

FORMATION OF CALCIUM CARBONATE FROM CALCIUM BICARBONATE BY ALGAE, $\text{Ca}(\text{HCO}_3)_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2$, AEROBIC ZONE.

DECOMPOSITION OF ORGANIC MATTER PROVIDES MICROBIAL PROTEIN BUT CAUSES REDUCTION OF AVAILABLE NITROGEN (H_2O_2 , NH_3) AND OXYGEN IN WATER.

ORGANIC MATTER CH_4 , H_2 , CO_2 TOO MUCH ACID (H_2) SLOWS BACTERIAL ACTION.

ALGAE SECRETES ORGANIC MATTER IN SOLUBLE FORM & SERVES AS NUTRIENT FOR GROWTH OF BACTERIA. PHOTOSYNTHESIS AREA - CO_2 , O_2 *

OXIDATION AREA-SOIL IF SHALLOW WATER USED *

AREA OF NH_3 VOLITIALIZATION *

AEROBIC AREA WATER *

ORGANIC MATTER *

DEPTH VARIES

REDUCTION AREA - SOIL *
ANAEROBIC AREA - SOIL *

N - FIXING GLOEOCAPS ALGAE - FIX N IN BOTH ZONES ANEROBIC AREA - WATER *

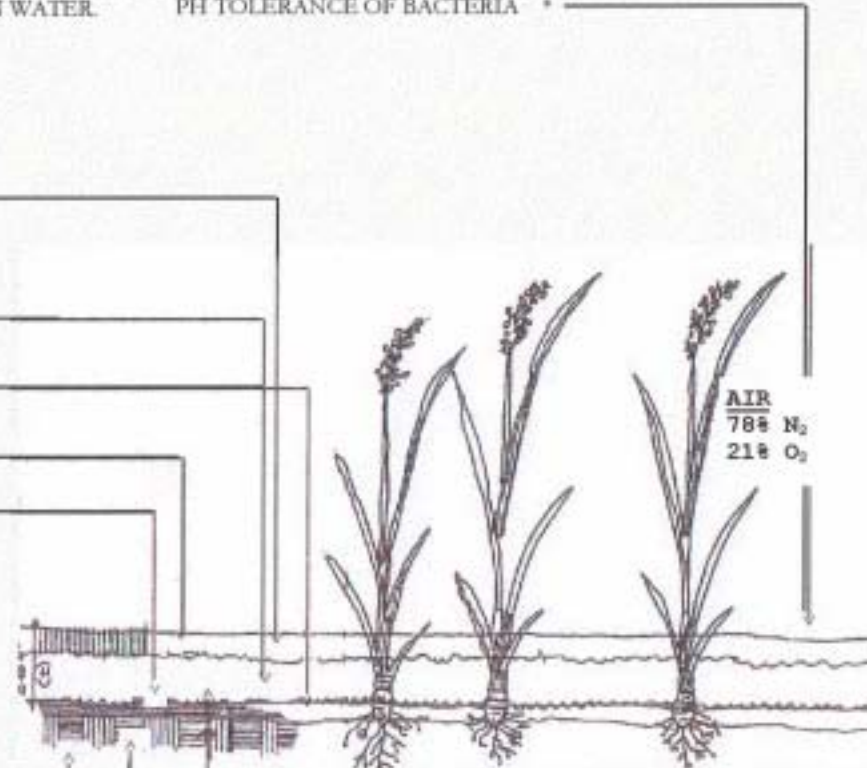
NOTE: MIXTURE OF MICROSOIL *



DETERMINE BACTERIAL ACTIVITY MEASUREMENT OF ATP LEVELS NITRIFICATION ACTIVITY AREA NH_3 , NO_2 (NITRATE) - AEROBIC ZONE NOTE *
PH TOLERANCE OF BACTERIA *

VARIABLES:

1. DEPTH OF WATER
2. PH OF WATER
3. AMOUNT OF ALGAE IN WATER
4. % ORGANIC MATTER IN TOP LAYER OF SOIL
5. TEMPERATURE OF WATER & SOIL
6. LIGHT INTENSITY
7. DILUTION EFFECT OF WATER
8. LASTING NUTRIENT PERIOD OF FERTILIZER USED. ZINC AVAILABILITY.
9. EFFECT OF COPPER SULFATE, PESTICIDES, HERBICIDES.
10. EXISTING NUTRIENTS IN TOP LAYER OF SOIL.
11. CROP ROTATION PRACTICE
12. EXISTING TYPES OF SOIL
13. AMOUNT OF AVAILABLE OXYGEN IN WATER AT DIFFERENT PERIODS.
14. NUMBER & TYPES OF MICRO-ORGANISMS IN SOIL & WATER.
15. BALANCE BETWEEN OXYGEN USERS & OXYGEN PRODUCERS.
16. EFFECT OF HAVING TO DRAIN FIELDS DURING GROWTH CYCLE.
17. METHODS OF APPLICATION.
18. EFFECT OF H_2S PRODUCTION
19. PHOSPHORUS REQUIREMENT OF AZOLLA



AIR
78% N_2
21% O_2

*DENTRIFICATION ZONE ANAEROBIC NH_3 & N_2 & N_2O
*ANAEROBIC ZONE SULFATE REDUCING BACTERIA $\text{CaSO}_4 + 4\text{H}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + 2\text{H}_2\text{O} + \text{H}_2\text{S}$ S MAY OXIDIZE TO S & H_2O (Or FeS)

* IDEAL RICE PLANT

PADDY RICE CULTURE

NO_3 (NITRATE) SERVES AS NUTRIENT FOR ALGAE. TOO MUCH MAY PROMOTE ALGAE BLOOM, (INCREASED GROWTH) A PHOTOSYNTHETIC BACTERIA PRESENT ALONG WITH HETEROTROPIC ORGANISMS.





RiceFields in Shangdong, China 1997

Proving that overuse of MicroSoil® in poor soils is not beneficial: Note smaller growth in circle.