

1 **Table S1.** Soil basic biochemical properties under nitrogen and water addition conditions.

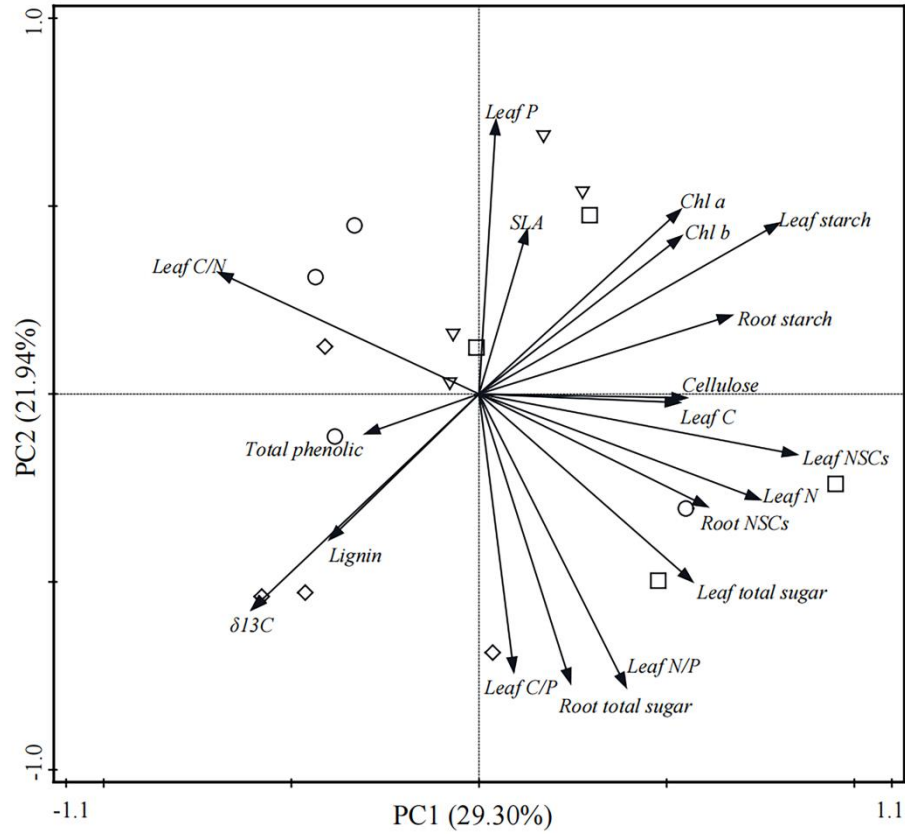
	CK	CN	CW	CWN
SOM (g kg ⁻¹)	46.65±1.51 b	98.66±20.53 a	46.17±10.60 b	64.07±4.87 ab
TN (g kg ⁻¹)	1.06±0.19 a	1.27±0.05 a	0.99±0.15 a	1.31±0.06 a
TP (g kg ⁻¹)	0.36±0.06 a	0.40±0.04 a	0.33±0.05 a	0.44±0.04 a
AN (mg kg ⁻¹)	124.71±23.13 b	193.77±18.81 a	125.27±23.06 b	177.53±15.31 ab
AP (mg kg ⁻¹)	25.14±3.50 a	25.84±0.69 a	22.78±3.94 a	29.64±0.66 a
pH value	4.40±0.12 ab	4.14±0.07 b	4.60±0.08 a	4.19±0.06 b
Urease (mg NH ₃ -N g ⁻¹ soil d ⁻¹)	26.79±3.46 a	36.52±2.97 a	26.69±3.57 a	33.02±1.60 a
Sucrase (mg Glucose g ⁻¹ soil d ⁻¹)	214.71±28.51 a	263.50±9.38 a	210.26±26.30 a	250.26±9.31 a
Nitrate reductase (mg NO ₂ g ⁻¹ ·d ⁻¹)	8.46±1.39 a	10.52±1.06 a	7.98±1.62 a	11.07±0.98 a
MBC (mg kg ⁻¹)	357.49±25.27 a	416.89±16.19 a	357.45±22.28 a	390.85±12.07 a
MBN (mg kg ⁻¹)	59.10±3.45 a	63.06±2.38 a	58.19±4.43 a	64.60±2.09 a

2 In the same row, different lowercase letters mean significant differences under four treatments according to
3 ANOVA with LSD tests ($P < 0.05$). CK, control treatment; CN, canopy N addition; CW, canopy water increase;
4 CWN, canopy water and N addition. SOM, soil organic matter; TN, soil total nitrogen; TP, soil total phosphorus;
5 AN, available nitrogen; AP, available phosphorus; MBC, soil microbial biomass carbon; MBN, soil microbial
6 biomass nitrogen.

7 **Figure S1.** Canopy nitrogen addition and water increase device, a triangular iron
8 tower with a height of 35 m, was built in the center of each circular quadrat.



Figure S2. The PCA based on physiological traits of *Q. variabilis* under N and water addition conditions. CK, white circle; CN, white inverse triangle; CW, white diamond; CWN, white square. Chl a, chlorophyll a; Chl b, chlorophyll b; SLA, specific leaf area; NSCs, non-structural carbohydrates.



16 **Figure S3.** The PCA based on physiological traits of *L. formosana* under N and water
 17 addition conditions. CK, black circle; CN, black inverse triangle; CW, black diamond;
 18 CWN, black square. Chl a, chlorophyll a; Chl b, chlorophyll b; SLA, specific leaf area;
 19 NSCs, non-structural carbohydrates.

