Table 9. Effect of pH on nutrient availability and productivity of onions grown on muck soils in Western New York, field survey, 2010: mid-season soil nutrient analysis.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mid-season soil nutrient analysis - collected July 15 (Panek) & 28 (all others)**  ***In order of increasing pH:*** | | | | | | | | | | | |
| **Field\*** | **pH** | **% OM** | **Lb/A** | | | | | | | | |
| **NO3** | **P** | **K** | **Ca** | **Mg** | **Mn** | **Al** | **Fe** | **Zn** |
| ***Below optimum pH (<5.2):*** | | | | | | | | | | | |
| **Mort B** | 4.8 e | 46 cd | 190 cd | 110 f | 960 | 20,590 e | 1,862 bc | 80 a | 66 b | 50 b | 18 |
| **Mort A** | 5.0 e | 42 d | 110 d | 120 ef | 688 | 17,980 ef | 2,097 b | 85 a | 83 a | 202 a | 23 |
| ***Optimum pH (5.2 – 5.8):*** | | | | | | | | | | | |
| **Panek A** | 5.3 de | 51 bc | 178 cd | 153 def | 1385 | 24,667 d | 2,270 b | 30 b | 38 cde | 12 c | 21 |
| **Panek B** | 5.3 de | 57 a | 188 cd | 182 cde | 1430 | 26,717 cd | 2,163 b | 30 b | 33 de | 4 c | 25 |
| **LS 1 A** | 5.3 cde | 53 ab | 276 bc | 191 cd | 1053 | 27,457 cd | 2,248 b | 36 b | 52 bc | 7 c | 24 |
| **LS 2 A** | 5.6 cd | 50 bc | 226 bcd | 183 cde | 1017 | 29,050 c | 2,831 a | 31 b | 45 cd | 5 c | 24 |
| **LS 2 B** | 5.8 bcd | 51 bc | 157 cd | 190 cd | 915 | 29,393 c | 3,100 a | 31 b | 38 cde | 8 c | 22 |
| ***Above optimum pH (>5.8):*** | | | | | | | | | | | |
| **Star A** | 5.9 bc | 53 ab | 502 a | 266 ab | 1223 | 40,597 b | 3,027 a | 17 b | 29 de | 6 c | 12 |
| **LS 1 B** | 6.2 ab | 19 e | 240 bcd | 227 bc | 713 | 15,200 f | 1,417 c | 19 b | 41 cde | 11 c | 13 |
| **Star B** | 6.5 a | 51 bc | 383 ab | 318 a | 1353 | 46,297 a | 3,182 a | 19 b | 26 e | 6 c | 13 |
| ***P Value (α=0.05)*** | ***0.0001*** | ***0.0000*** | ***0.0032*** | ***0.0002*** | ***NS*** | ***0.0000*** | ***0.0000*** | ***0.0000*** | ***0.0000*** | ***0.0000*** | ***NS*** |

\*Within each field, an area was selected for each low (A) and high (B) pH. Three sub-samples areas were set up within section A and B.

***Pearson correlation with pH and nutrient level in the soil:***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **pH** | **% OM** | **NO3** | **P** | **K** | **Ca** | **Mg** | **Mn** | **Al** | **Fe** | **Zn** |
| Pearson Correlation (R) | -0.3138\* | 0.4199 | 0.8118 | 0.1141 | 0.5151 | 0.4279 | -0.7169 | -0.7278 | -0.4276 | -0.6609 |
| ***P-value (α=0.05)*** | ***NS\**** | ***0.0209*** | ***0.0000*** | ***NS*** | ***0.0036*** | ***0.0183*** | ***0.0000*** | ***0.0000*** | ***0.0184*** | ***0.0001*** |

***Pearson correlation with %OM and nutrient level in the soil:***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **%OM** | **pH** | **NO3** | **P** | **K** | **Ca** | **Mg** | **Mn** | **Al** | **Fe** | **Zn** |
| Pearson Correlation (R) | -0.3138\* | 0.1615 | 0.0195 | 0.4750 | 0.5593 | 0.5371 | 0.0266 | -0.1457 | -0.1785 | 0.4569 |
| ***P-value (α=0.05)*** | ***NS\**** | ***NS*** | ***NS*** | ***0.0080*** | ***0.0013*** | ***0.0022*** | ***NS*** | ***NS*** | ***NS*** | ***0.0111*** |

\*When Star fields are taken out of the analysis, because they have high pH and high %OM, a significant Pearson correlation occurred (-0.5503; p=0.0053) between pH and %OM.