

## Supplemental figure captions

**Figure S1** (A) Pit mud samples were collected from Henan province, China. (B) Sampling locations of pit muds in the fermentation pit.

**Figure S2** Rarefaction curve was shown all pit mud samples.

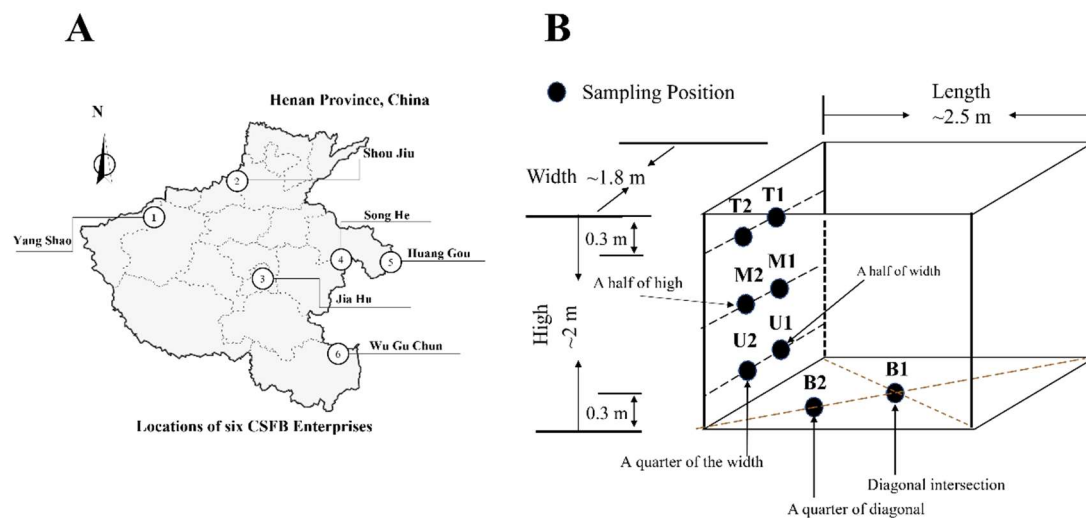
**Figure S3** Relative abundance for all pit mud samples at phylum level.

**Figure S4** Relative abundance for all pit mud samples at class level.

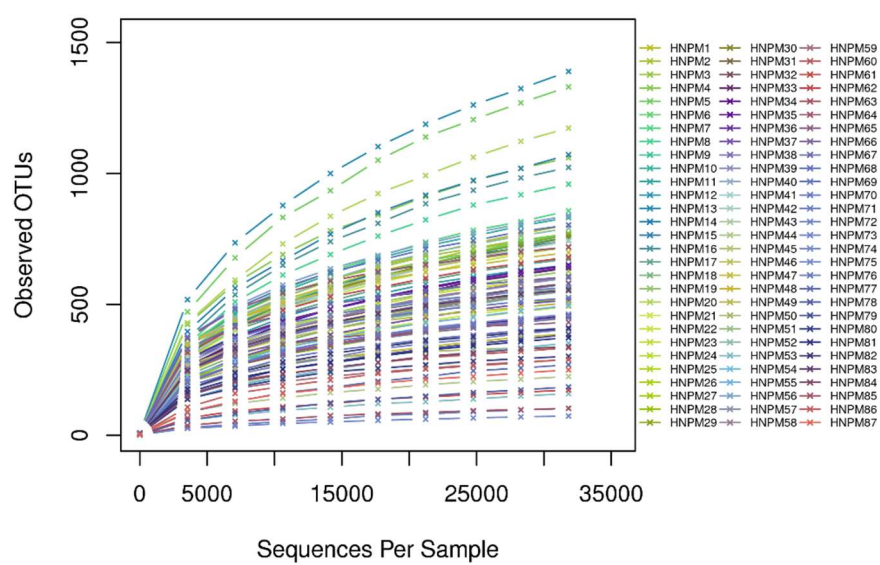
**Figure S5** Relative abundance for all pit mud samples at genus level.

**Figure S6** The results of linear discriminant analysis (LDA) effect size (LEfSe) algorithm. The cutoff LDA score was 4.0.

**Figure S7** Relative importance of different assembly processes within bins grouped by equal pH gradient.



**Figure S1**



**Figure S2**

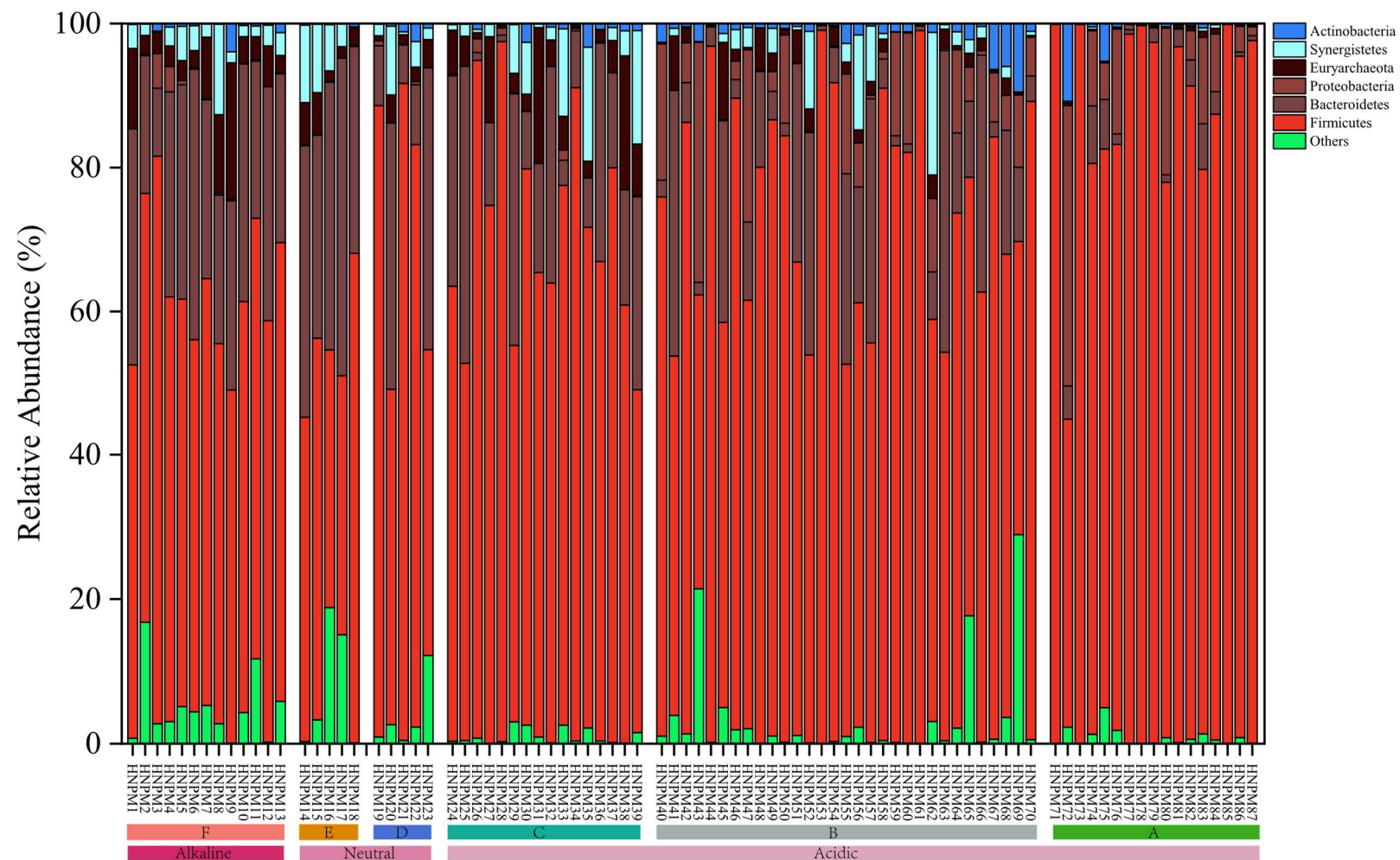


Figure S3

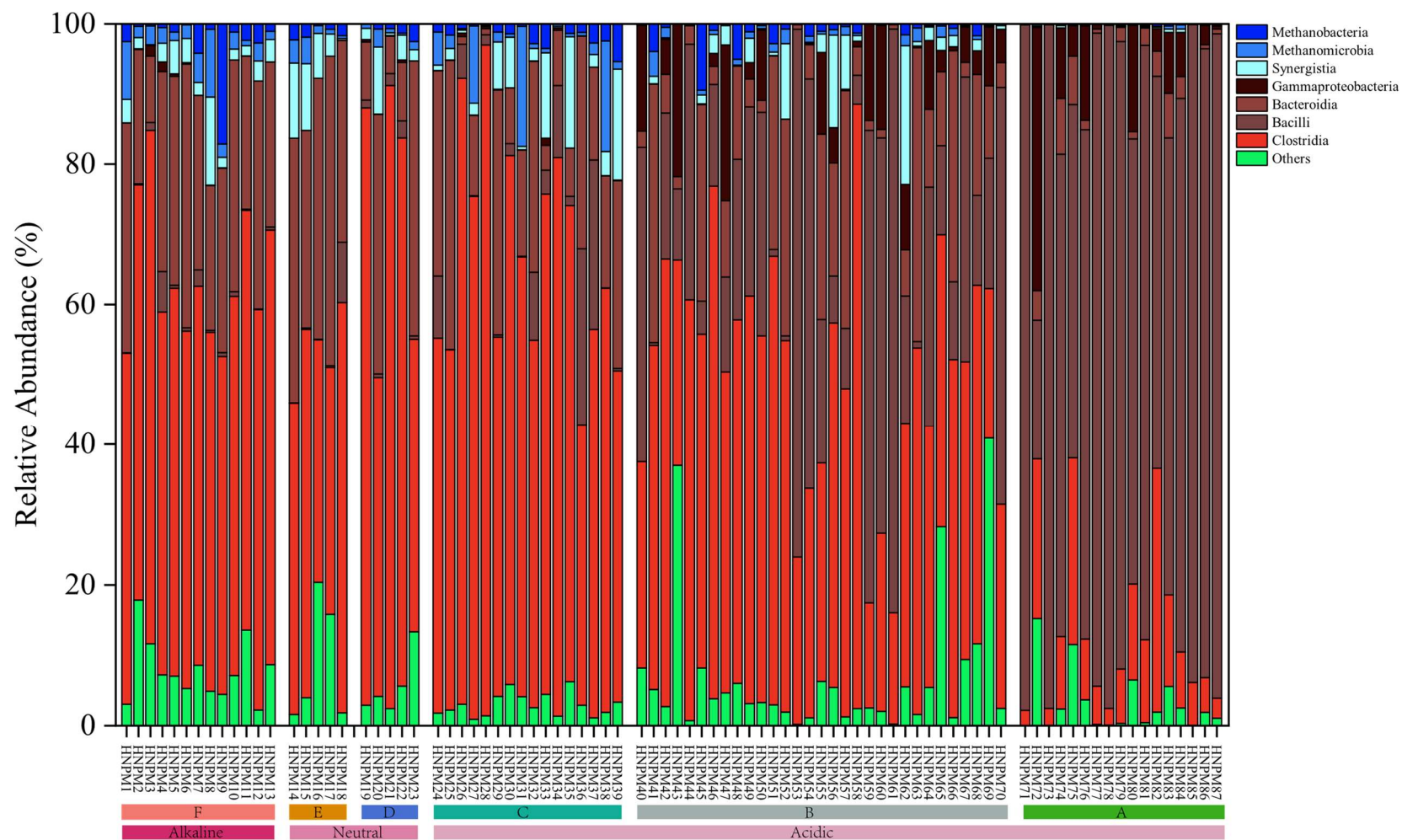


Figure S4

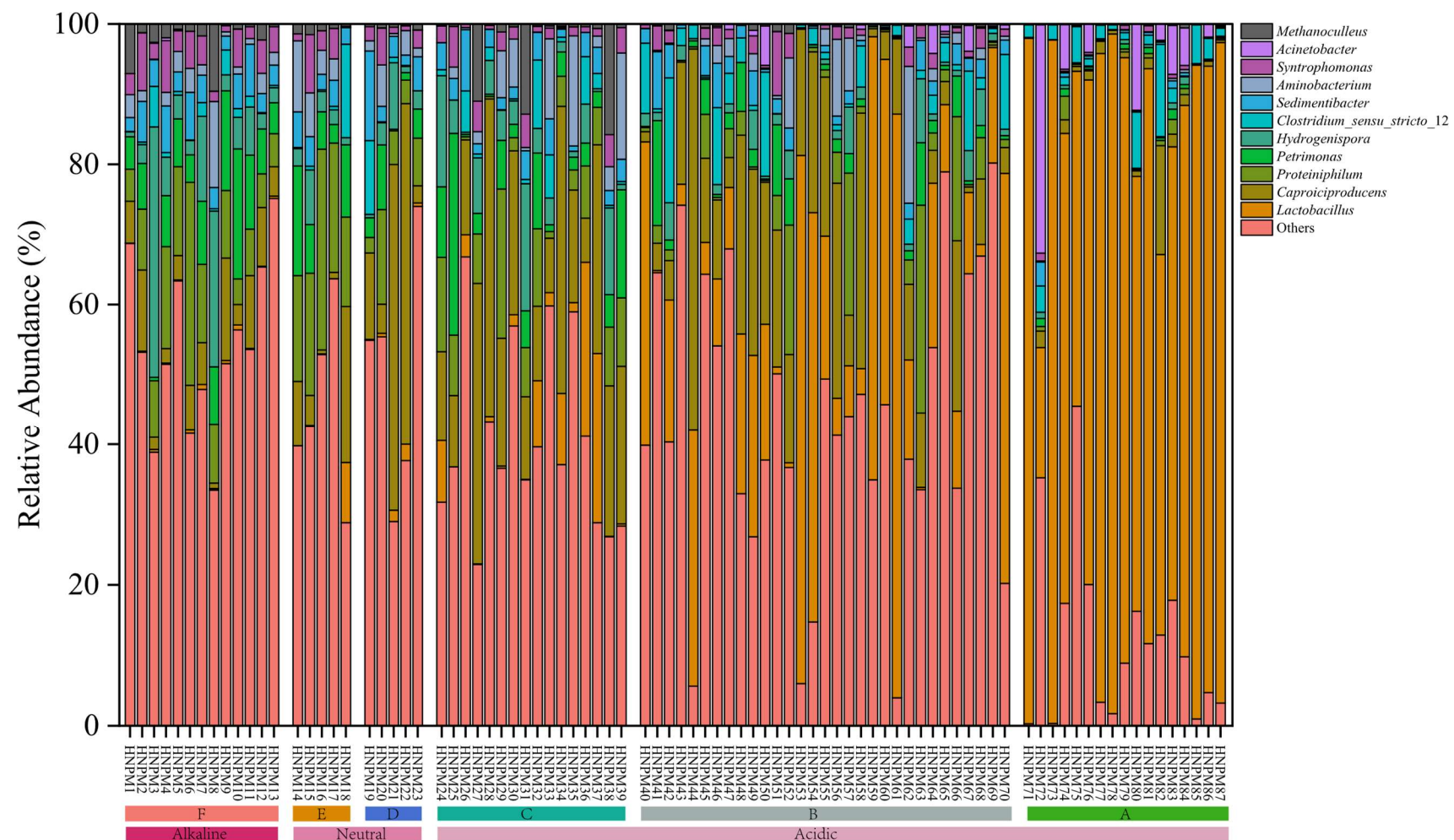


Figure S5

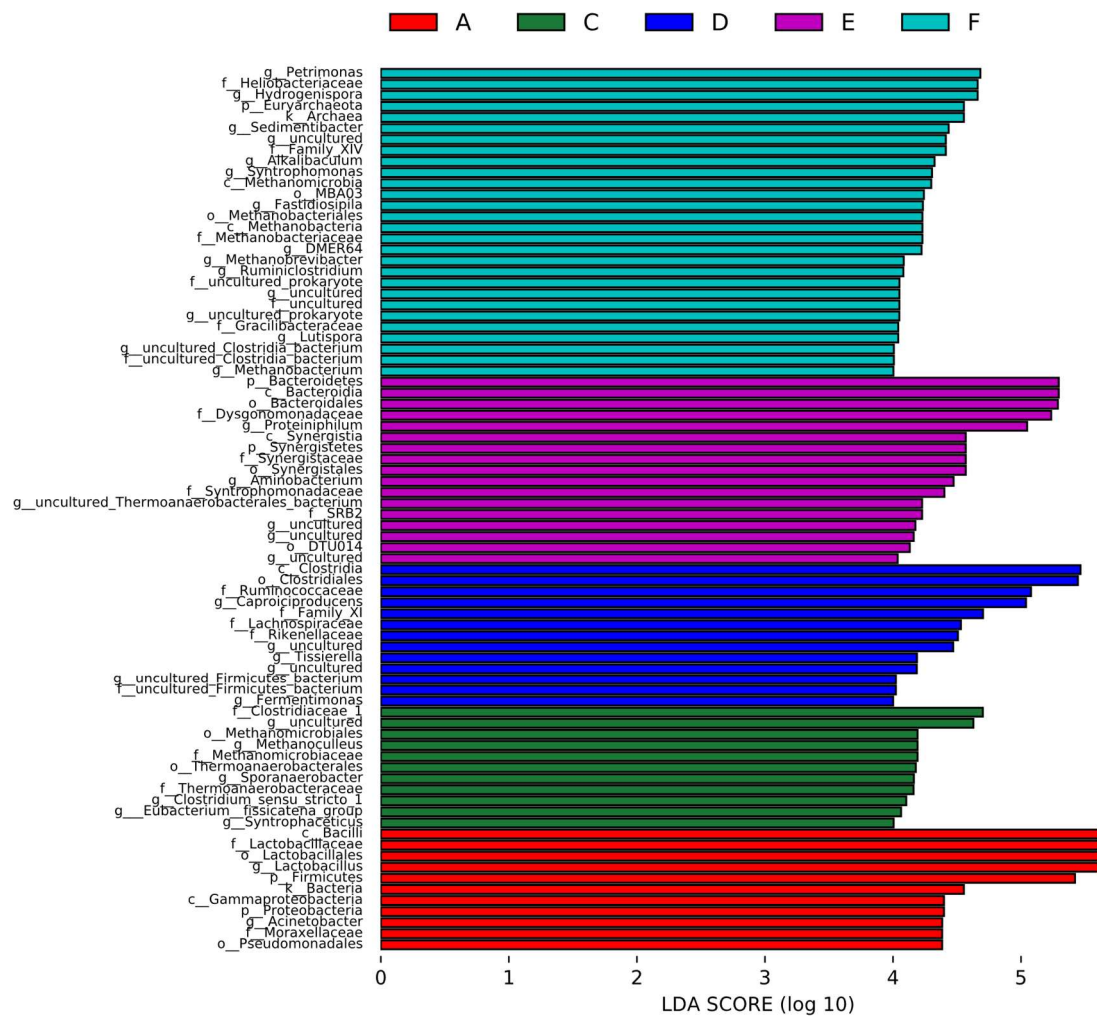


Figure S6

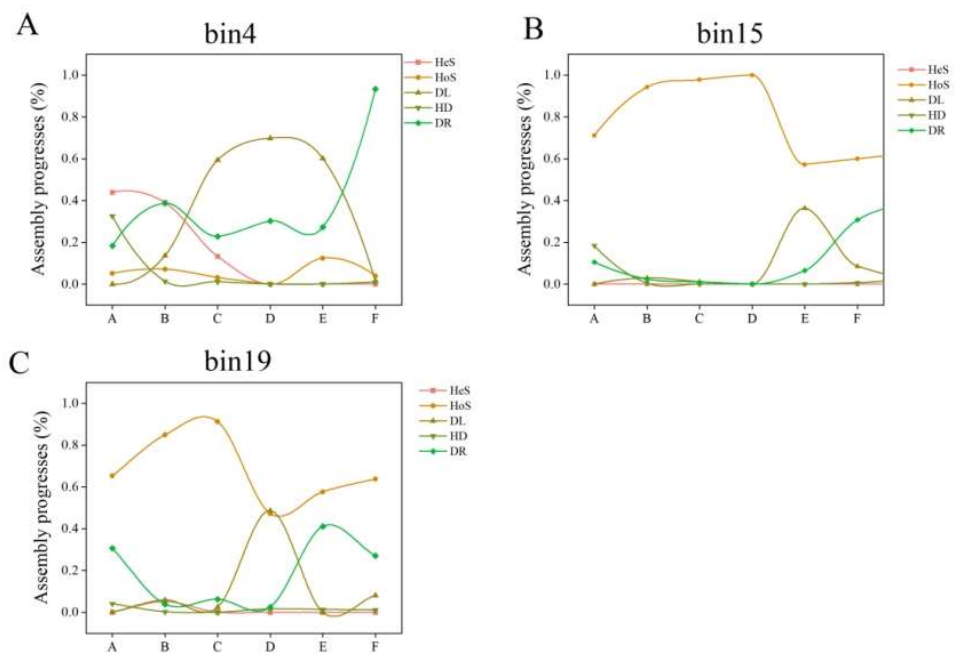


Figure S7