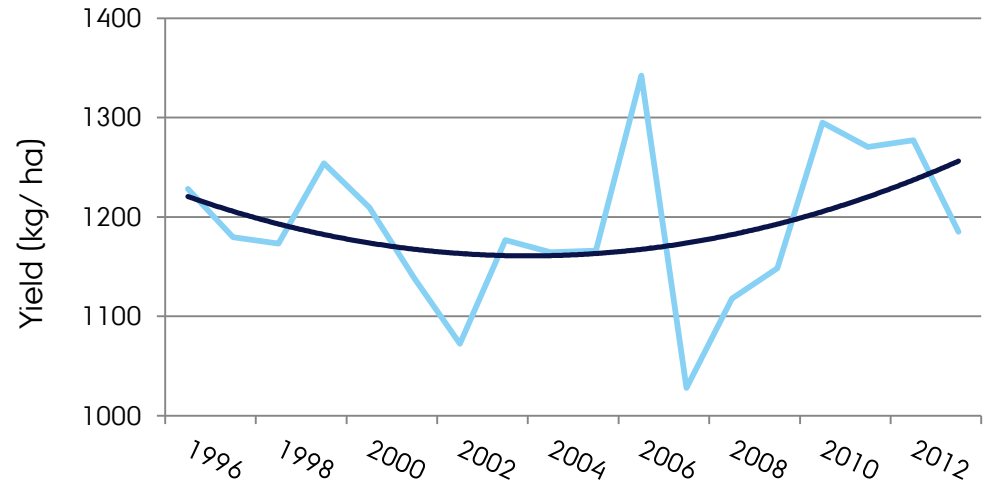
- Yield potential  $\geq 6.000$  kg/ ha
- Consisting of:
  - Tillers: 2000 – 3000 m<sup>2</sup>
  - Spikelet: 16 - 22
  - Floret number: 5 – 10
  - Floret Fertility (%): 100%
  - Seed weight: 0,002g



# DANISH YIELD

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- Averaging 1200 kg/ ha
- Potential trend on increase
- But highly variable
- Relates to floret fertility



# YIELD COMPONENTS

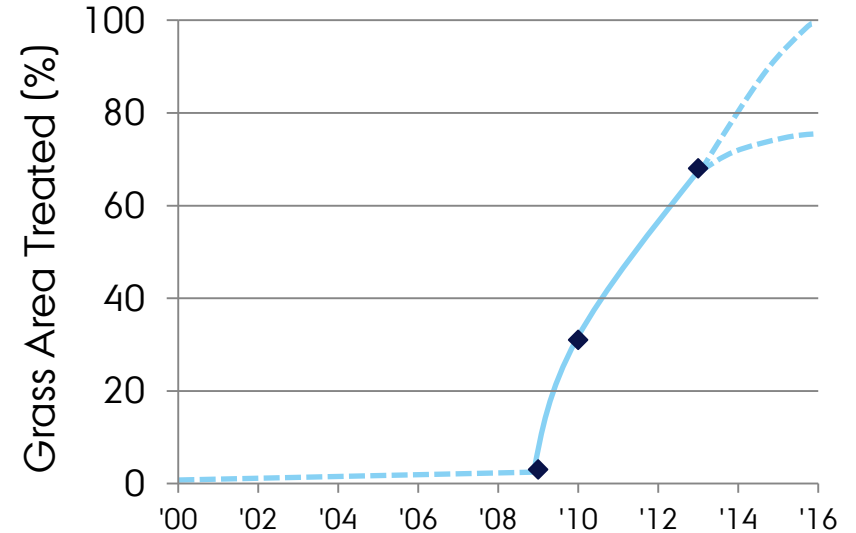
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- Floret fertility most influential:
- Average Danish yield is
  - 20% floret fertility
  - 2 florets producing seed
- Can we improve this?

| Floret Fertility | Seeds per m <sup>2</sup> | Yield (kg/ ha) |
|------------------|--------------------------|----------------|
| 10%              | 30.000                   | 600            |
| <b>20%</b>       | <b>60.000</b>            | <b>1.200</b>   |
| 30%              | 90.000                   | 1.800          |
| 40%              | 120.000                  | 2.400          |
| 50%              | 150.000                  | 3.000          |

# DENMARK: GROWTH REGULATOR

- Moddus™ most commonly applied product
  - Trinexapac-ethyl
  - Blocks enzymes late in GA pathway
- Available since ~2000
- Average dose 0,5L/ ha



# GROWTH REGULATOR: EXPERIENCE

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- Clear yield increases
- Unknown why, so will focus on the fore mentioned: **floret fertility**

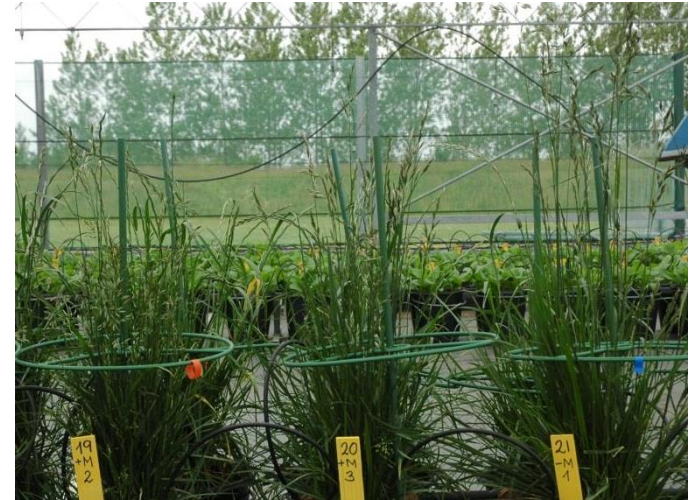
| Seed yield (kg/ hg) | Esquire | Foxtrot | Calibra |
|---------------------|---------|---------|---------|
| Control             | 1550    | 1350    | 1800    |
| 0,8 l/ha Moddus*    | 1600    | 1400    | 1900    |
| 2 x 0,8 l/ha Moddus | 1800    | 1500    | 2250    |

*\*average of treatments 'BBCH 31-33' and 'BBCH 49-51'*

# TREATMENT

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- Plants were grown in “Semi-field” conditions
- Treated with Moddus™ at:
  - BBCH Growth Stage 31 – 32
  - BBCH Growth Stage 49 – 51
  - Combined
- Analysis focused on “Control vs. Treated”





# FLORET POSITION: LABELLING

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- Within spikelet, are florets
  - Odd number florets on inside
  - Even number florets on outside
- Averaging 5 to 10 florets per spikelet



# OVERALL POSITION

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- Outer florets have slightly higher fertility than inner positions
- Physical limitation for successful seed set

Seed Set (%)

| Position | Inner | Outer |
|----------|-------|-------|
| 1        | 72.8  |       |
| 2        |       | 73.7  |
| 3        | 69.8  |       |
| 4        |       | 71.2  |
| 5        | 68.8  |       |
| 6        |       | 65.2  |
| 7        | 52.5  |       |



# GROWTH REGULATOR INFLUENCE

Seed Set (%)

| Position | Control     | Treated     | Significance |
|----------|-------------|-------------|--------------|
| 1        | 70.6        | 73.1        | ns           |
| 2        | 68.0        | 74.4        | ns           |
| <b>3</b> | <b>60.0</b> | <b>70.8</b> | <b>*</b>     |
| 4        | 64.8        | 71.9        | ns           |
| 5        | 73.0        | 68.0        | ns           |
| 6        | 68.2        | 64.9        | ns           |
| 7        | 52.4        | 52.6        | ns           |
| Average  | 60.9        | 62.2        | ns           |



# IS IT POSSIBLE THEN...

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- Yield increases due to Moddus™ treatment is due to position three
- Remember, Danish average yield is made up from position one and two
- But...



# ... STILL RESULTS UNCLEAR

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- Results inconsistent
  - Year effect
  - Most likely temperature related

|      | Control | "Treated" | Significance |
|------|---------|-----------|--------------|
| 2013 | 69.0    | 62.8      | ns           |
| 2014 | 55.5    | 61.7      | *            |



# MODDUS™: BENEFITS OBVIOUS

- While results unclear, there is benefit of applying Moddus™
- Reduced lodging
- Improves harvested seed yields
  - And economic yield

| Seed Yield (kg/ ha) |              |
|---------------------|--------------|
| Control             | 1550         |
| “Treated”           | 1750         |
| Increase            | 200          |
| Increased Return    | 1.600kr/ ha* |

\* 1kg/ seed = 8kr





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