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Carex scaposa C. B. Clarke (Cyperaceae): A New Record to the Flora of Taiwan

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ABSTRACT: *Carex scaposa* C. B. Clarke (Cyperaceae) is a new record to the Flora of Taiwan. It was collected from the eastern face of the Central Range, southern Taiwan, at an elevation between 1,000-1,200 m, adjusted Tawu forest trail in Taitung County. This species can be easily distinguished from the other species of *Carex* genus of Taiwan by the width of leaves and bractole shape of inflorescence. The width of *C. scaposa* leaves is about 40 mm, the largest among Taiwan *Carex*, and the leaf shape is gladiate. The inflorescence is composed of 3-4 panicles, and each of panicle is obviously closed with an utriculiform bracteole.

KEY WORD: *Carex scaposa*, Cyperaceae, *Carex*, new record, Dawu.

INTRODUCTION

The genus *Carex* L. is a variable genus with more than 2,000 species in the world and especially widespread in high humidity regions of the temperate zone (Dia and Liang, 2000). In Taiwan, the genus is represented by 61 species, which is the largest numbers of species in Taiwan (Hsieh, 2002), widely distributed from seashore, swamp, forest floor to high mountain grassland (Koyama *et al*., 2000).

In 2004 we investigated vegetation and collected specimens from Dahanshan to Chachayalaishan in Pingtung County. This is in the southern part of the Central Range and hard to access. Only a few reports were published (Yang, 1994, 1996) and one of the endemic species, *Amentotaxus formosana* Li (Amentotaxaceae), is protected by Taiwan forestry Bureau.

The major purpose of our survey was to analyze the vegetation structure and composition. The other aim was to find another population of *A. formosana*. We had a good opportunity to collect an unknown species. Based on the appearance, shape, and size of leaves without inflorescence, it looks like Orchidaceae. After collecting the complete fruits we surely conclude that it belongs to *Carex scaposa* C. B. Clarke (Cyperaceae) and is a new record to the Flora of Taiwan. In this manuscript we describe the taxonomy, morphology and distribution, and provide a line drawing, and photographs in habitats.

TAXONOMY

Carex scaposa C. B. Clarke in Hook. f., Curtiss Bot. Mag. 113, t. 6940, 1887.

花葶薹草 Figs. 1 & 2

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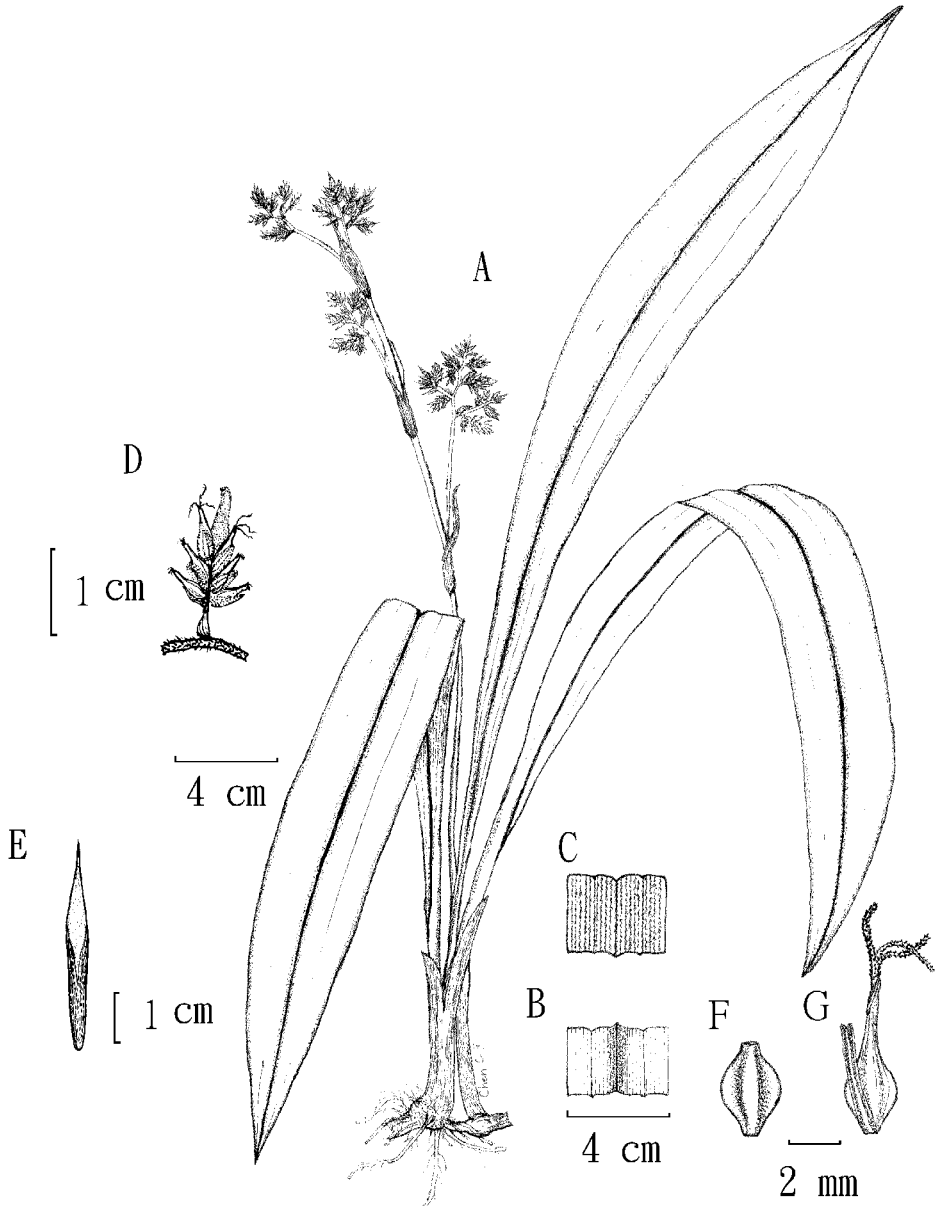

Fig. 1. *Carex scaposa* C. B. Clarke. A: Habit. B: Leaf of upper surface. C: Leaf of lower surface. D: Spikelet. E: Utriculiform bracteole (cladoprophyll). F: Achene. G: Utricle with glume.

Perennial herb, rhizome short, ca. 10-20 mm long and ca. 3-4 mm diameter, with scale-like leaves. Leave simple, lorate, gladiate or long lanceolate, drooping at apex, ca. 3-4 in cespitose, enclosed by sheath; blades ca. 42-49 cm long, ca. 3.5-4 cm wide, acuminate at apex, cuneate at base, with decurrent wing, glabrous on the surface, tomentose at lower surface; vein parallel, midrib downward at adaxial and flanged at lower surface; lateral vein 2, veinlets ca. 48-54, flanged on both surfaces. Culm of inflorescence shorter than or as long as the leaf, ca. 32-51 cm tall, ca. 1-2 mm thick, trigonous; inflorescence with 3-4 panicles, panicle triangle, ca. 3 cm long, ca. 3 cm wide, with a utriculiform bracteole (cladoprophyll) at base; utriculiform bracteole ca. 3-4 cm long, ca. 0.3-0.5 cm wide, linear-oblanceolate, acute at apex; spikelet ca. 6-8 mm long, with triangular bracts at base, ca. 2 mm long, 1 mm wide; staminate a few, less than pistillate, linear-lanceolate; pistillate ca. 2-7, ovate, glume linear with 2 vein,

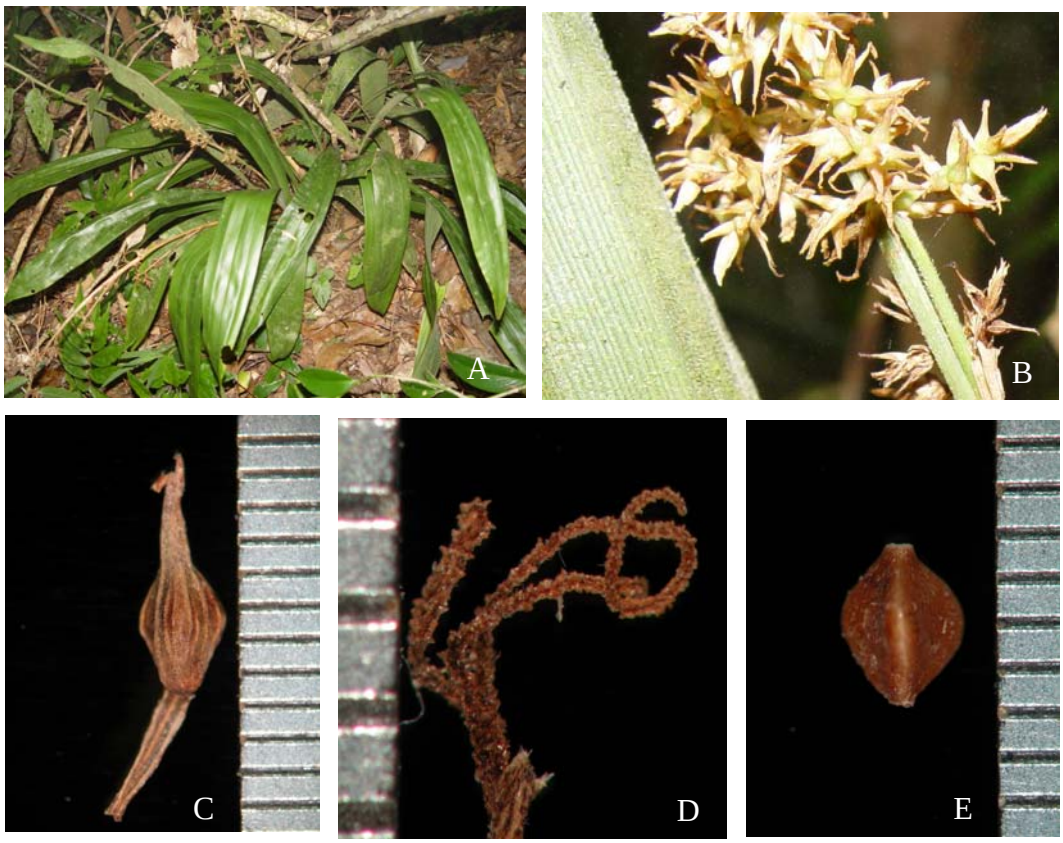

Fig. 2. Photographs of *Carex scaposa* C. B. Clarke. A: *Carex scaposa* growing as a tuft in the ground herbaceous layer, 2 Culms of inflorescence shorter than or as long as the leaf. B: Fruiting period spikelet. C: Utricle with glume. D: Stigma 3. E: Achene trigonous. (scale = 0.5 mm).

yellowish-brown at margin; stigma 3, scabrous at surface; ovule solitary. Utricle ovate, ca. 3-3.5 mm long, 1.5 mm wide; ventral side nerveless, dorsal side ribbed with 1 keel, each side with 1 coarse vein, and 1-2 fine nerves; body ca. 2 mm, tapering gradually to beak; beak ca. 1.5 mm, bidenticulate at apex. Fruit a trigonous achene, ca. 2 mm long, ca. 1.5 mm wide.

Habitats: *Carex scaposa* was first found in Guangdong and mainly distributed in southeastern China (Dia and Liang, 2000). The population of *C. scaposa* in Taiwan was collected from the eastern face of southern Central Mountain Range, Tawu Hsiang, Taitung County (Fig. 3). The habitats are mid-slope and at altitudes ranging 1000-1200 m and more humid and divergent that many of the shade-tolerant plants can grow well. The composition of this hardwood forest is dominated by *Cyathea lepifera* (J. Sm.) Copel., *Cyclobalanopsis repandifolia* (Hayata) Kudo, *Litsea acuminata* (Blume) Kurata, *Pasania hancei* (Benth.) Schottky var. *ternaticupula* (Hayata) J. C. Laio, *Pasania kawakamii* (Hayata) Schottky, and *Schefflera octophylla* (Lour.) Harms.

The associated species of underground herbaceous layer are *Blechnum orientale* L., *Gomphostemma callicarpoides* (Yamamoto) Masam., *Ophiorrhiza hayatana* Ohwi, *Pellionia radicans* (Sieb. & Zucc.) Wedd., *Sarcopyramis napalensis* Wall. var. *bodinieri* (H. Lév. & Vaniot) H. Lév. and *Scutellaria taiwanensis* C. Y. Wu.

The short rhizome of this species makes the plant a tuft. From three tufts growing on the understory of a hardwood forest along Tawu forest trail, we estimated that a lot of populations could be found in the habitat nearby.

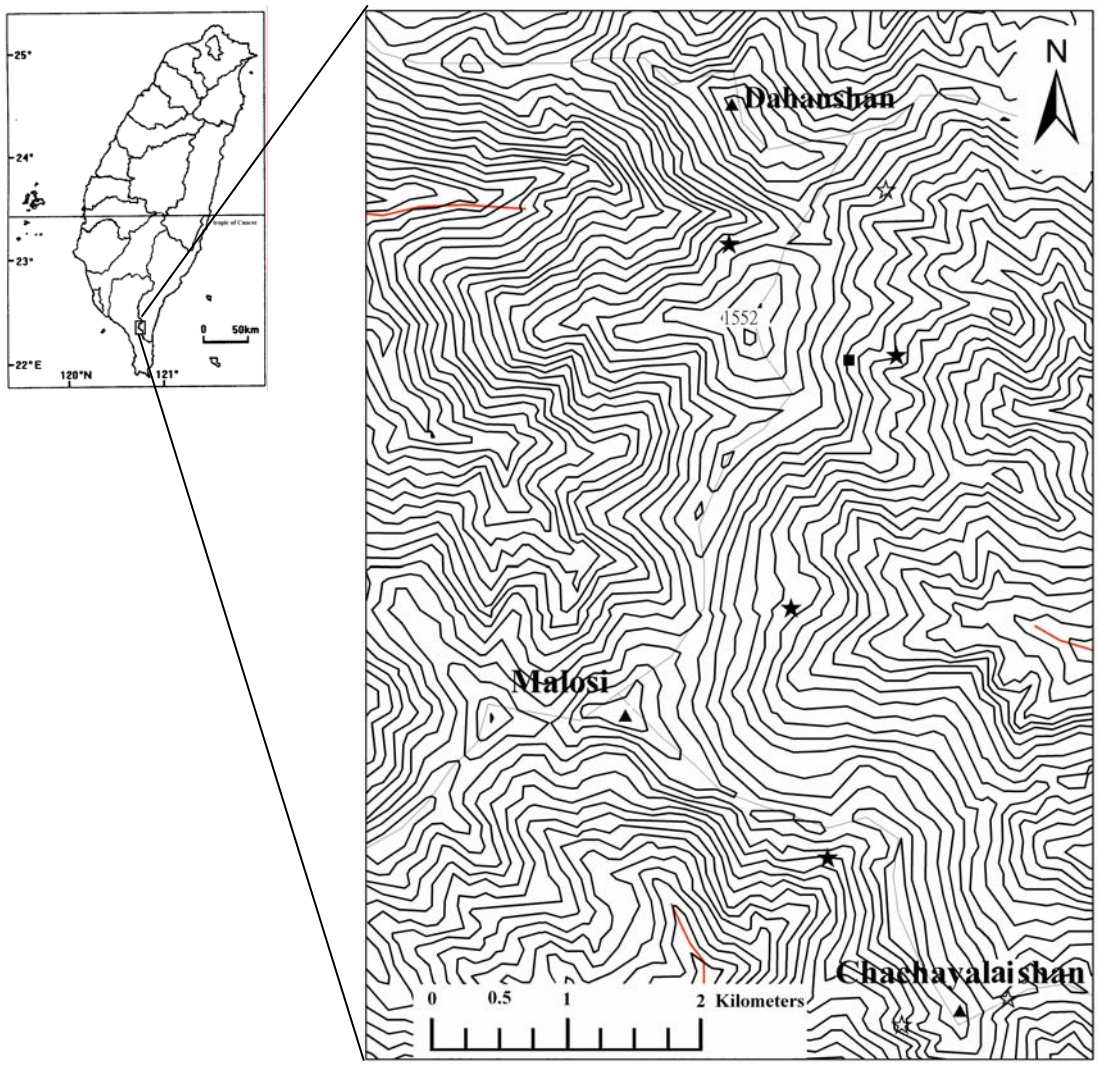

Fig. 3. The distribution point of *Carex scaposa* and *Amentotaxus formosana* in Pingtung and Taitung County. ★: The new distribution point of *A. formosana*. ☆: The old distribution point of *A. formosana*. ■: The distribution point of *C. scaposa* in Tawu Hsiang, Taitung County.

Specimens examined: *C. F. Chen* 878, 13 November, 2004, 120° 45’ 11” E, 22° 23’ 23” N, Taitung, Tawu forest trail (HAST, PPI); *C. F. Chen* 1237 (18 February, 2005) (PPI), *C. F. Chen* 1286 (12 March, 2005) (PPI).

DISCUSSION

In general, the leaves of *Carex* species in Taiwan are always slender and needle-like. The ranges of leaf width we have measured from Taiwanese *Carex* species (Koyama, Kuoh & Leong, 2000) are about 1-15 mm. In comparison, the width of *C. scaposa* is the largest, about 40 mm, and the leaf shape is gladiate. In addition to the leaf width, bractole shapes of inflorescence are also available to identify the species. The inflorescence of *C. scaposa* is composed of 3-4 panicles, and each panicle is closed with an utriculiform bracteole, 3-3.5 cm long, 1.5 mm wide.

To protect the growth of *A. formosana*, Dahanshan and Chachayalaishan areas had been included in the natural protection ranges. The microhabitats from Dahanshan to Chachayalaishan are very similar to those of the natural protection area of *A. formosana*, so it is reasonable to imagine that other populations of *A. formosana* should survive in here. Fortunately, we found 4 new populations of *A. formosana* in this area.

The first habitat of the population is located in mid-slope concave, northwestern side of Mountain 1552, southern Dahanshan. The second is located east of Mountain 1552, which is near Dawu *Amentotaxus formosana* Nature Reserve. The third is located in mid-slope of northeastern Malosi. The fourth is found on both sides of a valley in the north of Chachayalaishan (Fig. 3).

The microhabitats of these four populations are between 1,100-1,400 m elevation, slope about 20-40°. The associated species include *Drypetes hieranensis* (Hayata) Pax, *Helicia rengetiensis* Masam., *Hydrangea angustipetala* Hayata, *Litsea acutivena* Hayata, *Machilus konishii* Hayata, *Machilus thunbergii* Sieb. & Zucc. We also collected an unknown species to the Flora of Taiwan, *Rhododendron farrerae* Tate ex Sweet (Yamazaki, 1996), which is distributed in the first habitat. This shrub species is often dominant on the mountain ridge. Owing to difficult accessibility, we took a census of the individual numbers only in the third habitat of Malosi. The results showed that there are over 100 individuals and the largest diameter is about 37 cm. The population always adopted the strategy of sprouting to survive in the humid habitat.

Based on the previous papers and this finding, we conclude that *A. formosana* is distributed continuously along both sides of the southern Central Range. Between the Dahanshan and Chachayalaishan areas, it is possible that the number of individuals of *A. formosana* must be more than we have found. We will investigate these ranges more extensively to get more evidence to prove this hypothesis.

With this new record plant of *C. scaposa* and 4 locations of *A. formosana*, the Government must extend the ranges of nature reserves more than before. We suggest that the whole ranges from Dahanshan to Chachayalaishan areas should be included in a nature reserve of *A. formosana*. It protects not only the natural hardwood vegetation as their habitat, but really preserves the biodiversity of southern Taiwan. This new location of *A. formosana* will be more available for academic institutes to assess the population dynamics.

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臺灣新紀錄植物－花葶薹草(*Carex scaposa* C. B. Clarke)

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摘　　要

Carex scaposa C. B. Clarke (花葶薹草) 為一台灣莎草科植物新紀錄種。本種採集於中央山脈東南段之東面坡，台東大武林道附近海拔約 1,000-1,200 m 之間。本種植物葉寬約 4 cm，葉帶狀箭形，以及花序由 3-4 個圓錐狀花序所組成，每一圓錐花序具一穗內前葉，可與台灣薹屬其他物種區別。

關鍵詞：花葶薹草、莎草科、薹屬、新紀錄、大武。

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