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**Table 3-** Main factor effects (four-way ANOVA) for (a) shoot biomass, (b) root biomass and (c) root:shoot ratios of *Lolium perenne* grown in eight different green roof substrates. Main factors are brick size (small vs. large), organic matter (bark vs. green waste compost) and SwellGel (absence vs. presence). Main factor means are shown with the % change also shown between the two levels within that factor (e.g. absence vs. presence SwellGel). Significant factorial interactions are also shown. Statistical significances of P-value: \* p<0.01, \*\*p<0.001, \*\*\* p<0.0001. Statistical significances were calculated from four-way ANOVA. Abbreviations for each factor are as follows, Org=Organic matter type, GW=Green Waste organic matter, Sw.G=SwellGel.

**Table 4-** Main factor effects (four-way ANOVA) for (a) mean shoot nitrogen concentration (mg-1 g shoot biomass), (b) mean chlorophyll content (mg g-1 dry shoot biomass) of *Lolium perenne* grown in eight different green roof substrates. Main factors are brick size (small vs. large), organic matter (bark vs. green waste compost) and SwellGel (absence vs. presence). Main factor means are shown with the % change also shown between the two levels within that factor (e.g. absence vs. presence SwellGel). Significant factorial interactions are also shown. Statistical significances of P-value: \* p<0.01, \*\*p<0.001, \*\*\* p<0.0001. Statistical significances were calculated from four-way ANOVA. Abbreviations for each factor are as follows, Org=Organic matter type, GW=Green Waste organic matter, Sw.G=SwellGel.

**Tables**

Table 1

|  |  |  |  |
| --- | --- | --- | --- |
| Substrate Number | Compost Type  20% by volume | Brick Size  Small=2-5mm  Large=4-15mm | SwellGel  1% by volume |
| 1 | Bark | Small | Yes |
| 2 | Green Waste | Small | Yes |
| 3 | Bark | Large | Yes |
| 4 | Green Waste | Large | Yes |
| 5 | Bark | Small | No |
| 6 | Green Waste | Small | No |
| 7 | Bark | Large | No |
| 8 | Green Waste | Large | No |

Table 2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(a)** |  |  |  |  | | | | | | | | |  |
| Factor | Df | F-value | P-value | Main factor means of water holding capacity (ml per Lsubstrate) | | | | | | | | | % Change  (±SE, n=64) |
|  |  |  |  | Brick Size | | Organic | | SwellGel | | Depth | | |
|  |  |  |  | Small | Large | Bark | GW | No | Yes | 80mm | 120mm | |
| Brick | 1 | 640.6 | \*\*\* | 266.2 | 174.0 |  |  |  |  |  |  | | -34.6± 1.9 |
| Organic | 1 | 3.8 | 0.053 |  |  | 216.5 | 223.6 |  |  |  |  | | +3.3± 3.7 |
| SwellGel | 1 | 168.6 | \*\*\* |  |  |  |  | 196.4 | 243.7 |  |  | | +24.1± 3.8 |
| Depth | 1 | 222.4 | \*\*\* |  |  |  |  |  |  | 192.9 | 247.2 | | +28.1± 4.0 |
| Sw.G:Org  Brick:Depth  Sw.G:Org:Brick  Sw.G:Org:Brick:Depth | 1  1  1  1 | 4.9  9.3  4.6  4.0 | \*  \*\*  \*  \* |  |  |  |  |  |  |  | | |  |
| **(b)** |  |  |  | Main factor means of total pot evapotranspiration (ml) | | | | | | | | |  |
| Brick | 1 | 162.9 | \*\*\* | 1612.2 | 1415.5 |  |  |  |  |  | | | -12.2±1.2 |
| Organic | 1 | 47.0 | \*\*\* |  |  | 1461.0 | 1566.7 |  |  |  | | | +7.2±1.4 |
| SwellGel | 1 | 14.9 | \*\*\* |  |  |  |  | 1484.1 | 1543.6 |  | | | +4.0±1.1 |
| Depth | 1 | 108.2 | \*\*\* |  |  |  |  |  |  | 1433.7 | | 1594.0 | +11.2±1.3 |
| Sw.G:Brick | 1 | 7.8 | \*\*\* |  |  |  |  |  |  |  | | |  |

Table 3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(a)** |  |  |  |  | | | | | | | | | | | | | |  | |
| Factor | Df | F-value | P-value | Main factor means of dry shoot biomass (g) | | | | | | | | | | | | | | % Change  (±SE, n=64) | |
|  |  |  |  | Brick Size | | | | Organic | | SwellGel | | | | Depth | | | |
|  |  |  |  | Small | | Large | | N | Y | No | | Yes | | 80mm | | 120mm | |
| Brick | 1 | 68.5 | \*\*\* | 1.31 | | 1.10 | |  |  |  | |  | |  | |  | | -16.7± 2.0 | |
| Organic | 1 | 157.5 | \*\*\* |  | |  | | 1.04 | 1.38 |  | |  | |  | |  | | +32.1± 2.7 | |
| SwellGel | 1 | 13.2 | \*\*\* |  | |  | |  |  | 1.16 | | 1.26 | |  | |  | | +8.3± 2.6 | |
| Depth | 1 | 3.9 | 0.05 |  | |  | |  |  |  | |  | | 1.18 | | 1.23 | | +4.2± 2.6 | |
| Sw.G:Org:Depth | 1 | 4.3 | \* |  | |  | |  |  |  | |  | |  | | | |  | |
| **(b)** |  |  |  | | Main factor means of dry root biomass (g) | | | | | | | | | | | | | |  |
| Brick | 1 | 2.2 | 0.14 | | 2.38 | 2.30 |  | |  | |  | |  | |  | |  | | -3.4± 2.1 |
| Organic | 1 | 26.7 | \*\*\* | |  |  | 2.19 | | 2.48 | |  | |  | |  | |  | | +13.1± 2.6 |
| SwellGel | 1 | 9.4 | \*\* | |  |  |  | |  | | 2.42 | | 2.25 | |  | |  | | -7.0± 2.3 |
| Depth | 1 | 70.6 | \*\*\* | |  |  |  | |  | |  | |  | | 2.11 | | 2.57 | | +22.2± 2.6 |
| Sw.G:Org | 1 | 7.3 | **\*\*** | |  |  |  | |  | |  | |  | |  | |  | |  |
| Sw.G:Brick | 1 | 12.1 | \*\*\* | |  |  |  | |  | |  | |  | |  | |  | |  |
| **(c)** |  |  |  | | Main factor means of root:shoot ratios | | | | | | | | | | | | | |  |
| Brick | 1 | 35.8 | \*\*\* | | 1.84 | 2.14 |  | |  | |  | |  | |  | |  | | +16.2± 2.8 |
| Organic | 1 | 42.6 | \*\*\* | |  |  | 2.16 | | 1.83 | |  | |  | |  | |  | | -15.1± 1.8 |
| SwellGel | 1 | 43.6 | \*\*\* | |  |  |  | |  | | 2.16 | | 1.83 | |  | |  | | -15.3± 2.1 |
| Depth | 1 | 38.7 | \*\*\* | |  |  |  | |  | |  | |  | | 1.84 | | 2.15 | | +16.9± 3.2 |
| Sw.G:Org | 1 | 22.5 | \*\*\* | |  |  |  | |  | |  | |  | |  | |  | |  |
| Sw.G:Brick | 1 | 5.0 | \* | |  |  |  | |  | |  | |  | |  | |  | |  |

Table 4

**(a)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Factor | Df | F-value | P-value | Main factor means of total nitrogen shoot concentration  (mg-1 g shoot biomass) | | | | | | | | | % Change  (±SE, n=64) |
|  |  |  |  | Brick Size | | Organic | | SwellGel | | Depth | | |
|  |  |  |  | Small | Large | Bark | GW | No | Yes | 80mm | 120mm | |
| Brick | 1 | 53.897 | \*\*\* | 0.0053 | 0.0065 |  |  |  |  |  |  | | +21.9± 2.8 |
| Organic | 1 | 43.866 | \*\*\* |  |  | 0.0054 | 0.0064 |  |  |  |  | | +19.6± 3.1 |
| SwellGel | 1 | 50.765 | \*\*\* |  |  |  |  | 0.0053 | 0.0065 |  |  | | +21.2± 3.4 |
| Depth | 1 | 1.148 | 0.29 |  |  |  |  |  |  | 0.0058 | 0.0060 | | +2.9± 3.0 |
| Sw.G:Org | 1 | 7.815 | \*\* |  |  |  |  |  |  |  | | |  |
| Org:Depth  Sw.G:Org:Brick  Sw.G:Org:Depth | 1  1  1 | 4.707  8.014  6.490 | \*  \*\*  \* |  |  |  |  |  |  |  | | |  |
| **(b)** |  |  |  | Main factor means mean chlorophyll content (mg g-1 dry shoot biomass) | | | | | | | | |  |
| Brick | 1 | 5.4 | \* | 0.16 | 0.14 |  |  |  |  |  | | | -14.4±5.7 |
| Organic | 1 | 44.4 | \*\*\* |  |  | 0.12 | 0.18 |  |  |  | | | +56.7±8.9 |
| SwellGel | 1 | 1.7 | 0.20 |  |  |  |  | 0.15 | 0.14 |  | | | -8.2±5.8 |
| Depth | 1 | 24.3 | \*\*\* |  |  |  |  |  |  | 0.12 | | 0.17 | +39.5±8.0 |
| Sw.G:Org | 1 | 11.7 | \*\*\* |  |  |  |  |  |  |  | | |  |
| Org:Brick | 1 | 6.7 | \* |  |  |  |  |  |  |  | | |  |
| Sw.G:Org:Brick | 1 | 12.9 | \*\*\* |  |  |  |  |  |  |  | | |  |
| Sw.G:Org:Brick:Depth | 1 | 6.1 | \* |  |  |  |  |  |  |  | | |  |