

## Efficiency of Plant Growth Regulators and Load Index

### EFFICIENCY OF PLANT GROWTH REGULATORS AND LOAD INDEX AT DIFFERENT DOSES OF NITROGEN IN WINTER WHEAT

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#### Summary:

A three-year trial (2021–2023) was conducted on the winter wheat variety ‘Skagen’ to determine how to reduce the Plant Load Index (PLI) of plant growth regulator use under different nitrogen top-dressing levels (N180, N150, N120) while maintaining effective lodging resistance.

Five different plant growth regulators were used in the trial:

- Cycocel 750 (active ingredient: chlormequat chloride)
- Medax Max (active ingredients: prohexadione calcium, trinexapac-ethyl)
- Moddus 250 EC (active ingredient: trinexapac-ethyl)
- Terpal (active ingredients: mepiquat chloride, ethephon)
- Moddus Start (active ingredient: trinexapac-ethyl)

These were applied in various combinations, doses, and growth stages. The load index was calculated using three sub-indicators:

- Human health (PLC.V.)
- Ecotoxicology (PLTOKS.)

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- Environmental hazard (PLVIDE)

The trial measured plant height, lodging area, and lodging angle, from which the lodging index and yield were calculated. The trial years varied in rainfall, a major factor influencing lodging.

Key findings:

- At N120, the average plant height, lodging index, and yield did not differ significantly.
- At N150, plant height was significantly lower in the variant treated with Cycocel 750 (1.0 L/ha) and Medax Max (0.5 L/ha). Although the average lodging index was not significantly different, there was a trend toward a lower index with this combination. Yields were higher in variants treated with Cycocel 750 (1.5 L/ha) and Medax Max (0.3 kg/ha), as well as Cycocel 750 (1.0 L/ha) and Medax Max (0.5 L/ha).
- At N180, plant height was significantly lower in all treated variants (except Cycocel 750 1.5 L/ha + Moddus 250 EC 0.4 L/ha) compared to the untreated control. The lodging index was significantly lower in all treated variants, while yield did not significantly differ from the control.

The highest load index (PLI 0.79) at N180 was found in the strategy using Cycocel 750 (1.5 L/ha), Medax Max (0.5 kg/ha), and Terpal (0.75 L/ha). The lowest calculated PLI (0.02) was for the combination Medax Max (0.3 kg/ha) + Moddus 250 EC (0.4 L/ha).

At N150, the highest PLI (0.68) occurred with Cycocel 750 (1.5 L/ha) + Moddus 250 EC (0.3 L/ha), while the lowest was again for the Medax Max (0.3 kg/ha) + Moddus 250 EC (0.4 L/ha) combination.

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At N120, the lowest PLI (0.01) was found using only Moddus Start (0.25 L/ha).

Chlormequat chloride had the highest load index; thus, its inclusion increases total PLI.

An alternative is to use products with prohexadione calcium (which has the lowest PLI), combined with trinexapac-ethyl products like Moddus Start or Moddus 250 EC.

### **Conclusion:**

Load index indicators should be considered when selecting plant growth regulator strategies, along with their effectiveness.

Keywords: PLI, plant height, lodging index.