**Supplementary material**

|  |  |
| --- | --- |
| Table: Leaf biomass (mg) | |
| Treatment | Leaf biomass per pot (mg) |
| 5%SCB-S-W | 129 |
| 5%SCB-S-W | 447 |
| 5%LCB-S-W | 80 |
| 5%LCB-S-W | 209 |
| 7%SCB-S-W | 355 |
| 7%SCB-S-W | 130 |
| 7%SCB-S-W | 132 |
| 7%LCB-S-W | 165 |
| 7%LCB-S-W | 43 |
| 7%LCB-S-W | 159 |
| 5%SCB-W | 118 |
| 5%SCB-W | 113 |
| 5%SCB-W | 120 |
| 5%LCB-W | 205 |
| 5%LCB-W | 205 |
| 5%LCB-W | 420 |
| 7%SCB-W | 500 |
| 7%SCB-W | 460 |
| 7%SCB-W | 500 |
| 7%LCB-W | 294 |
| 7%LCB-W | 229 |
| 7%LCB-W | 500 |
| Control-S | 129 |
| Control-S | 32 |
| Control-S | 13 |
| Control-S-W | 354 |
| Control | 129 |
| Control | 153 |
| Control | 382 |
| 5%SCB-S | 129 |
| 5%SCB-S | 129 |
| 5%SCB-S | 126 |
| 5%LCB-S | 129 |
| 5%LCB-S | 128 |
| 5%LCB-S | 49 |
| 7%SCB-S | 127 |
| 7%SCB-S | 421 |
| 7%SCB-S | 289 |
| 7%LCB-S | 145 |
| 7%LCB-S | 174 |
| 7%LCB-S | 36 |
| 5%SCB | 448 |
| 5%SCB | 500 |
| 5%SCB | 500 |
| 5%LCB | 413 |
| 5%LCB | 22 |
| 5%LCB | 203 |
| 7%SCB | 413 |
| 7%SCB | 412 |
| 7%LCB | 227 |
| 7%LCB | 106 |
| 7%LCB | 235 |

Control has amendment of biochar manure mixture at 5% amendment rate, S, salinity stress; W; water stress, SCB; small particle-sized co-composted biochar, LCB; large particle-sized co-composted biochar 5 and 7 represents biochar amendment rates

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table: Number of roots per pot, lateral roots number per plant, length of main root, weight of roots per pot | | | | |
| Treatment | Roots number | lateral roots | Main root length | roots weight (mg) |
| 5%SCB-S-W | 8 | 17 | 12 | 16 |
| 5%SCB-S-W | 9 | 37 | 2.5 | 24 |
| 5%LCB-S-W | 1 | 9 | 2 | 3 |
| 5%LCB-S-W | 8 | 24 | 4.5 | 12 |
| 7%SCB-S-W | 14 | 17 | 3.7 | 21 |
| 7%SCB-S-W | 6 | 26 | 4 | 14 |
| 7%SCB-S-W | 5 | 33 | 3.5 | 20 |
| 7%LCB-S-W | 1 | 1 | 2 | 2 |
| 7%LCB-S-W | 2 | 16 | 2 | 4 |
| 7%LCB-S-W | 4 | 28 | 3.5 | 10 |
| 5%SCB-W | 4 | 6 | 6 | 5 |
| 5%LCB-W | 2 | 29 | 3.5 | 3 |
| 5%LCB-W | 3 | 18 | 2 | 10 |
| 5%LCB-W | 13 | 43 | 6 | 39 |
| 7%SCB-W | 4 | 51 | 4.7 | 13 |
| 7%SCB-W | 10 | 63 | 10.7 | 36 |
| 7%SCB-W | 9 | 65 | 5.5 | 38 |
| 7%LCB-W | 12 | 63 | 15.5 | 28 |
| 7%LCB-W | 11 | 20 | 4.7 | 17 |
| 7%LCB-W | 5 | 55 | 3.5 | 19 |
| Control-S-W | 2 | 20 | 2 | 8 |
| Control | 3 | 24 | 7.7 | 3 |
| Control | 5 | 21 | 2.2 | 6 |
| Control | 5 | 43 | 2.6 | 20 |
| 5%SCB-S | 1 | 25 | 5.4 | 2 |
| 7%SCB-S | 1 | 21 | 5.5 | 5 |
| 7%SCB-S | 5 | 27 | 2.5 | 10 |
| 7%SCB-S | 9 | 42 | 9 | 26 |
| 7%LCB-S | 9 | 21 | 3.5 | 23 |
| 7%LCB-S | 11 | 22 | 4.5 | 19 |
| 5%SCB | 12 | 24 | 4 | 31 |
| 5%SCB | 5 | 31 | 2.8 | 10 |
| 5%SCB | 21 | 60 | 6 | 83 |
| 5%LCB | 1 | 25 | 3.5 | 8 |
| 5%LCB | 1 | 13 | 3 | 3 |
| 5%LCB | 2 | 17 | 9 | 3 |
| 7%SCB | 7 | 52 | 9 | 23 |
| 7%SCB | 3 | 15 | 4 | 4 |
| 7%LCB | 9 | 36 | 4 | 25 |
| 7%LCB | 11 | 22 | 5 | 18 |
| 7%LCB | 2 | 35 | 2.5 | 7 |

Control has amendment of biochar manure mixture at 5% amendment rate, S, salinity stress; W; water stress, SCB; small particle-sized co-composted biochar, LCB; large particle-sized co-composted biochar 5 and 7 represents biochar amendment rates

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table: N (mg g-1), P (mg g-1), NUE and PUE of lettuce leaves | | | | |
| Treatment | N in leaves | P in leaves | NUE | PUE |
| 5%SCB-S-W | 10.2 | 2.8 | 0.0 | 0.0 |
| 5%SCB-S-W | 29.0 | 0.6 | 0.0 | 0.6 |
| 5%LCB-S-W | 21.0 | 4.5 | 0.0 | 0.0 |
| 5%LCB-S-W | 8.0 | 2.5 | 0.0 | 0.0 |
| 7%SCB-S-W | 1.2 | 0.3 | 0.2 | 1.0 |
| 7%SCB-S-W | 18.9 | 0.9 | 0.0 | 0.1 |
| 7%SCB-S-W | 6.5 | 1.8 | 0.0 | 0.0 |
| 7%LCB-S-W | 3.2 | 1.69 | 0.0 | 0.0 |
| 7%LCB-S-W | 23.4 | 1.8 | 0.0 | 0.0 |
| 7%LCB-S-W | 15.3 | 1.1 | 0.0 | 0.1 |
| 5%SCB-W | 7.5 | 1.1 | 0.0 | 0.0 |
| 5%SCB-W | 12.3 | 1.7 | 0.0 | 0.0 |
| 5%SCB-W | 1.1 | 5 | 0.1 | 0.0 |
| 5%LCB-W | 0 | 1.9 |  | 0.1 |
| 5%LCB-W | 13.5 | 0.7 | 0.0 | 0.2 |
| 5%LCB-W | 20.1 | 0.5 | 0.0 | 0.7 |
| 7%SCB-W | 6.6 | 2.0 | 0.0 | 0.2 |
| 7%SCB-W | 8.8 | 2.0 | 0.0 | 0.2 |
| 7%SCB-W | 3.2 | 0.1 | 0.1 | 3.1 |
| 7%LCB-W | 3.7 | 1.5 | 0.0 | 0.1 |
| 7%LCB-W | 5.7 | 1.8 | 0.0 | 0.1 |
| 7%LCB-W | 0 | 1.2 |  | 0.4 |
| Control-S | 1.9 | 33.3 | 0.0 | 0.0 |
| Control-S | 22.7 | 3.4 | 0.0 | 0.0 |
| Control-S | 32.3 | 15.3 | 0.0 | 0.0 |
| Control-S-W | 4.0 | 0.2 | 0.0 | 1.2 |
| Control | 4.9 | 3.6 | 0.0 | 0.0 |
| Control | 2.0 | 2.3 | 0.0 | 0.0 |
| Control | 16.8 | 1.5 | 0.0 | 0.2 |
| 5%SCB-S | 2.6 | 233.3 | 0.0 | 0.0 |
| 5%SCB-S | 3.6 | 51.8 | 0.0 | 0.0 |
| 5%SCB-S | 18.0 | 77.7 | 0.0 | 0.0 |
| 5%LCB-S | 3.4 | 37.0 | 0.0 | 0.0 |
| 5%LCB-S | 1.3 | 46.6 | 0.0 | 0.0 |
| 5%LCB-S | 7.4 | 4.5 | 0.0 | 0.0 |
| 7%SCB-S | 0 | 4.4 |  | 0.0 |
| 7%SCB-S | 3.2 | 0.1 | 0.1 | 3.1 |
| 7%SCB-S | 2.3 | 1.0 | 0.1 | 0.2 |
| 7%LCB-S | 5.6 | 4.4 | 0.0 | 0.0 |
| 7%LCB-S | 4.5 | 3.2 | 0.0 | 0.0 |
| 7%LCB-S | 0 | 0.7 |  | 0.0 |
| 5%SCB | 5.4 | 1.7 | 0.0 | 0.2 |
| 5%SCB | 6.5 | 3.2 | 0.0 | 0.1 |
| 5%SCB | 1.2 | 2.7 | 0.4 | 0.1 |
| 5%LCB | 19.6 | 0.8 | 0.0 | 0.4 |
| 5%LCB | 42.0 | 15.5 | 0.0 | 0.0 |
| 5%LCB | 4.5 | 5.3 | 0.0 | 0.0 |
| 7%SCB | 6.3 | 3.1 | 0.0 | 0.1 |
| 7%SCB | 2.3 | 2.4 | 0.1 | 0.1 |
| 7%LCB | 7.2 | 2.2 | 0.0 | 0.1 |
| 7%LCB | 6.6 | 5.3 | 0.0 | 0.0 |
| 7%LCB | 6.6 | 1.2 | 0.0 | 0.1 |

Control has amendment of biochar manure mixture at 5% amendment rate, S, salinity stress; W; water stress, SCB; small particle-sized co-composted biochar, LCB; large particle-sized co-composted biochar 5 and 7 represents biochar amendment rates

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table: Soil electrical conductivity, pH, organic matter (g kg-1), Olsen P (mg kg-1), nitrate (mg kg-1) of soil samples | | | | | |
| Treatment | soil EC | soil PH | Soil organic matter | Phosphours (mg kg -1 soil) | nitrate nitrogen(mg kg-1 soil) |
| 5%SCB-S-W | 5.21 | 7.97 | 3.1 | 9.03 | 158.22 |
| 5%SCB-S-W | 4.28 | 8.16 | 3.08 | 14.83 | 112.65 |
| 5%SCB-S-W | 6.58 | 7.97 | 2.97 | 8.70 | 127.84 |
| 5%LCB-S-W | 6.25 | 8.15 | 2.97 | 14.45 | 132.91 |
| 5%LCB-S-W | 5.71 | 8.2 | 2.54 | 7.09 | 188.60 |
| 5%LCB-S-W | 3.44 | 8.15 | 3.56 | 20.90 | 184.81 |
| 7%SCB-S-W | 3.64 | 7.97 | 3.91 | 18.06 | 151.89 |
| 7%SCB-S-W | 5.4 | 7.99 | 2.92 | 18.06 | 164.55 |
| 7%SCB-S-W | 4.52 | 8.04 | 2.78 | 22.90 | 136.70 |
| 7%LCB-S-W | 5.56 | 8.15 | 3.69 | 12.25 | 210.12 |
| 7%LCB-S-W | 4.88 | 8.09 | 3.08 | 12.129 | 481.01 |
| 7%LCB-S-W | 5.85 | 8.24 | 3.24 | 17.09 | 259.49 |
| 5%SCB-W | 5.61 | 7.56 | 3.34 | 10 | 720.25 |
| 5%SCB-W | 3.35 | 8.03 | 2.68 | 29.19 | 212.65 |
| 5%SCB-W | 3.78 | 3.01 | 3.41 | 11.29 | 236.70 |
| 5%LCB-W | 4.15 | 7.94 | 3.56 | 14.19 | 202.53 |
| 5%LCB-W | 3.23 | 8.14 | 2.46 | 13.06 | 154.43 |
| 5%LCB-W | 2.78 | 7.78 | 3.34 | 7.74 | 125.31 |
| 7%SCB-W | 2.37 | 8.01 | 3.36 | 18 | 139.24 |
| 7%SCB-W | 3.53 | 8.08 | 3.18 | 12.6 | 177.21 |
| 7%SCB-W | 3.36 | 8.06 | 3.09 | 11.6 | 295.38 |
| 7%LCB-W | 4.79 | 8.03 | 3.25 | 13.8 | 136.92 |
| 7%LCB-W | 4.31 | 8.05 | 3.32 | 17.2 | 318.46 |
| 7%LCB-W | 3.69 | 8.06 | 3.53 | 14 | 150.76 |
| Control-S | 3.89 | 8.12 | 3.63 | 23.75 | 136.92 |
| Control-S | 5.03 | 7.99 | 3.29 | 6.37 | 178.4 |
| Control-S | 4.09 | 8.02 | 2.86 | 9 | 376.92 |
| Control-S-W | 5.58 | 8.15 | 3.42 | 5.87 | 166.15 |
| Control-S-W | 6.81 | 7.95 | 3.74 | 9.62 | 116.92 |
| Control-S-W | 3.44 | 7.94 | 2.76 | 27.75 | 233.84 |
| Control | 2.15 | 7.9 | 3.21 | 8.8 | 93.84 |
| Control | 2.04 | 1.92 | 3.46 | 8.25 | 227.69 |
| Control | 2.6 | 7.9 | 3.86 | 9.87 | 23.07 |
| 5%SCB-S | 3.99 | 8.02 | 3.88 | 7.12 | 169.23 |
| 5%SCB-S | 4.27 | 7.93 | 3.22 | 49.5 | 24.61 |
| 5%SCB-S | 5.12 | 8.07 | 3.81 | 24.75 | 98.46 |
| 5%LCB-S | 4.06 | 8.1 | 0.43 | 18.25 | 73.84 |
| 5%LCB-S | 2.84 | 8.22 | 2.57 | 3.2 | 213.84 |
| 5%LCB-S | 2.79 | 8.16 | 3.13 | 14.4 | 49.23 |
| 7%SCB-S | 4.33 | 7.8 | 3.65 | 29.15 | 333.84 |
| 7%SCB-S | 4.44 | 7.98 | 4.1 | 14.69 | 101.42 |
| 7%SCB-S | 3.13 | 8.02 | 2.89 | 24.81 | 115.71 |
| 7%LCB-S | 4.09 | 8.01 | 3.05 | 9.15 | 142.85 |
| 7%LCB-S | 2.93 | 8.01 | 2.96 | 42.40 | 185.71 |
| 7%LCB-S | 5.51 | 8.15 | 3.65 | 16.38 | 281.42 |
| 5%SCB | 1.84 | 7.62 | 3.05 | 26.98 | 100 |
| 5%SCB | 1.81 | 7.84 | 2.96 | 17.54 | 187.14 |
| 5%SCB | 2.03 | 7.95 | 4.08 | 14.65 | 172.85 |
| 5%LCB | 1.77 | 7.91 | 2.36 | 11.18 | 91.42 |
| 5%LCB | 2.27 | 8.01 | 2.42 | 14.07 | 108.57 |
| 5%LCB | 3.04 | 8.07 | 3.25 | 12.72 | 130 |
| 7%SCB | 3.12 | 7.95 | 3.73 | 21.68 | 121.42 |
| 7%SCB | 1.87 | 8.1 | 2.73 | 30.60 | 67.14 |
| 7%SCB | 1.98 | 7.83 | 3.93 | 23.37 | 112.85 |
| 7%LCB | 3.03 | 8.02 | 3.25 | 20.48 | 94.28 |
| 7%LCB | 3.02 | 8.01 | 3.47 | 21.20 | 81.42 |
| 7%LCB | 2.85 | 8.01 | 3.6 | 11.32 | 92.85 |

Control has amendment of biochar manure mixture at 5% amendment rate, S, salinity stress; W; water stress, SCB; small particle-sized co-composted biochar, LCB; large particle-sized co-composted biochar 5 and 7 represents biochar amendment rates.