**Second lecture**

**Soil organic N**

**Soil organic N consists of proteins (20-40%) , amino sugars such as purine and pyrimidine (1%or Less) and condensation Of sugar and amines . part of organic -N is also present as clay -humus complexes , which are resistant to decomposition .**

**So ,**

**This would explain why only a very small part of immobilized Fertilizer N becomes available to growing crop plants**

**Mineralization of Soil organic N**

**It is microbial process by which organic forms of N in soils are converted to inorganic forms ( ammonia , nitrite and nitrate ) ,**

**Mineralization is take place in three step by step reactions , aminization , ammonification and nitrification**

**First and two are carried out by hetertrophic microoganisms**

**Third reaction carried out by autotrophic bacteria**

**Soil organic N in main forms crop residual and microbial biomass**

**What is the fate of ammonium which released ?**

1. **Lost by ammonia**
2. **Utilized by plants**
3. **Absorbed on exchange complex of clay minerals**
4. **Fixed in crystall 2:1 clay mineral**
5. **Immobilized by soil microoganisms**
6. **Nitrified**

**Nitrification**

**This is a two- step process**

**First ,**

**Ammonia converted to nitrite by Nitrosomonas bacteria**

**Second**

**Nitrite convert to nitrate by nitrobacter bacteria**

**So**

**What is fate of nitrate ?**

1. **Taken up by plants**
2. **Lost by leaching – creating health hazard by increasing nitrate in groundwater**
3. **Under anerobic condition lost by denitification**

**Creating atmosphere pollution**

1. **Immobilized by soil microoganisms**

**Main Factors affecting nitrification**

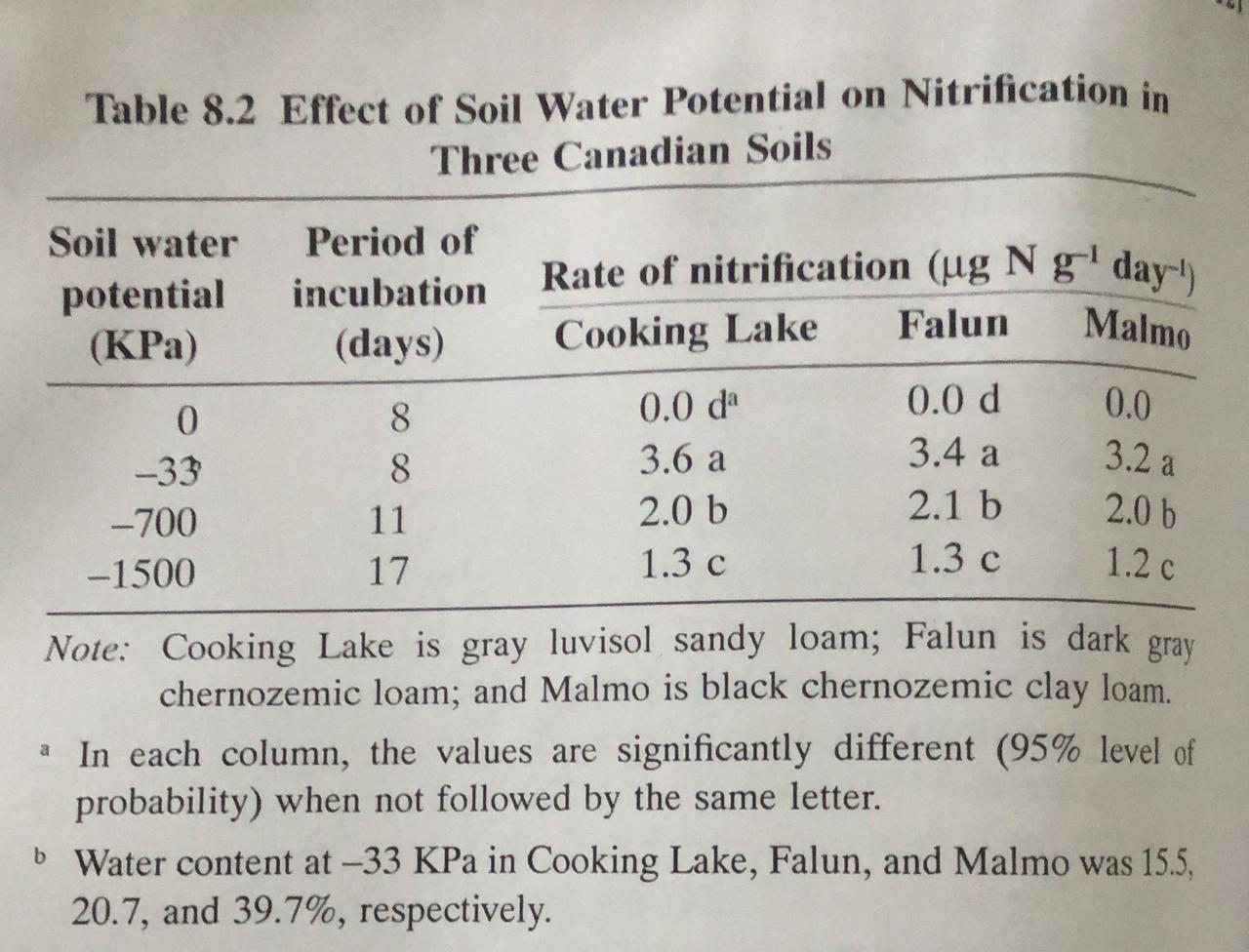
1. **Soil water and Aeration**

**Nitrification is brisk(تنتعش) in soils having adequate soil and water in near field capacity as table 8.2 below**

**0 kPa (100 % water filled pore space) , so Nitrification completely**

**Ceases , in low well- aerated soils Nitrification**

**increases from 1.5 Mega paskal water potential at perment wilting point ) to -0.33 kPa ( near field capacity ) Nitrification being greatest**

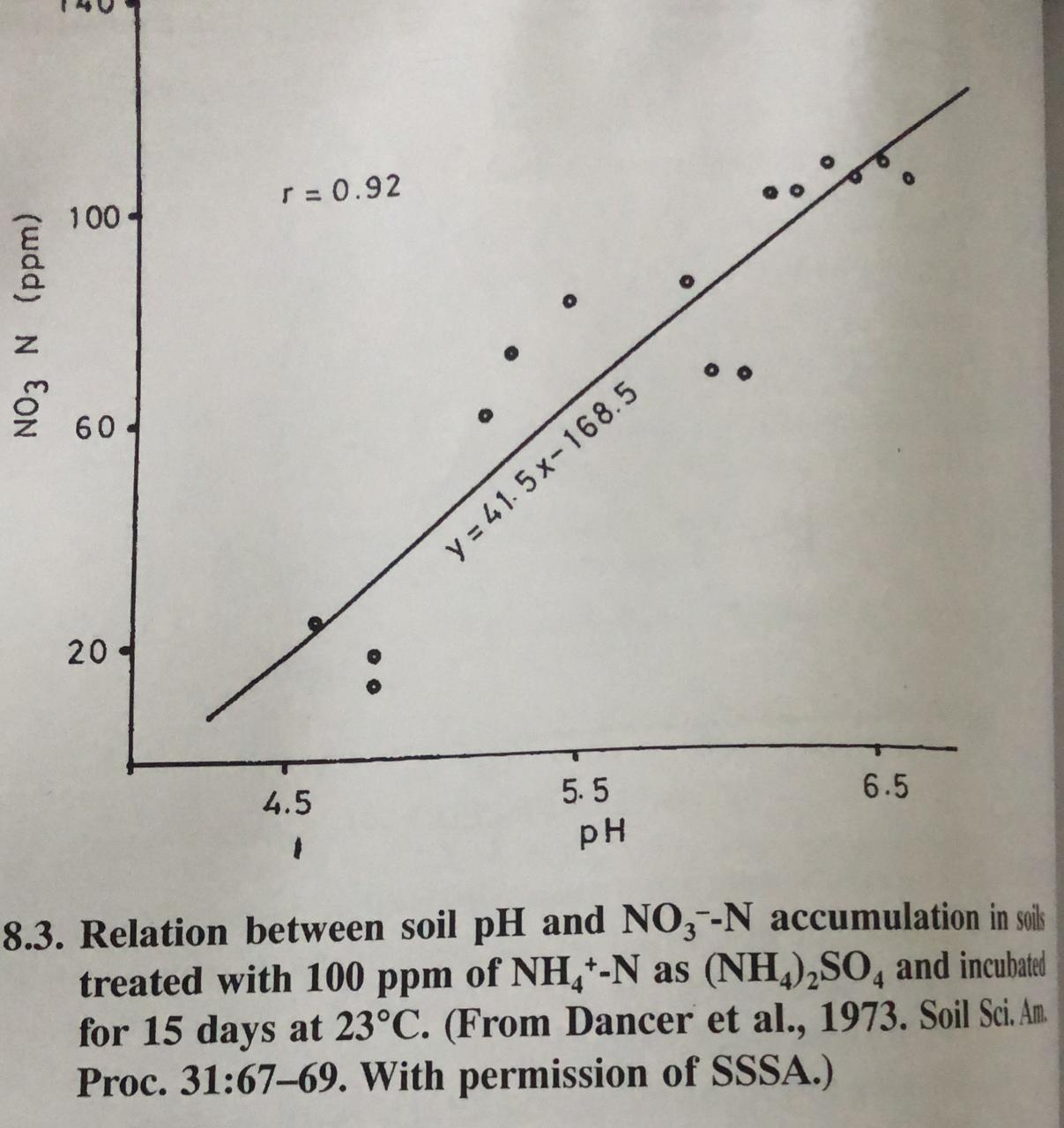


1. **Soil pH**
2. **Acid soil having pH < 5.39 NH4 + oxidized slowly to NO3 without appearance of NO2-1**
3. **Acid soil having pH = 5 .39 ther are some accumulation of NH4 + with very little oxidation**

**To NO2 and NO3**

1. **Soils having pH 5.01 – 6.38 , NH4 and NO2 are rapidly oxidized to NO3**
2. **Soils having PH 6.93- 7.85 , NH4 oxidized to NO2 Which accumulated**

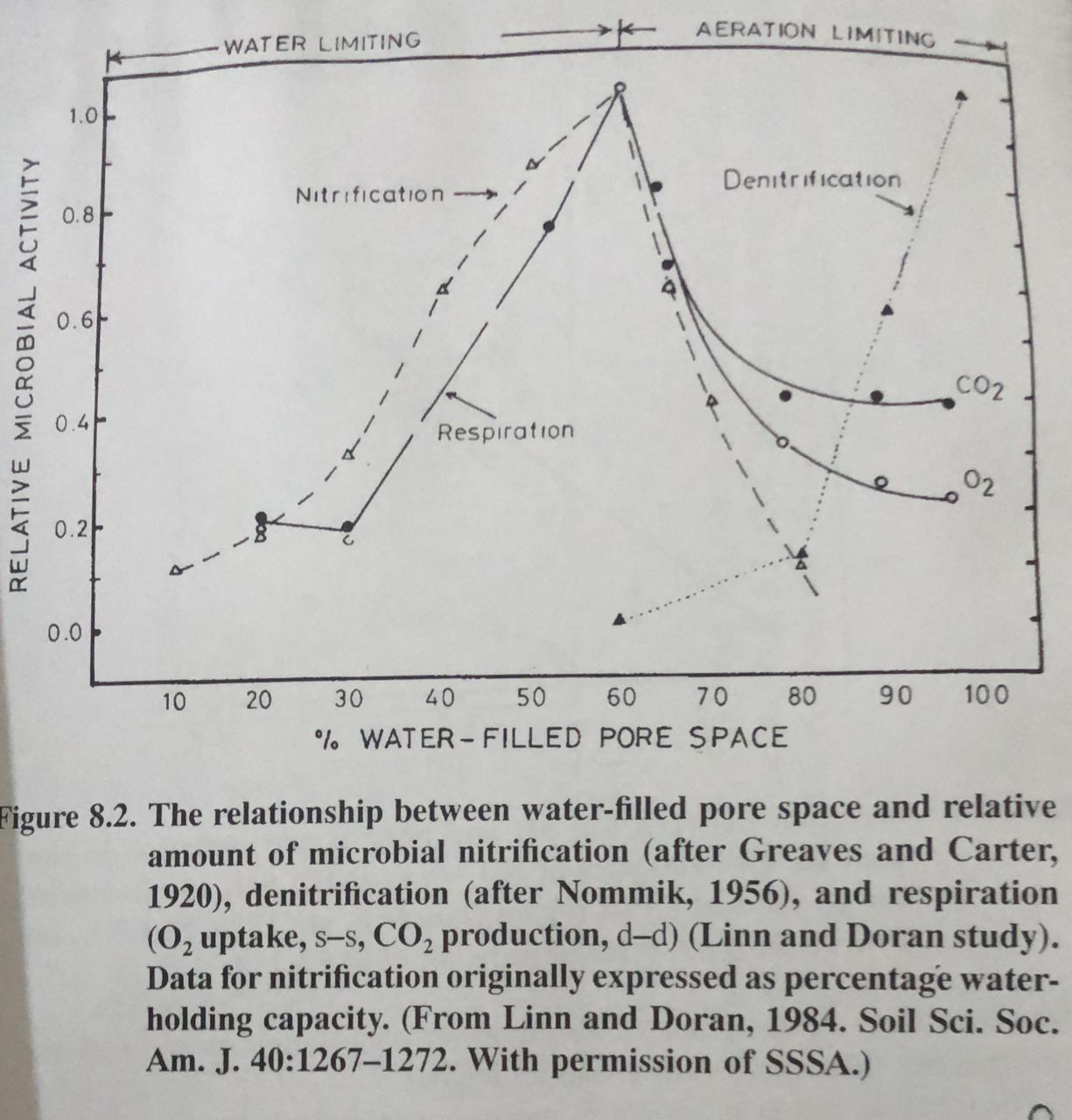
**So , figure 8.3 show that**



**optma soils pH range at 6 and 9.4**

**Nitrification of both soil and fertilizer nitrogen release H ions as reaction below**

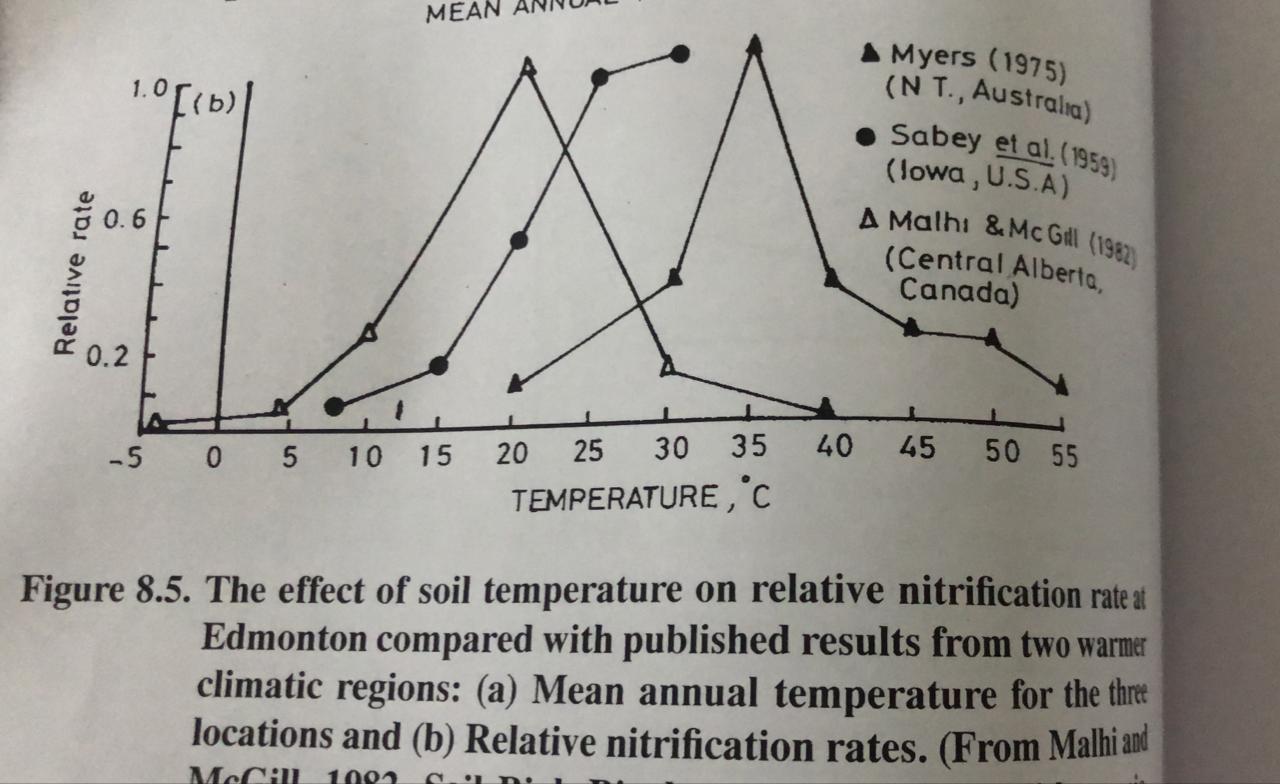
**NH4+ O2 ---🡪 NO2 + H2O + 4H +**



**Soil temperature**

**Optima Soil temperature 25 and 35 C0**

**As fig . 8.3 below**



**Supply of ammonia**

