**Supplementary files**



**Figure S1.** Precipitations in Dongying, Shandong Province, China in 2021 and 2022.



Temperature (℃)

**Figure S2.** The highest and lowest air temperatures in Dongying, Shandong Province, China in 2020 and 2021.

**Table S1.** Comparisons of soil electrical conductivity (EC) from the fields irrigated with saline waters in combination with plastic film mulching or no mulching.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Water salinitya**  **(g L‒1)** | **Soil depth** | **Mulching** | **EC1:5 (dS m-1) sampled on different dates (year/month/day)** | | | | |
| **2022/05/17** | **2022/06/21** | **2022/10/21** | **2022/12/10** | **2023/02/23** |
| 8+3 | 0‒10 cm | Plastic film mulching | 0.58 ± 0.24c | 1.00 ± 0.20ab | 0.40 ± 0.08ab | 0.40 ± 0.04e | 0.61 ± 0.17bcd |
|  |  | No muching | 1.17 ± 0.17a | 1.06 ± 0.03a | 0.34 ± 0.04b | 0.39 ± 0.08e | 0.55 ± 0.23cde |
| 3 |  | Plastic film mulching | 0.83 ± 0.43b | 1.02 ± 0.16ab | 0.44 ± 0.12a | 0.46 ± 0.16de | 0.49 ± 0.18de |
|  |  | No muching | 0.53 ± 0.20c | 0.94 ± 0.04b | 0.45 ± 0.23a | 0.29 ± 0.07f | 0.47 ± 0.10e |
| 8+3 | 10‒20 cm | Plastic film mulching | - | - | - | 0.58 ± 0.08bc | 0.60 ± 0.07bcd |
|  |  | No muching | - | - | - | 0.51 ± 0.08cd | 0.56 ± 0.17bcde |
| 3 |  | Plastic film mulching | - | - | - | 0.69 ± 0.11a | 0.62 ± 0.13bc |
|  |  | No muching | - | - | - | 0.53 ± 0.15bcd | 0.63 ± 0.16bc |
| 8+3 | 20‒30 cm | Plastic film mulching | - | - | - | 0.72 ± 0.14a | 0.76 ± 0.11a |
|  |  | No muching | - | - | - | 0.60 ± 0.11b | 0.64 ± 0.13bc |
| 3 |  | Plastic film mulching | - | - | - | 0.73 ± 0.15a | 0.68 ± 0.11ab |
|  |  | No muching | - | - | - | 0.57 ± 0.08bc | 0.66 ± 0.10abc |

*Notes*: - denotes not sampled. aTwo irrigation with 8+3 g L‒1 saline waters were performed on May 3 and May 25, respectively, while one irrigation with 3 g L‒1 saline water was carried out on May 25. Data are represented as mean ± SD (*n*=5). Different letters indicate significant differences at *p* < 0.05.

**Table S2.** The soil electrical conductivity (EC) from the fields irrigated with saline waters combined with plastic film mulching or no mulching.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Water salinitya**  **(g L‒1)** | **Soil depth** | **EC1:5 (dS m-1) sampled on different dates (year/month/day)** | | | | | **Reductionb** | | |
| **2022/05/17** | **2022/06/21** | **2022/10/21** | **2022/12/10** | **2023/02/23** | **2022/10/21** | **2022/12/10** | **2023/02/23** |
| 8+3 | 0‒10 cm | 1.17 ± 0.17a | 1.24 ± 0.15a | 0.30 ± 0.09b | 0.38 ± 0.15c | 0.48 ± 0.15c | 75.8% | 69.4% | 61.3% |
|  | 10‒20 cm | - | 0.88 ± 0.08c | 0.74 ± 1.08a | 0.61 ± 0.16ab | 0.62 ± 0.15ab | 15.9% | 30.7% | 29.5% |
|  | 20‒30 cm | - | 0.85 ± 0.17c | 0.49 ± 0.19ab | 0.65 ± 0.14a | 0.67 ± 0.10a | 42.4% | 23.5% | 21.2% |
| 3 | 0‒10 cm | 0.53 ± 0.20b | 1.13 ± 0.18ab | 0.32 ± 0.14b | 0.39 ± 0.06c | 0.58 ± 0.20b | 71.7% | 65.5% | 48.7% |
|  | 10‒20 cm | - | 1.05 ± 0.22b | 0.57 ± 0.13ab | 0.55 ± 0.09b | 0.58 ± 0.13b | 45.7% | 47.6% | 44.8% |
|  | 20‒30 cm | - | 1.16 ± 0.14ab | 0.76 ± 0.09a | 0.66 ± 0.14a | 0.70 ± 0.13a | 34.5% | 43.1% | 39.7% |

*Notes*: - denotes not sampled. aTwo irrigation with 8+3 g L‒1 saline waters were performed on May 3 and May 25, respectively, while one irrigation with 3 g L‒1 saline water was carried out on May 25. bPercentage reduction of EC1:5 in comparison with those sampled on June 21. Data are represented as mean ± SD (*n*=5). Different letters indicate significant differences at *p* < 0.05.

**Table S3.** The concentrations of ions in the representative drainage waters used in this study (mg L‒1).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Water salinity (g L‒1)** | **ECw**  **(dS m-1)** | **Sampling date** | **Na+** | **K+** | **Ca2+** | **Mg2+** | **Cl-** | **SO42‒** | **CO32‒** | **HCO3‒** | **B** | **Se** | **Mo** | **SARa** | **Mg/Caa** |
| 4 | 4.42 | 2022/5/2 | 1083 ± 8c | 27.5 ± 0.1c | 130.6 ± 0.8c | 153.0 ± 0.6c | 2373 ± 4c | 371.7 ± 1.8c | 22.5 ± 1.7b | 378.2± 1.3b | 0.45 ± 0.01c | <0.01 | <0.01 | 30.46 ±0.19a | 1.93 ±0.01b |
| 5 | 5.42 | 2022/4/24 | 1376 ± 34b | 40.2 ± 0.4b | 142.1 ± 1.2b | 177.4 ± 1.3b | 3335 ± 25b | 535.5 ± 1.5b | 27.2 ± 0.0b | 120.1 ± 1.7c | 0.56 ± 0.03b | <0.01 | <0.01 | 36.31 ±0.76b | 2.06 ±0.01a |
| 10 | 8.61 | 2023/3/30 | 1821 ± 24a | 53.8 ± 1.4a | 225.6 ± 2.9a | 236.3 ± 1.0a | 5815 ± 69a | 632.4 ± 7.1a | 54.9 ± 2.5a | 415.7 ± 5.9a | 0.65 ± 0.02a | <0.01 | <0.01 | 40.39 ±0.52c | 1.72 ±0.02c |

*Notes*: aComputed based on mEq L‒1. Data are represented as mean ± SD (*n*=3). Different letters indicate significant differences at *p* < 0.05.