

¹ Supplementary Figures & Tables: A commercial seaweed
² extract structured microbial communities associated with
³ tomato and pepper roots and significantly increased crop
⁴ yield

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Table S1: Soil characteristics (in *ppm* unless specified otherwise)

| Soil Characteristics | Average value |
|-------------------------|---------------|
| pH | 6.01 |
| Conductivity (mmhos/cm) | 0.68 |
| Nitrate (N) | 62.40 |
| Ammonium | 0.09 |
| Phosphorus | 0.41 |
| Potassium | 29.30 |
| Calcium | 64.40 |
| Magnesium | 13.80 |
| Chloride | 28.50 |
| Sulfate | 19.30 |
| Sodium | 17.80 |
| Zinc | 0.12 |
| Manganese | 0.06 |
| Cooper | 0.81 |
| Iron | 0.90 |
| Aluminium | 1.66 |

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| Tomato [cv: Totem Hybrid#A371, William Dam Seeds Ltd] | | | | | | | | |
|---|------|------|------|------|--------|------|------|------|
| | P+ | | P- | | P- | | P+ | |
| bloc 1 | P+F- | P-F- | P+F+ | P-F+ | P-F- | P+F+ | P+F+ | |
| | P+F+ | P-F+ | P+F- | P-F- | bloc 2 | P-F- | P+F+ | P-F- |
| bloc 4 | P+F+ | P-F+ | P+F- | P-F- | bloc 5 | P-F- | P+F+ | P+F- |
| | P+F- | P-F+ | P+F+ | P-F- | bloc 3 | P-F- | P+F+ | P+F- |
| bloc 6 | P-F+ | P+F- | P-F- | P+F+ | bloc 7 | P-F- | P+F+ | P+F+ |
| | P+F+ | P-F- | P+F- | P-F- | bloc 8 | P+F+ | P-F- | P-F+ |

| Pepper [cv: Ace Hybrid#318, William Dam Seeds Ltd] | | | | | | | | |
|--|------|------|------|------|--------|------|------|------|
| | P-F- | | P+F+ | | P-F- | | P-F- | |
| bloc 1 | P-F- | P+F+ | P+F+ | P-F- | P+F+ | P-F+ | P-F+ | |
| | P+F- | P-F+ | P+F+ | P-F- | bloc 2 | P+F- | P-F+ | P-F- |
| bloc 4 | P+F- | P-F+ | P+F+ | P-F- | bloc 5 | P-F+ | P+F+ | P+F+ |
| | P+F- | P+F+ | P-F- | P+F- | bloc 6 | P+F+ | P+F+ | P-F- |
| bloc 8 | P+F+ | P+F- | P+F- | P-F- | bloc 7 | P+F- | P+F+ | P-F+ |
| | P+F+ | P+F- | P+F- | P-F- | bloc 8 | P+F+ | P-F+ | P-F- |

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14 **Table S2:** Randomized split block design for the tomato and pepper experiments

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Table S3: Stella Maris® characteristics

| Stella Maris® characteristics | Average value |
|--------------------------------|-----------------------------------|
| Appearance | Viscous Brownish-Black Liquid |
| Odor | Marine Odor |
| Solubility in water (%) | 100 |
| pH | 7.4 - 8.2 |
| Carbohydrates | Alginic acid, Mannitol, Fucoidans |
| Organic matter content (%) | 13.0 - 16.0 |
| Total Nitrogen (N) (%) | 0.1 - 0.6 |
| Available phosphate (P2O5) (%) | < 0.2 |
| Soluble potash (K2O) (%) | 5.0 - 7.0 |
| Sulphur (S) (%) | 0.3 - 0.6 |
| Magnesium (Mg) (%) | 0.05 - 0.15 |
| Calcium (Ca) (%) | 0.05 - 0.15 |
| Sodium (Na) (%) | 0.7 - 1.2 |
| Iron (Fe) (ppm) | 30 - 90 |
| Cooper (Cu) (ppm) | < 4 |
| Manganese (Mn) (ppm) | 3 - 11 |
| Boron (B) (ppm) | 20 - 40 |

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Table S4: Summary of sequencing statistics and bioinformatics identification of ASV

| | fungi-soil | fungi-root | bacteria-soil | bacteria-root |
|--|------------|------------|---------------|---------------|
| No sequences (sum) | 976,000 | 309,000 | 920,000 | 535,000 |
| No sequences (mean) | 50,847 | 32,208 | 47,907 | 56,365 |
| No seq. filtered (mean) | 32,626 | 12,714 | 29,662 | 37,642 |
| No seq. filt. merged (mean) | 29,300 | 12,094 | 14,060 | 30,706 |
| No seq. filt. merg. no chimeras (mean) | 25,476 | 9,849 | 13,521 | 30,408 |
| No samples | 192 | 96 | 192 | 96 |
| No samples trimmed | 189 | 81 | 192 | 95 |
| No ASV (sum) | 6,112 | 845 | 9,352 | 2,023 |
| No ASV trimmed (sum) | 413 | 106 | 807 | 262 |
| No ASV trimmed per sample (mean) | 125 | 29 | 194 | 45 |

23 *No sequences (sum)*: Total number of paired-end sequencing reads per biotope. *No sequences*
 24 (*mean*): Average number of paired-end sequencing reads per sample. *No seq. filtered (mean)*: Total
 25 number of filtered paired-end sequencing reads per sample. *No seq. filt. merged (mean)*: Number
 26 of filtered paired-end sequencing reads merged per sample. *No seq. filt. merg. no chimeras (mean)*:
 27 Average Number of filtered paired-end sequencing reads merged, removing chimeras per sample.
 28 *No samples*: Number of samples. *No samples trimmed*: Number of samples, filtering out low
 29 quality samples. *No ASV (sum)*: Total number of ASV. *No ASV trimmed (sum)*: Total number of ASV,
 30 filtering out low abundance ASV and chloroplast or mitochondrial ASV for bacterial samples. *No*
 31 *ASV trimmed per sample (mean)*: Average number of filtered ASV per sample.

Table S5: Variance explained by the terms in the PERMANOVA models.

| | fungi-soil | fungi-root | bacteria-soil | bacteria-root |
|---------------------------|------------|------------|---------------|---------------|
| amendment | 0.02*** | 0.08*** | 0.04*** | 0.19*** |
| planted | 0.21*** | NA | 0.13*** | NA |
| species | 0.02*** | 0.26*** | 0.02*** | 0.20*** |
| amendment:planted | 0.01** | NA | 0.02*** | NA |
| amendment:species | 0.01* | 0.04* | 0.03*** | 0.05*** |
| planted:species | 0.01 | NA | 0.01** | NA |
| amendment:planted:species | 0.01 | NA | 0.01* | NA |

32 r^2 (percentage of variance explained by the term in the model); * $p\text{-value}<0.05$, ** <0.005 , *** <0.0005

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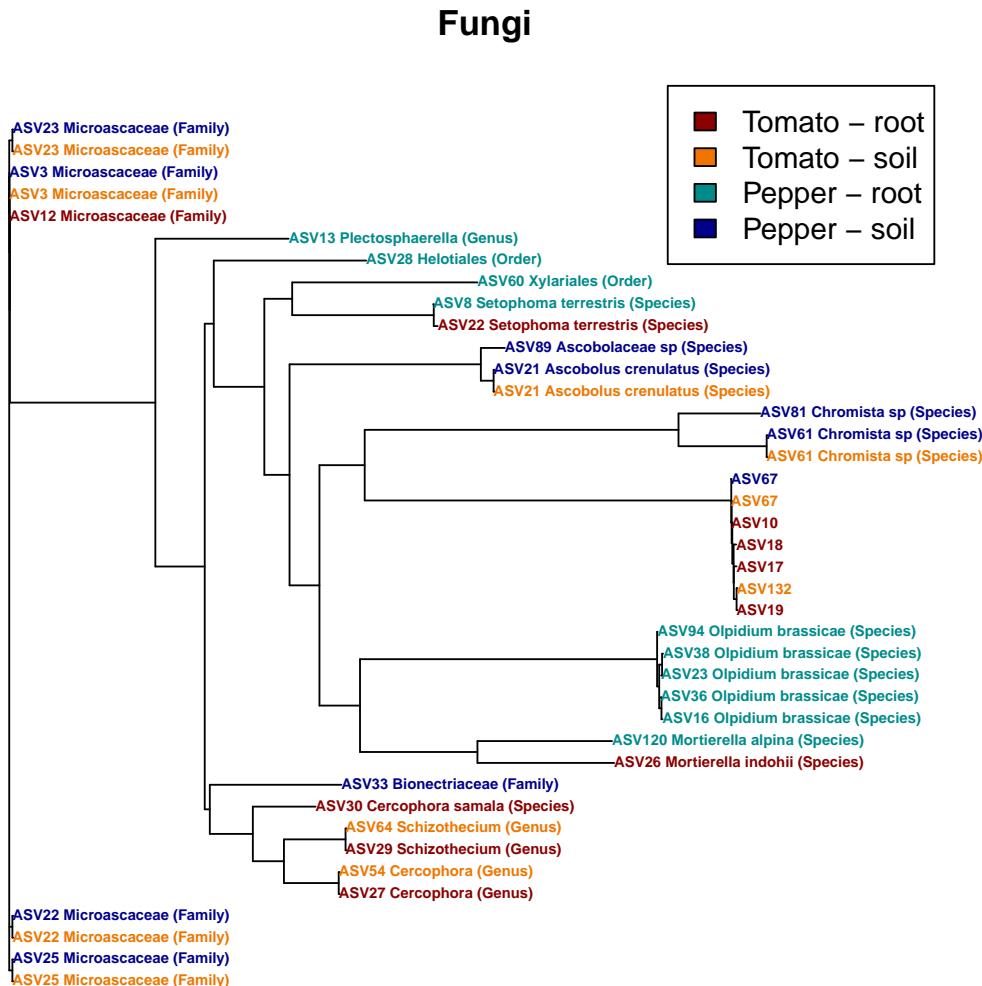
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36 **Figure S1: Plant productivity.** Photos were taken at the end of the experimental treatment. In
37 each photo, amended plants are on the left. **A:** pepper shoots, **B:** pepper roots, **C:** pepper fruits
38 and **D:** tomato fruits.

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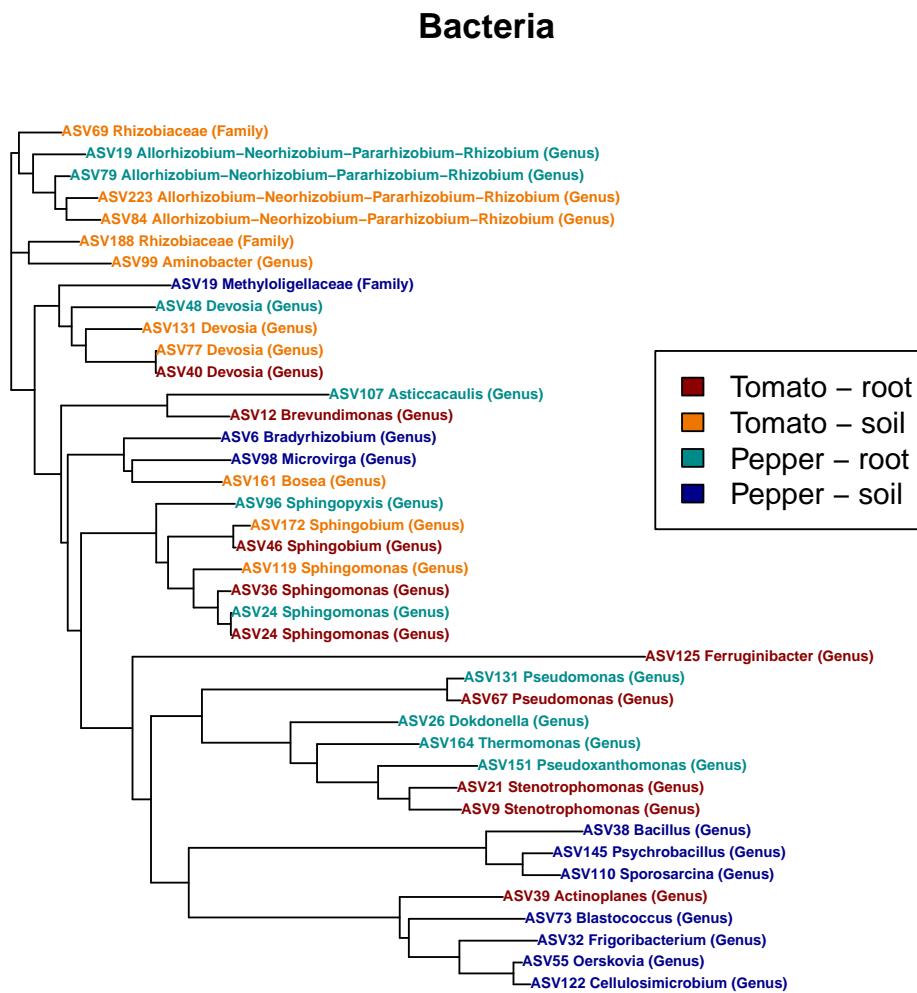


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43 **Figure S2: Neighbor-Joining trees of candidates ASV (fungi) most positively associated with
44 productivity measures as identified in Figure 5. The most accurate taxonomy assigned accord-
45 ing to the RDP bayesian classifier (from Phylum to species) was added as tip labels.**

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49 **Figure S3: Neighbor-Joining trees of candidates ASV (bacteria) most positively associated with
50 productivity measures as identified in Figure 6. The most accurate taxonomy assigned accord-
51 ing to the RDP bayesian classifier (form Phylum to species) was added as tip labels.**

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