# Results of soil analysis

2014.1.29 summarized by K. Tsutsuki (Lecturer)

## Analysis using pH meter, EC meter, and NO3 electrodes

| | | | | pH meter | | EC meter | NO3 electrode | Test paper | Test paper | Test paper |
|---|---|---|---|---|---|---|---|---|---|---|
| Layer | Upper (cm) | Lower (cm) | Average depth (cm) | pH($H_2O$) | pH(KCl) | EC ($\mu$S/cm) | $NO_3$ (ppm) 1:5 extraction | $P_2O_5$kg/10a (Bray extraction) | $P_2O_5$kg/10a ($H_2O$ extraction) | $K_2O$ kg/10a ($H_2O$ extraction) |
| $Ap_1$ | 0 | 10 | 5 | 5.24 | 4.83 | 281 | 99 | 100 | 10 | 25 |
| $Ap_2$ | 10 | 25 | 17.5 | 5.33 | 4.99 | 176 | 52 | 100 | 10 | 25 |
| 2BC | 25 | 30 | 27.5 | 5.54 | 5.36 | 142 | 39 | 100 | 10 | 25 |
| $3C_1$ | 30 | 45 | 37.5 | 5.89 | 5.36 | 135 | 23 | 100 | 10 | 25 |
| $3C_2$ | 45 | 73 | 59 | 6.27 | 5.36 | 115 | 12 | 100 | 10 | 10 |
| $3C_3$ | 73 | 98 | 85.5 | 6.16 | 5.11 | 92 | 11 | 100 | 10 | 10 |

pH (KCl) was measured separately by the lecturer

## Analysis using "Midori-kun" rapid soil diagnosis kit (Test paper method) 1:5 water extraction.

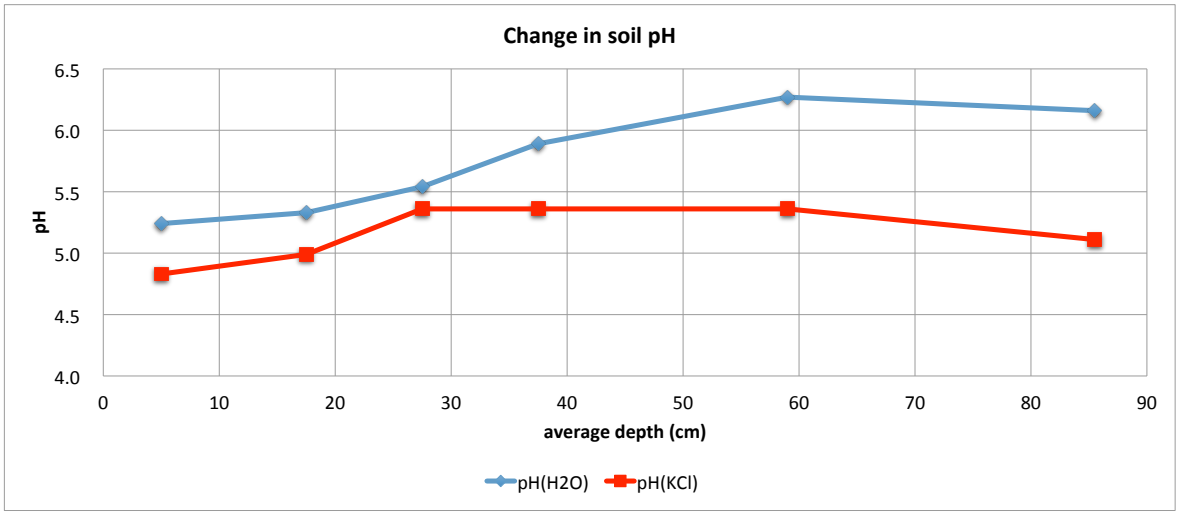
| Layer | Upper (cm) | Lower (cm) | Average depth (cm) | pH($H_2O$) | $NO_3$kg/ 10a | $P_2O_5$kg/ 10a | $K_2O$kg/ 10a |
|---|---|---|---|---|---|---|---|
| $Ap_1$ | 0 | 10 | 5 | 5.5 | 10 | 10 | 25 |
| $Ap_2$ | 10 | 25 | 17.5 | 5 | 5 | 10 | 25 |
| 2BC | 25 | 30 | 27.5 | 5 | 5 | 10 | 25 |
| $3C_1$ | 30 | 45 | 37.5 | 5.5 | 0 | 10 | 10 |
| $3C_2$ | 45 | 73 | 59 | 5.5 | 0 | 10 | 10 |
| $3C_3$ | 73 | 98 | 85.5 | 5 | 0 | 10 | 10 |

Measured separately by
Molybden blue method (Colorimetry)

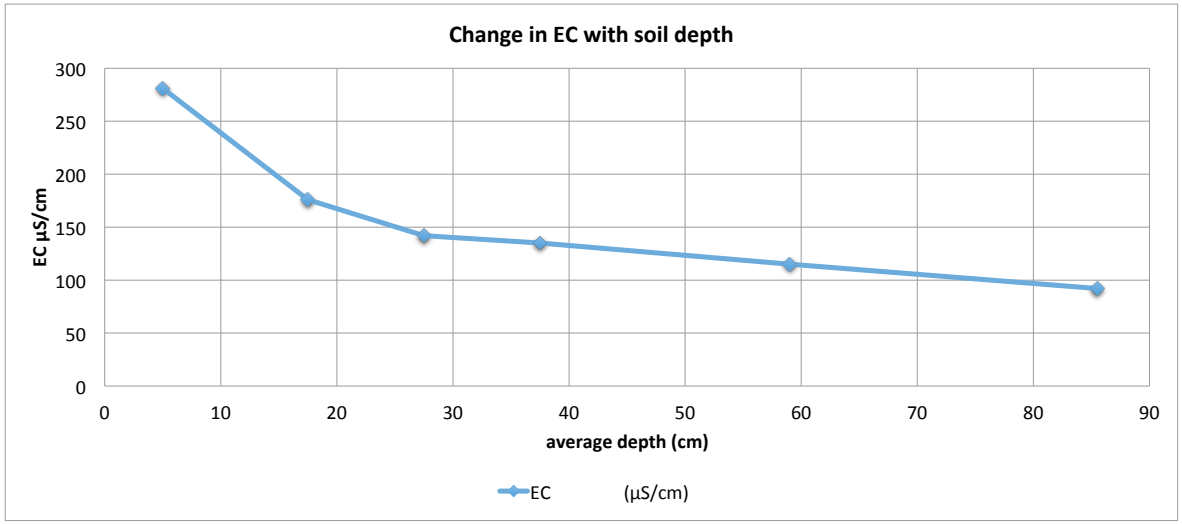
| mg $P_2O_5$/100g soil |
|---|
| 50.0 |
| 41.4 |
| 0.5 |
| 0.3 |
| 0.8 |
| 3.0 |

Results obtained by the rapid test paper method were reasonable compared with those obtained by scientific instruments.

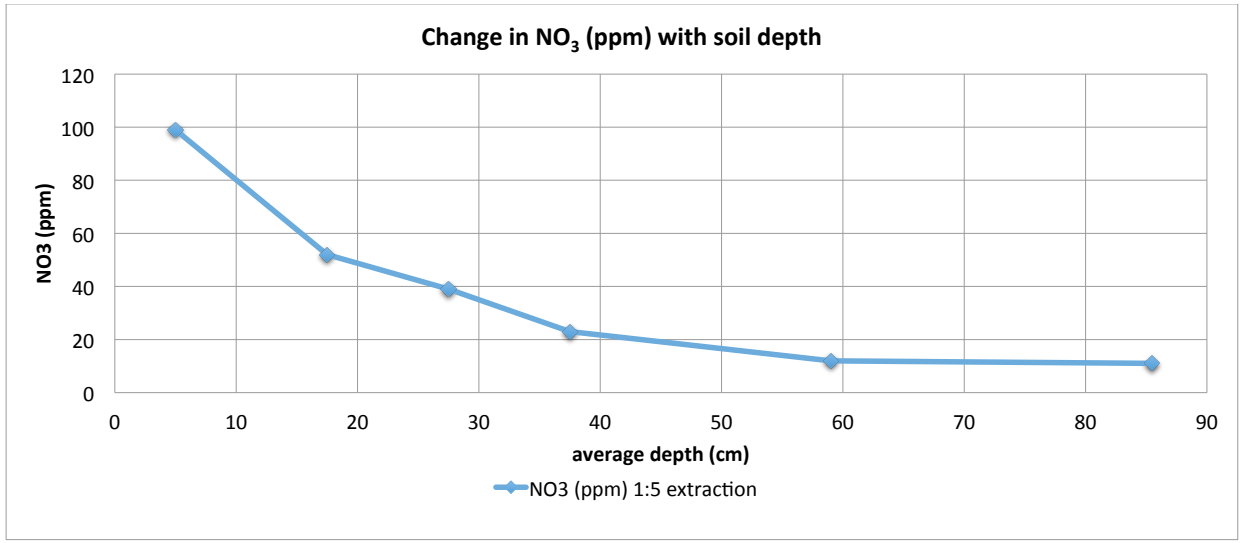
Water soluble phosphate was very low compared with the Bray 2 results.

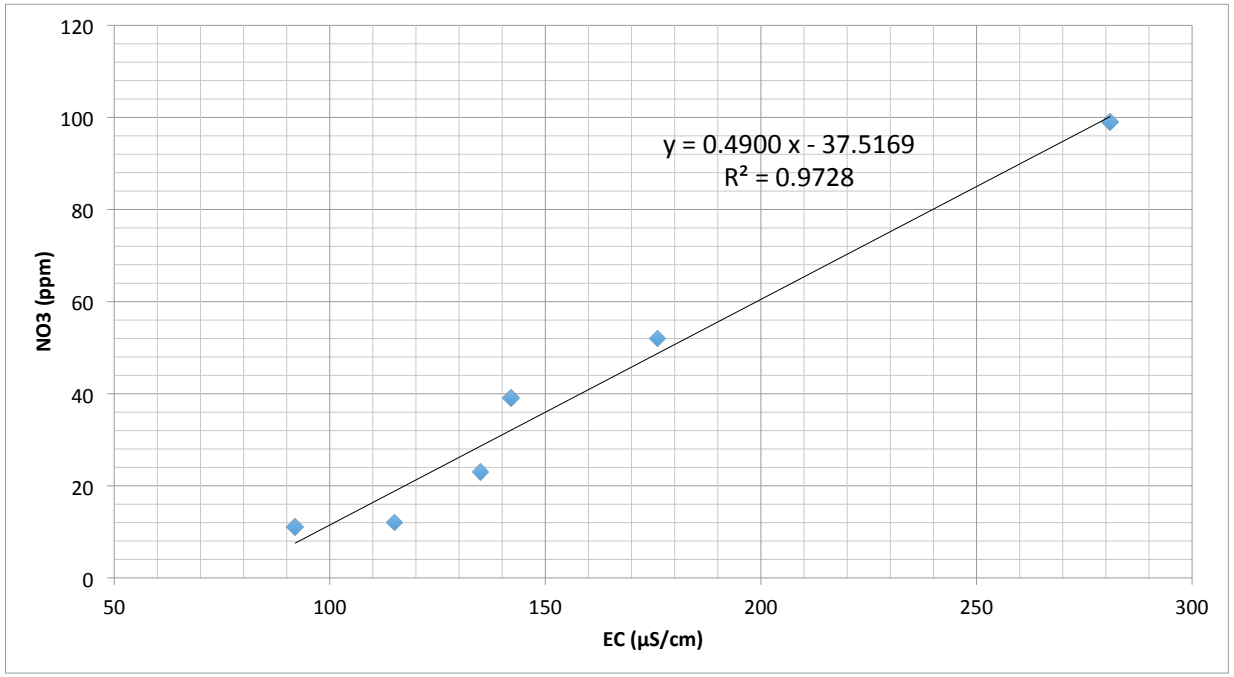



Soil pH was lower in the upper plowed layer.
Acidification due to fertilizer application is suspected.
Absorption and leaching of basic elements also cause the lowering of pH.




EC and $NO_3$ concentrations decreased with soil depth. It reflects the concentration of fertilizers in soil.
Highly positive correlation was also found between $NO_3$ and EC.


Change in NO3 (ppm) with soil depth
120
100
80
60
40
20
0
NO3 (ppm)
0
10
20
30
40
50
60
70
80
90
average depth (cm)
NO3 (ppm) 1:5 extraction


120
100
80
60
40
20
0
NO3 (ppm)
y = 0.4900 x - 37.5169
R² = 0.9728
50
100
150
200
250
300
EC (µS/cm)

## Nitrate concentration in vegetables

25 g of leaf and stem of vegetables were homogenized using a juicer mixer with 475 mL of deionized water.

$NO_3$ concentration was measured by $NO_3$ meter (HORIBA LAQUA Twin B-742 calibrated with 30 and 300 ppm standards).

Brassica campestris from Gunma prefecture

| | | | |
|---|---|---|---|
| 62 ppm | x 20 = | 1240 ppm | |
| 80 ppm | x 20 = | 1600 ppm | |

Spinach from Saitama prefecture

| | | | |
|---|---|---|---|
| 260 ppm | x 20 = | 5200 ppm | |
| 280 ppm | x 20 = | 5600 ppm | Very high nitrate concentration in spinach. |