



## พีชวงศ์กถกตามเส้นทางเดินศึกษาธรรมชาติในอุทยานแห่งชาติน้ำหนาว

### Cyperaceae Along the Nature Trails in Nam Nao National Park

Amornrat Meesawat<sup>1\*</sup> and Phutsadee Phromprasit<sup>2</sup>

#### บทคัดย่อ

สำรวจความหลากหลายของพีชวงศ์กถกตามเส้นทางเดินศึกษาธรรมชาติในอุทยานแห่งชาติน้ำหนาวระหว่างเดือนพฤษจิกายน 2550 ถึงเดือนพฤษจิกายน 2551 โดยศึกษาจากตัวอย่างพรรณไม้แห้ง และตัวอย่างพรรณไม้ภาคสนาม พบพีชในวงศ์กถก 8 สกุล 40 ชนิด สกุลที่พบมากที่สุด คือ สกุล *Cyperus* L. มี 11 ชนิด รองลงมา ได้แก่ สกุล *Carex* L. พบ 8 ชนิด สำหรับสกุล *Fuirena* Rottb. และ *Lipocarpha* R.Br. พบเพียงสกุลละ 1 ชนิด ได้แก่ *Fuirena umbellata* Rottb. และ *Lipocarpha chinensis* (Osbeck) Kern. มีรูปร่างรูปแบบสกุล

#### ABSTRACT

A survey of the family Cyperaceae along the nature trails in Nam Nao National Park was studied between November 2007 and November 2008. Dried and living specimens were studied. Eight genera and 40 species were enumerated, *Cyperus* L. is the most common genus in the area with 11 species. The second is *Carex* L. with eight species. Whereas, *Fuirena* Rottb. and *Lipocarpha* R.Br. were found only one species in each genus, namely *Fuirena umbellata* Rottb. and *Lipocarpha chinensis* (Osbeck) Kern. Key to genera is provided.

**คำสำคัญ:** พีชวงศ์กถก เส้นทางเดินศึกษาธรรมชาติ อุทยานแห่งชาติน้ำหนาว

**Keywords:** Cyperaceae, Nature trails, Nam Nao National Park

<sup>1</sup>Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand

<sup>2</sup>Program of Biology, Faculty of Science and Technology, Nakhon Ratchasima Rajabhat University, Nakhon Ratchasima 30000, Thailand

\*Corresponding Author, E-mail: amopra@kku.ac.th

## Introduction

*Cyperaceae* is mainly perennial, rhizomatous grasslike herbs, with solid stems and 3-ranked leaves. The family has worldwide distribution except Antarctica. They are common in marshy places of the temperate and subarctic zones. Many species of the family are economic importance, for example, *Cyperus papyrus* was used for making papers by the ancient Egyptians, *Eleocharis dulcis* (Chinese Water Chesnut) and *C. esculentus* (Tigernut, Chufa) are used as human food, *C. involucratus* is used as fodder, some species of *Carex*, *Caustis*, *Cyperus*, and *Scirpus* are also cultivated as pot plants and water-garden ornamentals (Heywood et al., 2007).

The family is the third largest family in monocots which is composed of 123 genera and about 5,000 species. Ten tribes were recognized (Bruhl, 1995). Eight tribes were reported in Thailand, namely Abilgaardieae, Cariceae, Cypereae, Hypolytreae, Rhynchosporeae, Schoeneae, Scirpeae and Scleriae. 29 genera and 248 species were reported from Thailand. *Fimbristylis* is the largest genus in Thailand which was found 59 species. *Cyperus* is the second which was found 47 species and *Scleria* is the third which was found 22 species. There were nine species of *Carex*, eight species of *Fimbristylis* and only one species of *Eleocharis* which are

endemic to Thailand (Simpson and Koyama, 1998).

Nam Nao National Park covers the areas of three districts of Phetchabun province, namely, Nam Nao, Lom Sak, and Lom Kao; and Khon San district of Chaiyaphum province. It was established since 1982 and is the fifth National Park of Thailand. There were 966 square kilometers which composed of deciduous dipterocarp forest, mixed deciduous forest, dry evergreen forest and grasslands (National Park Wildlife and Plant Conservation Department, 2006). Simpson and Koyama (1998) reported that five genera and 13 species including the 10 species were common throughout Thailand, namely *Cyperus haspan* L., *C. iria* L., *C. laxus* Lam., *C. rotundus* L., *Fimbristylis cinnamometorum* (Vahl) Kunth, *F. dichotoma* (L.) Vahl, *F. miliacea* (L.) Vahl, *F. ovata* (Burm.f.) Kern, *Kyllinga nemoralis* (J.R. Forst. & G. Forst.) Dandy ex Hutch. & Dalziel, and *Pycreus pumilus* (L.) Nees. The three species were identified from unspecified areas in Nam Nao National Park, namely *Carex thailandica* T. Koyama, *Cy. cyperoides* (L.) Kuntz, and *F. thomsonii* Boeck. Later, Phulphong (2007) reported six species of *Carex* L. from

unspecified areas in Nam Nao National Park, namely *Carex blinii*, *C. cruciata*, *C. subinclinata*, *C. speciosa*, *C. thailandica*, and *C. nemostachys*. In conclusion, five genera, 18 species were reported from Nam Nao National Park (Simpson and Koyama, 1998; Phulphong, 2007). According to the various kinds of forest in the area, it was expected to be the one area of high species diversity of Cyperaceae. Therefore, the revision of the species diversity of Cyperaceae in Nam Nao National Park was needed.

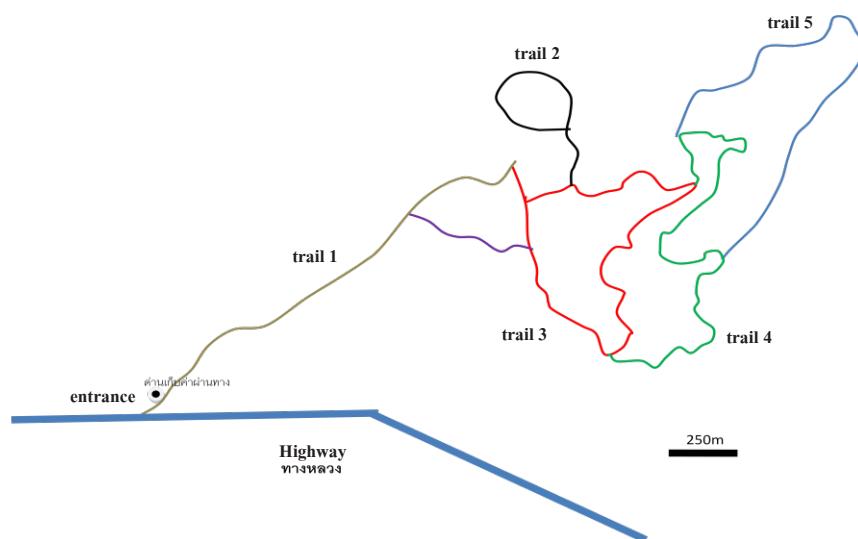
## Materials and Methods

The survey of species diversity of the Cyperaceae along the nature trails in Nam Nao National Park covers 19 kilometers. It was divided into five trails, namely (1) The entrance gate to the tent areas (1.8 kilometers), (2) The short-nature trail (1 kilometers from Visitor Center), (3) Visitor Center via Dong Ma Fai to Tung Na Noi (3 kilometers), (4) The short-way to scenic view

point (4.5 kilometers), and (5) The long-way to scenic view point (5.8 kilometers) (Figure 1). The collections of specimens were made every 2 weeks between November 2007 and November 2008. The plant collections were kept in the Khon Kaen University Herbarium (KKU) and the Forest Herbarium (BKF). The identification was made following Simpson and Koyama (1998). The local names are given following Simpson and Koyama (1998) and Royal Forest Department of Thailand (2001). Key to genera in the area is provided. Key to species is available from the first author.

## Results

Eight genera and 40 species were found (Table 1 and Figure 1). The importance taxonomic characters for generic identification including the type of the flowers, the numbers of perianth, the style characteristic, the numbers of stigma, and the presence of utricle (Table 2). Key to genera of Cyperaceae in the area was present as follows.



**Figure 1.** Five trails along the nature trails in Nam Nao National Park: Trail 1 is from the entrance gate to the tent areas, Trail 2 is from Visitor Center to the short-nature trail, Trail 3 is from Visitor Center via Dong Ma Fai to Tung Na Noi, Trail 4 is the short-way to scenic view point, and Trail 5 is the long-way to scenic view point.

#### Key to Genera of Cyperaceae in Nam Nao National Park

1. Flowers unisexual
  2. Utricle (a sac-like structure surrounds the nutlet) present
    1. Carex
  2. Utricle absent
    8. Scleria
1. Flowers bisexual
  3. Perianth present
    4. Perianth of 2
      6. Lipocarpha
    4. Perianth of 3-6
      5. Stigmas of 3
        4. Fuirena
      5. Stigmas of 2
        7. Rhynchospora
  3. Perianth absent
    6. Style jointed with the ovary and clearly demarcated from it
      3. Fimbristylis
    6. Style continuous with the ovary and not demarcated from it
      7. Stigmas of 3
        2. Cyperus
      7. Stigmas of 2
        5. Kyllinga

**Table 1.** List of Cyperaceae found in Nam Nao National Park

No.	Species	Local names (in Thai)	Simpson and Koyama (1998)	Phulphong (2007)
1*	<i>Carex baccans</i> Nees in Wight	หญ้าคมบาง		
2	<i>C. blinii</i> Léveillé & Varriot	ดอกดิน, กกหมาย		/
3	<i>C. cruciata</i> Vahl	คมบางขา		/
4*	<i>C. filicina</i> Nees in Wight	หญ้าคมบางกู		
5	<i>C. nemostachys</i> Steud.	กกดอกเข็ม		/
6	<i>C. speciosa</i> Kunth	-		/
7	<i>C. subinclinata</i> T. Koyama	กกช่องบาง		/
8*	<i>C. tricephala</i> Boeck.	หญ้าดอกดิน		
9*	<i>Cyperus compactus</i> Retz.	หญ้าใบคม		
10*	<i>Cy. cuspidatus</i> Kunth	กรรังกาป่า		
11	<i>Cy. cyperoides</i> (L.) Kuntze	หญ้ากอก, หญ้ารังกา	/	
12*	<i>Cy. difformis</i> L.	กกขนาด		
13*	<i>Cy. digitatus</i> Roxb.	กกดอกแಡง, กรรังกา		
14*	<i>Cy. dubius</i> Rottb.	แท้วหมูหัน, หญ้าหัวหงอก		
15*	<i>Cy. haspan</i> L.	กอกนา, หญ้ากอกชา	common	
16*	<i>Cy. iria</i> L.	หญ้ากอกหาราย, หญ้ารังกาขา	common	
17*	<i>Cy. laxus</i> Lam.	หญ้าตีนกา	common	
18*	<i>Cy. pilosus</i> Vahl	กกช่องดอกขน		
19*	<i>Cy. tenuiculmis</i> Boeck.	หญ้าดอกแಡง		
20*	<i>Fimbristylis dichotoma</i> (L.) Vahl	หญ้าเข็วหมู	common	
21*	<i>F. disticha</i> Boeck.	กกดอกเรียง		
22*	<i>F. eragrostis</i> (Nees & Meyen) Hance	หญ้าดอกขา		
23*	<i>F. ferruginea</i> (L.) Vahl	หญ้าดอกแಡง		
24*	<i>F. miliacea</i> (L.) Vahl	หญ้ารัดเขี้ยด	common	
25*	<i>F. ovata</i> (Burm.f.) Kern	หญ้ากอกหมู	common	
26*	<i>F. parviflora</i> T. Koyama	กกทุ่งกุล		
27	<i>F. thomsonii</i> Boeck.	หญ้าแท้วหมู, จุดหมู	/	
28*	<i>Fuirena umbellata</i> Rottb.	หญ้าสามคม		
29*	<i>Kyllinga breviflora</i> Rottb.	หญ้าหัวโป่ง, หญ้าดอกขา		
30*	<i>K. nemoralis</i> (J.R. Forst. & G. Forst.) Dandy ex Hutch. & Dalziel	หญ้าตุ้มหมู, หญ้าหน่วยที่้าย	common	

\*means new records for Nam Nao National Park, - means no Thai name reported, / means reported, common

means reported as common in unspecified areas in Thailand

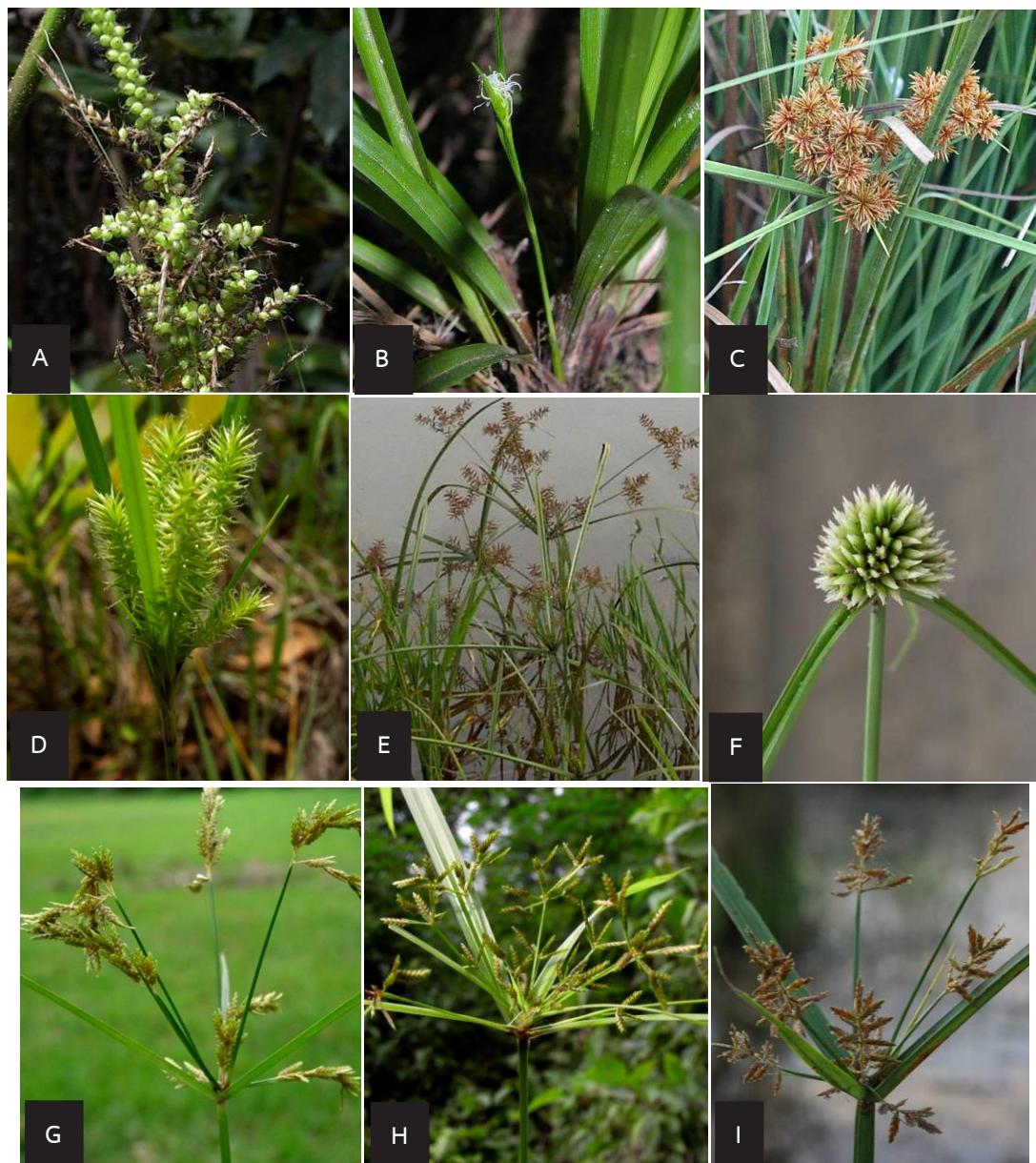
**Table 1.** List of Cyperaceae found in Nam Nao National Park (continued)

No.	Species	Local names (in Thai)	Simpson and Koyama (1998)	Phulphong (2007)
31*	<i>Lipocarpha chinensis</i> (Osbeck) Kern	โนโโพแสง, หญ้าแหงอนเงือก		
32*	<i>Rhynchospora corymbosa</i> (L.) Britton	หญ้าใบคอม, หญ้าคอมบาง		
33*	<i>R. hirticeps</i> (Kük.) T. Koyama	กอกขอบขน		
34*	<i>R. rubra</i> (Lour.) Makino	หญ้าหัวแดง		
35*	<i>Scleria kerrii</i> Turrill	หญ้าปูมบาง		
36*	<i>S. levis</i> Retz.	หญ้าสามคอม		
37*	<i>S. lithosperma</i> (L.) Swartz	คอมบางเล็ก, สะยา		
38*	<i>S. neesii</i> Kunth	กอกกระเจิง		
39*	<i>S. poaeformis</i> Retz.	บรือ, แวง, บรีอน่า		
40*	<i>S. scrobiculata</i> Nees & Meyen ex Nees	หญ้าคอมบาง		

\*means new records for Nam Nao National Park, - means no Thai name reported, / means reported, common means reported as common in unspecified areas in Thailand

**Table 2.** Comparative characters among 8 genera (jointed or continuous mean jointed or continuous with the ovary)

Genera	Flower	Perianth	Style	Stigma	Utricle
1. <i>Carex</i>	unisexual	0	continuous	3	present
2. <i>Cyperus</i>	bisexual	0	continuous	3	absent
3. <i>Fimbristylis</i>	bisexual	0	jointed (style base not persistent)	2-3	absent
4. <i>Fuirena</i>	bisexual	3	continuous	3	absent
5. <i>Kyllinga</i>	bisexual	0	continuous	2	absent
6. <i>Lipocarpha</i>	bisexual	2	continuous	3	absent
7. <i>Rhynchospora</i>	bisexual	3-6	jointed (style base persistent)	0 (style undivided)	absent
8. <i>Scleria</i>	bisexual	0	continuous	3	absent



**Figure 1.** Selected species of Cyperaceae found in Nam Nao National Park: **A.** *Carex baccans*, **B.** *C. blinii*, **C.** *Cyperus compactus*, **D.** *Cy. cyperoides*, **E.** *Cy. digitatus*, **F.** *Cy. dubius*, **G.** *Cy. iria*, **H.** *Cy. laxus*, and **I.** *Cy. pilosus* (Photo by Phutsadee Phromprasit)



Figure 1. Selected species of Cyperaceae found in Nam Nao National Park (continued): **J.** *Fimbristylis dichotoma*, **K.** *F. miliacea*, **L.** *F. parviflora*, **M.** *F. thomsonii*, **N.** *Fuirena umbellata*, **O.** *Kyllinga breviflora*, **P.** *K. nemoralis*, **Q.** *Lipocarpha chinensis*, **R.** *Rhynchospora corymbosa*, **S.** *R. rubra*, **T.** *Scleria kerrii*, **U.** *S. levis*, **V.** *S. neesii*, and **W.** *S. scrobiculata* (Photo by Phutsadee Phromprasit)

## Conclusion and Discussion

The high species diversity of Cyperaceae was found along the nature trails in Nam Nao National Park, which comprising of 40 species within eight genera. Most common genus was *Cyperus* L. with 11 species, the second was *Carex* L. with eight species. Two genera were found only one species in each genus, namely *Fuirena umbellata* Rottb. and *Lipocarpha chinensis* (Osbeck) Kern. Thirty three species in eight genera are new records for Nam Nao National Park (Table 1). *Fimbristylis dichotoma*, *Kyllinga breviflora* and *K. nemoralis* were found in various types of forest whereas, *Carex blinii* and *Scleria scrobiculata* were found only in dry evergreen forest. *Rhynchospora hirticeps* and *R. rubra* were found only in pine forest; and *Cyperus compactus*, *Cy. difformis*, *Cy. digitatus*, *Cy. haspan*, *Cy. pilosus*, *Fu. umbellata*, *L. chinensis*, *R. corymbosa* and *S. kerrii* were found only in marshy areas. It is noted that these following three species which were common throughout the country: *Cy. rotundus*, *F. cinnamometorum* and *Pycreus pumilus* (Simpson and Koyama, 1998) including *C. thailandica* which were found in unspecified areas in Nam Nao National Park

(Simpson and Koyama, 1998; Phulphong, 2007), they were not found in this research. It is possible that these four species were found in the areas which are out of the nature trails.

## Acknowledgments

The authors are very grateful to Prof. Dr. Pranom Chantaranothai for corrections and critical comments. Thanks to the National Park, Wildlife and Plant Conservation Department, Thailand for permission on field collections from the area. This research was supported by the New Researcher Fund 2007, Office of Research Administration, Khon Kaen University.

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