# Enhancing root proliferation in an alkaline dispersive subsoil: a comparative study of organic and inorganic amendments with different amelioration mechanisms

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**Table S1**. List of different organic, inorganic and combined amendments used to ameliorate an alkaline dispersive subsoil and their application rates. PAM: Polyacrylamide; N: Nitrogen; P: Phosphorus; S: Sulphur

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Amendments | Groups | Application rate (t ha-1) | Application rate(g kg-1 dry soil) | Notes |
| 1 | Control | Control | nil | nil |  |
| 2 | Bean residues | Organic | 15 | 12 | *Vicia faba* L. |
| 3 | Compost+Biochar | Organic | 15 | 12 | 49:1 w/w mature green waste compost: green waste biochar ratio; blended post-composting |
| 4 | Compost chicken manure | Organic | 15 | 12 | Mature poultry litter compost |
| 5 | Compost green organics | Organic | 15 | 12 | Mature municipal green waste compost |
| 6 | Compost pig on straw active | Organic | 15 | 12 | Immature pig bedding material compost |
| 7 | Cow manure  | Organic | 15 | 12 | Uncomposted |
| 8 | Humate | Organic | 15 | 12 |  |
| 9 | Pig manure | Organic | 15 | 12 | Uncomposted |
| 10 | Poultry litter | Organic | 15 | 12 | Uncomposted poultry litter; Charcoal was present at the sampling site |
| 11 | Reed winter residues | Organic | 15 | 12 | *Phragmites australis* |
| 12 | Shortland biosolid | Organic | 15 | 12 | Taken from a small suburban wastewater treatment plant receiving domestic commercial and industrial inflows. |
| 13 | Wheat | Organic | 15 | 12 | *Triticum aestivum* L. residues |
| 14 | Gypsum\_low | Inorganic | 5 | 4 |  |
| 15 | Gypsum\_high | Inorganic | 15 | 12 |  |
| 16 | PAM | Inorganic | 5 kg ha-1 | 4 mg kg-1 |  |
| 17 | PAM+Gypsum | Inorganic | 5 kg ha-1 PAM + 5 t ha-1 gypsum | 4 mg kg-1 PAM + 4 g kg-1 gypsum |  |
| 18 | Compost+Zeolite | Combined | 15 | 12 | 9:1 w/w mature green waste compost: zeolite ratio; blended post-composting |
| 19 | Wheat+Nut1a | Combined | 15 | 12 | *Triticum aestivum* L. residues + N, P and S containing fertilisers |
| 20 | Wheat+Nut2b | Combined | 15 | 12 | *Triticum aestivum* L. residues + N, P and S containing fertilisers |

a:wheat residues received 65 mg N, 15 mg P and 11 mg S as supplementary nutrients per kg of dry soil.

b: wheat residues received 130 mg N, 30 mg P and 22 mg S as supplementary nutrients per kg of dry soil.

**Table S2** Total carbon (C), nitrogen (N) and C:N ratio of the alkaline dispersive subsoil and the organic amendments used in the study.

|  |  |  |  |
| --- | --- | --- | --- |
| Soil & amendments | Total C (%) | Total N (%) | C:N ratio |
| Alkaline dispersive subsoil  | 0.7 | 0.05 | 13.0 |
| Bean residues | 42.2 | 2.5 | 16.9 |
| Compost+Biochar | 21.9 | 1.3 | 16.8 |
| Compost+Zeolite | 14.4 | 1.3 | 11.1 |
| Compost chicken manure | 31.0 | 4.2 | 7.4 |
| Compost green organics | 20.1 | 1.6 | 12.6 |
| Compost pig on straw active | 31.4 | 1.7 | 18.5 |
| Cow manure  | 18.0 | 2.1 | 8.6 |
| Humate | 47.5 | 0.9 | 52.8 |
| Pig manure | 38.6 | 2.4 | 16.1 |
| Poultry litter | 37.3 | 3.2 | 11.7 |
| Reed winter residues | 43.5 | 0.5 | 87.0 |
| Shortland biosolid | 23.1 | 3.2 | 7.2 |
| Wheat | 43.6 | 0.4 | 108.9 |