Supplement of

Water uptake patterns of pea and barley responded to drought but not to cropping systems

Qing Sun et al.

Correspondence to: Qing Sun (s.qing@outlook.com)

The copyright of individual parts of the supplement might differ from the article licence.
Table S1 Stable water isotope values ($\delta^{18}$O and $\delta^2$H, ‰) of soil in control and drought subplots under different cropping systems (C-IT for Conventional intensive tillage, C-NT for Conventional no tillage, O-IT for Organic intensive tillage, and O-RT for Organic reduced tillage) before the drought treatment (7 May), at the end of treatment (25 June), and after the treatment (11 July) in 2018. Mean ± 1 SE are given. Different small and capital letters indicate significant differences among CS in control and drought subplots, respectively, tested with Tukey HSD (honestly significant difference, $P < 0.05$).

| Isotope | Depth (cm) | Control | Drought |
|---------|------------|---------|---------|
|         |            | C-IT    | C-NT    |
|         |            | O-IT    | O-RT    |
|         |            | C-IT    | C-NT    |
|         |            | O-IT    | O-RT    |

Before drought treatment

| Isotope | Depth (cm) | C-IT     | C-NT     | O-IT     | O-RT     | C-IT     | C-NT     | O-IT     | O-RT     |
|---------|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| $\delta^{18}$O | 0-5 | -3.6±0.8 | -4.6±0.5 | -4.8±0.6 | -5.1±0.7 | -4.8±0.9 | -4.7±0.5 | -5.6±0.4 | -4.2±0.8 |
|          | 5-10  | -4.7±0.8 | b -7.1±1.2 ab | -7.5±0.8 a | -8.2±0.4 a | -7.6±0.7 AB | -8.2±0.3 A | -6.3±1.1 B | -7.7±0.5 AB |
|          | 10-20  | -6.6±0.6 | -8.0±1.4 | -9.2±0.5 | -8.4±0.5 | -7.9±0.8 | -8.6±1.2 | -7.8±1.0 | -8.5±0.5 |
|          | 20-30  | -9.7±0.3 a | -7.8±0.8 b | -9.8±0.2 a | -9.7±0.2 a | -9.8±0.4 | -9.8±0.9 | -9.6±0.6 | -9.6±0.3 |
|          | 30-40  | -10.2±0.3 | -10.3±0.2 | -9.7±0.5 | -9.9±0.3 | -10.4±0.1 A | -10.6±0.5 A | -9.6±0.2 B | -10.3±0.2 A |
|          | 40-60  | -10.3±0.3 | -10.2±0.3 | -10.3±0.2 | -10.5±0.5 | -10.3±0.2 | -10.5±0.3 | -10.2±0.4 | -10.4±0.4 |
| $\delta^2$H | 0-5 | -48.6±3.3 | -48.6±1.6 | -50.6±3.1 | -54.7±3.5 | -53.8±2.7 | -53.7±1.9 | -55.5±2.6 | -52.1±2.3 |
|          | 5-10  | -53.4±2.3 b | -62.4±6.5 ab | -65.6±3.7 a | -70.0±1.7 a | -67.6±2.5 AB | -70.8±1.7 A | -60.6±4.6 B | -68.6±2.2 A |
|          | 10-20  | -63.4±2.0 | -68.2±5.8 | -72.7±2.3 | -70.8±2.8 | -69.3±2.7 | -72.8±4.5 | -69.4±3.5 | -71.8±2.2 |
|          | 20-30  | -75.4±1.3 a | -65.0±3.9 b | -73.3±1.7 a | -75.9±1.5 a | -76.7±1.1 | -76.7±3.7 | -75.5±2.3 | -75.9±1.3 |
|          | 30-40  | -76.0±1.5 a | -76.1±0.9 a | -71.8±2.7 b | -75.4±2.4 ab | -79.1±0.3 A | -77.5±1.9 A | -73.2±1.9 B | -77.3±0.9 A |
|          | 40-60  | -75.7±2.0 | -74.2±1.2 | -73.9±1.0 | -78.4±4.6 | -77.9±1.5 | -75.6±1.1 | -75.9±1.4 | -77.4±2.5 |

End of drought treatment

| Isotope | Depth (cm) | C-IT     | C-NT     | O-IT     | O-RT     | C-IT     | C-NT     | O-IT     | O-RT     |
|---------|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| $\delta^{18}$O | 0-5 | -47.9±2.7 | -40.6±3.9 | -45.8±2.1 | -47.8±4.5 | -52.2±1.4 B | -53.2±4.4 B | -54.8±1.4 B | -62.8±3.8 A |
|          | 5-10  | -56.8±1.6 | -52.6±3.9 | -58.1±1.9 | -57.1±2.8 | -65.0±1.3 | -59.0±3.9 | -63.3±2.6 | -61.2±3.4 |
|          | 10-20  | -69.0±1.7 | -57.3±4.5 | -55.9±3.5 | -61.5±4.8 | -72.0±1.1 | -62.9±4.3 | -67.9±5.9 | -68.9±2.0 |
|          | 20-30  | -65.0±1.9 | -64.2±2.4 | -61.7±2.8 | -63.4±4.7 | -75.3±1.7 | -75.3±1.1 | -75.3±1.1 | -77.3±1.1 |
|          | 30-40  | -74.9±1.8 | -71.5±2.3 | -69.3±2.7 | -71.3±3.0 | -81.4±4.0 A | -77.6±1.0 B | -80.2±0.6 A | -79.7±1.2 AB |
|          | 40-60  | -79.8±1.2 a | -76.6±1.2 ab | -75.5±1.5 ab | -75.4±1.8 ab | -81.8±0.9 A | -78.2±1.1 B | -79.4±1.4 AB | -81.5±2.4 A |

After drought treatment

| Isotope | Depth (cm) | C-IT     | C-NT     | O-IT     | O-RT     | C-IT     | C-NT     | O-IT     | O-RT     |
|---------|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| $\delta^{18}$O | 0-5 | -3.8±0.3 ab | -3.5±0.3 b | -4.3±0.1 a | -4.3±0.5 a | -3.4±0.4 | -2.2±1.4 | -3.7±0.8 | -3.6±0.5 |
|          | 5-10  | -4.8±0.5 ab | -5.4±0.3 a | -4.2±0.7 b | -5.3±0.1 a | -5.0±0.4 | -4.5±0.5 | -5.0±0.3 | -4.7±0.5 |
|          | 10-20  | -5.2±0.6 | -6.0±0.6 | -5.4±0.8 | -6.3±0.2 | -5.3±0.2 | -5.3±0.7 | -5.7±0.5 | -5.8±0.2 |
|          | 20-30  | -7.1±0.3 | -7.5±0.7 | -7.3±0.8 | -7.2±0.5 | -8.1±0.6 | -8.2±0.3 | -7.6±1.0 | -8.2±0.7 |
|          | 30-40  | -9.0±0.3 | -9.3±0.3 | -8.9±0.4 | -9.0±0.5 | -9.9±0.8 | -9.9±0.3 | -9.5±0.3 | -9.8±0.6 |
|          | 40-60  | -10.0±0.1 | -10.0±0.3 | -10.0±0.2 | -9.9±0.2 | -10.0±0.3 | -10.5±0.2 | -10.4±0.3 | -10.6±0.2 |

$\delta^2$H
Table S2 Effects of cropping systems (CS, df = 3), drought treatment (D, df = 1) and the interaction (CS × D, df = 3) on stable water isotope data (δ¹⁸O and δ²H, %) of pea and barley in control and drought subplots under different cropping systems (C-IT for Conventional intensive tillage, C-NT for Conventional no tillage, O-IT for Organic intensive tillage, and O-RT for Organic reduced tillage) before the drought treatment (7 May), at the end of treatment (25 June), and after the treatment (11 July) in 2018 tested by linear mixed models (P values are given). Pea plants were already senesced in early July, therefore no stable water isotope data are available after the treatment. Significant differences are shown in bold (P < 0.05). Mean ± 1 SE are given. Different small and capital letters indicate significant differences among different cropping systems in control and drought subplots, respectively, tested with Tukey HSD (honestly significant difference, P < 0.05).

| Species | Isotope | P value from linear mixed models | Control | Mean ± 1 SE |
|---------|---------|---------------------------------|---------|-------------|
|         |         | CS | D | CS × D | Blocks | C-IT | C-NT | O-IT | O-RT | C-IT | C-NT | O-IT | O-RT |
| Pea     | δ¹⁸O    | 0.449 | 0.257 | 0.267 | 0.652 | -7.8±0.3 b | -8.4±0.4ab | -8.6±0.2ab | -8.8±0.3 a | -8.5±0.5 | -8.6±0.3 | -8.8±0.2 | -8.6±0.1 |
|         | δ²H     | 0.334 | 0.006 | 0.026 | 0.462 | -59.2±0.8 b | -64.8±2.4a | -62.4±0.8ab | -65.4±1.5 a | -65.4±0.5 | -65.6±1.3 | -65.3±1.2 | -64.9±1.6 |
| Barley  | δ¹⁸O    | 0.051 | 0.311 | 0.377 | 0.166 | -9.7±0.1ab | -9.1±0.1 b | -9.9±0.3 a | -10.1±0.2 a | -9.7±0.3 | -9.7±0.2 | -10.0±0.2 | -10.0±0.1 |
|         | δ²H     | 0.146 | 0.026 | 0.319 | 0.926 | -72.2±1.0ab | -69.7±1.4 b | -70.8±0.9ab | -73.3±1.3 a | -72.4±0.5BC | -71.7±0.6C | -74.0±0.8 A | -73.9±0.6AB |
| Pea     | δ¹⁸O    | 0.100 | 0.022 | 0.085 | 0.016 | -7.2±0.6 | -7.6±0.4 | -7.9±0.3 | -7.9±0.3 | -7.3±0.8 B | -6.0±1.0B | -5.7±1.5 B | -8.3±0.2 A |
|         | δ²H     | 0.142 | 0.595 | 0.074 | 0.177 | -54.9±1.4 | -58±1.7 | -57.8±1.4 | -57.1±2.2 | -59.5±3.5 B | -56.3±4.6B | -52.1±4.8 C | -65.1±1.0 A |
| Barley  | δ¹⁸O    | 0.035 | 0.008 | 0.920 | 0.008 | -8.4±0.3 b | -8.1±0.4 b | -8.9±0.3 a | -9±0.2 a | -8.9±0.4AB | -8.5±0.4B | -9.1±0.4AB | -9.3±0.2 A |
|         | δ²H     | 0.174 | <0.001 | 0.608 | 0.357 | -65.4±1.3ab | -63.2±1.3 b | -66.2±1.5 a | -66.9±0.6 a | -71.4±0.8 | -71.4±1.2 | -71.5±0.6 | -72.7±0.9 |

Before drought treatment

| Species | Isotope | P value from linear mixed models | Control | Mean ± 1 SE |
|---------|---------|---------------------------------|---------|-------------|
|         |         | CS | D | CS × D | Blocks | C-IT | C-NT | O-IT | O-RT | C-IT | C-NT | O-IT | O-RT |
| Pea     | δ¹⁸O    | 0.278 | 0.473 | 0.504 | 0.019 | -6.1±0.3 b | -6.3±0.3 b | -6.4±0.2ab | -6.8±0.2 a | -6±0.7 | -5.6±0.7 | -5.8±0.2 | -6.7±0.3 |
|         | δ²H     | 0.158 | 0.519 | 0.557 | 0.081 | -48.6±0.5 b | -52.7±2.1 a | -49.4±1.9ab | -50.9±1.2ab | -50.4±2.9AB | -54.8±4.5A | -47.1±1.0 B | -52.5±2.1AB |

End of drought treatment

After drought treatment
Table S3 Effects of cropping systems (CS, df = 3), drought treatment (D, df = 1) and the interaction (CS × D, df = 3) on the median proportional contributions (MPC) from different soil depths to water uptake of pea and barley before the drought treatment (7 May), at the end of treatment (25 June), and after the drought treatment on (11 July) in 2018 tested by linear mixed models.

Proportional contributions were derived from 10 000 simulations of mixing models using δ18O data. Pea plants were already senesced in early July, therefore no stable water isotope data are available after the treatment. Proportional contribution from 0-20 cm is the sum from 0-5, 5-10, and 10-20 cm, and 20-40 cm is the sum from 20-30 and 30-40 cm. CS and D were tested as two fixed effect factors for all subplots (P values are given). Significant differences are shown in bold (P < 0.05). Moreover, mean ± 1 SE for MPC (%) are given for different cropping systems (C-IT for Conventional intensive tillage, C-NT for Conventional no tillage, O-IT for Organic intensive tillage, and O-RT for Organic reduced tillage). Different small and capital letters indicate significant differences among cropping systems in control and drought subplots, respectively, tested with Tukey HSD (honestly significant difference, P < 0.05).

| Species | Depth (cm) | P value from linear mixed models | Mean ± 1 SE |
|---------|------------|----------------------------------|-------------|
|         | CS D CS × D | Blocks | Control | Drought |
|         | C-IT C-NT O-IT O-RT | C-IT C-NT O-IT O-RT |
|         | Before drought treatment | End of drought treatment | After drought treatment |

### Before drought treatment

| Deeds | P | CS | D | CS × D | Blocks | Control | Drought |
|-------|---|----|---|--------|--------|---------|---------|
| Pea   | 0.048 | 0.098 | 0.092 | 0.056 | 3±1 b | 19±8 a | 15±5 a | 14±2 a | 13±3 a | 19±7 | 19±6 | 11±4 | 15±4 |
| Barley| 0.548 | 0.501 | 0.518 | 0.553 | 16±3 | 14±3 | 12±2 | 16±3 | 15±2 | 14±7 | 10±6 | 16±2 | 25±11 |

### End of drought treatment

| Deeds | P | CS | D | CS × D | Blocks | Control | Drought |
|-------|---|----|---|--------|--------|---------|---------|
| Pea   | 0.327 | 0.003 | 0.289 | 0.033 | 10±2 a | 19±7 b | 15±3 a | 12±1 a | 8±1 b | 10±4 | 8±1 b | 10±4 | 6±3 a | 10±2 | B A | 30±4 |
| Barley| 0.398 | 0.008 | 0.272 | 0.027 | 8±1 a | 16±4 b | 18±6 b | 14±5 b | 9±1 a | 10±4 | 6±3 | 10±4 | 8±1 b | 10±4 | 8±1 a | 30±4 |

### After drought treatment

| Deeds | P | CS | D | CS × D | Blocks | Control | Drought |
|-------|---|----|---|--------|--------|---------|---------|
| Barley| 0.601 | 0.508 | 0.927 | 0.229 | 25±10 | 21±5 | 19±4 | 14±2 | 34±22 | 22±12 | 21±7 | 15±1 | 20±10 | 21±5 | 15±1 | 20±10 | 21±5 | 15±1 | 20±10 | 21±5 | 15±1 | 20±10 |

Note: The table includes the Proportional Contributions (MPC) for different cropping systems and drought treatments, with statistical significance levels (P values) and mean ± 1 SE values for each condition.
Table S4 The median proportional contributions (MPC) from different soil depths to water uptake of pea and barley before the drought treatment on 7 May, at the end of treatment on 25 June, and after the drought treatment on 11 July in 2018 (left) as well as effects of cropping systems (CS, df = 3), drought treatment (D, df = 1) and the interaction (CS × D, df = 3) on MPC tested by linear mixed models (right, P values are given).

| Depth (cm) | Species | Mean ± 1 SE Before drought treatment | Linear mixed models |
|-----------|---------|--------------------------------------|---------------------|
|           |         | Control | Drought | Blocks |
|           |         | C-IT    | C-NT    | O-IT    | O-RT    | CS   | D   | CS × D |
| 0-5       | Pea     | 32±7    | 29±12   | 43±9    | 47±12   | 39±9 | 40±7 | 28±7   | 42±12   | 0.794 | 0.931 | 0.379 | 0.675 |
| 10-May    | 26±8    | b       | 11±3    | a       | 14±6    | 16±3  | a    | 15±3   | 11±2    | 15±2   | 12±4   | 0.26  | 0.473 | 0.322 | 0.851 |
| 20-Oct    | 11±2    | 9±2     | 9±1     | 9±2     | 12±3    | 13±4  | 15±3 | 11±3   | 0.828 | 0.103 | 0.753 | 0.312 |
| 20-30     | 7±1     | 9±2     | 8±1     | 8±1     | 10±1    | 10±2  | 8±1  | 0.385  | 0.319  | 0.971  | 0.080 |
| 30-40     | 7±1     | 22±13   | 9±1     | 8±2     | 7±1 A   | 8±1 AB| 11±2 B | 8±2 AB | 0.345  | 0.373  | 0.337 | 0.400 |
| 40-60     | 7±2     | 11±2    | 9±1     | 8±2     | 8±0     | 9±1   | 10±1 | 8±1    | 0.417  | 0.095  | 0.653 | 0.500 |
| 0-5       | Barley  | 5±1     | 10±6    | 7±1     | 10±5    | 15±6 B | 16±6 B | 4±2 A  | 6±2 A   | 0.281 | 0.491 | 0.279 | 0.154 |
| 10-May    | 5±0     | 7±3     | 12±3    | 8±3     | 11±1 BC| 15±2 C| 6±3   | 10±3 AB| 0.663  | 0.101  | **0.008** | 0.425 |
| 20-Oct    | 7±1     | 8±2     | 11±1    | 10±3    | 12±2    | 10±1  | 11±5 | 9±3    | 0.774  | 0.435  | 0.551 | **0.046** |
| 20-30     | 21±4    | 11±4    | 15±1    | 34±22   | 14±1    | 11±2  | 15±6  | 33±18 | 0.485  | 0.561  | 0.620 | 0.501 |
| 30-40     | 22±5 ab| 41±20 b| 16±1 a  | 10±3 a  | 19±4    | 16±4  | 10±4 | 15±3   | 0.087  | 0.114  | 0.193 | 0.545 |
| 40-60     | 23±5 a  | 13±4    | 21±6    | 14±7    | 16±2    | 16±2  | 3±8 B | 17±6   | 0.371  | 0.514  | 0.643 | 0.882 |

End of drought treatment

| Depth (cm) | Species | Mean ± 1 SE After drought treatment | Linear mixed models |
|-----------|---------|------------------------------------|---------------------|
|           |         | Control | Drought | Blocks |
|           |         | C-IT    | C-NT    | O-IT    | O-RT    | CS   | D   | CS × D |
| 0-5       | Pea     | 5±1±4 b| 27±13 a| 23±3 a  | 27±8 a  | 68±14 B| 22±12 A| 8±4±10 C| 25±11 A | **0.008** | 0.054 | 0.039 | 0.773 |
| 10-May    | 10±3    | 16±4 a | 17±3 a  | 16±6 a  | 6±3 a   | 18±8 B | 3±2 A | 21±8 B | 0.119  | 0.371  | 0.291 | 0.078 |
| 20-Oct    | 10±5    | 9±1 a  | 17±3 a  | 15±6 a  | 6±2 AB | 36±22 B| 5±4 A | 31±20 AB| 0.513  | 0.376  | 0.336 | 0.205 |
| 20-30     | 7±1 a  | 12±2 ab| 12±1 ab | 21±9 b  | 5±2 AB | 6±2 B  | 2±1 A | 6±2 B | 0.257  | **0.01** | 0.412 | 0.763 |
| 30-40     | 6±1 a  | 13±4 b | 9±1 ab  | 6±1 a   | 5±2 AB | 6±2 B  | 2±1 A | 5±1 A | 0.109  | **0.002** | 0.14 | 0.079 |
| 40-60     | 5±1 a  | 12±4 b | 7±1 ab  | 6±2 ab  | 5±2 AB | 7±3 B  | 2±1 A | 5±2 B | 0.183  | 0.022  | 0.386 | 0.192 |
| 0-5       | Barley  | 14±2 a | 13±6 a  | 7±1 a   | 9±2 a   | 13±1 AB| 9±1 A | 13±3 AB| 15±2 A | 0.75   | 0.288  | 0.107 | 0.407 |
| 10-May    | 15±3 b | 10±2 ab| 9±1 a   | 12±2 ab | 16±1 a  | 10±1 A | 14±2 | 16±4 A | 0.116  | 0.119  | 0.618 | 0.243 |
| 20-Oct    | 12±1 a | 12±2 a | 9±1 a   | 11±2 a  | 17±1 B | 11±2 A| 12±2 A| 12±1 A | 0.076  | 0.081  | 0.313 | 0.805 |
| 20-30     | 14±2 a | 13±1 a | 11±1 a  | 15±4 a  | 14±1 A | 17±1 B| 16±1 AB| 13±1 A | 0.889  | 0.151  | 0.329 | 0.389 |
| 30-40     | 13±2 a | 17±3 a | 19±3 a  | 12±1 a  | 13±1 A | 20±2 a| 16±2 AB| 13±2 A | **0.028** | 0.757 | 0.685 | 0.478 |
| 40-60     | 18±6 a | 20±5 a | 34±6 a  | 31±9 a  | 11±1 a | 17±2 a| 15±2 | 17±6 a | 0.396  | **0.011** | 0.362 | 0.495 |

Proportional contributions were derived from 10 000 simulations of mixing models using δ²H data. Pea plants were already senesced in early July, therefore no stable water isotope data were available after the treatment. Proportional contribution from 0-20 cm is the sum from 0-5, 5-10, and 10-20 cm, and 20-40 cm is the sum from 20-30 and 30-40 cm. Significant differences are shown in bold (P < 0.05). Moreover, mean ± 1 SE for MPC (%) are given for different cropping systems (C-IT for Conventional intensive tillage, C-NT for Conventional no tillage, O-IT for Organic intensive tillage, and O-RT for Organic reduced tillage). Different small and capital letters indicate significant differences among cropping systems in control and drought subplots, respectively, tested with Tukey HSD (honestly significant difference, P < 0.05).
Table S5 Effects of cropping systems (CS, df = 3), sampling times (Time, df = 1) and the interaction (CS × Time, df = 3) on the median proportional contributions (MPC) from different soil depths to water uptake of pea and barley. Differences in MPC before the drought treatment (7 May) compared to MPC at the end of treatment (25 June) as well as MPC at the end of treatment compared to MPC after the treatment (11 July) for the three soil layers in 2018 tested for control and drought subplots separately by linear mixed models (P values are given).

| Species | Type       | Control                  | Drought                  |
|---------|------------|--------------------------|--------------------------|
|         |            | 0-20 | 20-40 | 40-60 | 0-20 | 20-40 | 40-60 |
|         |            |      |       |       |      |       |       |
| Pea     | CS         | 0.592 | 0.185 | 0.418 | 0.118 | 0.392 | 0.216 |
|         | Time       | 0.391 | 0.406 | 0.730 | <0.001 | 0.003 | 0.010 |
|         | CS × Time  | 0.591 | 0.185 | 0.418 | 0.118 | 0.393 | 0.217 |
|         | Blocks     | 0.301 | 0.200 | 0.516 | 0.003 | 0.010 | 0.066 |
| Barley  | CS         | 0.429 | 0.284 | 0.129 | 0.242 | 0.177 | 0.521 |
|         | Time       | <0.001 | 0.334 | 0.212 | <0.001 | 0.562 | 0.084 |
|         | CS × Time  | 0.428 | 0.285 | 0.129 | 0.243 | 0.177 | 0.523 |
|         | Blocks     | 0.117 | 0.821 | 0.353 | 0.008 | 0.796 | 0.177 |

Proportional contributions were derived from 10 000 simulations of mixing models using δ18O data. Pea plants were already senesced in early July, therefore no stable water isotope data are available after treatment. Significant differences are shown in bold (P < 0.05).
Table S6 Effects of cropping systems (CS, df = 3), drought treatment (D, df = 1) and the interaction (CS × D, df = 3) on absolute changes in median proportional contributions (MPC) to plant water uptake of pea and barley, calculated as the difference of MPC at the end (25 June; ET) and before the drought treatment (7 May; BT), from three soil layers by linear mixed models (P values are given).

| Species | Depth (cm) | CS     | D   | CS × D | Blocks |
|---------|-----------|--------|-----|--------|--------|
| Pea     | 0-20      | 0.534  | **0.001** | 0.053  | 0.178  |
|         | 20-40     | 0.310  | **0.005** | 0.736  | 0.295  |
|         | 40-60     | 0.714  | 0.052 | 0.084  | 0.249  |
| Barley  | 0-20      | 0.391  | 0.818 | 0.308  | 0.630  |
|         | 20-40     | 0.766  | 0.695 | 0.168  | 0.841  |
|         | 40-60     | 0.934  | 0.764 | 0.085  | 0.865  |

MPC was derived from 10 000 simulations of mixing models using stable water isotope data. Proportional contribution from the shallow layer is the sum of 0-5, 5-10, and 10-20 cm depths, the middle layer is the sum of 20-30 and 30-40 cm depths, and the deep layer represents 40-60 cm. Significant differences are shown in bold (P < 0.05).
Fig. S1 Dual isotope plot of soil and plant samples from control and drought subplots for three different times during the experiment (before the drought treatment, at the end of drought, and after the drought treatment). The long-term local meteoric water line (LMWL; 1994 to 2017; $R^2 = 0.98$) was fitted with data from the closest GNIP station (Global Network of Isotopes in Precipitation, Buchs Suhr, 47.37° N, 8.08° E, 34 km from the research site, solid line). The local meteoric water line of 2018 (2018 LMWL; $R^2 = 0.98$) was fitted with data of precipitation samples collected at the field during the growing season combined with data of 2018 from GNIP Buchs (dashed line). All the precipitation data presented here are monthly means. Regressions for soil water and plant xylem water were fitted for both treatments together.
Fig. S2 δ²H values of soil water from different depths and plant xylem water in each cropping system (a, d) before the drought treatment on 7 May, (b, e) at the end of the drought treatment on 25 June, and (c, f) after treatment on 11 July in 2018 (Conv. for conventional, Org. for organic).

Horizontal dotted lines separate isotopic composition of soil and plant samples (P for pea, B for barley). Pea plants were already senesced in early July, therefore no stable water isotope data are available after treatment. Means and 1 SE (horizontal bars) are given of each cropping system (n = 3-4).
Fig. S3 Relationships of median proportional contributions (MPC) to plant water uptake from the shallow and deep soil layers of pea vs. barley (Conv. for conventional, Org. for organic; n = 29-31). The relationship of MPC from the middle layer (20-40 cm) is not significant (r = 0.2, data not shown). Symbols with dark outlines were from control subplots, those with light outlines from drought subplots. MPC was derived from 10 000 simulations of mixing models using stable water isotope data. Proportional contribution from the shallow layer is the sum of 0-5, 5-10, and 10-20 cm depths and the deep layer represents 40-60 cm. Asterisks indicate the significance of linear regression (*** P < 0.001, ** 0.001 ≤ P < 0.01).