Christphe Bommes

Structure

- Introduction
- Fundamentals of NH_4-based Crop Nutrition
- Field Trial Results from 2001 to 2007

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Begin

- Since 1993 Advisory/ Contracting service/Sewage slurry recycling
- Soil sample based
- Indicators pH and P-level
- Open question: N delivery

Fertilizer savings in a CTF system

Time and manner of application are the key to sustainable savings

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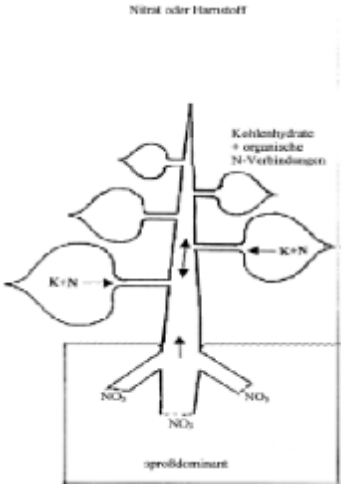
Fundamentals of NH_4-based Crop Nutrition

- Sustainable N-Supply
- Reduced Total- N-amount (20 % less!)
- One pass fits all!
- Root dominant N-Nutrition vs. Stem-dominant N-Nutrition

Root aspects

- Root development differs with type of N-Nutrition

Physiology of plant nutrition



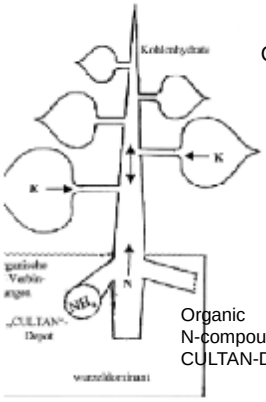
Nitrate or Urea

Carbohydrates
and organic
N-compounds

stem dominant

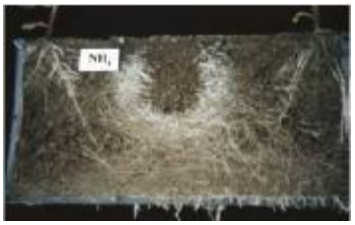
Physiology of plant nutrition

Ammonium as CULTAN



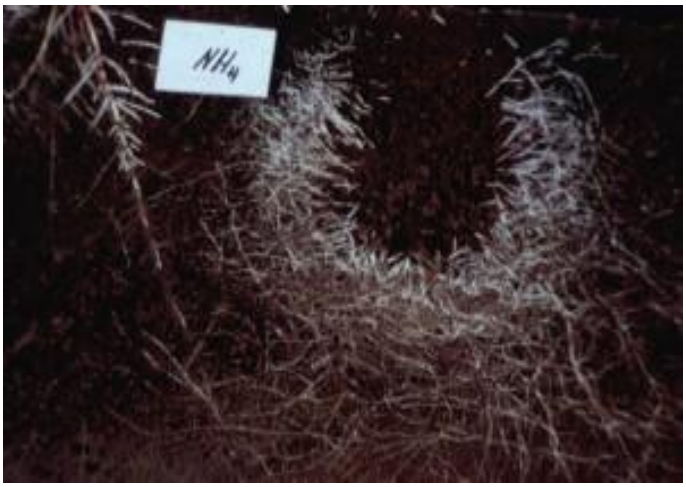
Carbohydrates

Organic
N-compounds from
CULTAN-Depot



root dominant

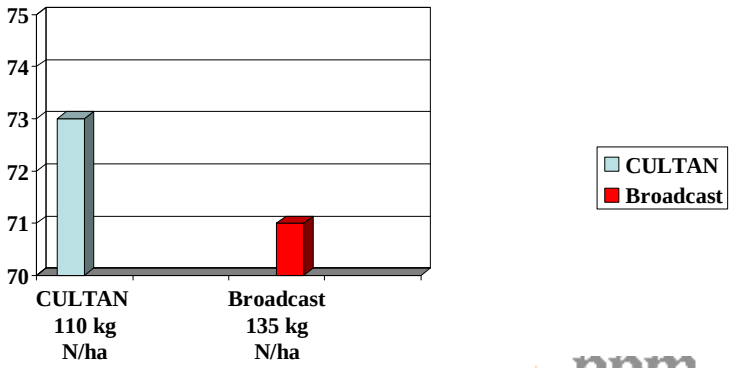
Root dominance off-site



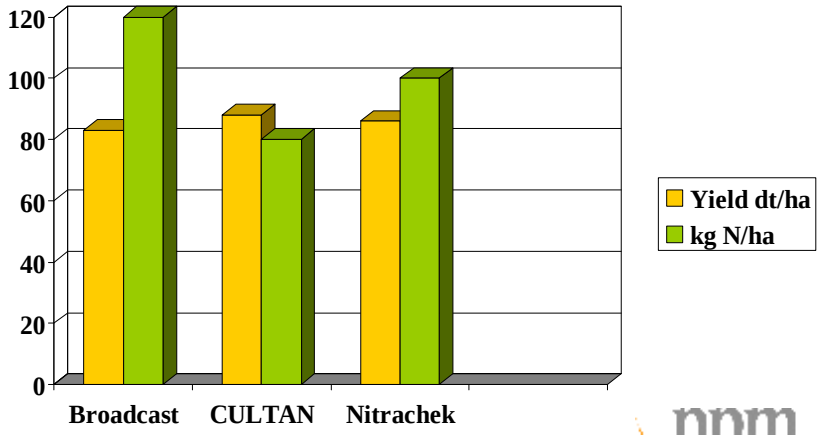
Root dominance on-site!

Intensive Fieldtrials since 2001

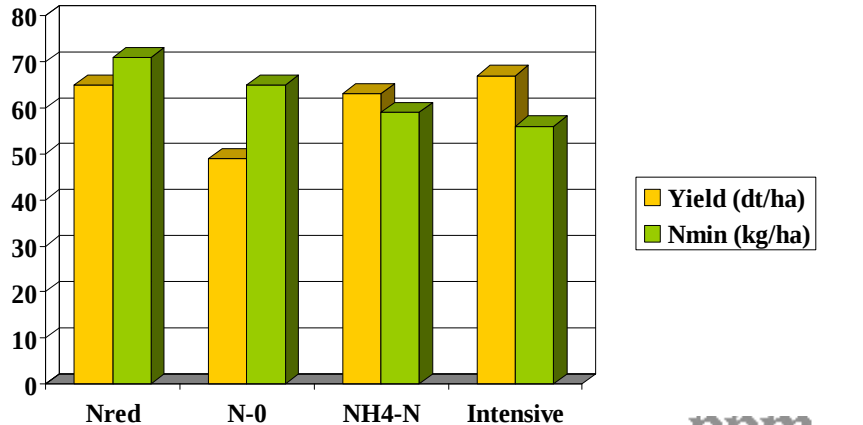
Average Cereal yields in dt/ha as a funtion of N-intensity
(2001 - 2004, Elbe-Weser, Lower Saxony)



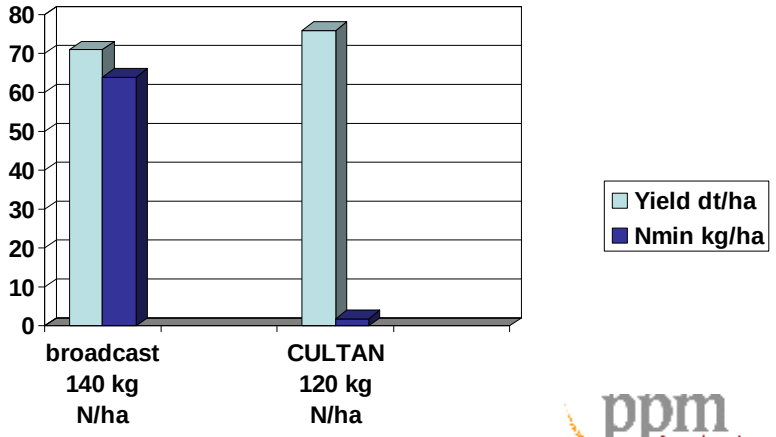
Winter Ryeyields (dt/ha) and N-intensity, Worpswede 2001, Lower Saxony



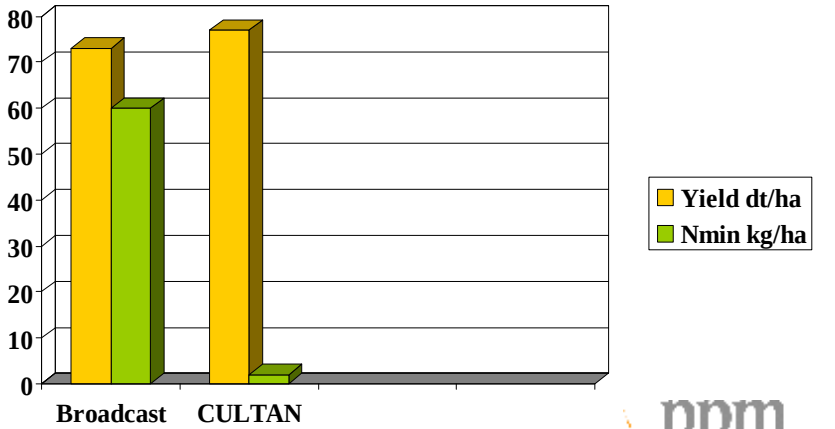
Yields and N_{min}-residues under different fertilizer regime in W-Wheat, Meyenburg 2002, L.S.



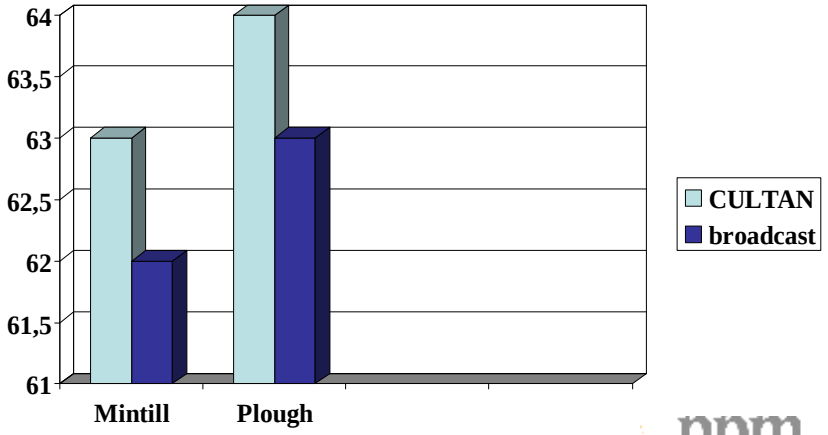
Winter Barley yield 2003 im WSG Meyenburg



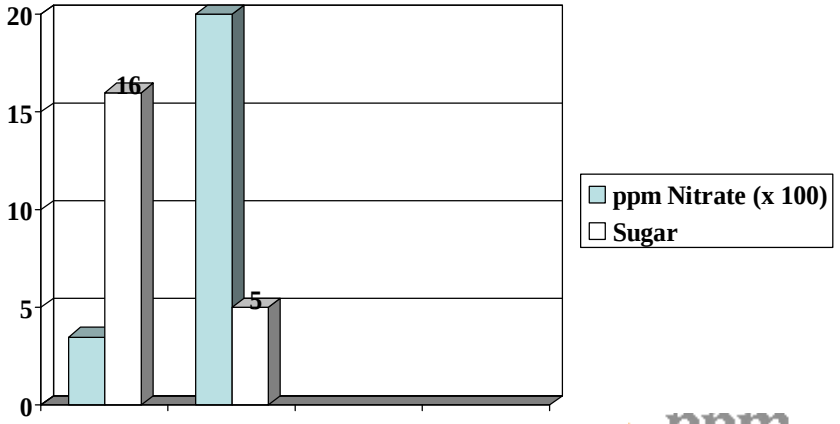
Yields und Autumn-N_{min}-residues after Winter Barley, Meyenburg 2003



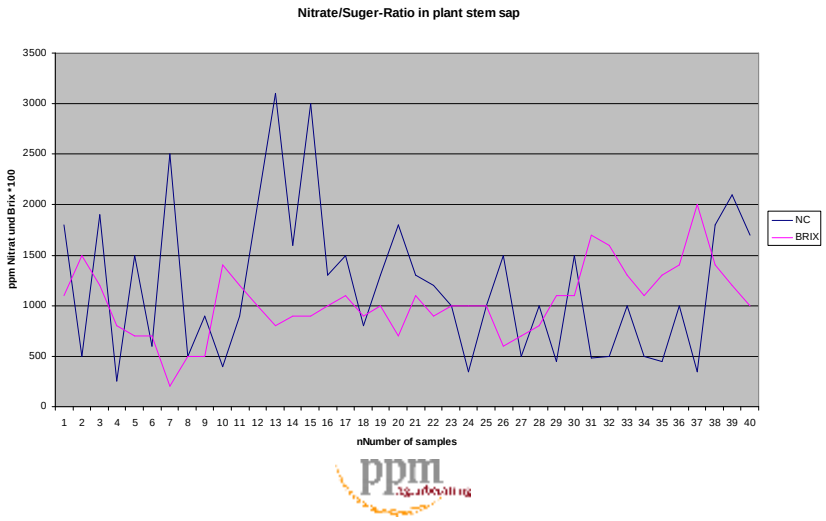
Winter barley yield mintill vs. plough (CULTAN vs. broadcast), Uthlede 2004, L.S.



Sugar content (%) and Nitrate content (in ppm x 100) of shoot stem base of cereals (n=500)



Fieldanalytics 2005



Open question: N demand and supply

- N supply is more than counting estimated amounts
- Soil sampling mineral N (Nmin) is not effective in results

Exkurs Nmin – bad science

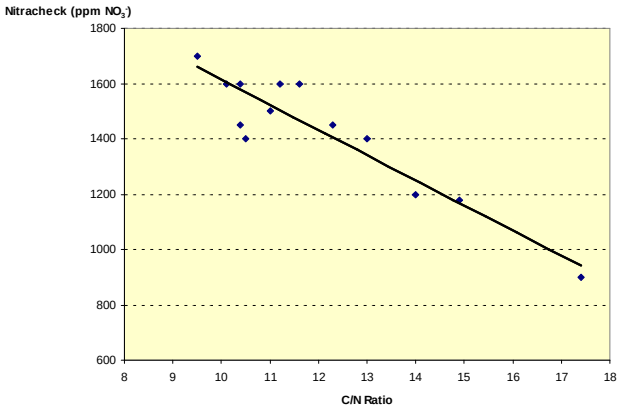
- There is no evidence that mineral N samples show any correlation with plant uptake

Solution:

- Alternative to mineral N testing:

Plant testing to reflect nutrient availability

Plant analysis and soil fertility



N-Dynamics
are depending on time of fertilizer application

Temperature:	Humidity:
Warm	Dry
Cold	Wet

Corresponding combinations and N supply (mineralisation)

Temperature: Humidity:	N
Warm and Dry	High accumulation
Cold and dry	Low accumulation
Warm and Wet	High release
Cold and Wet	Great losses after warm period

Examples and conditions of plant testing

- 5 steps

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N-Management

N-Management

N-Management

Early results and conclusions

- CULTAN

CULTAN and Mintill/ Notill

- To avoid exceeding application of organic or mineral N- fertilizer

From Mintill to CTF

- A CTF System points out the necessity of root establishment

CTF a base and a framework

- Mintill allows to yet to know the previous crop
- CTF allows to consider all aspects of previous management

The key to a reliable future Zoning

- CTF
- CULTAN
- Banded and placed slurry
- Maize under Plastic

Zoning

- Continues the development of agricultural infrastructure

Zoning

- Exkurs Project 20 -20 -20

Suger beet improvement Germany 2010

20 % of the best operations

20% more sugar per hectar

Until 2020

Zoning

- Exkurs Project 20 -20 -20

Stressing
Unterfußdüngung
Autumn slot
Mechanical weeding
Nematodes
Early drilling (film)
Rotfäule

Zoning

- Our Project 50 - 5

50 % less nitrogen with given yield within the next 5 years

How to start

- No mapping:
  - Consider slopes, tops and feet for extra sampling

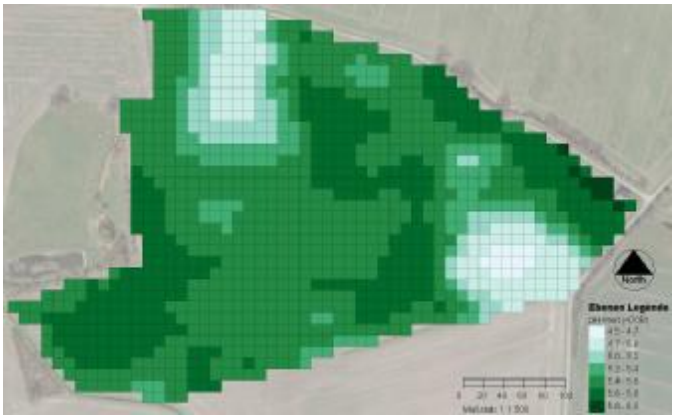
Exkurs Soil Analysis and Sampling

- Meet the right place
- Soil map for localizing significantly different parts of the field

How to start

- Mapping does exist:
  - Consider GPS sampling

Exkurs Soil Sampling



Exkurs Soil Sampling

- Bring the correct fertilizer to right place

Exkurs: Calibration

- N-Sensors promise

will only be kept with a reliable testing to calibrate the sensor