Grassland yield and nitrogen uptake as influenced by urea or ammonium nitrate based fertilisers

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Experimental design

- Randomised complete block experimental design with 5 replications
- Three experimental sites over two years = Six site-years
- N rates 0 – 500 kg N/ha
- Five applications per year
- P, K, S separately
- Five N fertilisers
  - Calcium ammonium nitrate (CAN)
  - 4 Urea based N w/wo urease and/or nitrification inhibitors
- Data presented collates 30 separate applications
Yield? CAN, Urea, Urea+NBPT
Six site-years 30 N applications

Forrestal et al. (2017) Soil Use & Management 33: 243-251
Effect of fertiliser formulation on yield at 200 kg N/ha?

N recovery efficiency? CAN vs Urea vs Urea+NBPT

Forrestal et al. (2017) Soil Use & Management 33: 243-251

Effect of fertiliser formulation on apparent fertilizer N recovery?

Individual harvest, was there a yield difference?

- Repeated measures analysis of the 30 harvests showed no significant difference ($P \leq 0.05$) in yield between CAN, urea and urea+NBPT.

Collating the spring and summer data:

- Spring cuts urea at **103.5%** of CAN yield
- Summer cuts urea at **98.4%** of CAN yield

- Trend towards small urea yield advantage in spring and small penalty in summer
Summary

- No significant yield difference in annual yield between: CAN, Urea and Urea + NBPT
  - Keane et al. (1974) n.s. between CAN and urea
  - Murphy (1983), Watson et al. (1990) n.s. for early season
- Slight trend towards spring advantage urea
- Slight trend for summer advantage CAN / urea+NBPT
- Use of a nitrification inhibitor on urea without also using a urease inhibitor decreased yields
- **BUT WAIT!** Urea looses ammonia and has reduced N recovery efficiency
  - Shouldn’t yields suffer over the long term?
Long-term fertiliser N test facility at Teagasc Johnstown Castle

Plots now in their fifth year receiving the same nitrogen source e.g. CAN, urea or urea+NBPT, products on the market and new products not yet on the market in Europe or Ireland

Is the urea story different? Evidence emerging of declining yield as well as N recovery by urea over time

Watch this space!
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References


Thank you