**Metadata**

These are descriptions of raw-data and arthropod-information file in this Dryad upload:

Rawdata.xlsx contains following four sheets:

Arthropod List – Individual numbers of arthropod taxa and their corresponding feeding guilds in the five types of plant communities in the Dongtan wetlands on Chongming Island of Shanghai, China.

Plant traits – Data of aboveground biomass (g/m^2), plant density (individuals/m^2), leaf C (mg/g), leaf N (mg/g) and leaf P (mg/g) in the five types of plant communities. The missing values result from the instrument failure.

Soil traits – Data of soil C (mg/g), soil N (mg/g), soil P (mg/g), soil pH, soil salinity (%) and soil water (%) in the five types of plant communities.

Stable isotope – Data of ratios of C and N stable isotopes output by the isotope ratio mass spectrometer (DELTA V Advantage, Thermo, USA). The ratios of C and N stable isotopes were calculated by the following equation:

$$δ(X)=\left(\frac{R\_{Sample}}{R\_{Standard}}-1\right)\*1000$$

where *X* represents 13C or 15N; *R* is the ratio of 13C/12C or 15N/14N; and *δ* is a notation for the ratios and expressed as ‰. Caffeine (IAEA600) was used as the accuracy and precision standard, and the analytical precisions for *δ*13C and *δ*15N were 0.2 ‰ and 0.3 ‰, respectively. The missing values result from the limited powders that failed to meet the minimum mass requirements for isotope analysis.

In all four sheets, plant community types included the original reference *Phragmites* monoculture that had never been affected by *Spartina* (OP); the *Phragmites* monoculture that had not yet been invaded by but was being threatened by *Spartina* (TP); the *Phragmites–Spartina* mixture in which *Spartina* was gradually displacing *Phragmites* (PS); the *Spartina* monoculture in which *Spartina* had completely displaced *Phragmites* (IS); and the restored *Phragmites* monoculture following *Spartina* removal (RP).

Data\_Arthropod Information.xlsx contains information of means of cumulative number of individuals of arthropod taxa and their corresponding feeding guilds in the five plant communities in the Dongtan wetlands on Chongming Island of Shanghai, China.

Arthropods were sampled by vacuum suctioning methods. Plant communities included the original reference *Phragmites* monoculture that had never been affected by *Spartina* (OP); the *Phragmites* monoculture that had not yet been invaded by but was being threatened by *Spartina* (TP); the *Phragmites–Spartina* mixture in which *Spartina* was gradually displacing *Phragmites* (PS); the *Spartina* monoculture in which *Spartina* had completely displaced *Phragmites* (IS); and the restored *Phragmites* monoculture following *Spartina* removal (RP). Feeding guilds: 1–detritivores, 2–leaf chewers, 3–leaf suckers, 4–stem borers, 5–non-spider predators, 6–parasitoids, 7–web-building spiders, 8–hunting spiders, and 0–others or unknown. For holometabolous insects, the trophic role of the larval stage was used to determine their feeding guild. The density columns contain the means of cumulative number of individuals in a 3.2-m2 area of the vegetation.

**Methods to measure each variable and units**

***Study site and plant communities***

We collected this dataset in Dongtan wetlands on Chongming Island (31°27′–31°5l′ N, 121°09′–121°54′ E) in the Yangtze estuary. We sampled replicate transects of five types of plant communities in the Dongtan wetlands: 1) the original reference Phragmites monoculture that had never been affected by Spartina; 2) the Phragmites monoculture that had not yet been invaded by but was being threatened by Spartina (i.e, on periphery of the plant community where Spartina was encroaching with some number of meters); 3) the Phragmites–Spartina mixture in which Spartina was gradually displacing Phragmites; 4) the Spartina monoculture in which Spartina had completely displaced Phragmites; and 5) the restored Phragmites monoculture following Spartina removal.

***Arthropod sampling***

In each type of plant community, we randomly designated 15 replicate transects along the main creek channel. We used a vacuum suctioning method to collect arthropods on each transect on 22–25 June, 24–27 July, and 23–26 August in 2018. All arthropods were identified to the lowest taxonomic category possible and the number of individuals of each species on transects was counted. We followed several references to identify the arthropod taxa (Xin et al., 1985; Zhong, 1990; Zheng & Gui, 1999; Zhang & Li, 2011; Zhang & Wang, 2017). We also assigned these arthropods to trophic groups and feeding guilds according to Gratton and Denno (2005).

***Arthropod natural enemy diets***

We used stable isotopes to determine the diets of arthropod natural enemies collected from different types of plant communities. All arthropod and plant samples were dried, ground into powders and then subjected to the analysis using an isotope ratio mass spectrometer (DELTA V Advantage, Thermo, USA).

***Environmental variables***

We randomly designated five quadrats (0.5 m × 0.5 m) along each transect and extracted a soil core in each quadrat on 23–26 August 2018. All soil samples were weighted and then dried. Soil water was estimated from the weight of a soil core before and after drying. Soil pH and salinity were determined using a multi-function tester (S975-uMix SevenExcellence, Mettler-Toledo, Switzerland). Soil C and N were analyzed with an element analyzer (FlashEA1112 Series, Thermo, USA). Soil P was measured by molybdenum-antimony colorimetry using a microplate reader (Synergy 2, BioTek, USA). We counted plant (stem) density in each quadrat. All aboveground plant tissues in each quadrat were then dried and weighed to obtain their aboveground biomass. We measured leaf C, N, and P contents according to the same methods as used for soil samples. For each environmental variable, we used the average value in the five quadrats from one transect to represent the transect replicate.

**Reference**

Gratton, C. & Denno R. F. Restoration of arthropod assemblages in a Spartina salt marsh following removal of the invasive plant Phragmites australis. Restoration Ecology 13, 358–372 (2005).

Xin, J.L., Q.S. Yang, C.Y. Hu. 1985. *Insect morphology taxonomy*. Shanghai: Fudan University Press.

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