



## New subspecies of *Ardisia crenata* (Primulaceae) from Thailand

Wannachai CHATAN\* and Wilawan PROMPROM

Department of Biology, Faculty of Science, Mahasarakham University, Kantharawichai District, Maha Sarakham Province, 44150, Thailand

\* Corresponding author's email: wannachaichatan@gmail.com

(Manuscript received 26 October 2016; accepted 15 February 2017; online published 6 April 2017)

**ABSTRACT:** A new subspecies of *Ardisia crenata* Sims (Primulaceae), namely *A. crenata* Sims subspecies *obtusifolia* Chatan & W. Promprom, collected from Nakhon Phanom Province, Thailand, is described and illustrated. The distinguishing morphological characters between two similar subspecies are discussed. The new taxa is clearly different from the other subspecies in shape, apex, margin, texture of leaf blade, primary rachis of inflorescence and sepal characteristic.

**KEY WORDS:** *Ardisia crenata* subsp. *obtusifolia*, Intraspecific classification, Myrsinaceae, Taxonomy, Thailand.

### INTRODUCTION

*Ardisia* Swartz is a genus in the family Primulaceae with more than 500 species, of which about 400 are distributed in Asia (Mao and Hu, 2013). However, this genus was formerly included within the family Myrsinaceae by many taxonomists, such as Larsen and Hu (1996, 2001) and Hu and Vidal (2004). Seventy-two species were recorded as part of the Flora of Thailand, including *Ardisia crenata* Sims and its two varieties, namely var. *crenata* and var. *angusta* C.B. Clarke, and a new record of an *Ardisia* species and some taxonomic changes were reported for Thailand (Larsen and Hu, 1996, 2001). The most recent revision of the genus in Cambodia, Laos and Vietnam was performed by Hu and Vidal (2004) with 104 species reported, including *A. crenata* and the two subspecies, namely subsp. *crenata* and subsp. *crassinervosa* (E. Walker) C. M. Hu & J. E. Vidal.

During fieldwork in Phu Langka National Park, Nakhon Phanom Province and nearby areas in the years 2012–2015, the authors collected many *Ardisia* specimens to study their morphology (both morphology of living and herbarium specimens). After careful examination and comparison with relevant taxonomic literatures, including Sims (1817), Walker (1940), Chen and Pipoly (1996), Hu and Vidal (1996), Larsen and Hu (1996), Hu (1999), Larsen and Hu (2001) and Hu and Vidal (2004), as well as herbarium specimens stored at herbaria in Thailand and Europe including the Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation (BKF); Bangkok Herbarium (BK); Muséum National d'Histoire Naturelle (P); and Royal Botanic Gardens, Kew (K), we found that some *Ardisia* specimens were distinct from previously named subspecies of *A. crenata*, but they could be distinguished from the latter. These plants are recognized as a new subspecies of *A. crenata*. A

description, made from the observation of both dried and fresh materials, and illustrations of the new taxon are given below.

### TAXONOMIC TREATMENTS

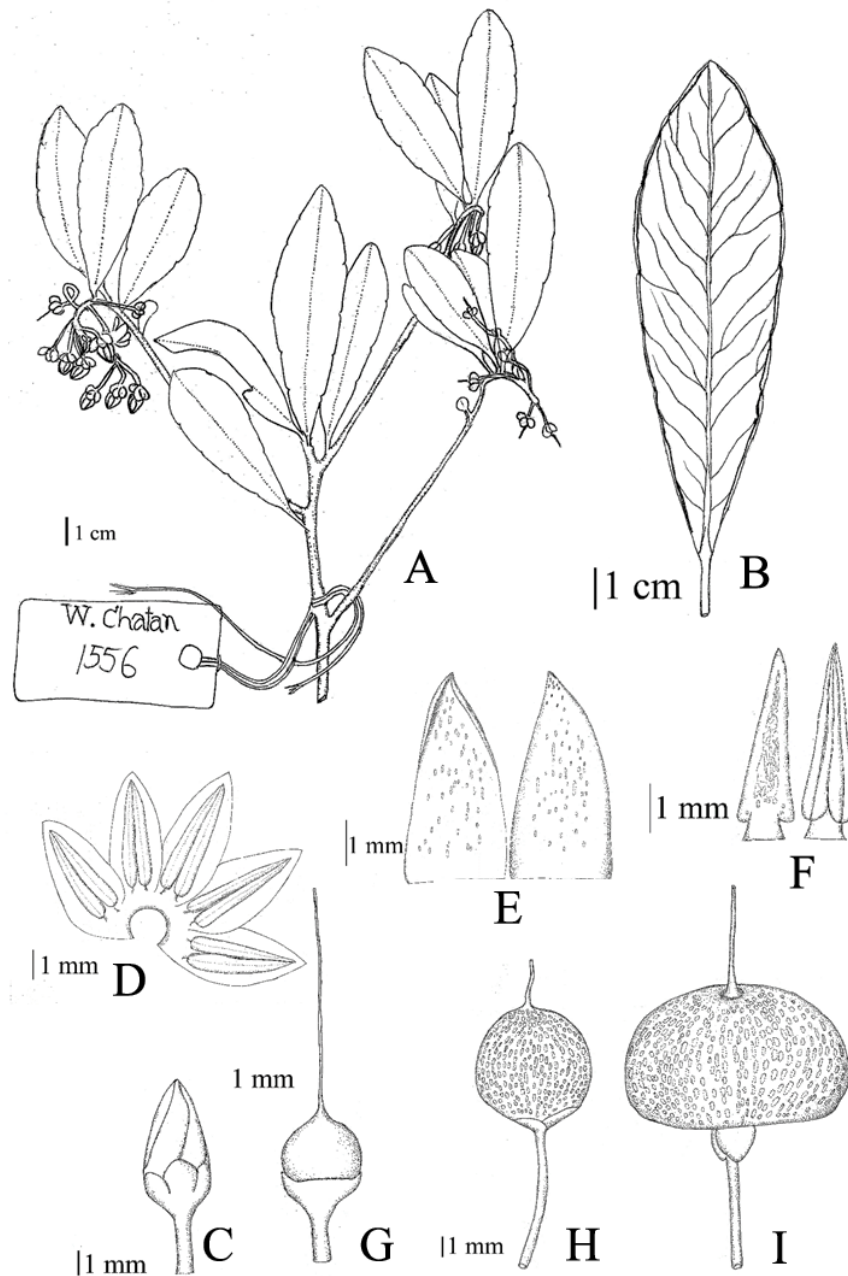
*Ardisia crenata* Sims subsp. *obtusifolia* Chatan & W. Promprom *subsp. nov.*

Type. **Thailand:** Phu Langka National Park, Nakhon Phanom Province, 210–280 m alt., 17°57'04.8" N; 104°09'19.8" E, December 10<sup>th</sup>, 2012, W. Chatan 1556 (holotype: BKF!; isotype: BK!, BKF! & TAI!).

**Figs. 1, 2, & 3**

**Diagnosis:** The new subspecies is different from *Ardisia crenata* Sims subsp. *crenata* and *Ardisia crenata* Sims subsp. *crassinervosa* (E. Walker) C.M. Hu & J.E. Vidal by the following combination of characters: leaf blades spatulate, narrowly elliptic and oblanceolate; highly coriaceous, rarely acute and mostly obtuse blade apices, sub-entire or shallowly crenate and shallowly undulate margin; primary rachis of inflorescence 2–6 mm long; and sepals broadly ovate or suborbicular or orbicular and imbricate at base.

**Description:** Shrubs 40–105 cm high; branchlets slender, terete or angular, striate, generally bearing 3–4 leaves. Leaves alternate, petioles 3–5 mm long; blades highly coriaceous, spatulate and narrowly elliptic and oblanceolate, 2–7 (–11) × 1.2–2 (–2.7) cm; apices rarely acute and mostly obtuse; bases cuneate or acute, margins sub-entire or shallowly crenate, shallowly undulate, recurved, marginal glands (vascularized nodules) at each sinus; both adaxial and abaxial surfaces moderately or densely black-, brown- or colorless-punctate; veins distinct or obscure; intramarginal veins present at ≤ 1 mm from the blade edge, sometimes covered by recurved blade margin. Inflorescences sub-umbellate or corymbiform, simple or compound, terminal on branchlets, glabrous;



**Fig. 1** *Ardisia crenata* subsp. *obtusifolia*. **A.** Branch with inflorescences. **B.** Abaxial side of leaf showing venation pattern. **C.** Floral bud. **D.** Open corolla and stamens (adaxial view). **E.** Corolla lobes, adaxial view (left), abaxial view (right). **F.** Stamens, adaxial view (right), abaxial view (left). **G.** Pistil. **H.** Young (left) and ripe (right) fruits. Drawn by Wannachai Chatan from W. Chatan 1556 (A, C-G) W. Chatan 1453 (B & H).

peduncles absent or up to 3 mm long; primary rachis 2–6 mm long; pedicels 7–11 mm long, pink or greenish pink, surface black-punctate. Calyx of five sepals, free, pink; sepals broadly ovate or suborbicular or orbicular, about 1.5–1.7×1.5–1.8 mm, densely black-punctate and glabrous on both surfaces, distinctly imbricate at base; apices obtuse or rounded. Corolla of five deep lobes, pink, tubes about 1 mm long; lobes convolute in bud, ovate-lanceolate, 4.5–5×2–2.5 mm long, densely

black-punctate on both surfaces and glabrous on both sides. Anthers yellowish brown, narrowly triangular or lanceolate about 2.5–3×1–1.2 mm, black-punctate on back; filaments about 0.5–1 mm long. Gynoecium length is slightly similar to the stamen; ovary globose, 1–1.2 mm diameter, glabrous; styles about 4 mm long. Fruits globose when young and depressed globose when ripe, 5–7 mm diameter, bright red when fresh, brown or black-brown when dry, densely black-punctate.



**Fig. 2.** *Ardisia crenata* subsp. *obtusifolia*. **A.** Branch with inflorescences. **B.** Adaxial side of leaf. **C.** Abaxial side of leaf. **D.** Inflorescences showing many floral buds, sepal aestivation and many ripe fruits (side view). **E.** and **F.** Inflorescences with four buds, a floret during anthesis and one after anthesis (E.= side view and F.= bottom view).



Fig. 3. Habitat and Distribution of *Ardisia crenata* subsp. *obtusifolia* (\*) in Phu Langka National Park, Nakhon Phanom Province, Thailand.

**Distribution:** *Ardisia crenata* Sims subsp. *obtusifolia* Chatan & W. Promprom is an endemic to Thailand. It is only found from type locality and only one population have so far been identified by us during field investigations in the years 2012-2015 at Phulangka National Park, Ban Pheang District, Nakhon Phanom Province. Its distribution is shown in Fig. 3.

**Ecology:** It mostly grows in slightly dense dry dipterocarp forest or open areas, and usually grows on summits. Sometimes it grows in grassland or oak-dipterocarp forest (Fig. 3).

**Phenology:** Flowering in June to November and fruiting in August to February.

**Vernacular name:** Takai or Takai Daeng.

**Conservation status:** So far, *Ardisia crenata* subsp. *obtusifolia* has only been found in the type locality. The individual number of this subspecies was about 40. It should be classified as Critically Endangered (CR, D), according to IUCN red list criteria (IUCN, 2012).

**Etymology:** The infraspecific epithet of this subspecies was chosen for its leaf apices that were mostly obtuse.

**Additional Specimens examined:** THAILAND: Nakhon Phanom Province: Phu Langka National Park, December 10<sup>th</sup>, 2011, W. Chatan 1124 (BKF); September 16<sup>th</sup>, 2012, W. Chatan 1453 (BKF).

**Notes:** Both vegetative and reproductive morphological characters of *A. crenata* were variable (Larsen and Hu, 1996). They noted that the inflorescence might be simple or compound, puberulous or glabrous. Leaf blade was up to 21 cm long and its texture might be thin-chartaceous to subcoriaceous. In addition, we found some other variation of this species such as blade shape, apex, margin and highly coriaceous texture in this study.

Formerly, *A. crenata* was classified into three subspecies: *A. crenata* subsp. *crenata*, *A. crenata* subsp. *crassinervosa* (E. Walker) C. M. Hu & J. E. Vidal and *A. crenata* subsp. *mouretii* (Pit.) C. M. Hu & J. E. Vidal. The first subspecies was found in Japan, China, Indochina, South-East Asia, while the second one was found in southern China, Indochina and Malay Peninsula and the last one was found in southern China, Hong Kong and Vietnam (Hu and Vidal, 1996; Hu and Vidal, 2004). However, when the most recent revision of this species was performed, *A. crenata*

subsp. *mouretii* was reduced to a synonym under *A. crenata* subsp. *crenata* (Hu and Vidal, 2004). Currently, the new subspecies of *A. crenata*, namely subsp. *obtusifolia* has been found. This subspecies is naturally distributed in Phu Langka National Park, Nakhon Phanom Province, the Northeast of Thailand. Up to now, there are three subspecies of *A. crenata* have been recognized, including the new subspecies.

*A. crenata* subsp. *obtusifolia* differs from subsp. *crenata* by having the following combination of characters: the former has highly coriaceous blades, blade shapes spatulate, narrowly elliptic or oblanceolate, blade apices mostly obtuse and rarely acute, primary rachis of inflorescence 2–6 mm long, sepals broadly ovate or suborbicular or orbicular and imbricate at the base; while, the latter has chartaceous or subcoriaceous blades, blade shapes elliptic or oblong-lanceolate, blade apices acute or acuminate, inflorescences without or with a very short primary rachis (less than 2 mm), ovate or ovate-oblong sepals and not imbricate at base of sepals. In addition, the new subspecies differs from *A. crenata* subsp. *crassinervosa* by having the following combination of characters: in the former subspecies, blades are spatulate, narrowly elliptic and oblanceolate, highly coriaceous, rarely acute and mostly obtuse blade apices; while, in the latter subspecies, the blades are narrowly elliptic and oblanceolate, subcoriaceous or coriaceous, blade apices mostly acute and rarely obtuse. A comparison of the distinguishing features between the three subspecies is shown in Table 1.

## ACKNOWLEDGEMENTS

The authors are indebted to Phulangka National Park and the Department of National Parks, Wildlife and Plant Conservation for their permission to collect and study plants in the national park, and to my research team, including Mr. Nopphanun Kanitthaisong, Mr. Peerapon Saisaard, Mr. Teerawut Namsawang and others for help during field trips. Thanks for linguistic advice from Dr. Jolyon Dodgson, Faculty of Science, Mahasarakham University. This research was financially supported by Mahasarakham University, 2015 copyright of Mahasarakham University.

**Table 1.** Distinguishing features between *Ardisia crenata* subsp. *crenata*, subsp. *crassinervosa* and subsp. *obtusifolia*.

Characters	Subsp. <i>crenata</i>	Subsp. <i>crassinervosa</i>	Subsp. <i>obtusifolia</i>
Blade texture	Chataceous or subcoriaceous	Subcoriaceous or coriaceous	Highly coriaceous
Blade shape	Elliptic or oblong-lanceolate	Narrowly elliptic or oblanceolate	Spathulate, narrowly elliptic or oblanceolate
Blade apice	Acute or acuminate	Mostly acute and rarely obtuse	Mostly obtuse and rarely acute
Blade margin	Undulate-crenate	Undulate-crenate	Sub-entire or shallowly crenate, undulate
Primary rachis of inflorescence length	Absent or less than 2 mm	About 5 mm	2–6 mm
Sepal characteristics	Shapes ovate or ovate-oblong and not imbricate	Shapes broadly ovate or suborbicular and imbricate at base	Shapes broadly ovate or suborbicular or orbicular and imbricate at base

## LITERATURE CITED

- Chen, J. and J.J. Pipoly III.** 1996. Myrsinaceae. *In*: Wu, Z.Y. & Raven, P.H. (eds.), *Flora of China* 15. Science Press, Beijing; & Missouri Botanical Garden Press, St. Louis, 1–38.
- Hu, C.-M.** 1999. New synonyms and combinations in Asiatic *Ardisia*. *Blumea* **44**: 391–406.
- Hu, C.-M. and J.E. Vidal.** 1996. Towards a revision of the Myrsinaceae of Indochina. *J. Trop. Subtrop. Bot.* **4**(4): 1–15.
- Hu, C.-M. and J.E. Vidal.** 2004. Myrsinaceae. *In*: Morat, A. (ed.), *Flore du Cambodge, du Laos et du Vietnam* 32. Muséum National D'Histoire Naturelle, Paris, 9–152.
- IUCN.** 2012. IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK. 32pp.
- Larsen, K. and C.-M. Hu.** 1996. Myrsinaceae. *In*: Larsen, K. (ed), *Flora of Thailand* 6(2). Diamond Printing, Bangkok, 81–178.
- Larsen, K. and C.-M. Hu.** 2001. Note on the genus *Ardisia* (Myrsinaceae) from Thailand. *Nord. J. Bot.* **21**(2): 147–148.
- Mao, S.-Z. and C.-M. Hu.** 2013. *Ardisia rubricaulis* sp. nov. (Primulaceae) from Guangxi, China. *Phytotaxa* **138**(1): 39–42.
- Sims, J.** 1817. *Ardisreia crenata*. *Curtis's Bot. Mag.* **45**: 1950.
- Swartz, O.** 1788. *Nova Genera & Species Plantarum seu Prodrromus*. In Bibliopoliis Acad. M. Swederi, Stockholm, Uppsala and Abo, 1–152.
- Walker, E.H.** 1940. A revision of the Eastern Asiatic Myrsinaceae. *Philipp. J. Sci.* **73**:1–258.