Supplementary of

Nycterohemeral airborne fungal and bacterial communities and health risks of potential pathogens in Shanghai

Xueyun Geng[a], Changliang Nie[a*], Hui Chen[a], Xu Tang[b], Min Wei[c], Yi Wang[d], Huanxiang Gao[d], Dan Li[a], Mingliang Fang[a], Ruiting Ju[a], Bo Li[a], Haidong Kan[e], Renjie Chen[e], Jinzhuo Zhao[e], Lin Wang[a,b], Jianmin Chen[a,b,f,*]

[a] *Shanghai Key Laboratory of Atmospheric Particle Pollution and Prevention (LAP³), Department of Environmental Science & Engineering, National Observations and Research Station for Wetland Ecosystems of the Yangtze Estuary, Fudan University, Shanghai 200438, China.*

[b] *IRDR International Center of Excellence on Risk Interconnectivity and Governance on Weather/Climate Extremes Impact and Public Health, Institute of Atmospheric Sciences, Fudan University, Shanghai 200438, China.*

[c] *College of Geography and Environment, Shandong Normal University, Jinan 250014, China*

[d] Thermo Fisher Scientific China, *200050, China.*

[e] *Public Health School, Fudan University, Shanghai 200, China.*

[f] *Institute of Eco-Chongming (IEC), Shanghai 200062, China.*

[*] *Corresponding author*:

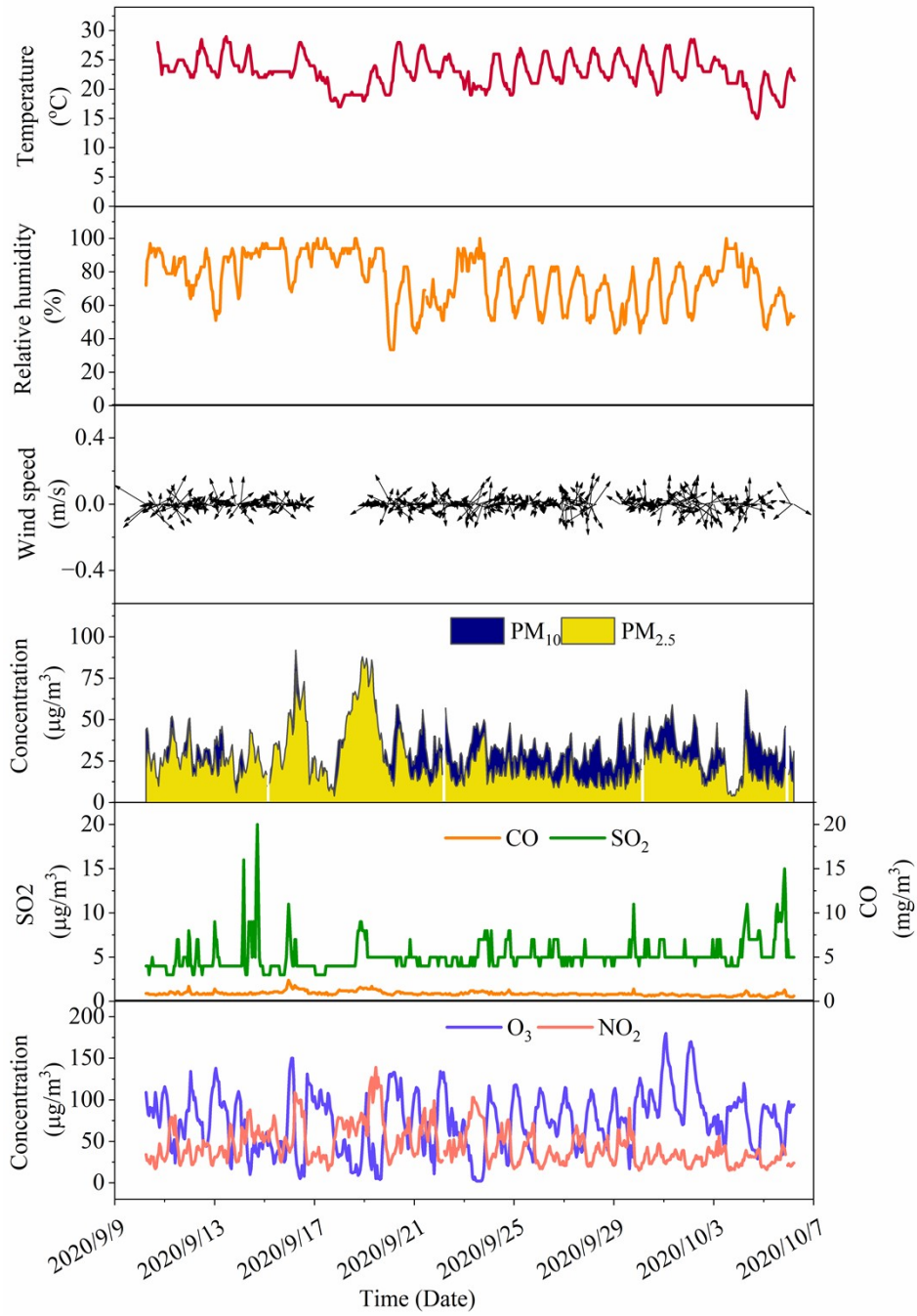*E-mail address*: CL Nie (niechangliang@fudan.edu.cn), JM Chen (jmchen@fudan.edu.cn)

Figure S1. The hourly pollutant (PM$_{10}$, PM$_{2.5}$, O$_3$, NO$_2$, CO, SO$_2$) concentrations in Shanghai during the sampling period.
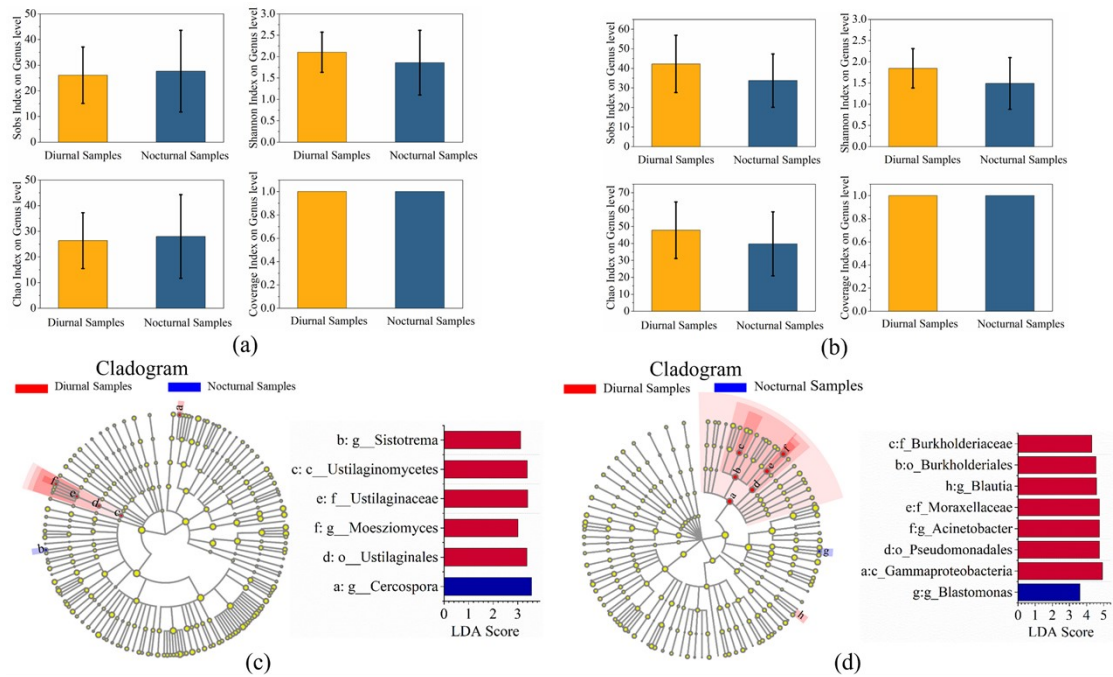
Figure S2. The α-diversity of airborne (a) fungi and (b) bacteria in diurnal and nocturnal samples. (c) and (d) represents the LefSe analysis corresponding to the fungi and bacteria community. The taxonomic cladogram was visualized with LDA values higher than 3. The red and blue dots represent distinct fungal and bacterial taxon on diurnal and nocturnal days. Each bar represents a fungal taxon, and the absolute value of LDA represents the difference of this taxon in different groups.
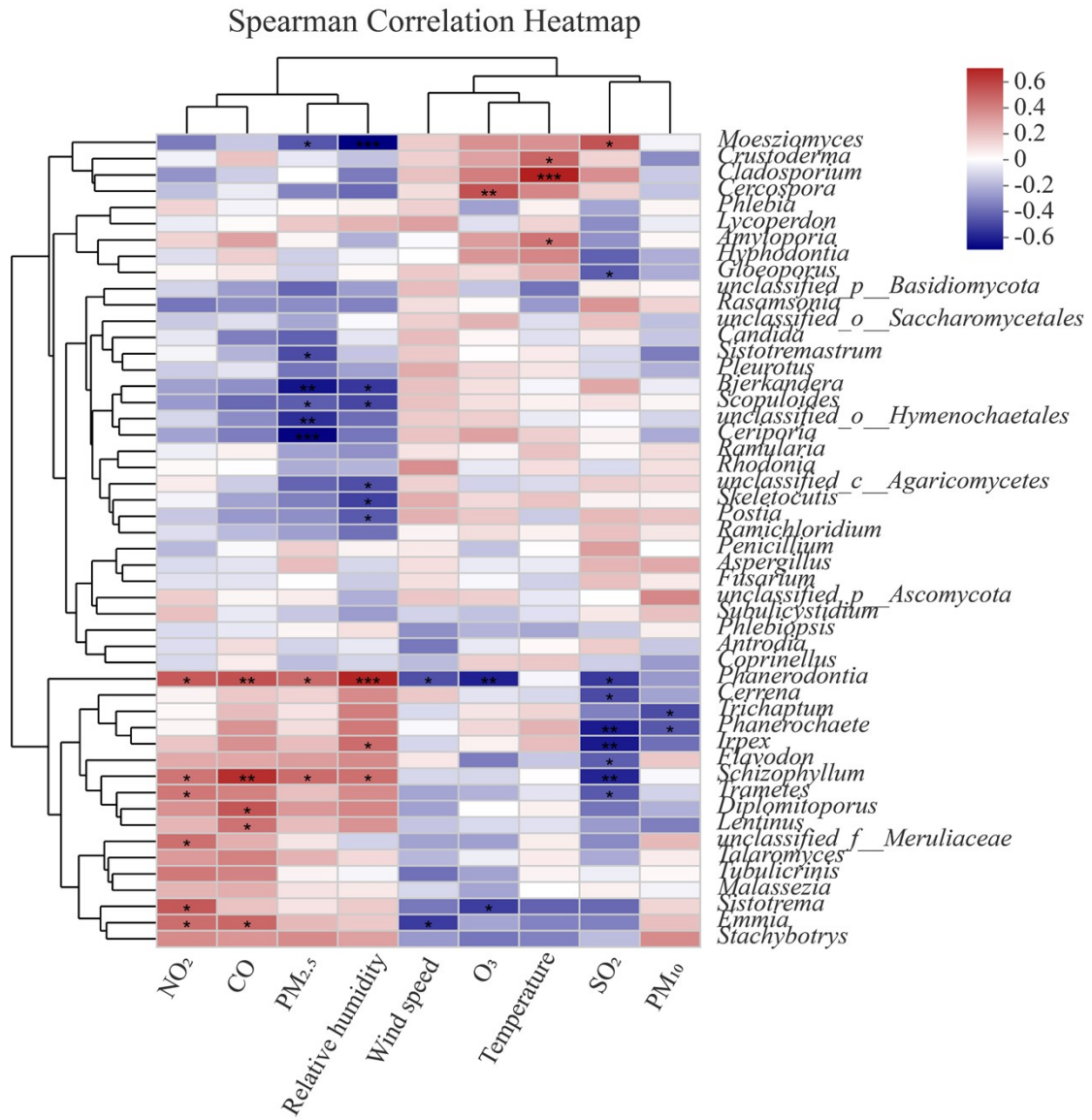
Figure S3. The correlation analysis between the relative abundance of fungi and air quality.
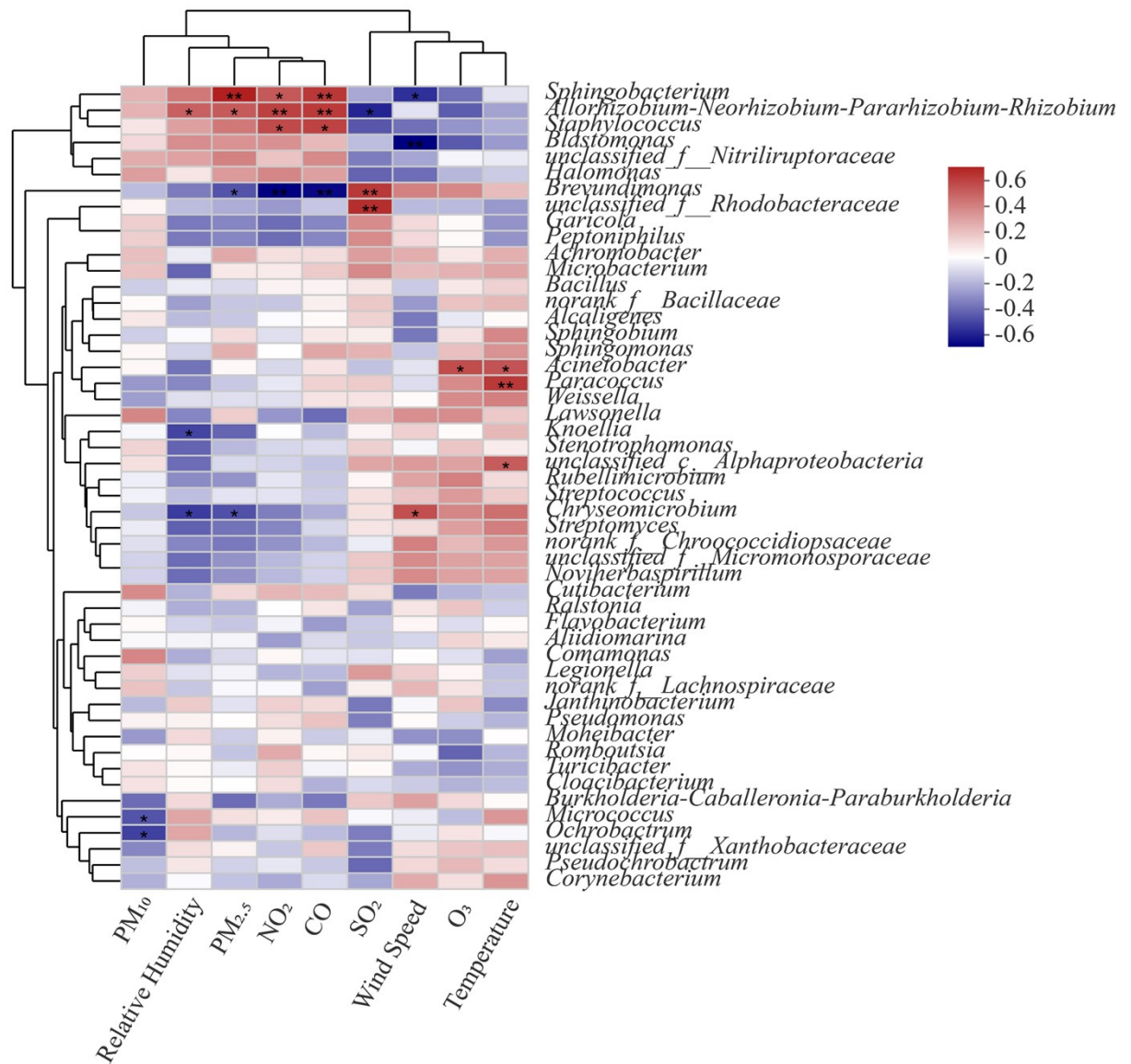
Figure S4. The correlation analysis between the relative abundance of bacteria and air quality.
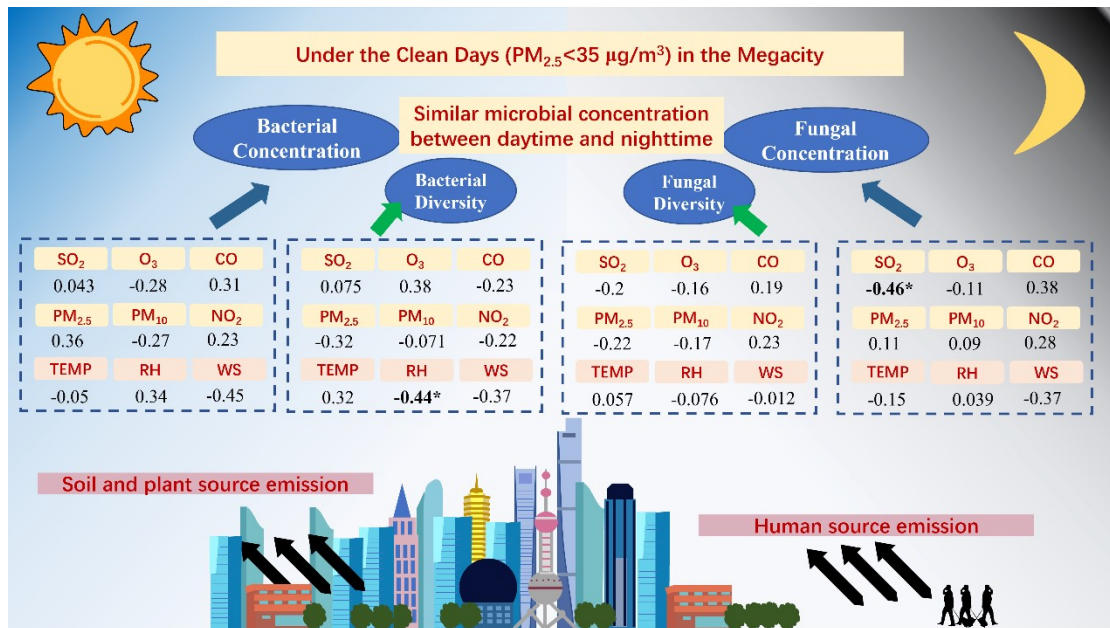
Figure S5. The correlation analysis based on Spearman between the airborne microbiota and environmental index. TEMP means the temperature. RH means the relative humidity. WS means the wind speed.
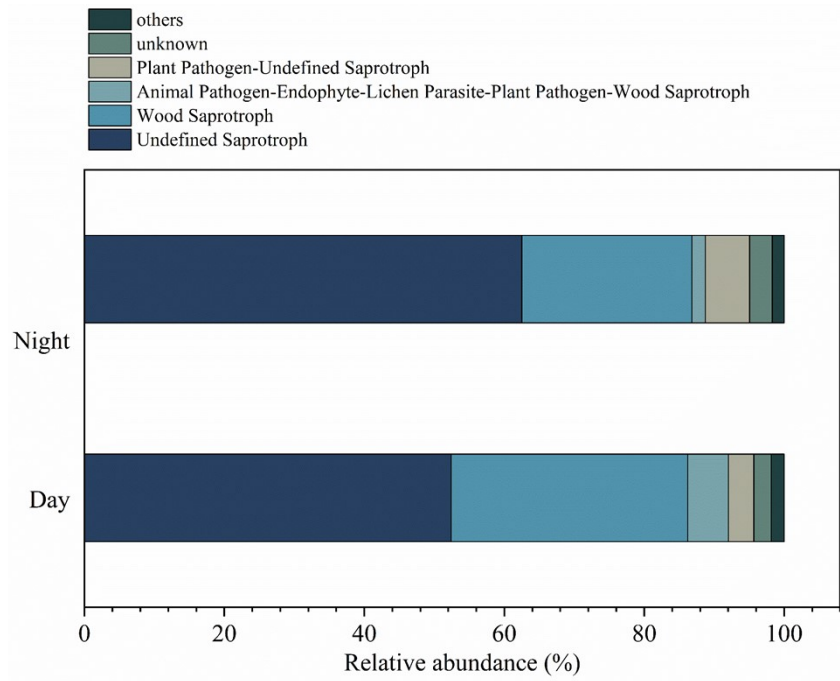
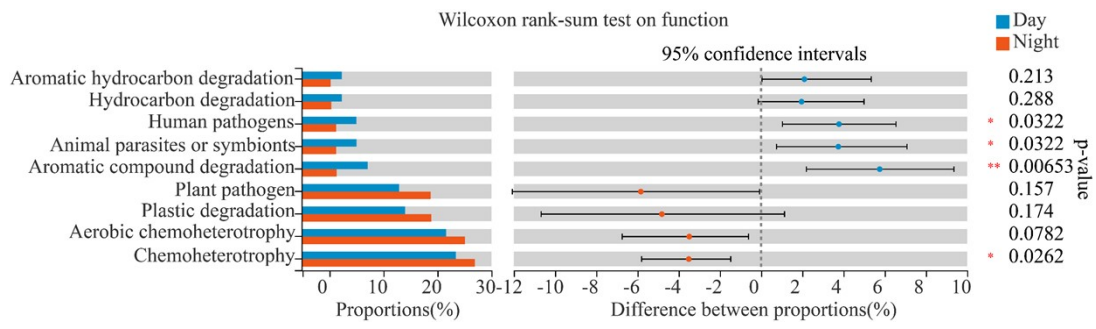Figure S6. Functional guild airborne fungi in the day and night samples.

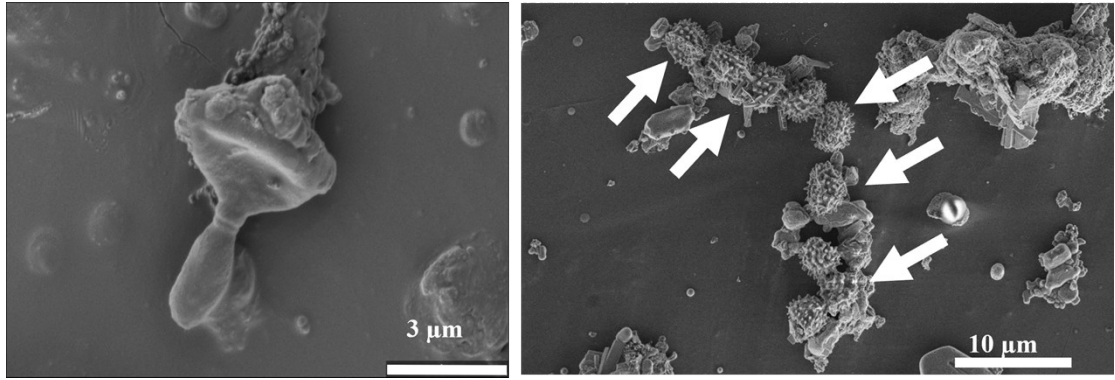Figure S7. The bacterial function prediction is based on the FAPROTAX.

Figure S8. The scanning electron microscopic images of fungal spores.

Table S1 The sample collection details

Diurnal Samples	Sample date	Nocturnal Samples	Sample date
D1	2020/9/11/6:00 2020/9/12/6:00	N1	2020/9/10 18:00 2020/9/11 18:00
D2	2020/9/13 6:00 2020/9/14 6:00	N2	2020/9/12 18:00 2020/9/13 18:00
D3	2020/9/15 6:00 2020/9/16 6:00	N3	2020/9/14 18:00 2020/9/15 18:00
D4	2020/9/17 6:00 2020/9/18 6:00	N4	2020/9/16 18:00 2020/9/17 18:00
D5	2020/9/19 6:00 2020/9/20 6:00	N5	2020/9/18 18:00 2020/9/19 18:00
D6	2020/9/21 6:00 2020/9/22 6:00	N6	2020/9/20 18:00 2020/9/21 18:00
D8	2020/9/25 6:00 2020/9/26 6:00	N7	2020/9/22 18:00 2020/9/23 18:00
D9	2020/9/27 6:00 2020/9/28 6:00	N8	2020/9/24 18:00 2020/9/25 18:00
D10	2020/9/29 6:00 2020/9/30 6:00	N9	2020/9/26 18:00 2020/9/27 18:00
D11	2020/10/1 6:00 2020/10/2 6:00	N10	2020/9/28 18:00 2020/10/1 18:00
D12	2020/10/3 6:00 2020/10/4 6:00	N11	2020/10/2 18:00 2020/10/3 18:00
D13	2020/10/5 6:00 2020/10/6 6:00	N12	2020/10/4 18:00 2020/10/5 18:00

Table S2. The primers for nested PCR

	Target gene	Primer (5'-3')
Bacteria	16S rRNA	27F:AGAGTTTGATCCTGGCTCAG
		1492R: TACGGYTACCTTGTTACGACTT
		341F:CCTAYGGGRBGCASCAG
		806R:GGACTACNNGGGTATCTAAT
Fungi	ITS region	ITS1F:CTTGGTCATTTAGAGGAAGTAA
		ITS2R:GCTGCGTTCTTCATCGATGC
		ITS4R:TCCTCCGCTTATTGATATGC