**TABLE S5** The relationships between soil physicochemical properties and the relative abundance of AOB subclusters in black soils using Spearman’s correlations. Correlations with significant values (**\***, *p* < 0.05; **\*\***, *p* < 0.01) are shown in bold number.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AOB | Latitude | pH | TC | TN | C/N | H2O% | TP | AK | AP | NH4+-N | NO3--N | PNR |
| *Nitrosospira* | | | | | | | | | | | | |
| Cluster 3a.1 | -0.122 | **0.795\*\*** | 0.122 | 0.114 | 0.07 | -0.095 | 0.159 | 0.351 | 0.22 | -0.195 | -0.171 | **0.708\*\*** |
| Cluster 3b | -0.247 | **0.428\*** | -0.063 | -0.106 | 0.104 | 0.123 | -0.089 | 0.105 | 0.152 | -0.065 | -0.075 | 0.385 |
| Cluster 10 | -0.231 | **-0.636\*\*** | -0.3 | -0.301 | -0.079 | -0.281 | -0.235 | -0.372 | -0.134 | -0.115 | 0.051 | **-0.474\*** |
| Cluster 2 | **0.603\*\*** | 0.374 | **0.609\*\*** | **0.603\*\*** | 0.108 | **0.604\*\*** | **0.569\*\*** | 0.266 | -0.089 | -0.17 | -0.212 | 0.157 |
| Cluster 3a.2 | **-0.418\*** | **-0.475\*** | **-0.546\*\*** | **-0.531\*\*** | -0.121 | -0.45 | **-0.536\*\*** | -0.239 | 0.135 | 0.372 | 0.374 | -0.257 |
| Cluster 9 | 0.195 | -0.313 | 0.093 | 0.139 | -0.151 | 0.058 | 0.046 | -0.183 | -0.338 | -0.092 | -0.163 | **-0.428\*** |
| *Nitrosomonas* | -0.141 | -0.085 | 0.004 | -0.069 | 0.308 | -0.152 | 0.059 | 0.012 | -0.097 | -0.095 | -0.162 | 0.07 |