

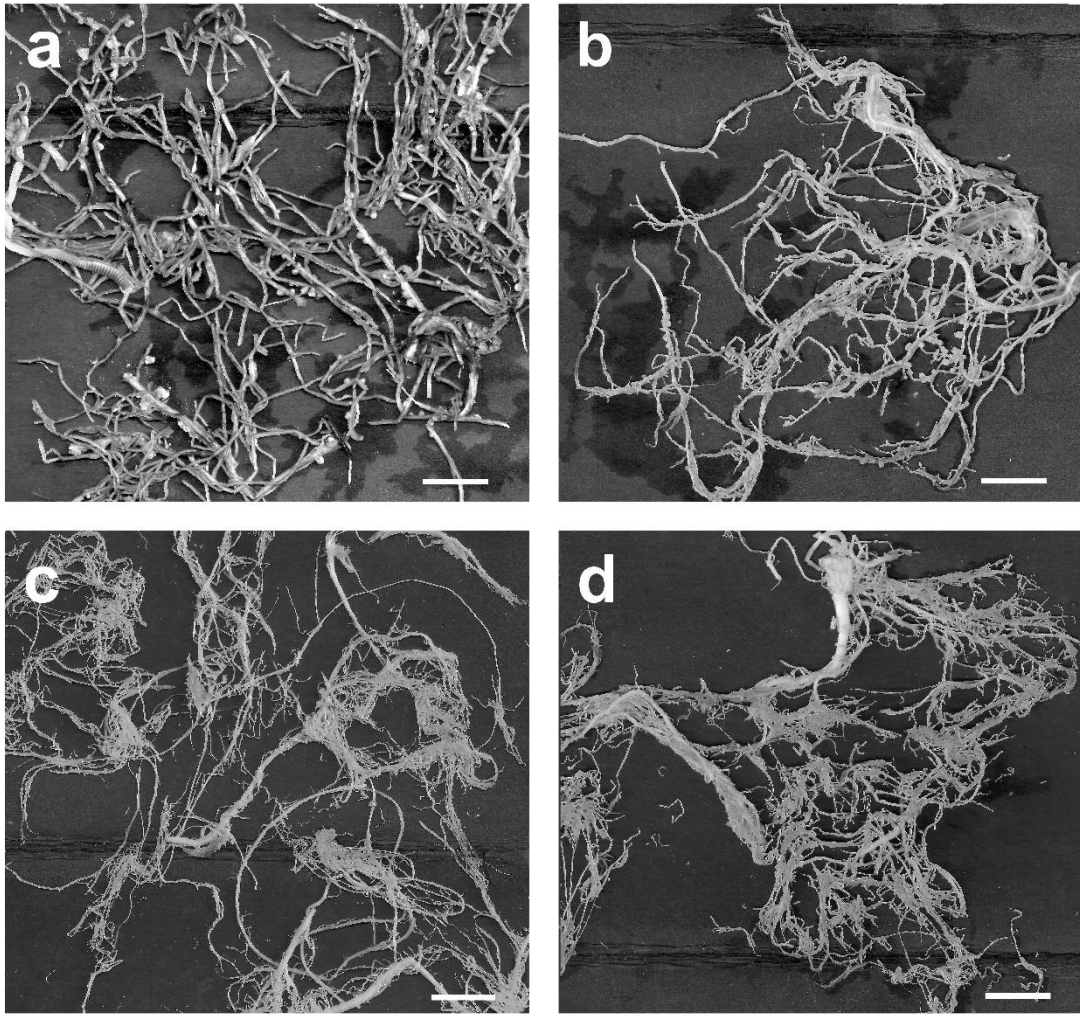
## Supplementary materials

**Table S1.** Dry weight and main length of shoots and roots, and root density of different plant species measured after 90 days of cultivation. Each value represents the mean ( $\pm$  SD) from five independent measurements on five plants ( $n = 5$ ) for each species. The values followed by different letters are statistically different ( $p \leq 0.01$ ) within columns.

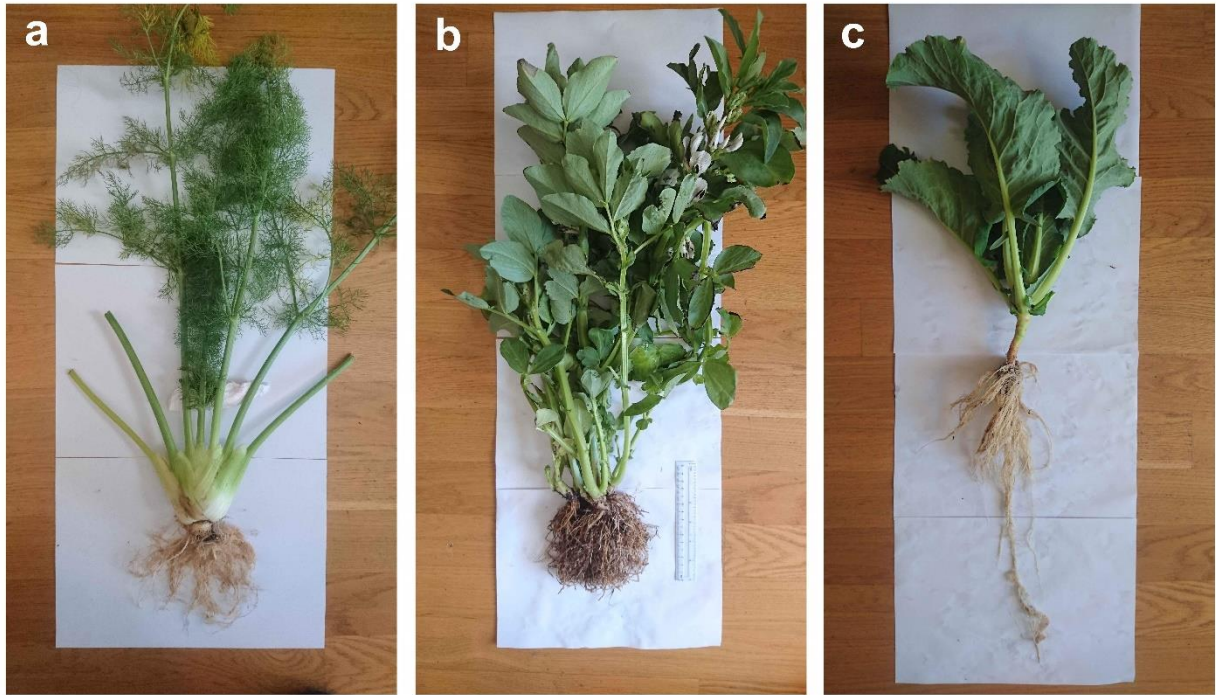
| Plant species | Shoot DW<br>(g)        | Root DW<br>(g)        | Root/shoot<br>DW  | Main shoot<br>length<br>(cm) | Main root<br>length<br>(cm) | Main<br>root/shoot<br>length |
|---------------|------------------------|-----------------------|-------------------|------------------------------|-----------------------------|------------------------------|
| Broad bean    | 75.40 $\pm$ 4.45 b     | 23.66 $\pm$ 2.25 b    | 0.31 $\pm$ 0.07 b | 56.90 $\pm$ 9.36 c           | 13.23 $\pm$ 4.06 c          | 0.23 $\pm$ 0.04 b            |
| Pea           | 22.87 $\pm$ 3.33 e     | 7.25 $\pm$ 1.36 d     | 0.32 $\pm$ 0.04 b | 78.54 $\pm$ 5.18 b           | 14.70 $\pm$ 2.66 c          | 0.19 $\pm$ 0.04 c            |
| Cabbage       | 31.36 $\pm$ 3.28 d     | 11.26 $\pm$ 2.49 c    | 0.36 $\pm$ 0.06 b | 39.40 $\pm$ 6.99 d           | 37.92 $\pm$ 5.13 b          | 0.96 $\pm$ 0.13 a            |
| Fennel        | 45.01 $\pm$ 8.92 c     | 7.79 $\pm$ 1.57 d     | 0.17 $\pm$ 0.08 c | 68.65 $\pm$ 7.29 b           | 12.90 $\pm$ 3.01 c          | 0.19 $\pm$ 0.06 c            |
| Olive         | 1241.76 $\pm$ 121.73 a | 829.21 $\pm$ 110.80 a | 0.68 $\pm$ 0.10 a | 162.71 $\pm$ 18.46 a         | 43.01 $\pm$ 5.31 a          | 0.26 $\pm$ 0.05 b            |

**Table S2.** Pearson correlation coefficients (*R*) among the measured parameters from the five plant species. \*: significant difference at  $P < 0.05$ ; \*\*: significant difference at  $P < 0.01$ . DW = dry weight; *S* = stabilization factor; *k* = decomposition rate constant; SOC = soil organic carbon; STN = soil total nitrogen; TBC = total bacterial count; TFC = total fungal count.

|                         | Root DW | Total root length | Root tips | Average root diameter | Total root surface area | <i>S</i> | <i>k</i> | SOC    | STN    | Soil pH | TBC   | TFC  |
|-------------------------|---------|-------------------|-----------|-----------------------|-------------------------|----------|----------|--------|--------|---------|-------|------|
| Root DW                 | 1.00    |                   |           |                       |                         |          |          |        |        |         |       |      |
| Total root length       | -0.82*  | 1.00              |           |                       |                         |          |          |        |        |         |       |      |
| Root tips               | -0.75** | 0.72**            | 1.00      |                       |                         |          |          |        |        |         |       |      |
| Average root diameter   | 0.62    | 0.27              | 0.24      | 1.00                  |                         |          |          |        |        |         |       |      |
| Total root surface area | 0.69**  | 0.70**            | 0.55      | 0.33                  | 1.00                    |          |          |        |        |         |       |      |
| <i>S</i>                | 0.88*   | 0.90*             | 0.58      | 0.41                  | 0.76**                  | 1.00     |          |        |        |         |       |      |
| <i>k</i>                | 0.72**  | 0.71**            | 0.62      | 0.16                  | 0.82**                  | -0.74**  | 1.00     |        |        |         |       |      |
| SOC                     | 0.65    | 0.80**            | 0.53      | -0.15                 | 0.69                    | -0.89*   | 0.68**   | 1.00   |        |         |       |      |
| STN                     | 0.61    | 0.77**            | 0.60      | 0.18                  | 0.55                    | -0.72**  | 0.66     | 0.88*  | 1.00   |         |       |      |
| Soil pH                 | 0.71**  | 0.82*             | 0.64      | 0.47                  | 0.94*                   | -0.57    | 0.73**   | 0.68** | 0.65   | 1.00    |       |      |
| TBC                     | 0.65    | 0.86*             | 0.39      | 0.60                  | 0.92*                   | -0.78*   | 0.87*    | 0.74** | 0.78** | 0.51    | 1.00  |      |
| TFC                     | 0.72**  | 0.59              | 0.53      | 0.70**                | 0.73**                  | -0.68**  | 0.88*    | 0.74** | 0.90*  | 0.57    | 0.88* | 1.00 |



**Figure S1.** Root portions analysed by SmartRoot software: (a) broad bean, (b) pea, (c) cabbage, and (d) fennel. Scale bar = 1 cm.



**Figure S2.** Plants of (a) fennel, (b) broad bean, and (c) cabbage used during the experiment. Ruler length = 15 cm.



**Figure S3.** The green (left) and red (right) tea bags recovered from the soils after 90 days.