



**KNOWLEDGE CENTRE FOR AGRICULTURE**

# **Managing manure: Experience and ideas from Denmark**

**5<sup>th</sup> Organic Producers' Conference, IOTA**

**17 – 18<sup>th</sup> January 2011**



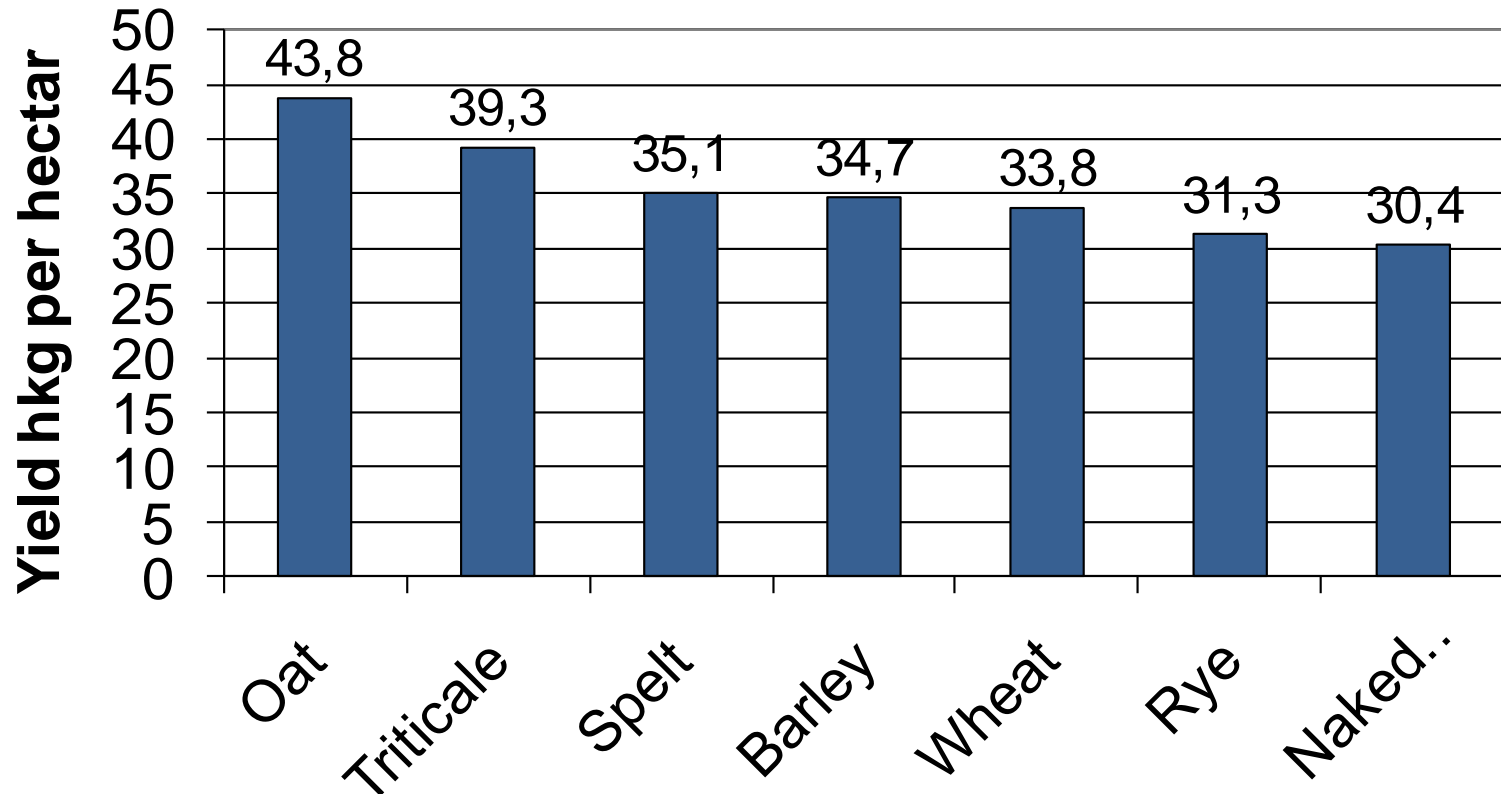
# Agenda

- Recommendation of ammonia on basis of the previous crop in cereals
- Prioritizing manure – depending on crop rotation, level of manuring and species
- Practice for slurry application
- Elimination of the use of conventional slurry

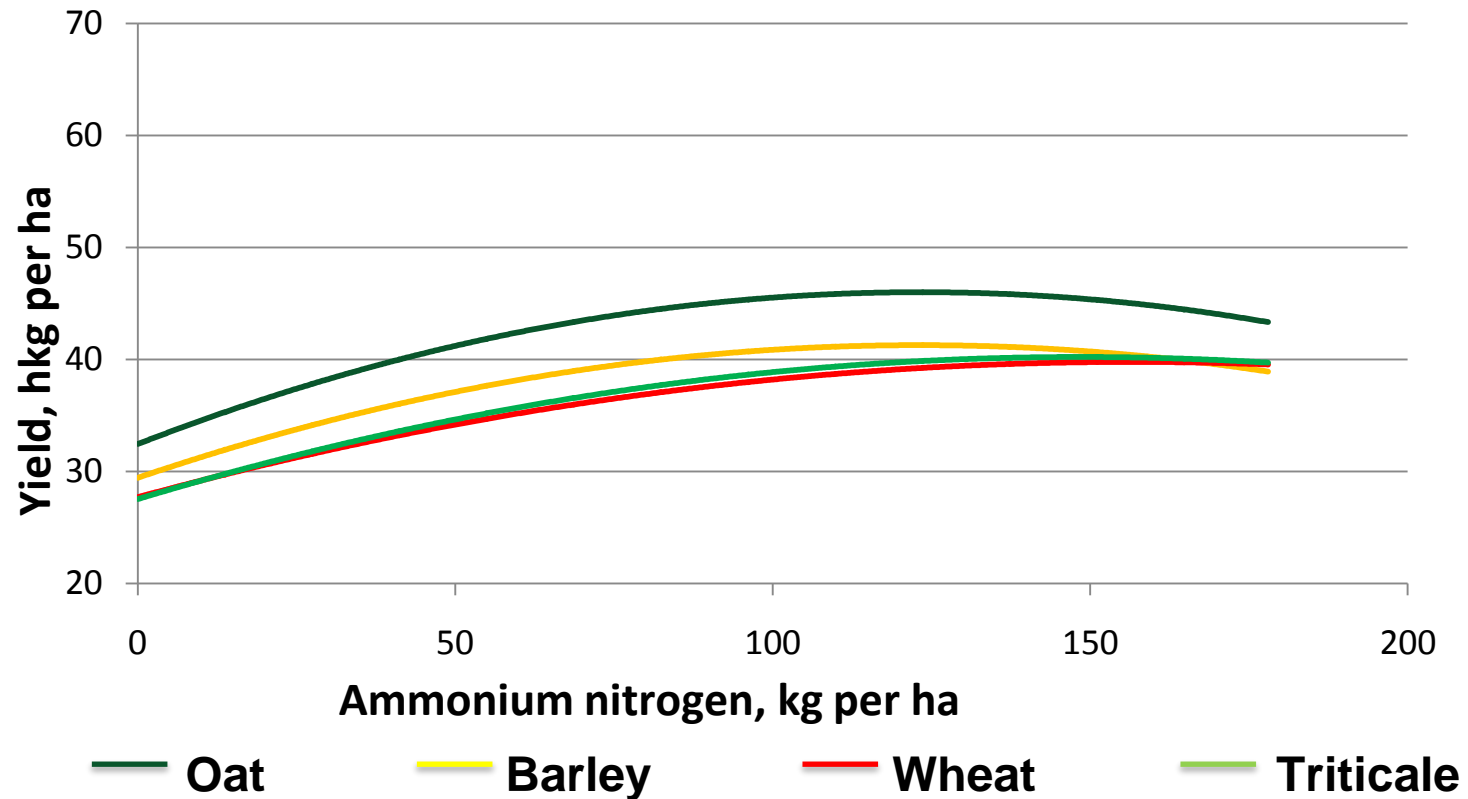


# Spring cereal species

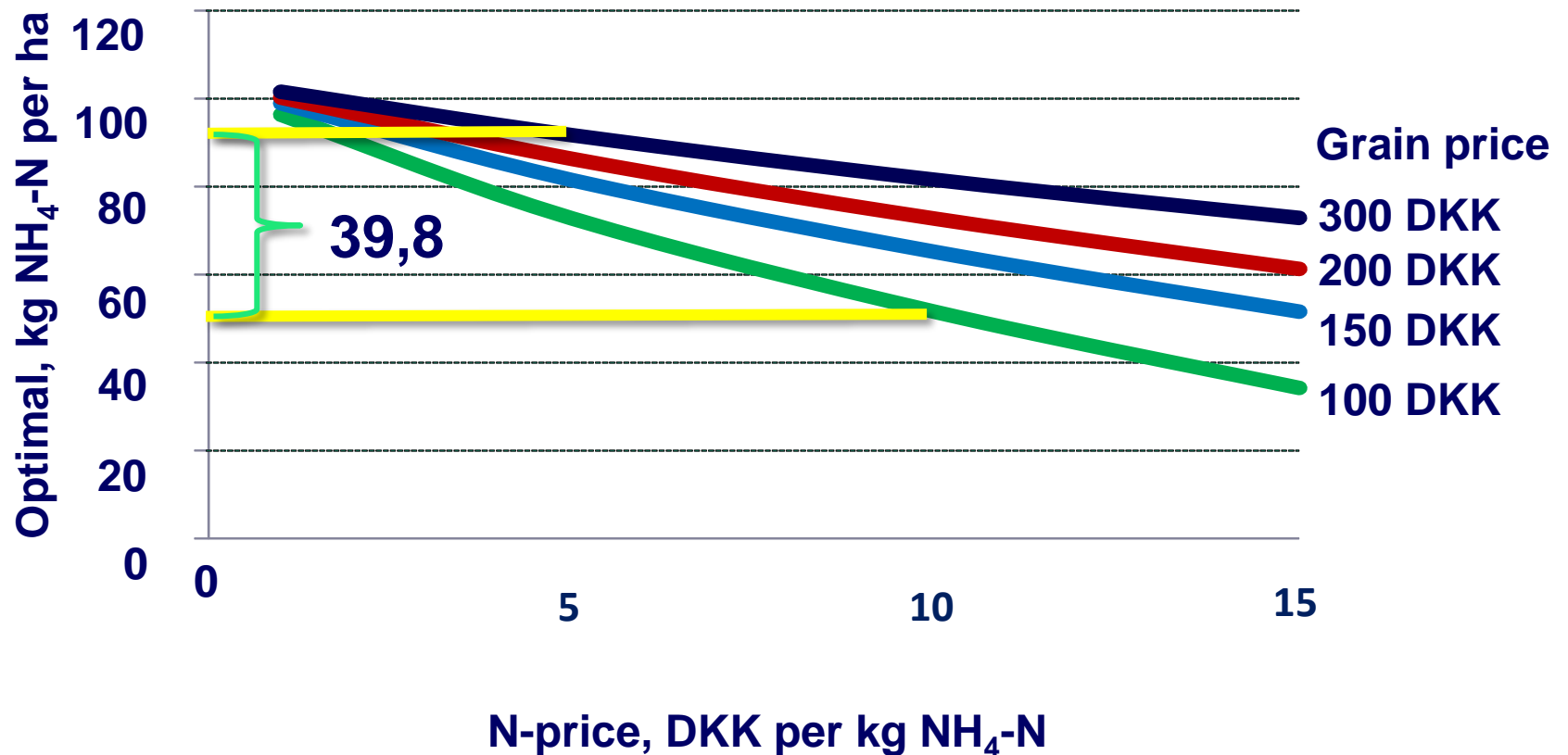
## 35 trials 1999 - 2006



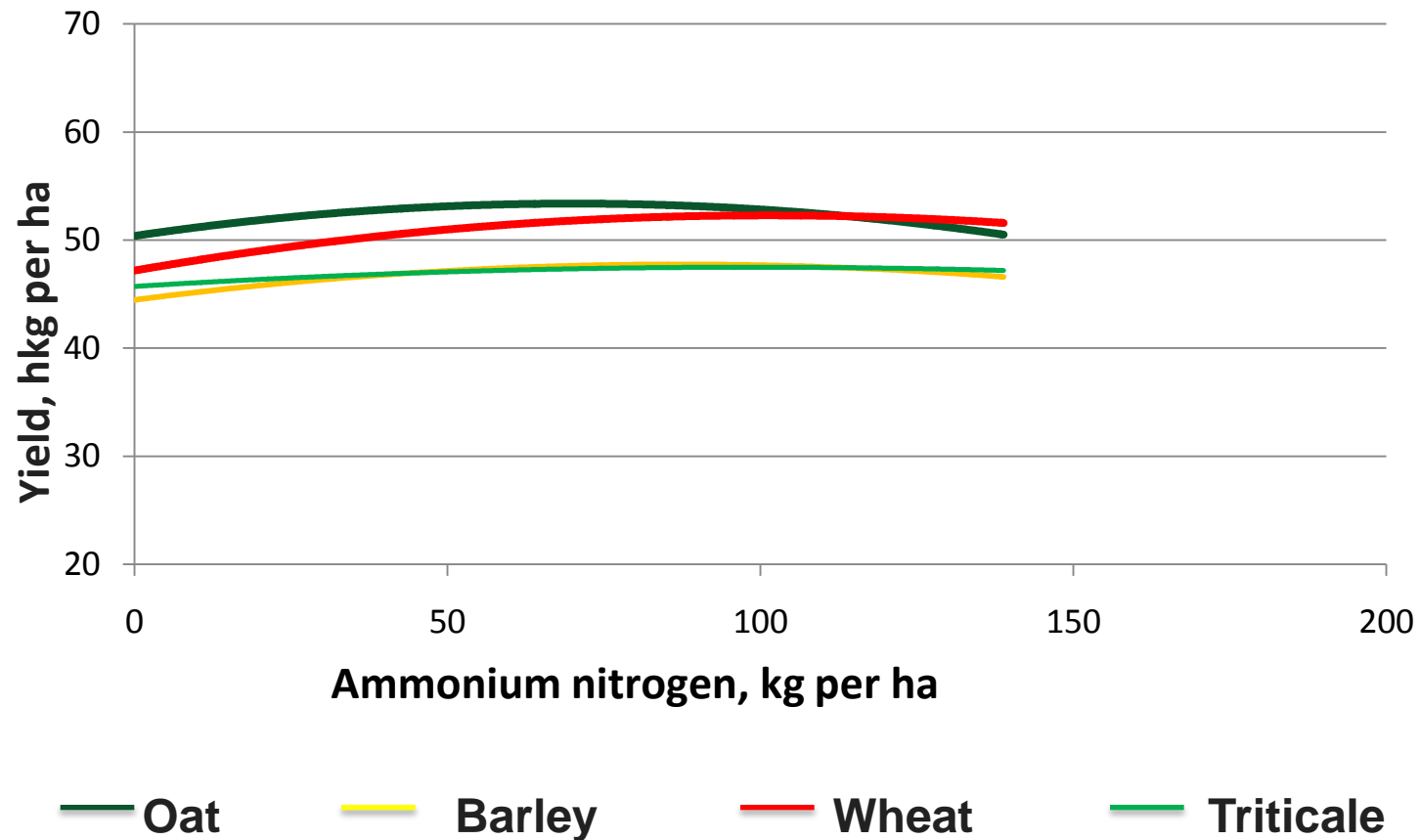
# Spring cereal after cereal 2006-2008, 12 experiment



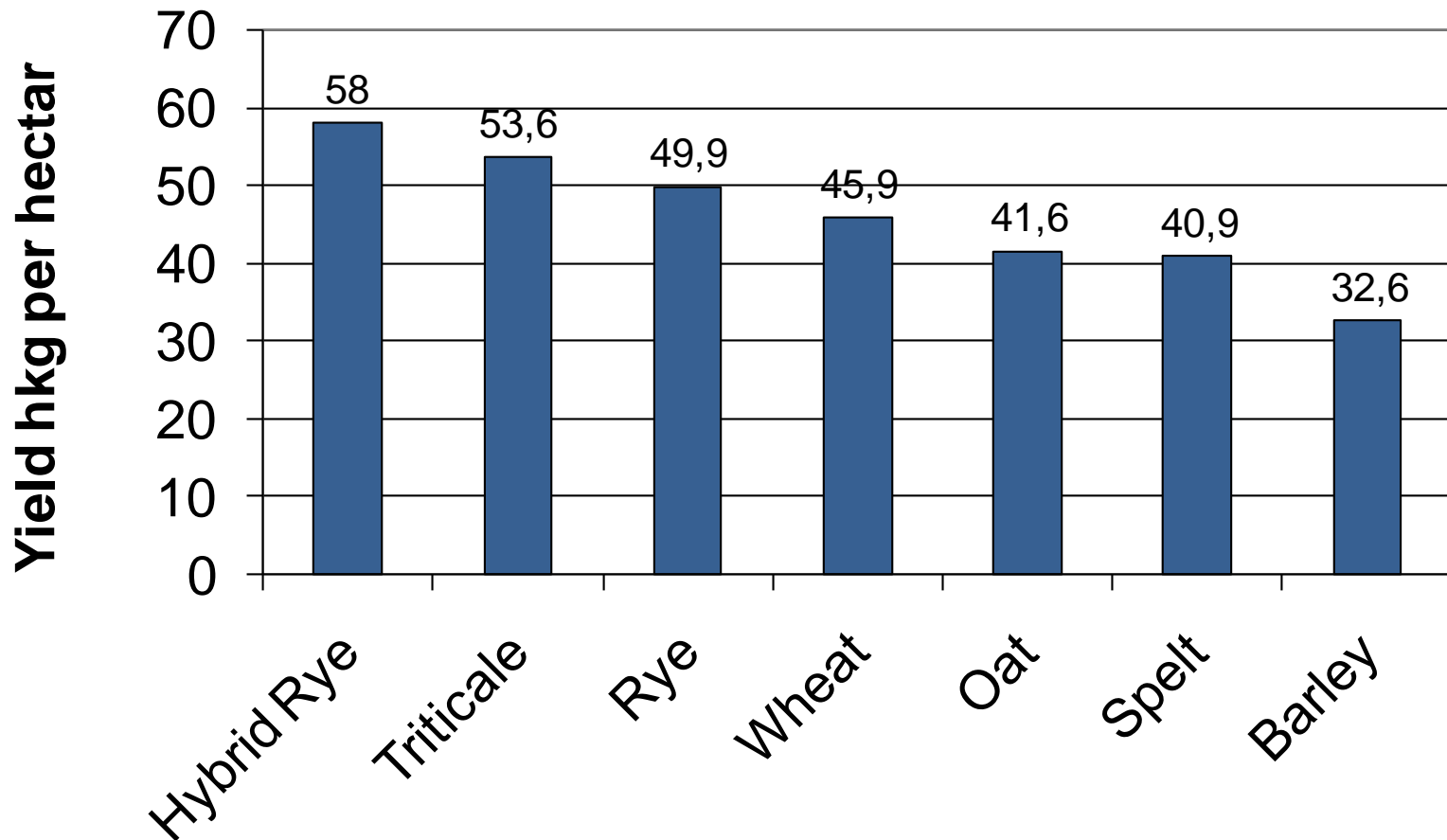
# Optimal amount of manure in spring cereal after cereal, depending on price of manure and grain



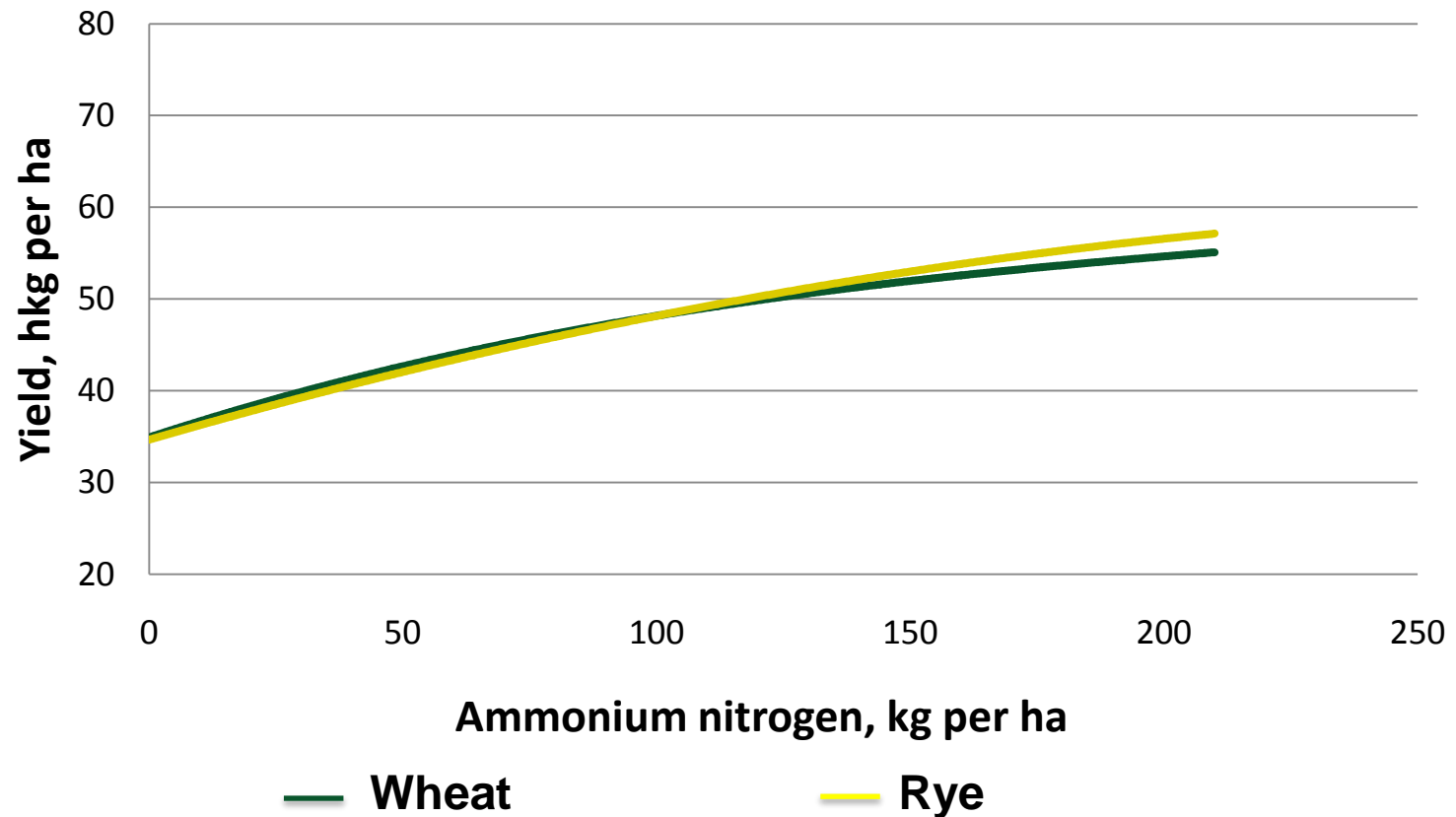
# Spring cereal after clover grass 2006-2008, 10 experiments



# Winter cereal species 40 trials 1999 - 2006

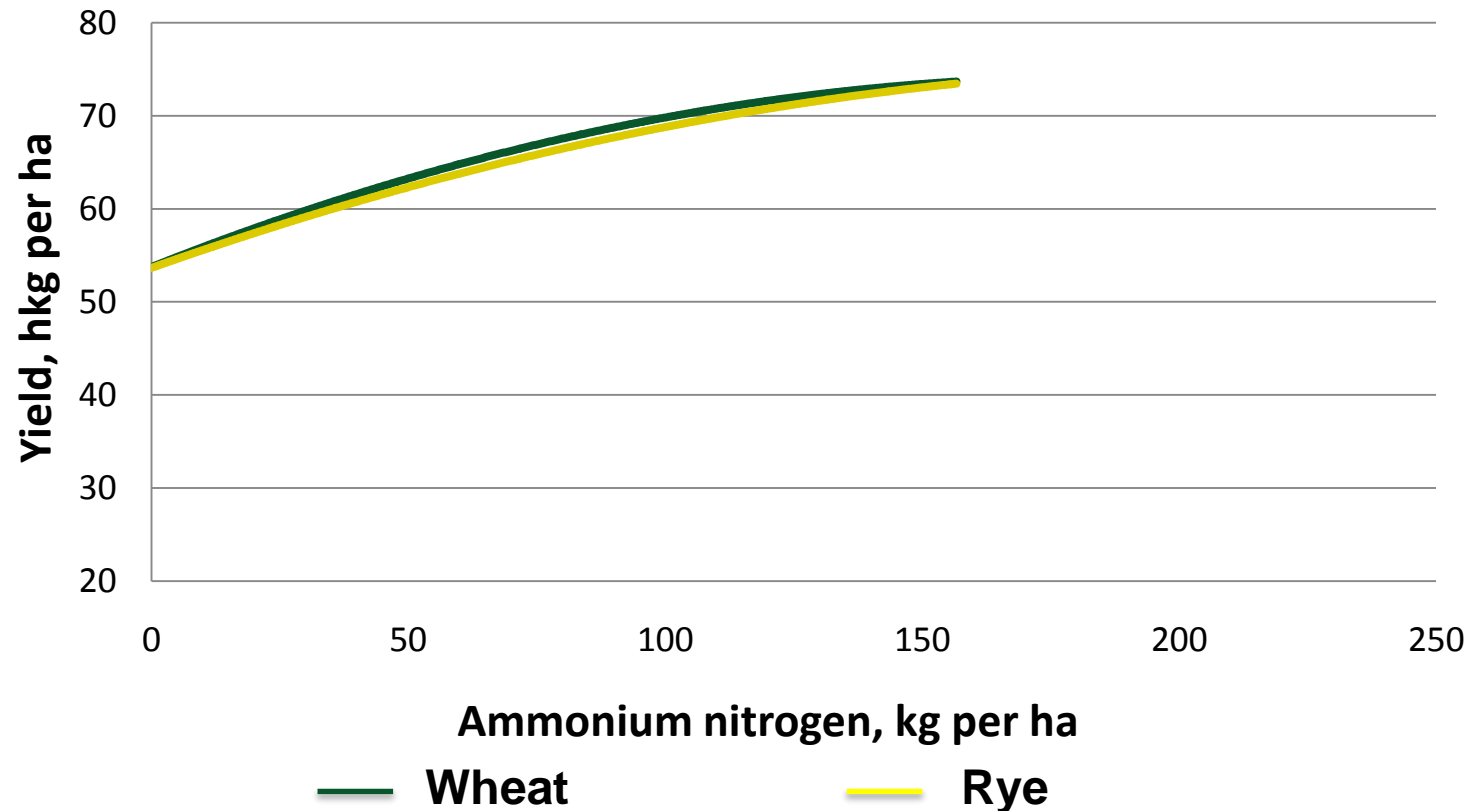


# Winter cereal after cereal 2009-10, 8 experiments





# Winter cereal after clover grass 2009-10, 5 experiments



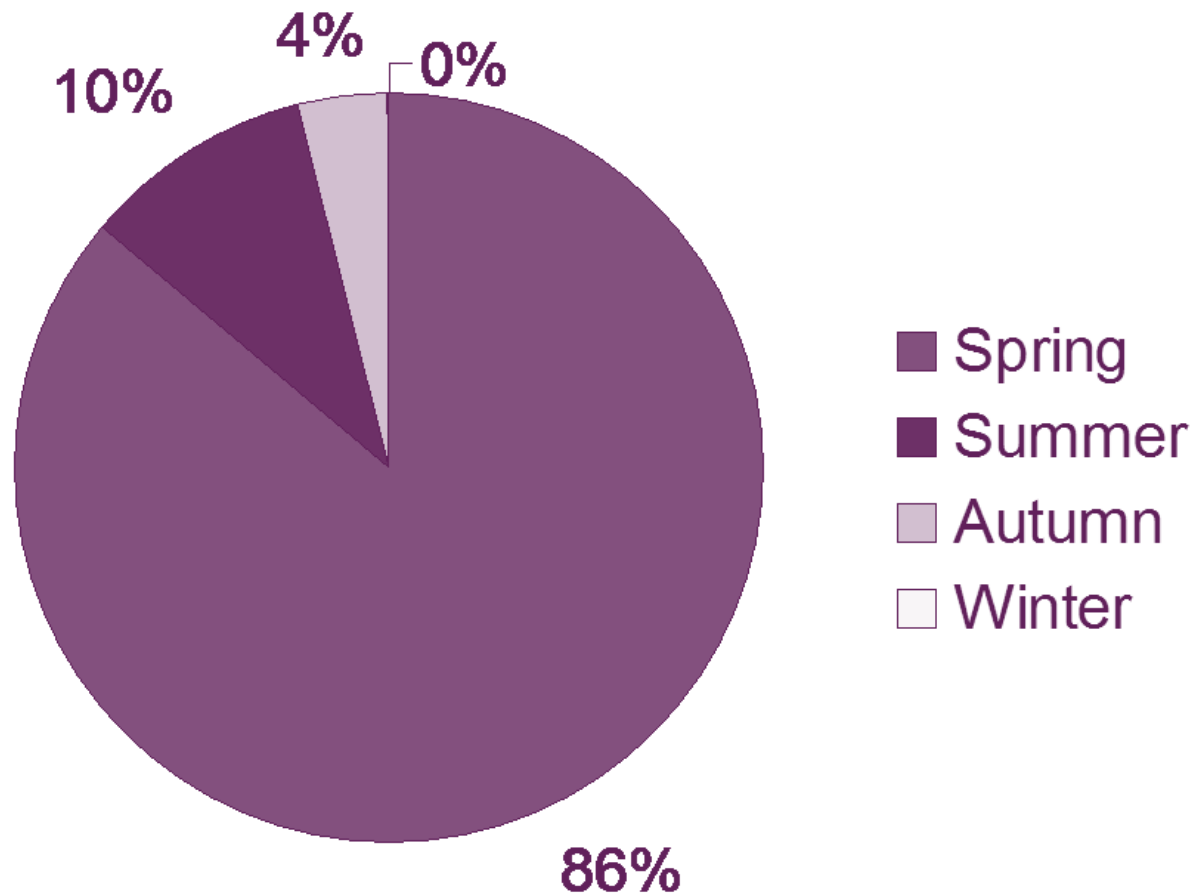
# Conclusions

- Spring cereal - after clover grass
  - Save your manure and choose spring wheat
- Spring cereal - after cereal
  - Choose spring barley and oat if the price is high
  - A high grain price then 70-85 kg  $\text{NH}_4\text{-N}$  per ha
- Winter cereal
  - Nearly same yield response to  $\text{NH}_4\text{-N}$ , no matter previous crop
- In general
  - Prioritize manure to high value crops
  - Weeds, lodging, and fungal diseases reduce the top need for manure

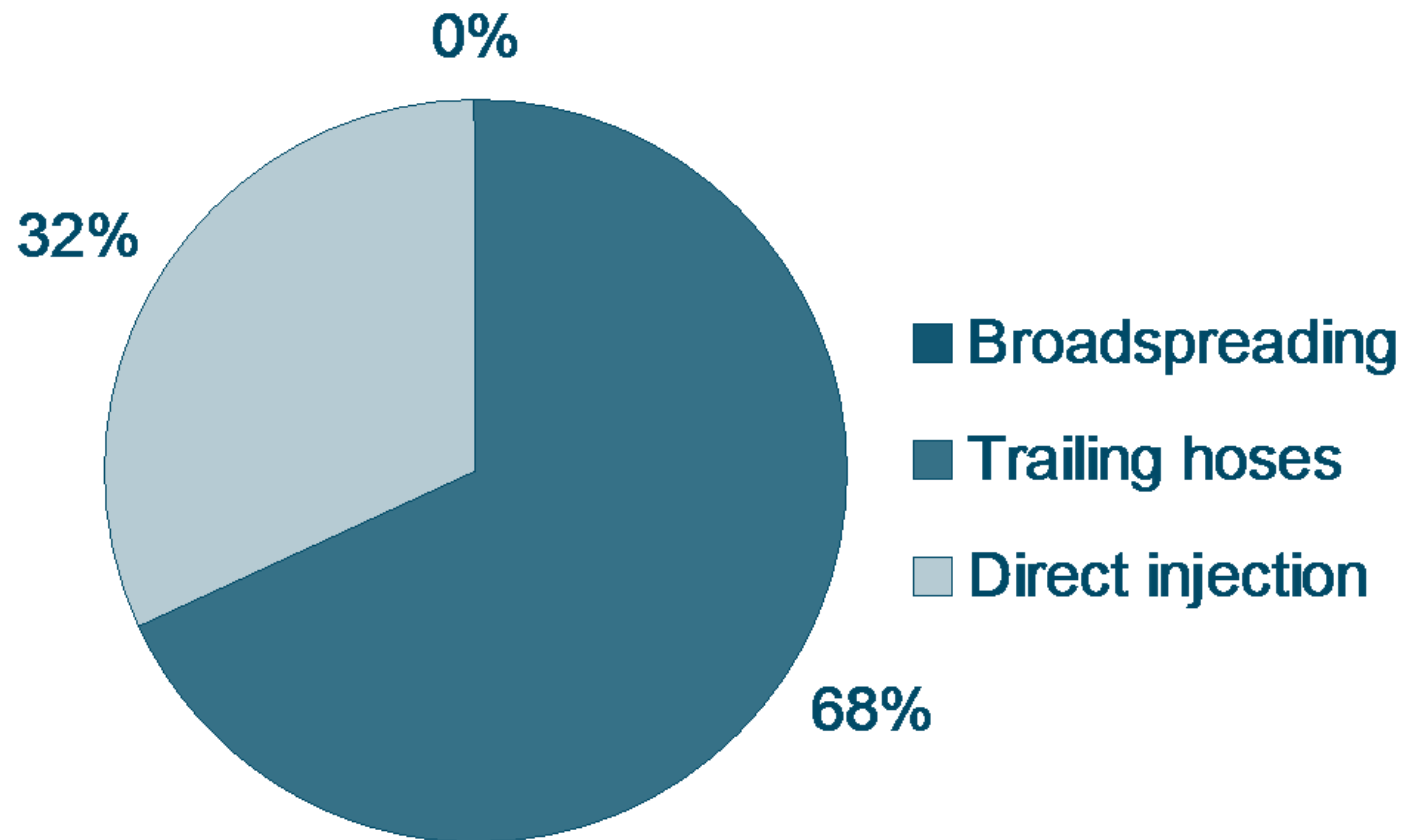
# Practise for application of slurry



# When is slurry spread in Denmark?



# How is slurry spread in Denmark?







**Injection in bare soil**

# Application of cattle slurry to spring barley

	Yield of grain t/ha	Nitrogen utilization, %
Trailing hoses + harrowing	4.28	49
Injection after ploughing	4.69	71



# Application in winter wheat with trailing hoses





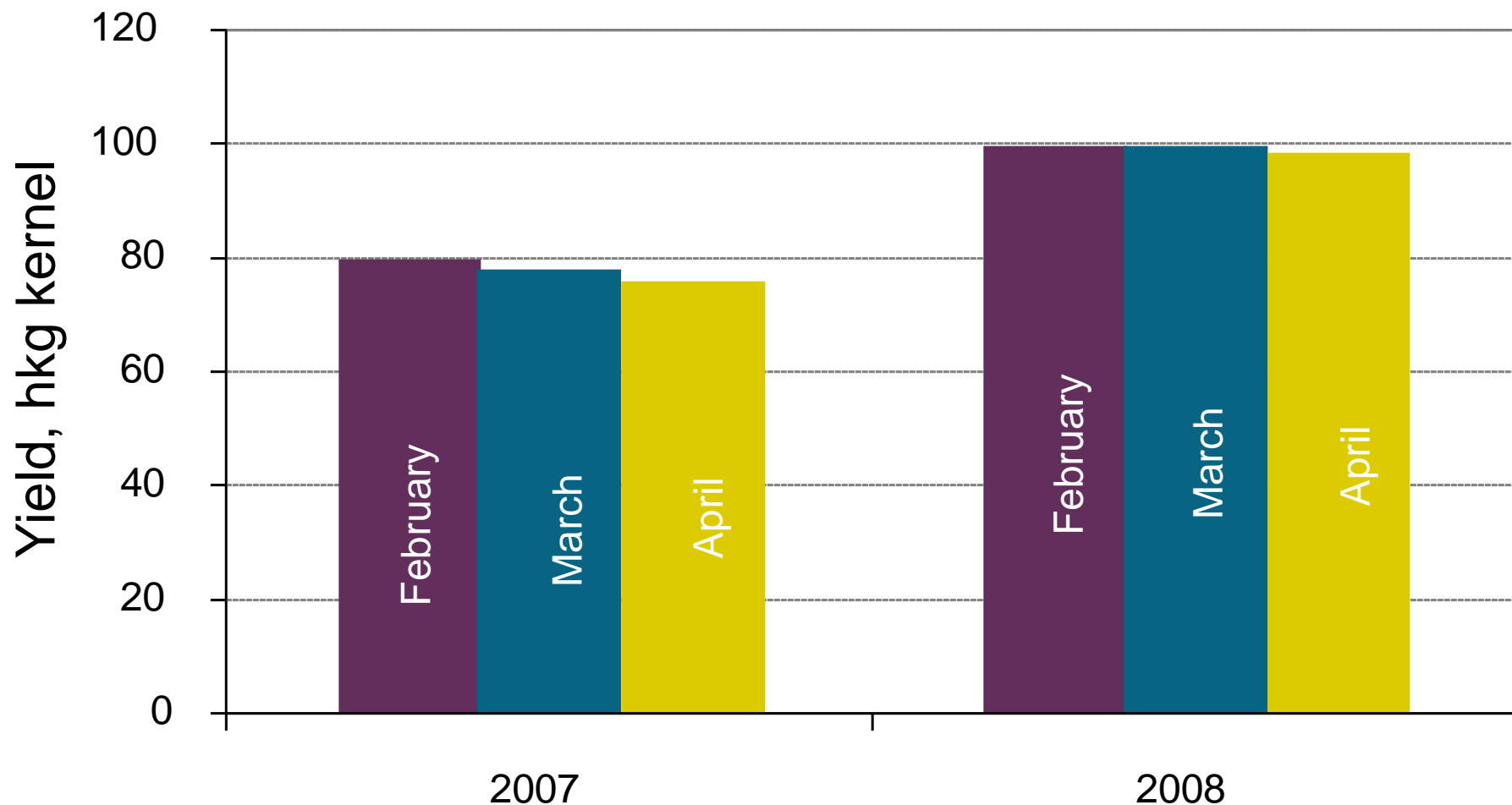
**February?**



**April?**



# Time of application of pig slurry to winter wheat 6 trials 2007-08





# Injection of slurry in grass?



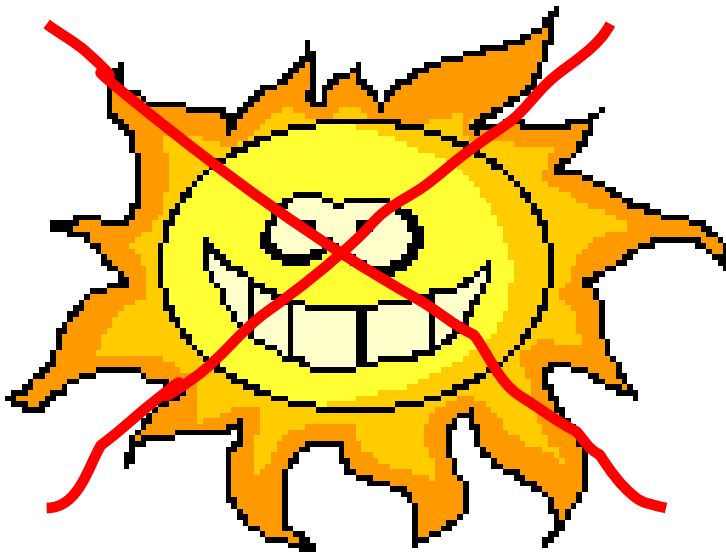
# Application of cattle slurry to grassland

	Yield of grass, fodder units/ha	Nitrogen utilization, %
Trailing hoses	35.6	27
Injection	37.4	40



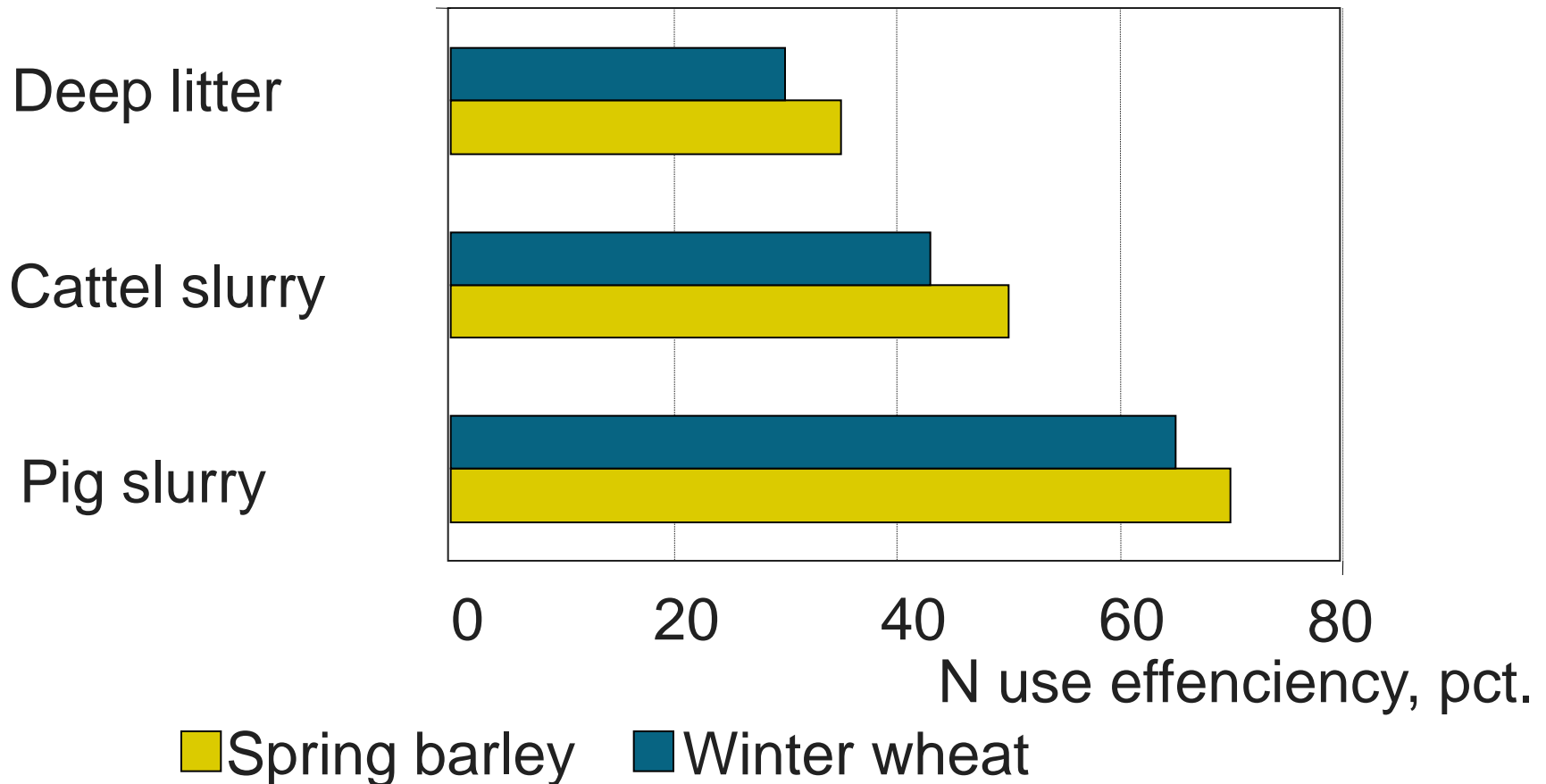
## Slurry weather:

- Cloudy
- Cool
- No wind
- High humidity

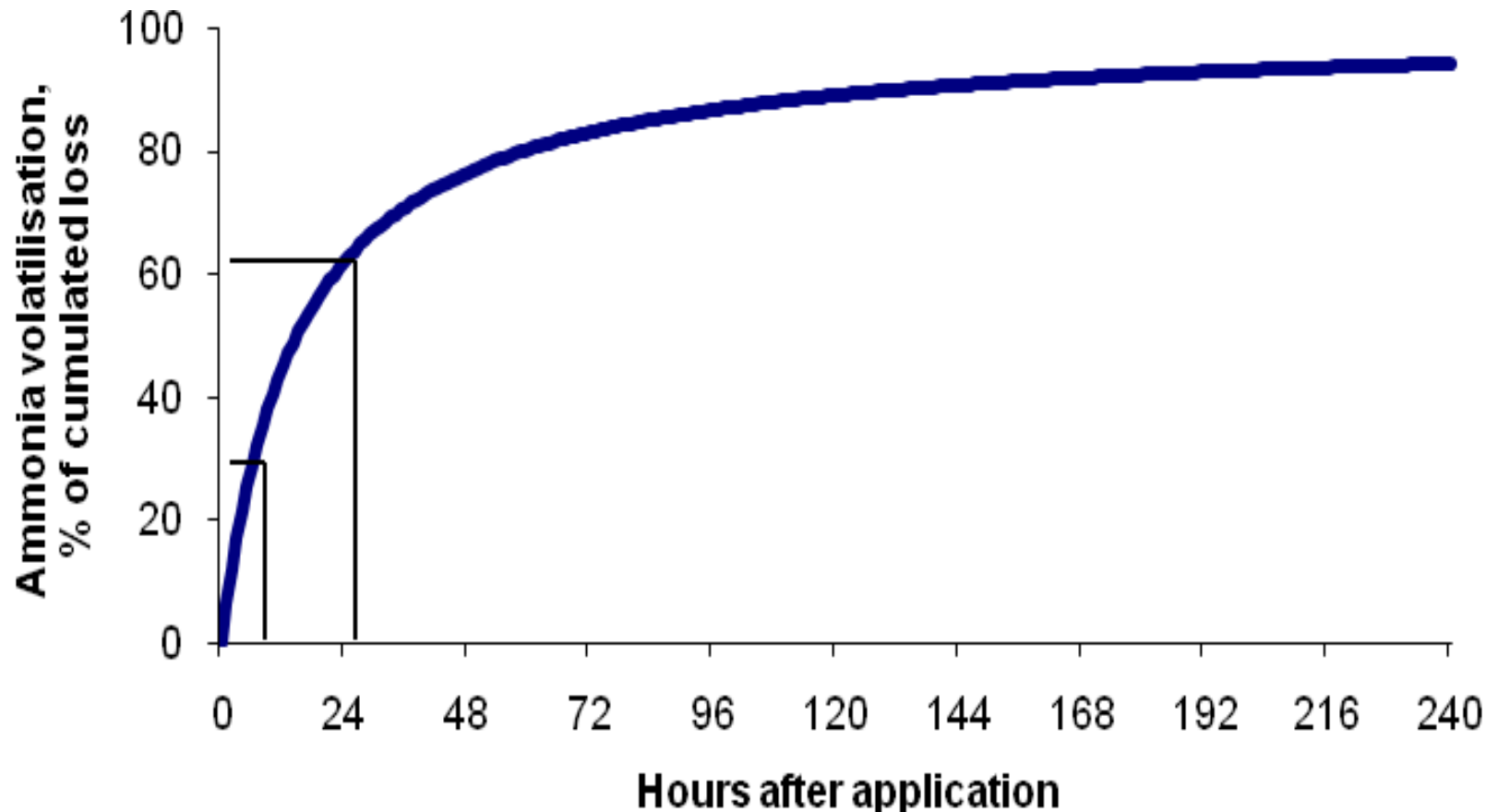




# Liquid manure is utilize better than solid manure. Spring cereal utilize manure better than winter cereal



# Quick incorporation ensure an effective reduction of ammonia volatilisation





# Quick incorporation ensure an effective reduction of ammonia volatilization





# About 80 biogas plants in Denmark



Thank you for now



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