**Supplementary Information**

Table S1. Summary of the RM-ANOVAs for the greenhouse-gas emissions for the various amendments (treatments comparison with the control).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *df* | *MS* | *F* | *P* |
| **CO2** |  |  |  |  |
| Straw | 1, 4 | 770643.853 | 1.312 | 0.316 |
| Time | 15, 60 | 2905611.578 | 33.945 | **<0.001** |
| Straw × Time | 15, 60 | 141148.628 | 1.649 | 0.088 |
| Straw+biochar | 1, 4 | 834510.031 | 2.547 | 0.186 |
| Time | 15, 60 | 2493666.771 | 49.548 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 50299.372 | 0.999 | 0.468 |
| Straw+steel slag | 1, 4 | 227351.897 | 0.836 | 0.412 |
| Time | 15, 60 | 2109157.166 | 27.091 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 47663.790 | 0.612 | 0.853 |
| Straw+gypsum slag | 1, 4 | 1417670.541 | 9.510 | **0.037** |
| Time | 15, 60 | 2933398.808 | 66.195 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 136792.237 | 3.087 | **0.001** |
| **CH4** |  |  |  |  |
| Straw | 1, 4 | 0.009 | 0.077 | 0.795 |
| Time | 15, 60 | 0.079 | 0.506 | 0.928 |
| Straw × Time | 15, 60 | 0.047 | 0.298 | 0.994 |
| Straw+biochar | 1, 4 | 2.111 | 1.019 | 0.370 |
| Time | 15, 60 | 0.493 | 0.486 | 0.939 |
| Straw+biochar × Time | 15, 60 | 0.594 | 0.586 | 0.874 |
| Straw+steel slag | 1, 4 | 0.079 | 1.232 | 0.329 |
| Time | 15, 60 | 0.228 | 1.533 | 0.122 |
| Straw+steel slag × Time | 15, 60 | 0.039 | 0.259 | 0.997 |
| Straw+gypsum slag | 1, 4 | 0.658 | 1.360 | 0.308 |
| Time | 15, 60 | 0.339 | 0.852 | 0.618 |
| Straw+gypsum slag × Time | 15, 60 | 0.170 | 0.428 | 0.965 |
| **N2O** |  |  |  |  |
| Straw | 1, 4 | 0.399 | 0.454 | 0.537 |
| Time | 15, 60 | 2.623 | 15.245 | **<0.001** |
| Straw × Time | 15, 60 | 0.099 | 0.576 | 0.882 |
| Straw+biochar | 1, 4 | 0.636 | 0.792 | 0.424 |
| Time | 15, 60 | 2.424 | 13.748 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.091 | 0.515 | 0.922 |
| Straw+steel slag | 1, 4 | 1.828 | 1.761 | 0.255 |
| Time | 15, 60 | 1.847 | 9.287 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 0.222 | 1.118 | 0.361 |
| Straw+gypsum slag | 1, 4 | 0.348 | 0.352 | 0.585 |
| Time | 15, 60 | 2.514 | 7.454 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 0.231 | 0.684 | 0.790 |

Table S2. Summary of the RM-ANOVAs for the greenhouse-gas emissions for the various amendments (treatments comparison with the straw).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *df* | *MS* | *F* | *P* |
| **CO2** |  |  |  |  |
| Straw+biochar | 1, 4 | 1271.063 | 0.001 | 0.972 |
| Time | 15, 60 | 3524837.442 | 33.179 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 78067.152 | 0.735 | 0.740 |
| Straw+steel slag | 1, 4 | 160840.228 | 0.190 | 0.685 |
| Time | 15, 60 | 3040848.189 | 22.733 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 174911.218 | 1.308 | 0.226 |
| Straw+gypsum slag | 1, 4 | 97841.636 | 0.136 | 0.731 |
| Time | 15, 60 | 4072898.357 | 40.638 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 56231.139 | 0.561 | 0.893 |
| **CH4** |  |  |  |  |
| Straw+biochar | 1, 4 | 1.845 | 0.872 | 0.403 |
| Time | 15, 60 | 0.551 | 0.585 | 0.875 |
| Straw+biochar × Time | 15, 60 | 0.469 | 0.498 | 0.932 |
| Straw+steel slag | 1, 4 | 0.024 | 0.219 | 0.664 |
| Time | 15, 60 | 0.145 | 1.902 | **0.041** |
| Straw+steel slag × Time | 15, 60 | 0.054 | 0.714 | 0.761 |
| Straw+gypsum slag | 1, 4 | 0.513 | 0.969 | 0.381 |
| Time | 15, 60 | 0.238 | 0.733 | 0.742 |
| Straw+gypsum slag × Time | 15, 60 | 0.203 | 0.627 | 0.841 |
| **N2O** |  |  |  |  |
| Straw+biochar | 1, 4 | 0.028 | 0.220 | 0.663 |
| Time | 15, 60 | 1.993 | 25.338 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.042 | 0.553 | 0.912 |
| Straw+steel slag | 1, 4 | 0.519 | 1.443 | 0.296 |
| Time | 15, 60 | 1.428 | 14.106 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 0.162 | 1.602 | 0.100 |
| Straw+gypsum slag | 1, 4 | 0.002 | 0.006 | 0.944 |
| Time | 15, 60 | 2.163 | 9.027 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 0.102 | 0.427 | 0.965 |

Table S3. Summary of the RM-ANOVAs for the soil properties for the various amendments (treatments comparison with the control).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *df* | *MS* | *F* | *P* |
| **Soil pH** |  |  |  |  |
| Straw | 1, 4 | 0.137 | 4.061 | 0.114 |
| Time | 15, 60 | 0.385 | 32.593 | **<0.001** |
| Straw × Time | 15, 60 | 0.193 | 16.390 | **<0.001** |
| Straw+biochar | 1, 4 | 1.932 | 56.596 | **0.002** |
| Time | 15, 60 | 0.361 | 34.007 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.315 | 29.690 | **<0.001** |
| Straw+steel slag | 1, 4 | 97.143 | 2785.806 | **<0.001** |
| Time | 15, 60 | 0.949 | 110.311 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 2.340 | 271.977 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 1.638 | 49.875 | **0.002** |
| Time | 15, 60 | 0.403 | 54.084 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 0.361 | 48.456 | **<0.001** |
| **Plant height** |  |  |  |  |
| Straw | 1, 4 | 4.126 | 0.018 | 0.901 |
| Time | 15, 60 | 3337.480 | 46.180 | **<0.001** |
| Straw × Time | 15, 60 | 76.739 | 1.062 | 0.416 |
| Straw+biochar | 1, 4 | 11.003 | 0.103 | 0.764 |
| Time | 15, 60 | 4259.900 | 69.949 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 45.858 | 0.753 | 0.722 |
| Straw+steel slag | 1, 4 | 124.898 | 0.783 | 0.426 |
| Time | 15, 60 | 4457.776 | 57.754 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 57.543 | 0.746 | 0.729 |
| Straw+gypsum slag | 1, 4 | 2.344 | 0.012 | 0.918 |
| Time | 15, 60 | 4146.708 | 57.620 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 57.833 | 0.804 | 0.669 |
| **Soil temperature** |  |  |  |  |
| Straw | 1, 4 | 0.082 | 0.096 | 0.772 |
| Time | 15, 60 | 139.905 | 188.204 | **<0.001** |
| Straw × Time | 15, 60 | 1.057 | 1.423 | 0.167 |
| Straw+biochar | 1, 4 | 2.633 | 3.776 | 0.124 |
| Time | 15, 60 | 138.109 | 231.444 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.962 | 1.612 | 0.098 |
| Straw+steel slag | 1, 4 | 0.863 | 1.059 | 0.362 |
| Time | 15, 60 | 142.597 | 217.989 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 0.847 | 1.295 | 0.234 |
| Straw+gypsum slag | 1, 4 | 0.002 | 0.001 | 0.977 |
| Time | 15, 60 | 130.052 | 104.210 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 1.341 | 1.074 | 0.399 |
| **Soil salinity** |  |  |  |  |
| Straw | 1, 4 | 1.203 | 59.910 | **0.004** |
| Time | 15, 60 | 0.388 | 34.939 | **<0.001** |
| Straw × Time | 15, 60 | 0.277 | 24.938 | **<0.001** |
| Straw+biochar | 1, 4 | 0.479 | 22.418 | **0.018** |
| Time | 15, 60 | 0.212 | 18.416 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.091 | 7.898 | **<0.001** |
| Straw+steel slag | 1, 4 | 1.260 | 34.206 | **0.010** |
| Time | 15, 60 | 0.316 | 11.922 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 0.177 | 6.676 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 24.368 | 1160.072 | **<0.001** |
| Time | 15, 60 | 1.605 | 144.849 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 1.097 | 99.052 | **<0.001** |
| **Soil water content** |  |  |  |  |
| Straw | 1, 4 | 188.160 | 5.670 | 0.076 |
| Time | 15, 60 | 162.576 | 11.354 | **<0.001** |
| Straw × Time | 15, 60 | 5.848 | 0.408 | 0.971 |
| Straw+biochar | 1, 4 | 1464.844 | 43.096 | **0.003** |
| Time | 15, 60 | 472.851 | 19.349 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 134.096 | 5.487 | **<0.001** |
| Straw+steel slag | 1, 4 | 143.326 | 2.110 | 0.220 |
| Time | 15, 60 | 307.645 | 19.084 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 60.599 | 3.759 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 822.510 | 10.876 | **0.030** |
| Time | 15, 60 | 261.405 | 10.837 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 29.301 | 1.215 | 0.286 |
| **Soil Fe2+** |  |  |  |  |
| Straw | 1, 4 | 17.367 | 58.105 | **0.002** |
| Time | 15, 60 | 3.606 | 30.395 | **<0.001** |
| Straw × Time | 15, 60 | 0.804 | 6.776 | **<0.001** |
| Straw+biochar | 1, 4 | 3.927 | 37.098 | **0.004** |
| Time | 15, 60 | 2.435 | 47.897 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.197 | 3.866 | **<0.001** |
| Straw+steel slag | 1, 4 | 10.387 | 33.356 | **0.004** |
| Time | 15, 60 | 2.587 | 17.423 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 0.454 | 3.057 | **0.001** |
| Straw+gypsum slag | 1, 4 | 2.019 | 20.656 | **0.010** |
| Time | 15, 60 | 2.378 | 39.601 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 0.111 | 1.851 | **0.048** |
| **Soil Fe3+** |  |  |  |  |
| Straw | 1, 4 | 30.961 | 38.880 | **0.003** |
| Time | 15, 60 | 63.177 | 91.151 | **<0.001** |
| Straw × Time | 15, 60 | 3.423 | 4.939 | **<0.001** |
| Straw+biochar | 1, 4 | 4.533 | 3.502 | 0.135 |
| Time | 15, 60 | 61.023 | 75.022 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 1.453 | 1.787 | 0.058 |
| Straw+steel slag | 1, 4 | 1.274 | 1.654 | 0.268 |
| Time | 15, 60 | 68.444 | 95.006 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 1.584 | 2.198 | **0.016** |
| Straw+gypsum slag | 1, 4 | 1.059 | 1.258 | 0.325 |
| Time | 15, 60 | 63.370 | 53.861 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 1.508 | 1.282 | 0.242 |
| **Soil total Fe** |  |  |  |  |
| Straw | 1, 4 | 1.951 | 6.809 | 0.059 |
| Time | 15, 60 | 59.618 | 90.826 | **<0.001** |
| Straw × Time | 15, 60 | 2.359 | 3.594 | **<0.001** |
| Straw+biochar | 1, 4 | 0.022 | 0.020 | 0.893 |
| Time | 15, 60 | 64.046 | 79.632 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 1.451 | 1.804 | 0.055 |
| Straw+steel slag | 1, 4 | 4.385 | 17.581 | **0.014** |
| Time | 15, 60 | 62.879 | 94.775 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 1.593 | 2.400 | **0.009** |
| Straw+gypsum slag | 1, 4 | 0.154 | 0.281 | 0.624 |
| Time | 15, 60 | 66.585 | 47.902 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 1.590 | 1.144 | 0.304 |

Table S4. Summary of the RM-ANOVAs for the soil properties for the various amendments (treatments comparison with the straw).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *df* | *MS* | *F* | *P* |
| **Soil pH** |  |  |  |  |
| Straw+biochar | 1, 4 | 1.042 | 279.564 | **<0.001** |
| Time | 15, 60 | 0.382 | 36.814 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.220 | 21.194 | **<0.001** |
| Straw+steel slag | 1, 4 | 89.997 | 20205.104 | **<0.001** |
| Time | 15, 60 | 1.332 | 159.034 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 1.884 | 224.947 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 0.829 | 341.633 | **<0.001** |
| Time | 15, 60 | 0.568 | 78.714 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 0.122 | 16.870 | **<0.001** |
| **Plant height** |  |  |  |  |
| Straw+biochar | 1, 4 | 0.876 | 0.009 | 0.932 |
| Time | 15, 60 | 3200.670 | 39.375 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 92.667 | 1.140 | 0.351 |
| Straw+steel slag | 1, 4 | 144.651 | 0.835 | 0.428 |
| Time | 15, 60 | 3358.379 | 32.605 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 102.606 | 0.996 | 0.475 |
| Straw+gypsum slag | 1, 4 | 682.667 | 0.770 | 0.430 |
| Time | 15, 60 | 3542.622 | 35.353 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 61.000 | 0.609 | 0.856 |
| **Soil temperature** |  |  |  |  |
| Straw+biochar | 1, 4 | 1.788 | 2.778 | 0.171 |
| Time | 15, 60 | 142.564 | 313.032 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.875 | 1.922 | **0.039** |
| Straw+steel slag | 1, 4 | 0.413 | 0.544 | 0.502 |
| Time | 15, 60 | 146.661 | 285.974 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 1.151 | 2.244 | **0.014** |
| Straw+gypsum slag | 1, 4 | 0.060 | 0.034 | 0.864 |
| Time | 15, 60 | 134.252 | 121.311 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 1.508 | 1.363 | 0.196 |
| **Soil salinity** |  |  |  |  |
| Straw+biochar | 1, 4 | 0.204 | 115.305 | **<0.001** |
| Time | 15, 60 | 0.882 | 403.240 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.187 | 85.339 | **<0.001** |
| Straw+steel slag | 1, 4 | 0.001 | 0.061 | 0.817 |
| Time | 15, 60 | 1.120 | 83.402 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 0.187 | 13.896 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 18.428 | 12388.261 | **<0.001** |
| Time | 15, 60 | 2.601 | 1391.855 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 1.467 | 785.115 | **<0.001** |
| **Soil water content** |  |  |  |  |
| Straw+biochar | 1, 4 | 603.004 | 97.912 | **0.001** |
| Time | 15, 60 | 457.853 | 20.918 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 135.339 | 6.183 | **<0.001** |
| Straw+steel slag | 1, 4 | 3.046 | 0.076 | 0.796 |
| Time | 15, 60 | 290.013 | 21.371 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 64.475 | 4.751 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 223.870 | 4.684 | 0.096 |
| Time | 15, 60 | 226.063 | 10.480 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 50.887 | 2.359 | **0.010** |
| **Soil Fe2+** |  |  |  |  |
| Straw+biochar | 1, 4 | 4.777 | 19.540 | **0.012** |
| Time | 15, 60 | 4.829 | 51.981 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 0.450 | 4.839 | **<0.001** |
| Straw+steel slag | 1, 4 | 0.892 | 1.982 | 0.232 |
| Time | 15, 60 | 4.552 | 23.891 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 1.136 | 5.961 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 7.544 | 31.914 | **0.005** |
| Time | 15, 60 | 4.499 | 44.061 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 0.637 | 6.239 | **<0.001** |
| **Soil Fe3+** |  |  |  |  |
| Straw+biochar | 1, 4 | 11.801 | 12.699 | **0.024** |
| Time | 15, 60 | 65.634 | 70.193 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 4.686 | 5.012 | **<0.001** |
| Straw+steel slag | 1, 4 | 19.673 | 48.491 | **0.002** |
| Time | 15, 60 | 74.462 | 88.427 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 3.409 | 4.049 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 20.570 | 43.185 | **0.003** |
| Time | 15, 60 | 69.359 | 53.427 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 3.363 | 2.590 | **0.005** |
| **Soil total Fe** |  |  |  |  |
| Straw+biochar | 1, 4 | 1.561 | 1.793 | 0.252 |
| Time | 15, 60 | 63.926 | 79.468 | **<0.001** |
| Straw+biochar × Time | 15, 60 | 4.366 | 5.427 | **<0.001** |
| Straw+steel slag | 1, 4 | 12.187 | 205.253 | **<0.001** |
| Time | 15, 60 | 64.197 | 96.740 | **<0.001** |
| Straw+steel slag × Time | 15, 60 | 3.069 | 4.624 | **<0.001** |
| Straw+gypsum slag | 1, 4 | 3.200 | 8.990 | **0.040** |
| Time | 15, 60 | 67.671 | 48.678 | **<0.001** |
| Straw+gypsum slag × Time | 15, 60 | 3.298 | 2.372 | **0.009** |

Table S5. Correlations between the soil properties and the greenhouse-gas emissions.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO2** | Soil pH | Plant height | Soil temperature | Soil salinity | Soil water content | Soil Fe2+ | Soil Fe3+ | Soil total Fe |
| Control (n=48) | -0.539\*\* | 0.020 | 0.766\*\* | 0.292\* | 0.269\* | -0.188 | -0.596\*\* | -0.618\*\* |
| Straw (n=48) | -0.567\*\* | 0.236 | 0.680\*\* | 0.190 | 0.248\* | -0.081 | -0.579\*\* | -0.650\*\* |
| Straw+biochar (n=48) | -0.304\* | 0.047 | 0.819\*\* | 0.423\*\* | 0.095 | -0.204 | -0.550\*\* | -0.575\*\* |
| Straw+steel slag (n=48) | 0.584\*\* | -0.028 | 0.771\*\* | 0.317\* | -0.064 | 0.092 | -0.577\*\* | -0.600\*\* |
| Straw+gypsum slag (n=48) | -0.374\*\* | 0.111 | 0.811\*\* | 0.768\*\* | 0.311\* | -0.307\* | -0.537\*\* | -0.574\*\* |
| Total treatments (n=240) | -0.031 | 0.083 | 0.752\*\* | 0.414\*\* | 0.165\*\* | -0.100 | -0.558\*\* | -0.594\*\* |
| **CH4** |  |  |  |  |  |  |  |  |
| Control (n=48) | -0.018 | -0.022 | 0.143 | 0.091 | 0.003 | 0.034 | 0.052 | 0.058 |
| Straw (n=48) | -0.032 | 0.177 | 0.056 | 0.088 | 0.019 | -0.270\* | 0.032 | -0.058 |
| Straw+biochar (n=48) | 0.003 | -0.077 | -0.248\* | -0.202 | -0.007 | 0.149 | 0.051 | 0.081 |
| Straw+steel slag (n=48) | 0.071 | -0.080 | 0.259\* | 0.077 | 0.008 | -0.422\*\* | 0.029 | -0.083 |
| Straw+gypsum slag (n=48) | -0.051 | 0.157 | -0.080 | -0.128 | -0.061 | -0.168 | 0.095 | 0.057 |
| Total treatments (n=240) | -0.043 | 0.015 | -0.062 | -0.032 | 0.031 | -0.053 | 0.048 | 0.035 |
| **N2O** |  |  |  |  |  |  |  |  |
| Control (n=48) | -0.458\*\* | -0.170 | 0.463\*\* | 0.070 | 0.304\* | 0.023 | -0.455\*\* | -0.449\*\* |
| Straw (n=48) | -0.268\* | -0.114 | 0.436\*\* | 0.333\* | 0.390\*\* | 0.250\* | -0.560\*\* | -0.517\*\* |
| Straw+biochar (n=48) | -0.404\*\* | -0.147 | 0.498\*\* | 0.420\*\* | 0.497\*\* | 0.004 | -0.438\*\* | -0.442\*\* |
| Straw+steel slag (n=48) | 0.401\*\* | -0.059 | 0.431\*\* | 0.151 | -0.006 | 0.105 | -0.387\*\* | -0.391\*\* |
| Straw+gypsum slag (n=48) | 0.033 | -0.248\* | 0.280\* | 0.515\*\* | 0.367\*\* | 0.038 | -0.413\*\* | -0.387\*\* |
| Total treatments (n=240) | -0.107\* | -0.149\* | 0.406\*\* | 0.261\*\* | 0.273\*\* | 0.055 | -0.430\*\* | -0.423\*\* |

\*, significant at the 0.05 level; \*\*, significant at the 0.01 level



Figure S1. Locations of the study area, sampling site (▲) in Fujian Province, southeastern China (A) and temporal variation of air temperature (B) and humidity (C) in the study site.







Figure S2. Soil pH (A), temperature (B), salinity (C), water content (D) in the control and treatment. Error bars indicate one standard error of the mean of triplicate measurements. \* indicates significant differences (*P*<0.05) between treatments.







Figure S3. Soil Fe2+ concentration (A), Fe3+ concentration (B) and total Fe concentration (C) in the control and treatment. Error bars indicate one standard error of the mean of triplicate measurements. \* indicates significant differences (*P*<0.05) between treatments.