

Supplementary Information

Figure S1 Average water depth of Poyang Lake from January to December.

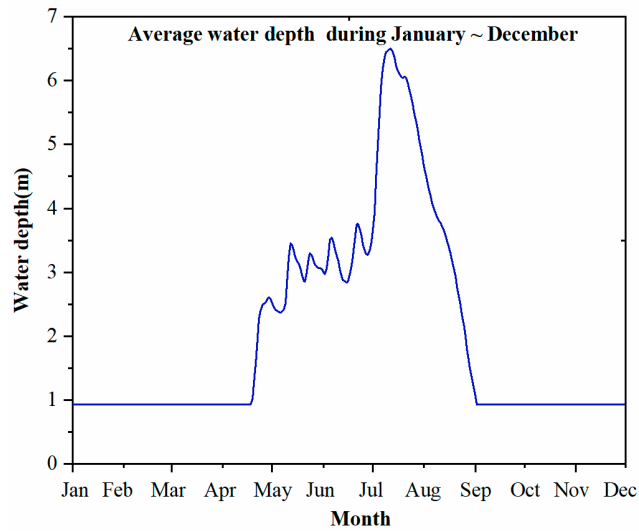


Figure S2 Niche width value of microeukaryotes in different subcommunities in (a) dry season and (b) wet season. The top, middle, and bottom lines of the box indicate the 75th quartile, median, and 25th quartile, respectively. The whiskers indicate the minimum and maximum. The black dots indicate outliers. Different letters above each box indicate significant differences (ANOVA, $p < 0.05$).

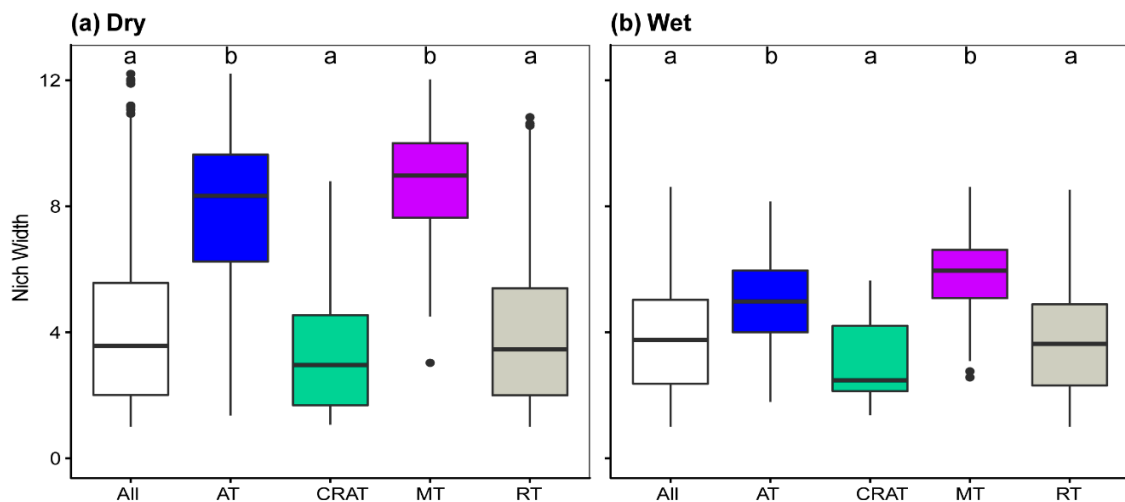


Figure S3 Chord diagram showing the relative abundances of microeukaryotic super groups in dry season and wet season. Statistical significance between dry season and wet season was assessed by t-test and indicated by asterisks (** represents $p < 0.01$).

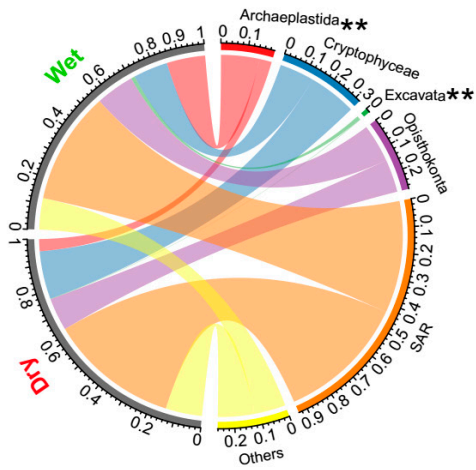


Figure S4 The node degree distributions of real co-occurrence networks (colored) and random networks (grey) of microeukaryotic communities in (a) the dry season and (b) wet season.

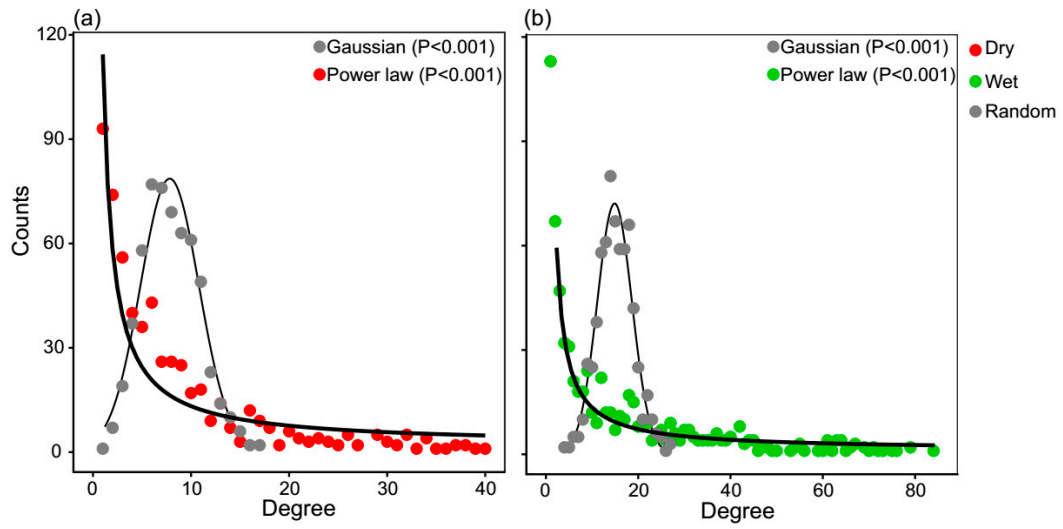


Figure S5 Composition of modules. Pie charts showing the proportion of nodes number in (a) axonomic groups and (b) subcommunities.

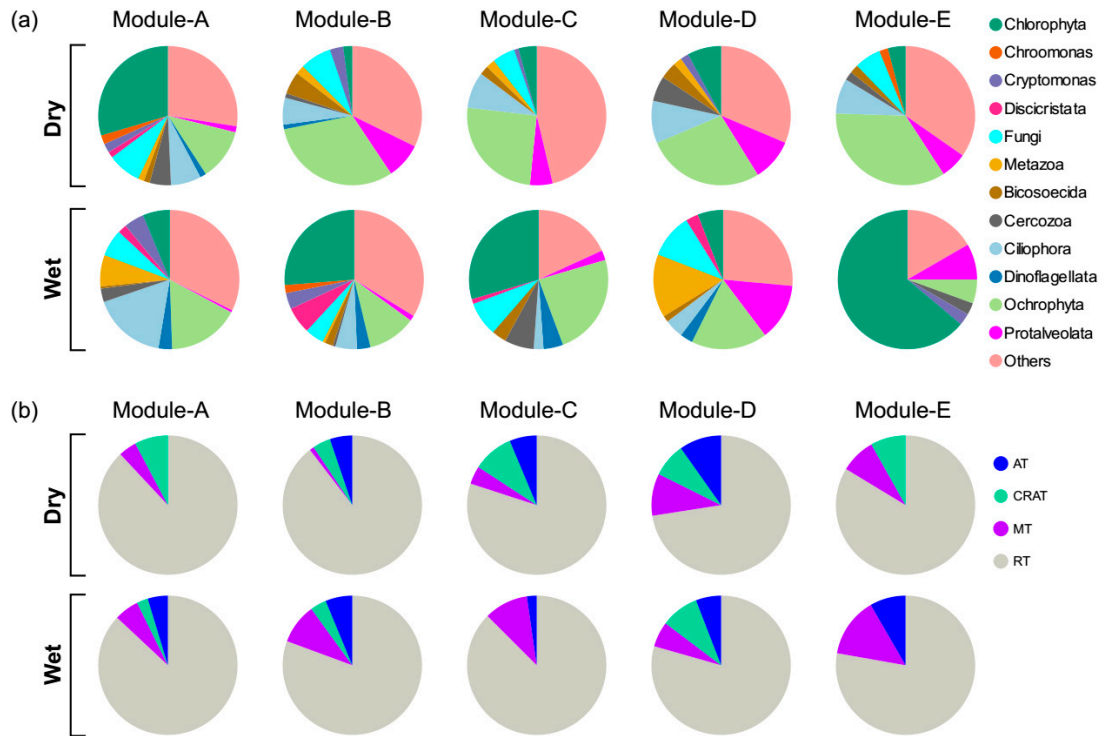


Figure S6 Zi-Pi plot indicates the distribution of OTUs based on their topological roles. Each dot represents an OTU colored by (a) taxonomic groups and (b). The topological roles were determined according to the values of within-module connectivity ($Z_i = 2.5$) and among-module connectivity ($P_i = 0.62$). The detail of the module hubs and connectors are shown in Table S3.

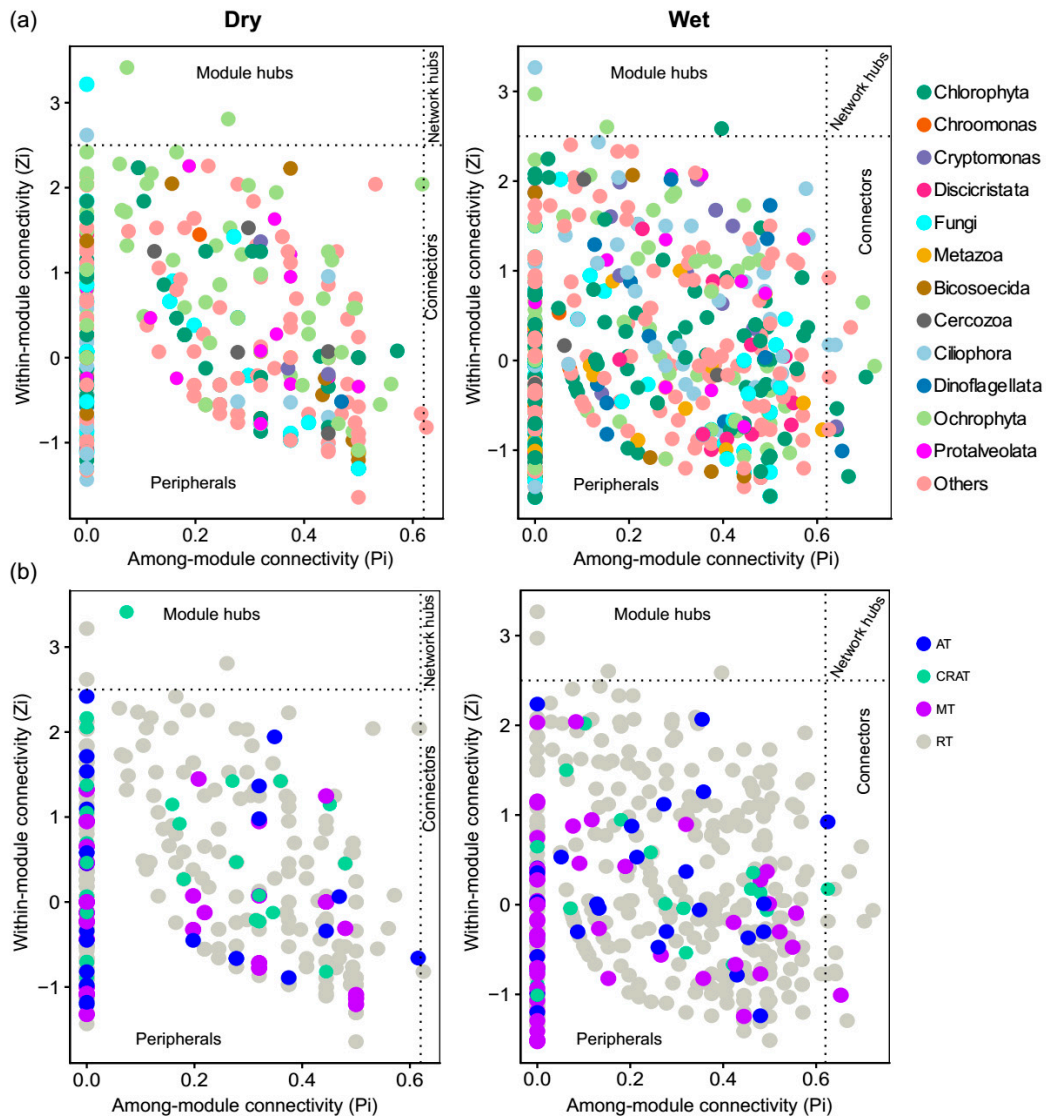


Table S1 GPS coordinates of the sample sites in the dry and wet seasons of Poyang Lake.

Dry season	Wet Season	Longitude	latitude
NS.	W01	116.191	29.714
NS.	W02	116.145	29.623
NS.	W03	116.133	29.524
NS.	W04	116.059	29.443
D01	W05	116.072	29.259
D02	NS.	116.115	29.242
D03	W06	116.200	29.243
D04	W07	116.272	29.209
D05	NS.	116.296	29.162
D06	W08	116.319	29.107
D07	NS.	116.363	29.093
D08	NS.	116.380	29.065
D09	W09	116.415	29.055
D10	NS.	116.417	29.011
D11	NS.	116.389	28.970
D12	W10	116.421	28.945
D13	NS.	116.397	28.854

NS.— No Sample

Table S2 Nutrient concentrations (mg/L) in the dry and wet seasons of Poyang Lake. The minimum (Min), maximum (Max), and mean values, as well as standard deviation (SD) are shown. Statistical significance between dry and wet seasons was assessed by t-test.

	Dry				Wet				t-test	
	Min	Max	Mean	SD	Min	Max	Mean	SD	t	P-value
DOC	2.100	3.840	2.610	0.546	3.560	4.820	4.116	0.419	-7.225	<0.001
TN	0.893	2.733	1.679	0.563	0.320	0.909	0.602	0.190	5.771	<0.001
NO ₃ ⁻	0.487	1.845	1.237	0.496	0.070	0.715	0.370	0.207	5.165	<0.001
NH ₄ ⁺	0.078	0.341	0.182	0.078	0.007	0.066	0.038	0.021	5.626	<0.001
TP	0.027	0.051	0.034	0.007	0.035	0.095	0.070	0.022	-5.572	<0.001
SRP	0.021	0.031	0.027	0.003	0.008	0.010	0.009	0.001	18.276	<0.001

Table S3 List of module hubs and connectors in co-occurrence networks according to the connectivity of each node.

Season	OTU ID	Pi	Zi	Category1	Category2	Module	Taxonomy
Dry	OTU14422	0.625	-0.820	Module hubs	RT	Module D	Unassigned
Dry	OTU11753	0.000	3.217	Connectors	RT	Module A	D_1_Opisthokonta; D_2_Nucleomyces; D_3_Fungi; D_4_Chytridiomycota; D_5_Incertae Sedis; D_6_Chytridiomycetes; D_7_Rhizophydiales
Dry	OTU22759	0.074	3.414	Connectors	CRAT	Module A	D_1_SAR; D_2_Stramenopiles; D_3_Ochrophyta; D_4_Chrysophyceae; D_5_Synurales; D_6_Mallomonas
Dry	OTU23137	0.000	2.620	Connectors	RT	Module C	D_1_SAR; D_2_Alveolata; D_3_Ciliophora; D_4_Intramacronucleata; D_5_Conthreep; D_6_Phyllopharyngea; D_7_Suctoria
Dry	OTU7872	0.260	2.808	Connectors	RT	Module E	D_1_SAR; D_2_Stramenopiles; D_3_Ochrophyta; D_4_Chrysophyceae
Wet	OTU13603	0.697	0.647	Module hubs	RT	Module D	D_1_SAR; D_2_Stramenopiles; D_3_Ochrophyta; D_4_Chrysophyceae; D_5_Chromulinales
Wet	OTU1384	0.639	0.174	Module hubs	RT	Module D	D_1_SAR; D_2_Alveolata; D_3_Ciliophora; D_4_Intramacronucleata; D_5_Litostomatea; D_6_Mesodiniidae
Wet	OTU13873	0.642	-0.772	Module hubs	RT	Module D	D_1_Archaeplastida; D_2_Chloroplastida; D_3_Chlorophyta; D_4_Trebouxiophyceae
Wet	OTU14760	0.640	-0.739	Module hubs	RT	Module E	D_1_Cryptophyceae; D_2_Cryptomonadales; D_3_Cryptomonas
Wet	OTU16034	0.671	0.369	Module hubs	RT	Module E	D_1_SAR; D_2_Alveolata
Wet	OTU17090	0.626	-0.185	Module hubs	RT	Module E	D_1_Opisthokonta
Wet	OTU21252	0.667	-1.293	Module hubs	RT	Module E	D_1_Archaeplastida; D_2_Chloroplastida; D_3_Chlorophyta; D_4_Chlorophyceae
Wet	OTU21595	0.722	-0.063	Module hubs	RT	Module D	D_1_SAR; D_2_Stramenopiles; D_3_Ochrophyta; D_4_Chrysophyceae
Wet	OTU5251	0.625	0.174	Module hubs	CRAT	Module D	D_1_SAR; D_2_Alveolata; D_3_Ciliophora; D_4_Intramacronucleata; D_5_Conthreep; D_6_Oligohymenophorea; D_7_Hymenostomatia
Wet	OTU7733	0.625	0.923	Module hubs	AT	Module E	Unassigned
Wet	OTU8154	0.704	-0.185	Module hubs	RT	Module E	D_1_Archaeplastida; D_2_Chloroplastida; D_3_Chlorophyta; D_4_Trebouxiophyceae; D_5_Chlorellales
Wet	OTU8424	0.625	-0.772	Module hubs	RT	Module D	D_1_SAR; D_2_Stramenopiles; D_3_Perozoosporomycetes
Wet	OTU9557	0.653	-1.009	Module hubs	MT	Module D	D_1_SAR; D_2_Alveolata; D_3_Dinoflagellata; D_4_Dinophyceae; D_5_Gymnodiniophycidae; D_6_Suessiaceae; D_7_Symbiodinium
Wet	OTU9730	0.642	-0.536	Module hubs	RT	Module D	D_1_Archaeplastida; D_2_Chloroplastida; D_3_Chlorophyta; D_4_Chlorophyceae
Wet	OTU17201	0.000	3.266	Connectors	RT	Module A	D_1_SAR; D_2_Alveolata; D_3_Ciliophora; D_4_Intramacronucleata; D_5_Conthreep; D_6_Prostomatea; D_7_Cryptocaryon
Wet	OTU21213	0.000	2.971	Connectors	RT	Module C	D_1_SAR; D_2_Stramenopiles; D_3_Ochrophyta; D_4_Diatomea; D_5_Bacillariophytina; D_6_Mediophyceae; D_7_Cyclotella
Wet	OTU21892	0.397	2.586	Connectors	RT	Module E	D_1_Archaeplastida; D_2_Chloroplastida; D_3_Chlorophyta; D_4_Chlorophyceae; D_5_Sphaeropleales
Wet	OTU26526	0.153	2.604	Connectors	RT	Module C	D_1_SAR; D_2_Stramenopiles; D_3_Ochrophyta; D_4_Diatomea; D_5_Bacillariophytina; D_6_Mediophyceae; D_7_Cyclotella

Table S4 Mantel test between environmental variables and modules in different seasons. Spearman correlations were calculated. * represents $p < 0.05$ and ** represents $p < 0.01$.

	Dry					Wet				
	Module A	Module B	Module C	Module D	Module E	Module A	Module B	Module C	Module D	Module E
Geographic Distance	-0.086	-0.024	-0.145	-0.267*	-0.115	0.382**	0.110	0.157	0.191	0.024
Environmental Distance	0.440**	0.432**	0.664**	0.294**	0.209	0.417**	0.461**	0.122	0.149	0.130
DOC	0.392**	0.622**	0.592**	0.214	0.119	-0.006	-0.112	-0.038	-0.069	0.005
TN	0.199	0.164	0.564**	0.359**	0.126	-0.158	0.110	0.186	0.020	-0.179
NO ₃ ⁻	0.484**	0.554**	0.811**	0.365**	0.244*	0.525**	0.738**	0.158	0.159	0.463**
NH ₄ ⁺	0.197	0.054	-0.002	0.082	0.193	0.164	-0.105	-0.155	-0.160	-0.067
TP	-0.118	0.086	0.156	-0.161	0.039	0.600**	0.365*	0.015	0.552**	0.217
SRP	0.484**	0.533**	0.535**	0.240*	0.078	-0.013	-0.074	-0.246	-0.131	0.025