Fluid Technology Roundup

Fluid Fertilizer Opportunities In Modern Production Systems

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Systems Approach

Soil Structure
Fertilizer Utilization
Nutrient Balance
Placement


Garst
COUNTRY

Farming the Zone

"Improving the Physical Status of Soil"

- There are six major soil basics that govern the welfare of the soil-plant system and are controllable by the grower.
- These soil basics listed in their relative order of importance are:
  - **Soil aeration**
  - **Soil water**
  - **Crop residue decay**
  - **Plant nutrient availability**
  - **Heat**
  - **Time**

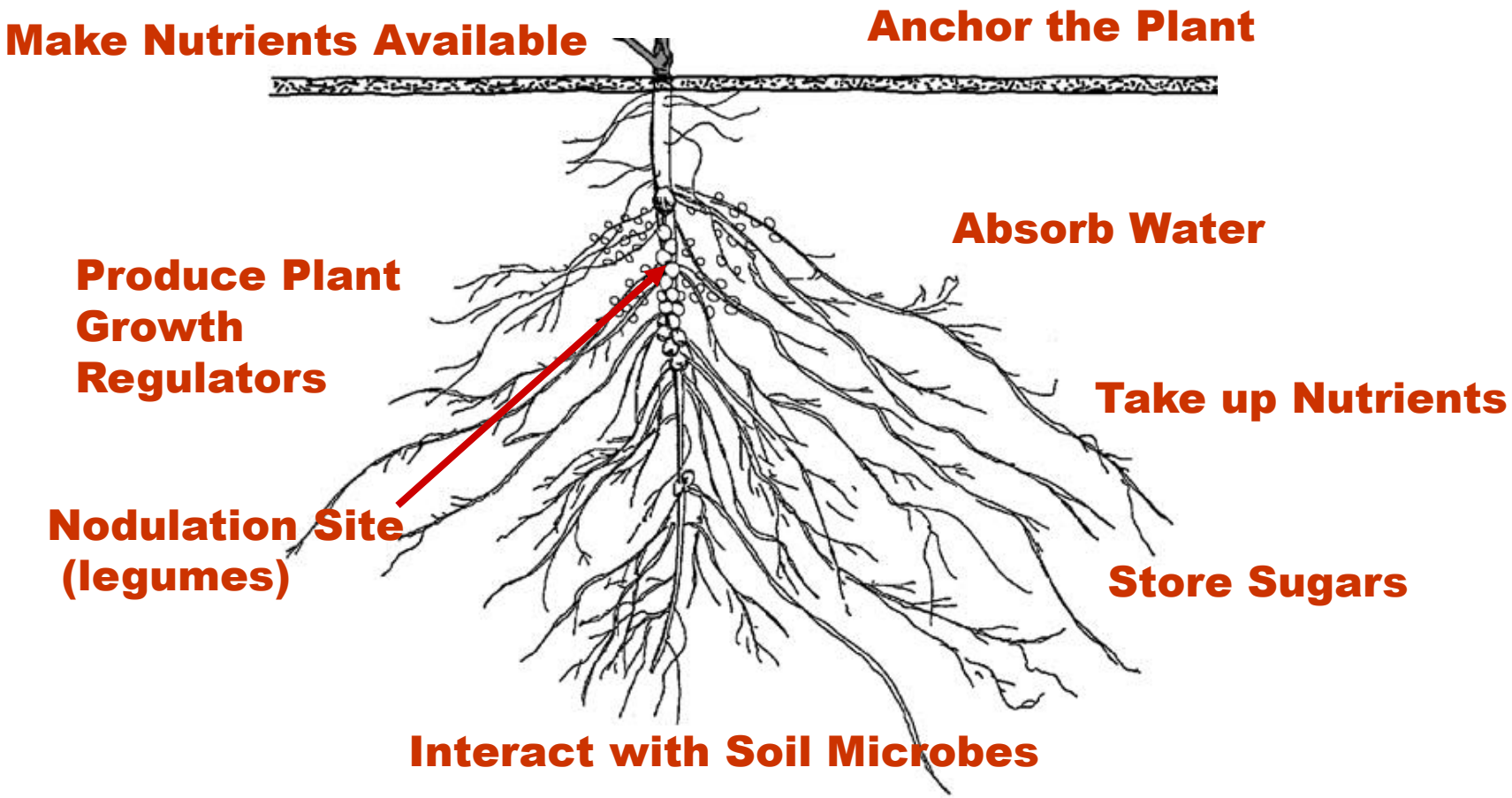
Ingredients of a 300 bu/A Corn

Ingredient	Amount (Seed and Stover)
CO_2	390,000 semi-trailer loads of air (1,300 loads/bu)
Glucose	30,000 lbs (100 lbs/bu)
Water	1,500,000 gal (5,000 gal/bu)
Nutrients in Seed and Stover	• 450 lbs (1.5 lbs/bu) Nitrogen (33% left in stover) • 180 lbs (0.6 lb/bu) Phosphorus (42% left in stover) • 390 lbs (1.3 lbs/bu) Potassium (80% left in stover) • 63 lbs (0.21 lb/bu) Calcium (90% left in stover) • 48 lbs (0.16/lb bu) Sulfur (56% left in stover) **1,131 Total Pounds**

Ingredients of a 100 bu/A Soybeans

Ingredient	Amount (Seed and Stover)
CO2	4,000 semi-loads of air/bu
Glucose	301,080 lbs (301 lbs/bu)
Water	1,350,000 gal (13,500 gal/bu)
Nutrients in Seed and Stover	•Pounds 550 lbs (5.5 lbs/bu) Nitrogen (24% left in Stover) •120 lbs (1.2 lbs/bu) Phosphorus (29% left in Stover) •240 lbs (2.4 lbs/bu) Potassium (41%left in Stover) •170 lbs (1.7 lbs/bu) Calcium (88% left in Stover) •45 lbs (0.45 lb/bu) Sulfer (56% left in Stover) •**1,125 Total**

Functions of the Plant Root System



NUTRIENT USES IN THE PLANT

CALCIUM--
- --promotes root formation & growth
- --improves plant vigor & stalk strength
- --improves nodulation

NITROGEN--
- --essential component of proteins
- --necessary for chlorophyll

MAGNESIUM--
- --is part of each chlorophyll molecule
- --assists in translocation of P and starches in plant

PHOSPHORUS--
- --stimulates early growth
- --stimulates root growth
- --promotes seed production

ZINC--
- --builds growth regulators
- --important for chlorophyll production
- --essential for seed maturity

POTASSIUM--
- --essential for N metabolism
- --promotes root growth & stalk strength

IRON--
- --the energy element
- --necessary for P.S. and chlorophyll

SULFUR--
- --necessary in chlorophyll production
- --essential for certain amino acids
- --promotes nodule formation

BORON--
- --starch producer
- --promotes maturity and seed development
- --involved in N and carbohydrate metabolism

MANGANESE--
- --involved with enzyme systems in plant
- --helps break down carbohydrates & metabolize nitrogen

COPPER--
- --amino acid converter
- --important in plant reproduction stage
- --important role in respiration

ALL NUTRIENTS ARE IMPORTANT!!

Nutrient Uptake

Cations are:

- urea *(nitrogen)* NH_2
- ammonium *(nitrogen)* NH_4
- potassium K
- calcium Ca
- magnesium Mg
- iron Fe
- zinc Zn
- copper Cu
- manganese Mn
- cobalt Co

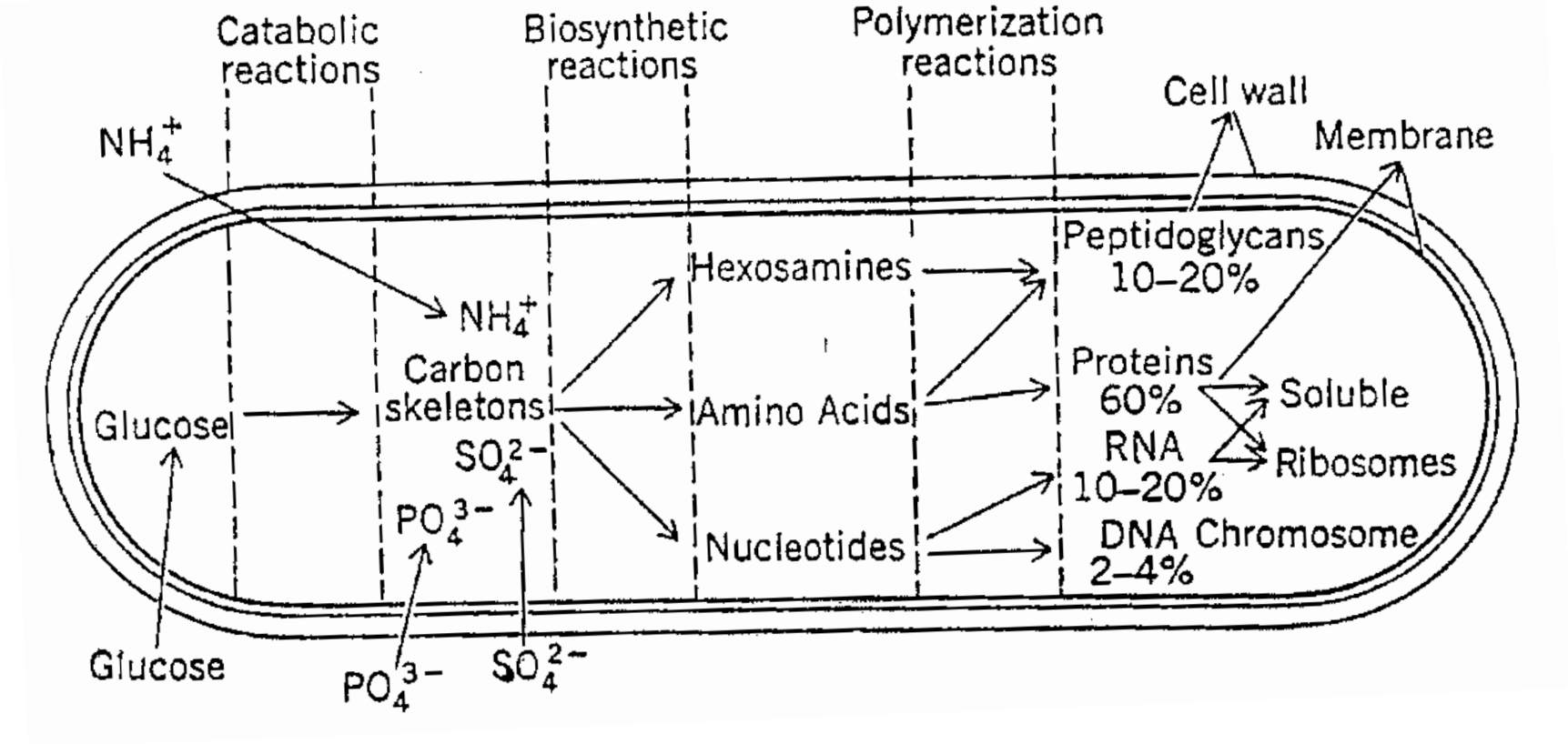
H+
Hydrogen Ion
(Decreases pH)

Anions are:

- NO_3 nitrates *(nitrogen)*
- H_2PO_4 phosphates *(phosphorus)*
- SO_4^2 sulfates
- CO_3 carbonates
- HCO_3 bicarbonates

OH-
Hydroxide Ion
(Increases pH)

Role of Soil Organisms



Generalized Flow Diagram for the Synthesis of the Bacterial Cell Components

J. Mandelstam and K. McQuillen. Biochemistry of Bacterial Growth. John Wiley, 1973

Source: Soil Biology Primer. Soil and Water Conservation Society

Managing Soil Fertility

"Basic 3" In Fertility Management

Nutrient Management =

- Balance
- Placement
- Recovery

REPORT NUMBER
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21047
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Jun 26, 2009

NACHURS®

Analysis by
Midwest Laboratories

TIM MUNDORF
8125 S 100TH CT
LA VISTA NE 68128

PLANT ANALYSIS

SAMPLE ID	REPORT OF ANALYSIS-PERCENT							REPORT OF ANALYSIS - PARTS PER MILLION							
	N Nitrogen	P Phosphorus	K Potassium	Mg Magnesium	Ca CALCIUM	S Sulfur	Na SODIUM	Fe Iron	Mn MANGA-NESE	B Boron	Cu COPPER	Zn Zinc			
1	**3.73**	**0.43**	**3.30**	**0.17**	**0.44**	**0.22**	**0.005**	**147**	**90**	**8**	**10**	**24**			
CORN-5	S	S	H	S-L	S	S	S	S	S-H	D	S	S-L			
3107498 NORMS	3.70	0.38	2.40	0.29	0.45	0.25	0.006	150	75	12	11	28			
2	**3.64**	**0.35**	**2.64**	**0.20**	**0.43**	**0.21**	**0.004**	**119**	**108**	**9**	**12**	**23**			
CORN-5	S	S	H	S-L	S	S-L	S	L-D	H	L	S	S-L			
3107499 NORMS	3.70	0.38	2.40	0.29	0.45	0.25	0.006	150	75	12	11	28			
3	**3.97**	**0.31**	**2.38**	**0.22**	**0.43**	**0.20**	**0.006**	**159**	**162**	**8**	**13**	**19**			
CORN-5	S-H	S-L	S	S-L	S	S-L	S	S	E	D	S-H	D			
3107500 NORMS	3.70	0.38	2.40	0.29	0.45	0.25	0.006	150	75	12	11	28			
3P	**2.97**	**0.34**	**2.24**	**0.22**	**0.42**	**0.17**	**0.001**	**118**	**80**	**13**	**14**	**28**			
CORN-5	L-D	S	S-L	S-L	S	L-D	S	L-D	S	S	S-H	S			
3107502 NORMS	3.70	0.38	2.40	0.29	0.45	0.25	0.006	150	75	12	11	28			
4	**4.09**	**0.33**	**2.93**	**0.17**	**0.40**	**0.20**	**0.001**	**160**	**134**	**7**	**13**	**23**			
CORN-5	H	S	H	L	S	S-L	S	S	H-E	D	S-H	S-L			
3107503 NORMS	3.70	0.38	2.40	0.29	0.45	0.25	0.006	150	75	12	11	28			

D or Deficient L or Low S or Sufficient H or High E or Excessive

Plant Nutrients absorbed by 180 bu/A Corn Crop

Corn Growth in 25 Day Periods

Seedling

Rapid Growth

Silking

Grain Fill

Maturity

Pounds of Plant Nutrients Taken up by Corn:

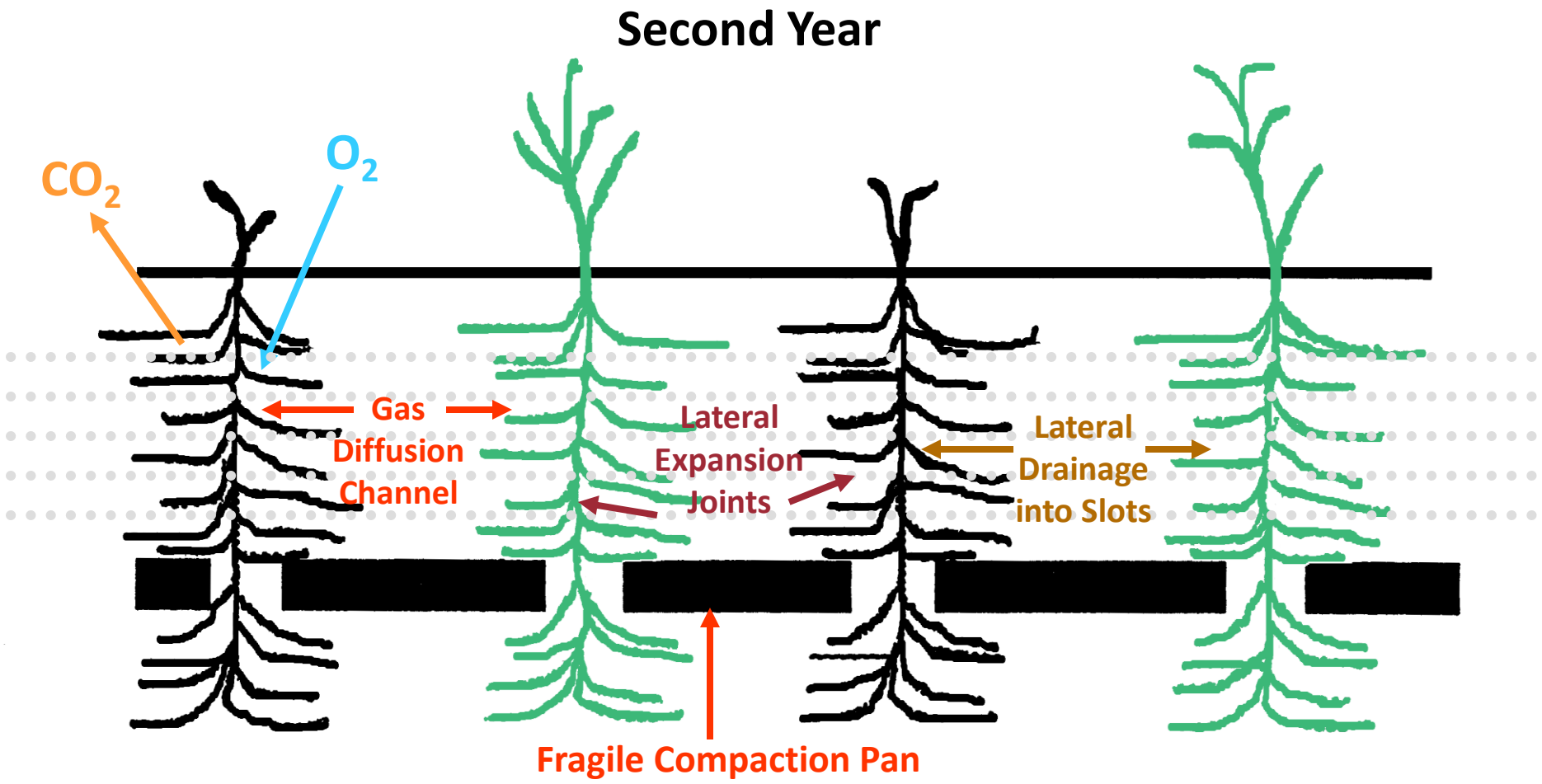
						Totals	Stover	Grain
N	19	84	75	48	14	240	104	136
P_2O_5	4	27	36	25	8	100	24	76
K_2O	22	104	72	36	6	240	188	52

Percentage of Plant Nutrients Taken up by Corn:

N	8	35	31	20	6	100
P_2O_5	4	27	36	25	8	100
K_2O	9	44	31	14	2	100

Vertical Tillage System

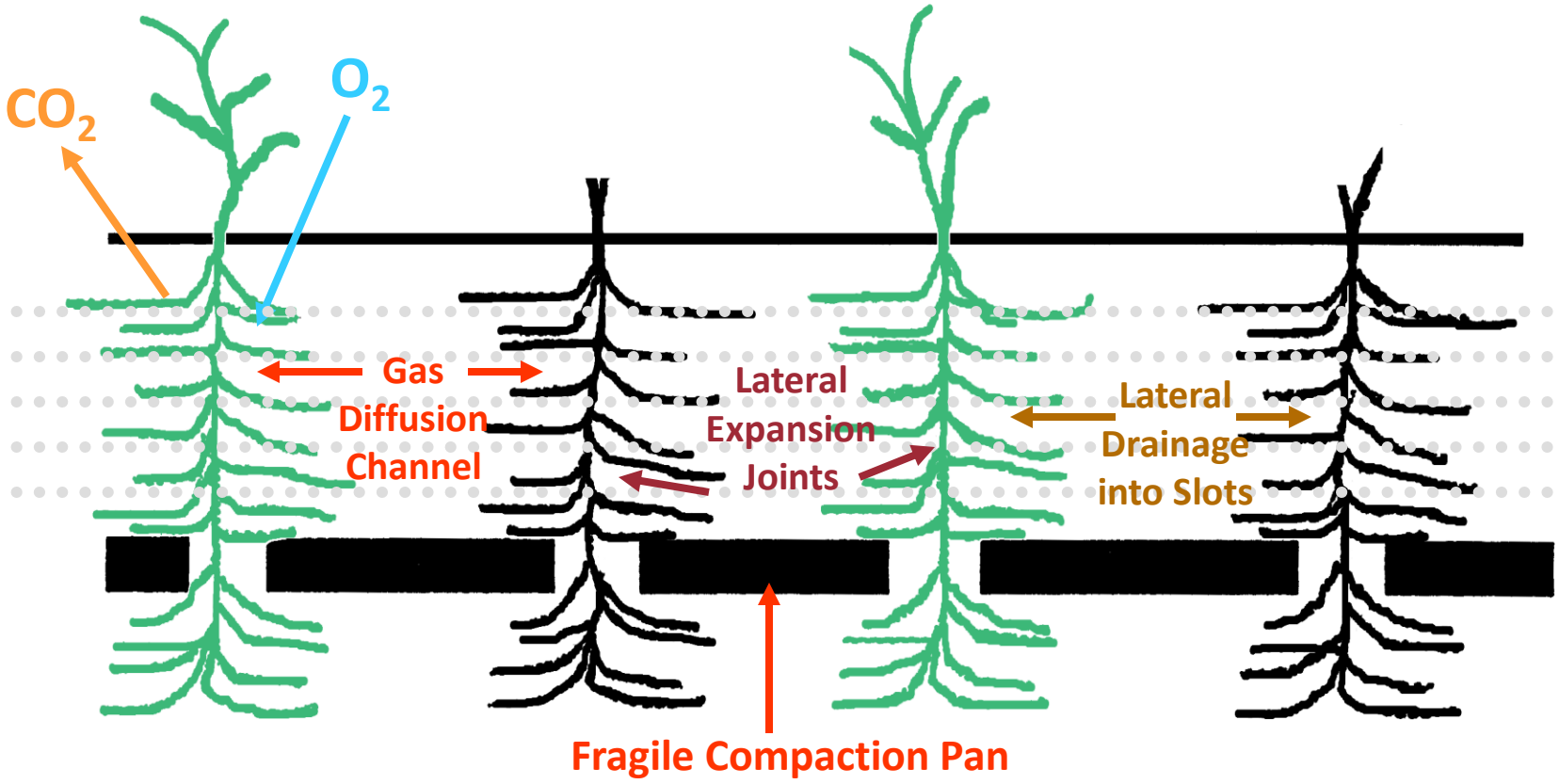
Builds Rootability and The Soil Bio-digester



Vertical Tillage System

Builds Rootability and The Soil Bio-digester

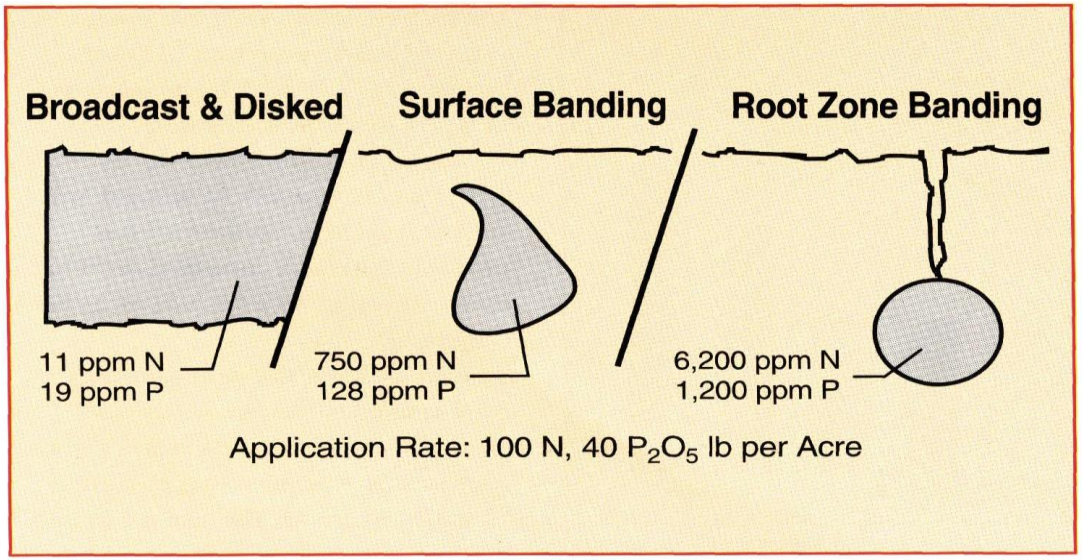
Third Year



Farming the Zone

"Improving the Physical Status of Soil"

- Fertilizer Banding
  - Nutrient concentration and plant uptake is optimized when fertilizer is banded.



Source: Fluid Journal, Volume 6, No. 3, Issue No. 22, Summer 1998


STRIP CAT
08/23/2012


Zone
Commander


GLADIATOR

ST-PRO


DANGER

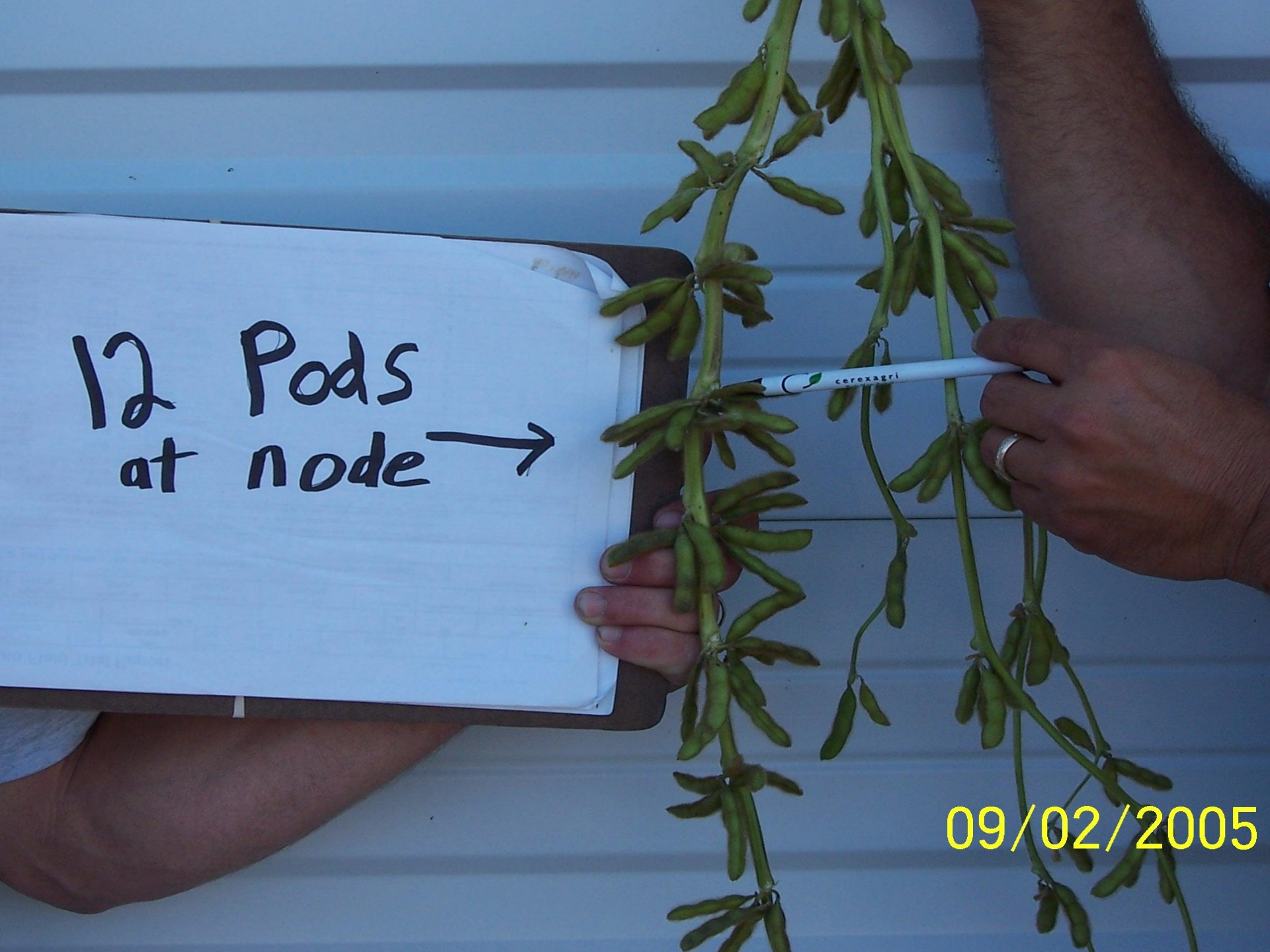

Great Plains


MONOSEM
Twin-Row


4640
SPRA-COUPE


Corn – Foliar
2 ½ gal SRN


High Rate
Alpine SRN
Foliar


12 Pods
at node
cerexagri
09/02/2005


Ryegrass,
Radish,
Clover

Questions

or

Comments

Thanks for Your Attention