Taxonomic Studies in the Compositae of Thailand 3*

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小山博滋：タイ国産キク科植物の分類学的研究 3

Tribe Vernoneae

Vernonieae is essentially widespread tropical tribe. As summarized by Jones (1977), the knowledge of this tribe is still largely in alpha state. In this paper, Camchaya, Elephantopus, Ethulia and Struchium, are enumerated in alphabetical order except the largest genus Vernonia. Although 28 species of Vernonia are enumerated by Kerr (1936) in Thailand, further study will be necessary to clarify the concept of some species.

Based on his new species, Iodocephalus glandulosus, from Doi Suthep, Kerr (1936) enumerated Iodocephalus Thorel ex Gagnep. as a genus of the tribe in Thailand. Iodocephalus, however, should be excluded from the composite flora of Thailand for a reason mentioned below. In the course of our field survey in Thailand, we collected many new materials from Doi Suthep and other places. An examination of these materials reveals that I. glandulosus is an extreme type of the variation in I. eberhardtii Gagnep. As already treated by Kitamura (1968), I. eberhardtii is considered to be a species of Camchaya.


Thorelia Gagnep. in Notulæ Syst. 4: 18 (1920)—Thoreliella C. Y. Wu in Acta Phytotax. Sin. 6: 297 (1975)

Type: Camchaya kampotensis Gagnep.

Camchaya and Thorelia were described as satellite genera of Vernonia, a genus widely distributed in tropical areas in both the Old and New World. According to the original descriptions, the chief distinction between Camchaya and Thorelia is the presence of a pappus in the former and its absence in the latter. The pappus, however, was observed by Kerr (1935) to be lacking in some florets in his new species of Camchaya tenuiflora, which is very closely allied to Thorelia montana. Since Thorelia was considered too close to Camchaya to be maintained as a distinct genus, he (Kerr, 1935) united it with Camchaya.

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In 1968, Kitamura described two new species of *Camchaya* from Thailand. They are characterized by having very short, numerous, deciduous pappus bristles. Considering this character to be intermediate between *Camchaya* and *Vernonia*, Kitamura proposed a new section, Sect. *Calcarea* in *Camchaya*.

In the course of my field survey in Thailand, I encountered numerous populations of the species concerned. The species of Sect. *Calcarea*, which are perennial, are confined to limestone areas, while those of Sect. *Camchaya*, annual, are in both limestone and non limestone areas. The major distinction between the two sections is observed in the involucral scales. Those of Sect. *Calcarea* are herbaceous for the 2/3 of their length and are largely reflexed; those of Sect. *Camchaya* are not herbaceous for their entire length of the scales and sometimes shortly spread out, but never reflexed. Another difference between them is in hair types. Hairs found in these species are all multicellular. Usually, an apical cell of the hair is elongated, i.e. needlelike in shape, and colorless, but the basal ones are square in shape and somewhat colored. By features of the apical cell, the hairs can be divided into two types: T-type, where the apical cell is attached at the middle to the cell below; and I-type, where the apical cell is attached at the end to the cell below. A detailed examination of the hair types of several species of *Vernonia* and *Camchaya* reveals that Sect. *Camchaya* has both T- and I-type hairs, while *Vernonia* and Sect. *Calcarea* have only I-type hairs. In addition, Sect. *Calcarea* has 54 somatic chromosomes, while Sect. *Camchaya* has 20 (Fig. 1). According to my preliminary survey of the chromosome numbers of some species of *Vernonia* in Thailand, more than ten species have 2n=18, or polyploid derivatives of that number. Sect. *Calcarea* should, therefore, be excluded from *Camchaya*, although further study will be necessary to determine its correct taxonomic position in *Vernonia*.

The 10-costate achenes have been considered to be one of the diagnostic characters of *Camchaya*. Examination of more than 20 sheets of specimens reveals the new species described here to have 5-costate achenes. The texture of the achenes, however, is the same as in the 10-costate achenes of other species. Thus, *Camchaya* is noted here to be characterized by having both 5- and 10-costate achenes (Fig. 2).

Four species of *Camchaya* have been known from Thailand. Having new materials at hands from the Eastern and Northeastern parts of Thailand, four new taxa, two
species and two varieties, are described in this paper. They are distinguished from each other as follows.

1. Achenes conical, 10-shallowly costate with glands....................C. eberhardtii
1. Achenes obovoid, 5-shallowly or 10-deeply costate, without glands...........2
2. Spines of involucral scales inconspicuous, less than 0.2 mm long......C. kampotensis
2. Spines of involucral scales conspicuous, more than 0.4 mm long..........3
3. Outer involucral scales lanceolate .....................................C. loloana
3. Outer involucral scales linearlanceolate ................................4
4. Achenes 5-shallowly costate ..............................................C. pentagona
4. Achenes 10-deeply costate .................................................5
5. Spines of involucral scales about 1 mm long, both patent and appressed hairs on stem..............................................C. spinulifera
5. Spines of involucral scales about 0.5 mm long, only appressed hairs on stem ..............................................C. tenuiflora


Habitat: on mountain grassy slope or on wayside at edge of hill evergreen forest, alt. 800–1700 m.

The somatic chromosome are observed to be 20 in the root tip cells of young plants germinated at our botanic garden. The seeds are collected from voucher specimens which are indicated by an asterisk in the list of specimens examined.

Specimens examined. N Chiang Mai: Doi Angkhang (Boonkird 24 BK); Doi Suthep (Soradech 133 BKF; Sørensen et al. 4060 BKF, G; T-10575 KYO; Larsen et al. 2792 AAU, BKF); Doi Pui (T-15328 BKF, KYO, T; T-18595, -18676, -18672 BKF, KYO). NE Loei: Phu Kradung (Smitinand 1890 BKF, TNS, US; T-502, -8661, -22797* KYO; T-22798, -23017, -23033, -31665 BKF, KYO; T-31254*, -31363 KYO); Phu Luang (T-1234 BKF, KYO, TNS; T-1610 BKF, KYO; T-31570, -31637, -33698 KYO; Santitsuk 526 BKF). Phetchabun: Phu Miang (T-11755 KYO). E Chaiyaphum: Thung Kamang (Larsen et al. 31588 AAU); Khao Khieo, Khao Yai National Park (Charoenphol et al. 4223 AAU). C Nakhon Nayok: Khao Khieo, Khao Yai National Park (Maxwell 74-808 AAU; T-18098 BKF, KYO; T-18098-bis KYO).

Distribution: Indochina (Dalat: Eoward 325 GH, US, 1070 KYO; Annan: Poilane 18083 P) and Thailand.


Habitat: on grassy slope in Dipterocarpus or light evergreen forest, alt. 250–800 m.

Involucres of our plants are more densely covered with crispcd soft hairs than those of Cambodian plant, though further study will be necessary as to the variation of the pubescence. The somatic chromosomes were observed to be 20 in the root tip cells of plant, T-30662-bis, which were cultivated at the botanic garden of Kyoto University.

Distribution: Cambodia (Kira et al. 102 BKF, KYO) and Thailand.


This species is very variable in involucres. Although they are subglobose in shape, there are three types concerning the size of the involucre and the number of spines in an involucral scale. The large involucre is 11 mm wide and 13 mm long and is characterized by having small number of spines in the scale, while the medium one, 9 mm wide and 11 mm long, and the small one, 8 mm wide and 9 mm long, by having numerous spines in the scale. Each of these three types is observed to be stable in every population. These three entities characterized by the type of involucres could, therefore, be distinguished from one another as varieties morphologically differentiated.

Var. loloana


Habitat: on dry grassy slope at edge of forest, in light deciduous forest and clearings in hill evergreen forest of limestone areas, alt. 340–1300 m.

This variety has medium heads and lanceolate leaves, 6–9 cm long, 1–3 cm wide. In the northern and southwestern parts of Thailand, it grows on the mountain slope at the elevation of more than 1000 m high, whereas in the eastern part it occurs on grassy slope at the elevation of 340 m at sea level. Chromosome number 20 is determined in the root tip cells of young plants germinated at our botanic garden. The seeds are collected from voucher specimen indicated by an asterisk in the list of specimens examined.

Specimens examined. N Chiang Mai: Chiang Dao (Kerr 6650 BK-type; T-20639* KYO); Pong Pho, 12 km N of Doi Chiang Dao (Larsen et al. 2862 AAU, BKF); Mae Sarifong to Chom Thong (T-10493 KYO). E Ubon Ratchathani: Nachaluy District (T-30760* KYO). SW Kanchanaburi: Kriti to Muang Cha (Geissok & Phengkai 6192 AAU, BKF, C, KYO, P).

Distribution: Yunnan (Henry 12375 NY, 12375A US; Wang 77785, 77984, 79038, 79269, 79555, 80330 GH; Department of Biology, Yunnan University 2232 YNU), Laos (Vidal 5643 P) and Thailand.

Var. mukdahanensis H. KOYAMA var. nov.


Involucrum minus, 8 mm latum, 9 mm longum, squamis multiseriatis, exterioribus gradatim brevioribus et patentibus ciliatis, setis numerosis brevioribus, infinis squamorum 2 mm longis.

Stem erect, striate with appressed hairs (T-type hair), 30–90 cm high; leaves lanceolate to oblanceolate, 3–10 cm long, 1–3.5 cm wide, acute to acuminate at tip, gradually or abruptly narrowed at base, subequal, with patent soft hairs on both surfaces, the leaf base and petiole with long patent hairs (I-type hair); heads numerous, erect, subglobose, the involucre 8 mm wide, 9 mm long, the scale numerous seriate, the outer one short, lanceolate, 2 mm long, 0.3 mm wide at very base, the inner scales shortly patent with scattered spines; florets about 40 per head, the corolla 5-lobed, 5 mm long, the lobe 1.5
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mm long; achenes about 1.6 mm long, 10-costate.

Habitat: on grassy slope in open field or roadside in cultivated field, in Dipterocarpus forest and clearings in evergreen forest along stream, alt. 200–300 m.

This variety is characterized by having small heads. The somatic chromosomes are observed to be 20 in the root tip cells of plant, T-30904-bis, cultivated at our botanic garden.

Type collection: Thailand NE Mukdahan: Hill by route 212, Dongman village, Muang District (Koyama et al. T-30941 KYO-holotype).


Distribution: endemic to eastern and northeastern parts of Thailand.

Var. pseudodentiflora H. Koyama var. nov.


Involucrum majus, 11 mm latum, 13 mm longum, squamis multiseriatis, exterioribus gradatim brevioribus et patentibus ciliatis, insimis 3 mm longis, setis paucioribus et patentibus.

Stem erect, striate with appressed hairs, more than 1.3 m high; leaves ovate, acute at tip, cuneate at base, 10–15 cm long, 2.5–6.0 cm wide; heads numerous, erect, the involucre subglobose, 11 mm wide, 13 mm long, the scale numerous seriate, the outer one short, patent, lanceolate, 3 mm long, 0.3 mm wide at very base, the inner scales rather patent, lanceolate with scattered spines; florets about 50 in a head, the corolla 5-lobed, 7 mm long, the lobe 1.5 mm long; achenes 2.0 mm long, 10-costate.

Habitat: on grassy slope in clearings in hill evergreen forest, alt. 50 m.

This variety is characterized by having large heads and large ovate leaves, 10–15 cm long, 2.5–6.0 cm wide.

Type collection: Thailand E Nakhon Ratchsima: Khao Yai National Park (Phengkla 580 BKF-holotype, C).


Distribution: endemic to central Thailand.

4. Camchaya pentagona H. Koyama sp. nov.

A C. tenuiflora Kerr cui affinis, involucri bracteis subappendis, setis paucioribus achenio longe-ovobato, 5-costato distinguenda.

Annual herbs with branched stems; stem teret, erect, 1.5 m high, appressed-pilose, 9 mm in diameter at the base of stem; leaves oblanceolate, 7–10 cm long, 1.5–3.5 cm wide, acute at tip, gradually narrowed at base, minutely dentate, subsessile, with patent soft hairs on both surfaces, the leaf base and petiole with short patent hairs; heads numer-
ous, erect, the involucre globose, 10–12 mm long, 10–12 mm wide, the scale numerous seriate with minute hairs, the outer one short, linear, 3 mm long, 0.2 mm wide at very base, the inner scales rather patent, linear-lanceolate with scattered spines; florets about 70 in a head, the corolla 5-lobed, 6 mm long, the lobe 1.7 mm long; achenes about 2.0 mm, 5-costate.

Habitat: on grassy slope at edge of cultivated field, alt. 220 m.

This species is unique to have 5-costate achenes (Fig. 2). Chromosome number 20 is determined in the root tip cells of young plants germinated at our botanic garden. The seeds are collected from the type collection.

Type collection: Thailand E Ubon Ratchathani: Nong Khoon village, Muang Samsib Distr. (Koyama et al. T-30791 KYO-holotype).

Distribution: endemic to eastern Thailand.

5. Camchaya spinulifera H. Koyama sp. nov. (Fig. 3)

A C. montana cui affinis, involucri bracteis appressis, setis longioribus, ca. 1.0 mm longis ornatis, floribus longioribus, 10 mm longis distinguenda.

Annual herbs with erect branched stem; stems erect, 12–100 cm high, appressed hairs and sparsely long patent hairs; leaves broadly oblanceolate, 5–12 cm long, 2–5 cm wide, acuminate at tip, gradually narrowed at base, subsessile, flat or minutely dentate, with patent soft hairs on both surfaces, the leaf base and petiole with long patent hairs; heads small to numerous in number, erect, the involucre about 10–15 mm wide, 13–15 mm long, the scale numerous seriate, the outer one short, the inner scales linear-lanceolate with conspicuous and numerous spines; florets about 130 per head, the corolla 5-lobed, 10 mm long, lobe 2.0 mm long; achenes about 2–2.5 mm long, 10-costate.

Habitat: on grassy slope in scattered Dipterocarpus forest and clearings in evergreen forest along stream, alt. 250–350 m.

The present species is characterized by having conspicuous spines of involucral scales and large heads with about 130 florets in a head. The involucre of this species is very similar to that of C. montana (Gagnep.) Kerr, though I have not seen the type materials of the latter species. C. montana, however, is noted to have small florets, 3.5 mm long and small number (12–30) florets in a head in the original description. Chromosome number is 2n=20. Voucher specimens are indicated by an asterisk in the list below.

Type collection: Thailand NE Mukdahan: Phu Moo Forest Park, Nikomkhamsai Distr. (Koyama et al. T-30837 KYO-holotype).


Distribution: endemic to northeastern Thailand.

This species is easily distinguished from *C. montana* by having rather patent involucral scales with shorter spines, though it is noted by Kerr (1935) to be very closely allied to *C. montana*. No specimen has been brought to the herbaria of BK, BKF, C and KYO, since the original collections were made. The habitat is not recorded on the label of
specimens examined.

Specimens examined. E Chaiyaphum: collected from Chawng Sam Maw and cultivated at Phra Nakhon (Kerr 20567 BK-type). Rachaisima: Korat, Bua Yai (Put 4264 BK).

Distribution: endemic to northeastern part of Thailand.


More than 15 species are known from the tropical region in Elephantopus s. str. In Thailand, following two species are found. E. scaber is widely distributed in whole country, while E. mollis is known only from the peninsular part. They are distinguished from each other as follows.

1. Leaves in a radical rosette present in flowering, abruptly small in size on the stem; flower purple; involucral scales pubescent; pappus bristle scaber, gradually dilated at the base .............................................E. scaber

1. Leaves in a radical rosette absent in flowering, scattered along the stem; flower white; involucral scales subglabrous; pappus bristle slender, abruptly deltoid at the base ................................................... E. mollis


As already mentioned in my previous paper (Koyama, 1982), three varieties, vars. scaber, sinuatus Miq. and penicillatus Gagnep., are distributed in Thailand.


Habitat: on wet grassy slope by stream, alt. 50–80 m.


Distribution: tropical regions of the world, sometimes north and southward into subtropical region.


This is a monotypic genus occurring in the tropical region in the Old World.


Habitat: on sandy bank in river, alt. 200–400 m.

Specimen examined. N Chiang Rai: old Mé Kok bed, about 1 km East of Chiang Rai (Garrett 227 BKF, GH).


This monotypic genus is said to be a tropical American origin, though it is widely distributed in the tropical region of the Old World.


**Habitat:** on wetty grassland by stream in half shade, alt. 2–30 m.

According to my field note, florets have white corolla and violet stygatic branches.


**Reference**


The other references in the text are cited in the list of synonymy.

摘 要 ショウジョウハグマ族 Tribe Vernonieae はキク科植物で、頭花が両性の筒状花のみからなり、花柱分枝が先端へしだいに細くなり、葯胞の下部附属体が短かく矢じり状となるなどの特徴によって、他の属から区別される。約70属からなるが、大部分の属が熱帯域に生育するため、日本ではなじみの少ないものである。琉球、小笠原、九州南部でショウジョウハグマ属 Vernonia とミシマ属 Elephantopus のそれぞれ1, 2種がこの仲間のものとして見られるにすぎない。熱帯域に位置するタイ国にはこれらの属の他に、Camchaya, Euthalia, Struchium の3属がある。属の数で云えば、タイ国は日本の2.5倍の属を有するにすぎない。しかし、ショウジョウハグマ属を取り上げると、日本ではムラサキムカシヨモギ V. cinerea 1種を見るにすぎないのに対し、タイ国には28種も記録されている。しかもこれまでのタイ国における野調調査で得られた資料標本の研究によって、この数はさらに増えそうである。この属の多くは広く東南アジアや中国南部、さらにはヒマラヤに分布しているので、個々の種の実態を把握するためには近隣地域のものとの比較研究が必要である。

しばしば種子植物の種属誌的研究は一通り終ったと云われるが、これとは逆に寒帯域に生育するものに関してであって、熱帯域のものについてはやっと手がつけき始めたと云うのが現状である。この論文でも Camchaya について、2新種と2新変種が記載されている。Camchaya はショウジョウハグマ属に近縁で、カンボジア産の C. kamptensis をタイプとして記載された東南アジアの特産属である。冠毛は剛毛状で、1小花あたりせいぜい9本までと少なく、しかも容易に脱落する。また、すべて1年草で、平地の耕作地周辺や山地の路側に生育する。一方、ショウジョウハグマ属は全世界の熱帯に広く分布する。冠毛は剛毛状で、小花あたり20本以上と多い。また、冠毛が容易に脱落するものもある一方で、短かい剛毛状や鱗片状のものを外側に向けて2列性となるものも多い。一年草から樹高が10 m を越える本格的な高木まであり、石灰岩地や落葉樹の林床などにも生育する。予備的に調査したタイ国産のショウジョウハグマ属10種よりの染色体数はいずれも 2n=18, 36, 54 と x=9 の倍数であった。これに対し、Camchaya の各種はいずれも 2n=20 である。この染色体数の差に関する評価は1000種
M. SHIMIZU & H. KOYAMA: On the chromosome number of Lactuca parishii and L. sororia

Lactuca parishii Craib
Lactuca sororia Miq.

Thailand 2n=18 (left)
Japan 2n=18 (right)

邦産のムラサキニガナ Lactuca sororia とタイ産の L. parishii の染色体数を 2n=18 と算定した。L. parishii については Ixeris parishii (Craib) Kitam. とする見解（本誌、23: 140）がある。そう果の形はニガナ属 Ixeris に似ているが、色は濃紫褐色でニガナ属とは異なる。ニガナ属には 2n=18 の染色体数が報告されていないので、原記載通りアキノゲシ属 Lactuca のものと考えておく。