Supplement 2 Five methods used for leaf area measurements. For Method 1, the leaf area for each species was measured directly, while it was determined through specific leaf area and leaf dry mass in the Methods 2, 3, 4, and 5.

Method 1: For species with erose leaves, such as families of Compositae, Rosaceae and Umbelliferae, 5–20 leaves from the same species were placed on a transparent rectangular plastic sheet (21×29.7 cm, 'A4' size) as a sample, and then the sheet was scanned immediately with a flatbed scanner (BenQ 5000 scanner, China). The image was analyzed by using DELTA-T SCAN image analysis software (Delta-T Scan, Delta-T Devices Company, UK), and then the total projected leaf area (cm^2) and number of leaves in each sample were obtained. For each species, 30 samples (replicates) were examined in the same way. Before analysis, the scanner and software were calibrated with DELTA-T SCAN image standards.

Method 2: For species with long and narrow leaves, such as the families of Gramineae and Cyperaceae, a 2–5 cm long segment in the middle of leaf was cut as a subsample. The length (L) and width (W) were measured immediately with a micrometer, and the area of the segment (cm^2) was obtained ($L \times W$). After the area measurement, 10 segments (subsamples) were mixed as a sample and enclosed in an envelope, with a total of 30 replicates for each species being measured (the same as follows). These samples were oven-dried at 65°C for 24 h to constant mass, and then specific leaf area (SLA, $cm^2\ g^{-1}$) for each sample was calculated as the ratio of area to dry mass. In the same way, for each species 30 samples, each with 10 full

mature leaves, were also collected, oven-dried and weighted; leaf dry mass was determined. Thus, the leaf area for each sample was estimated as average leaf dry mass × SLA, and the leaf area for each species was determined by averaging all the 30 samples.

Method 3: For species with approximately cylindrical leaves, such as *Allium condensatum*, *Orosiachys fimbriatus*, *Ephedra sinica*, *Equisetum arvense*, and *E. fluviatil*e,

a 2–5 cm segment in the middle of leaf was cut as subsample, and its cross section is approximately circular (Fig. S1). The diameter (*D*) of the circular was measured with a micrometer caliper (unit: μm), and then leaf area of the segment was determined by the following formula:

$$\text{Leaf area } (\text{cm}^2) = \pi D \times H$$

where π is the circumferential rate (i.e., 3.1415926), *H* is the height of segment.

Then, for each species, the leaf area was determined through SLA and leaf dry mass in the same way as for the long and narrow leaves (the same as for Method 4 and Method 5).

Method 4: For species with approximate semi-cylindrical leaves, such as *A. anisopodium*, *A. tenuissimum*, *A. bidentatum*, *Triglochin palustre* and *T. maritimum*, a representative 2–5 cm high segment in the middle of leaf was cut as a subsample, and its cross section is an arc (a segment of a circle) (Fig. S1). The chord length (*b*) and vector height (*h*) of the arc section were measured with a micrometer caliper (unit:

μm), and then the arc length (L) could be obtained. Leaf area of the segment was calculated by the following formula:

Circle radius (R, cm) = $(b^2 + 4h^2)/8h$

Central angle degree (α) = 2arcsin ($b/2R$)

Arc length (L, cm) = $R \times \alpha$

Leaf area (cm^2) = $L \times H$

Method 5: For species with approximate elliptic-cylindrical leaves, such as *Iris tenuifolia* and *Eleocharis intersita,* a 2–5 cm high segment in the middle of leaf was cut as sample, its cross section is an approximate ellipse (Fig. S1). The long-axis (a) and short-axis (b) of the ellipse section were measured with a micrometer caliper (unit: μm), and then the perimeter (L) could be calculated. Leaf area of the segment was calculated by the perimeter × height (H) using the following formulae:

Ellipse perimeter (L, cm) =$2\pi b+4(a-b)$

Leaf area (cm^2) = $L \times H$

where π is the circumferential rate, H is the height of segment.

Figure Caption

Fig. S1 The sketches of cross sections of leaf segments for leaf area measurements used in Method 3 (a), 4 (b) and 5 (c).