

Supplementary Material S1:

The biomarker we used were as follows: terminal-branched saturated PLFAs (i14:0, i15:0, a15:0, i16:0, a16:0, i17:0, a17:0) representing Gram-positive bacteria (Gram +), cyclopropyl saturated PLFAs (16:1 ω 9c, 16:1 ω 7c, cy17:0 ω 7c, cy19:0 ω 7c) representing Gram-negative bacteria (Gram -), nonspecific bacteria (14:0, 15:0, 16:0, 17:0, 18:0), arbuscular mycorrhizal fungi (AMF) (16:1 ω 5c), fungi (16:1 ω 5c, 18:1 ω 9c, 18:2 ω 6c), and actinomycetes (16:0 10-methyl, 17:0 10-methyl, 18:0 10-methyl) (Frostegård and Bååth, 1996).

Supplementary Material S2:

DNA was extracted from rhizosphere soils using the Dneasy® PowerSoil® Pro Kit (QIAGEN). The purity and concentration of DNA were then determined using 1% agarose gel electrophoresis. The primers ITS3-2024F (5'-GCATCGATGAAGAACGCAGC-3') and ITS4-2409R (5'-TCCTCCGCTTATTGATATGC-3') were used for the PCR amplification of the ITS2 region with barcodes and TaKaRa Premix Taq® Version 2.0 (TaKaRa Biotechnology Co., Dalian, China). Purified PCR products were used according to NEBNext® Ultra™ II DNA Library Prep Kit for Illumina® (New England Biolabs, USA) as a standard process for library building. Then, PE250 sequencing was performed for the constructed amplicon library using the Illumina Nova 6000 platform (Guangdong magigene Biotechnology Co., Ltd. Guangzhou, China).

Reference

Frostegård, A., Bååth, E., 1996. The use of phospholipid fatty acid analysis to estimate bacterial and fungal biomass in soil. *Biology and Fertility of Soils* 22,



Figure S1. Field work to distinguish and mark *P. euphratica* males (left) and females (right) in April 2019. Dr. Lei Yu provided all the photos in this paper.

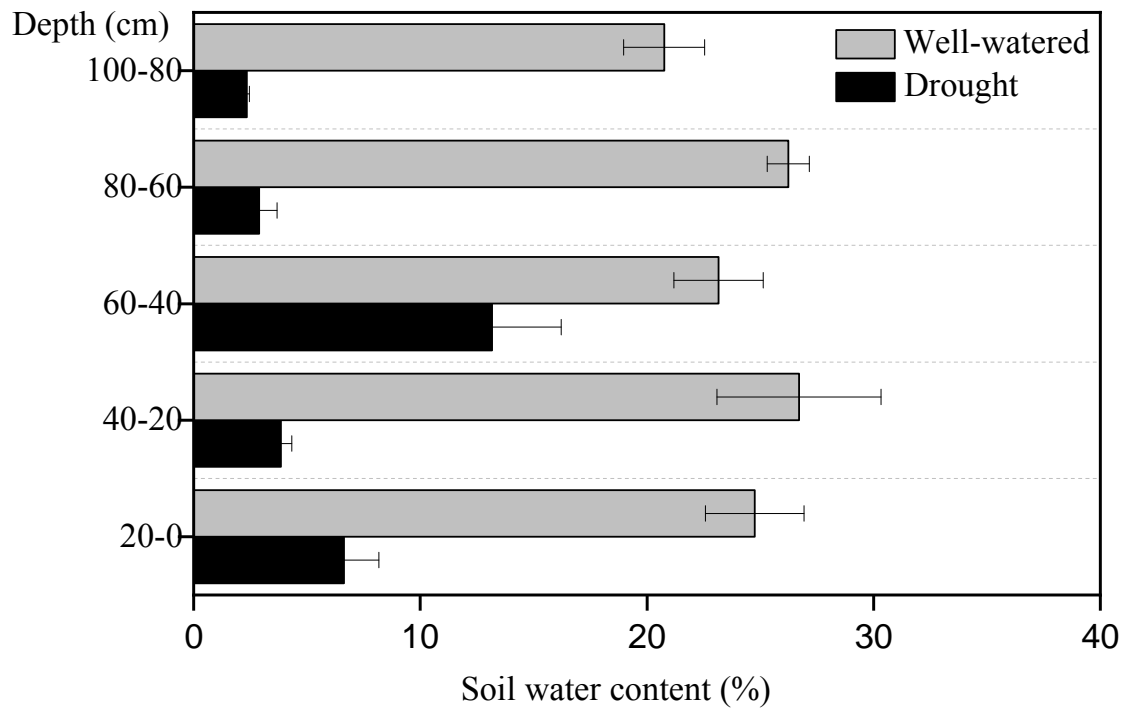


Figure S2. Soil water content of *P. euphratica* plantations at different soil depths under well-watered and drought conditions.

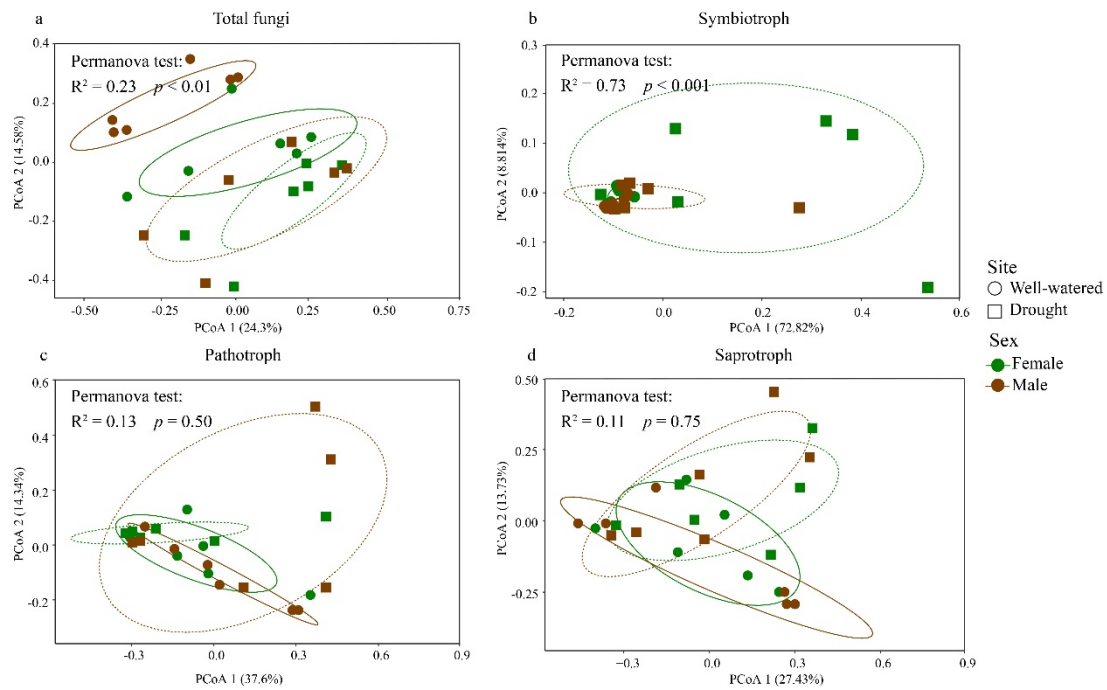


Figure S3. Community structure (beta-diversity) of total fungal communities (a) and functional fungal groups (b, c, d) using Bray-Curtis dissimilarity metric. Principal coordinate analyses (PCoAs) show fungal communities of *P. euphratica* females and males under well-watered and drought conditions. Results of differences in fungal communities among treatments evaluated by two-way permutational multivariate ANOVA (PERMANOVA) are shown.