

New records of Thailand mosses collected from Chiang Mai Province

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Abstract. Seven new moss records are reported for Thailand moss flora, namely *Anacamptodon latidens*, *Fissidens beckettii*, *Fissidens bryoides* var. *esquirolii*, *Fissidens bryoides* var. *schmidii*, *Fissidens flabellulus*, *Fissidens guangdongensis*, and *Weissia platystegia*. *Anacamptodon* is a new generic record for Indochina. *Anacamptodon latidens*, *Fissidens bryoides* var. *esquirolii*, *Fissidens bryoides* var. *schmidii*, *Fissidens flabellulus*, and *Fissidens guangdongensis* are also new records for the Indochinese moss flora.

Introduction

Thailand, formerly Siam, is located in continental SE Asia between the latitudes 6°-20° N and longitudes 98°-105° E. It shares borders on the west and northwest with Myanmar, on northeast with Laos, on southeast with Kampuchea, and on south with Malaysia. With an area of 513,115 square kilometers, the country exhibits a diverse landscape, ranging from sea level to 2,565 meters in elevation. The climate is monsoonal with a dry and hot season lasting from 4-6 weeks in the peninsula, and 3-4 months in the north and northeast (Maxwell 2004). As a result, two basic forest types are recognized

for the country, viz., wet evergreen and deciduous (Maxwell 2004). However, there are seven floristic regions in Thailand which roughly correspond with the rainfall and vegetation types (Smitinand 1989; Maxwell 2004). Under this phytogeographical scheme, Chiang Mai Province falls within the North Floristic Region which has a strong affinity with the floras of China (Yunnan) and Myanmar, with influences from the Indian Himalayan flora. This characteristic feature of the flora of North Region is borne out by the new moss records reported below.

The history of botanical studies of the country's flora was recently reviewed by Maxwell (2004), and a historical synopsis of Thailand bryology was presented by He Si (see <http://www.mobot.org/MOBOT/moss/Thailand/history.shtml>). Important past publications on mosses of Thailand include Dixon (1932, 1935), Noguchi (1960), Horikawa and Ando (1964), Tixier and Smitinand (1966), Touw (1968) and Tixier (1971). Tan & Iwatsuki (1993) published a checklist of Indochinese mosses, which included references of 563 Thai mosses in 167 genera, while an electronic moss checklist of Thailand housed at the MO website (<http://www.mobot.org/MOBOT/moss/Thailand/list.shtml>) reported 620 species and 31 subspecific taxa distributed in 190 genera and 52 families.

Although Thailand has been botanized extensively in the past and has a relatively well known moss flora (Tan and Iwatsuki 1993) among the Indochinese countries, a new, small collection of mosses, mainly from Chiang Mai Province, has yielded eight new species records of mosses for the country. In August of 2005, a workshop on the biodiversity and conservation of bryophytes and lichens was conducted at Chiang Mai University. Subsequently, a field trip was organized to visit the oak-pine mixed montane deciduous forest at Doi Mon Long Viewpoint to collect mosses for study. Below we report six new moss records that came out of this endeavour. In addition, two other new records of Thailand mosses collected from Doi Suthep and Doi Ithanon are also included.

It is noteworthy that the seven new moss records, mostly *Fissidens*, belong to the micro species group with the plants less than 5 mm tall. This may explain why the species have not been seen by previous collectors in Thailand. Except for *Weissia platystegia*, which is an ephemeral, and probably opportunistic species, the distribution patterns of the remaining seven mosses highlight further the Sino-Japanese and Indian Himalayan floristic connections of the Chiang Mai flora.

New Thailand moss records

Anacamptodon latidens (Besch.) Broth. –

This is a small moss species that forms greenish mats on bark and knothole of tree trunk. The leaves are oval to ovate-lanceolate, with a short single costa (ecostate on a few leaves), reaching half the length of the leaf. The leaf cells are oval and short-oblong. Leaf alar cells are quadrate. The erect capsule has a wide mouth with recurved and papillose outer peristome teeth, an unmistakable feature of the genus. An illustration of this species in Noguchi (1991) shows very well this character seen in our Thai specimen.

The distinction between *A. latidens* and the widespread boreal species, *A. splachnoides* (Brid.) Brid., is not clear. Here we refer our Thai collection to the former taxon because it is a widespread temperate Asiatic species known from Russian Siberia, Mongolia, Japan, China, Himalaya and India.

Anacamptodon Brid. is a new generic and species record for the Indochinese moss flora (see Tan and Iwatsuki 1993).

Specimen studied: on bark of tree trunk, Doi Mon Long Viewpoint, coll. *Tan 05-102* (SINU).

Fissidens beckettii Mitt. (Plate 1) –

The very small plant with curved capsules, and the somewhat asymmetrical leaf outline bending at the junction of the vaginant laminae, point to this species for a positive identification. *Fissidens beckettii* is reported also from Myanmar, Japan and China.

Specimen studied: Doi Mon Long Viewpoint, coll. *Kanjana & Tan 05-100* (SINU).

Fissidens bryoides Hedw. var. *esquirolii* (Th ) Z. Iwatsuki & Tad. Suzuki –

This variety of *Fissidens bryoides* is characterized by weakly developed limbidia, mostly confining to the vaginant laminae of perichaetial leaves. Stem cross section shows none to weakly differentiated central strand. It is similar in leaf outline and leaf areolation to *F. schwabei*, but the latter has curved capsule. Leaf cells more or less are mammillose. No axillary hyaline nodule was seen in the Thai specimens. *Fissidens bryoides* var. *esquirolii* is known from Japan, China and Taiwan. It is new to Indochina.

Specimen studied: on tree trunk, Doi Mon Long Viewpoint, coll. *Tan 05-106* (SINU).

Fissidens bryoides Hedw. var. *schmidii* (Muell.Hal.) Chopra & Kumar –

This is a common variety of *Fissidens bryoides* in Malesia and also in southern China. Although the variety was described in Iwatsuki and Suzuki (1982) to have no central strand in the stem cross-section, the drawing of this species in the publication does show a somewhat differentiated central strand. Leaf cells of var. *schmidii*, measuring 7-10 µm, are strongly mammillose. No axillary hyaline nodule was seen. *Fissidens bryoides* var. *schmidii* is widely distributed from Japan, China, India, Pakistan, Sri Lanka, to the Philippines, Indonesia and New Guinea. It is a welcome addition to the Thai and Indochinese floras.

Specimens studied: common on soil along paved trail at Ang Ka, 2500 m, summit of Doi Ithanon, colls. *Tan 05-103, 05-104, 05-105, Kanjana 175* (SINU).

Fissidens flabellulus Thwaites & Mitten –

The crenulate margin, at times irregularly so, formed by the protrusion of somewhat mammillose, thin-walled cells along the leaf margin, is distinctive for this species. The laminal cells, measuring 12-15 x 20-25 µm, are quadrate to polygonal, with a good proportion of mixture of short rectangular cells. Although

the leaf cells are described as quadrate to hexagonal in many publications (Iwatsuki & Suzuki, 1982; Li and Iwatsuki 2001), the illustrations of leaf areolation in Iwatsuki and Suzuki (1982, Pl. XXX, figs. 10, 11 & 14) show several rectangular ones. Overall, the size of leaf cells is rather large for a species of micro-*Fissidens*, such as *F. flabellulus*. Our Thai specimen matches well the illustrations of this species shown in Eddy (1988, Fig. 55 on p. 67), which was considered a synonym of *F. serratus* Muell.Hal. Here we follow Li and Iwatsuki (2001) in accepting the two as separate species.

Compared to *Fissidens flabellulus*, *F. serratus* is characterized by having sharply serrate (not crenulate) leaf margins and the leaf cells are clearly unipapillose (not mammillose). Axillary hyaline nodule is differentiated in *Fissidens flabellulus*, but is observed to be weakly differentiated in *F. serratus*. *Fissidens flabellulus* is known from Japan, China, Malaysia, India, and Sri Lanka, and is a new moss for Indochina.

Specimen studied: Doi Mon Long Viewpoint, coll. *Kanjana & Tan 05-101* (SINU).

Fissidens guangdongensis Iwatsuki & Z.-H. Li (Plate 2) –

This species is similar to the widespread *Fissidens pellucidus* Hornsch. in leaf morphology and areolation, except for its costa, which disappears several cells below the leaf apex. *Fissidens guangdongensis* was only given a taxonomic recognition recently (Li 1985). Thereafter, it was identified and reported from many countries in SE Asia (Tan and Choy 2002). Its presence in Thailand is to be expected. *Fissidens guangdongensis* is also a new moss record for the Indochina region.

Specimen studied: on soil, roadside, Doi Mon Long Viewpoint, coll. *Kanjana 158* (SINU).

Weissia platystegia (Dixon) A. Eddy –

The specimen, unfortunately or fortunately, has one somewhat mature, sessile capsule showing a differentiated operculum with a rather long conic lid. Eddy (1990) described the leaves of this species on the basis of Papua New Guinea plants as „narrowly lanceolate, tapered to acute apices; costa excurrent as a small cusp...“

Weissia platystegia was reported from Vietnam for the first time outside of its Australasian range by Tan et al. (2003). The Vietnamese plant specimen has a shorter opercular lid than those illustrated by the PNG specimens.

Specimen studied: on soil in forest, 800 m, Doi Suthep, coll. *Sodchit 126* (SINU).

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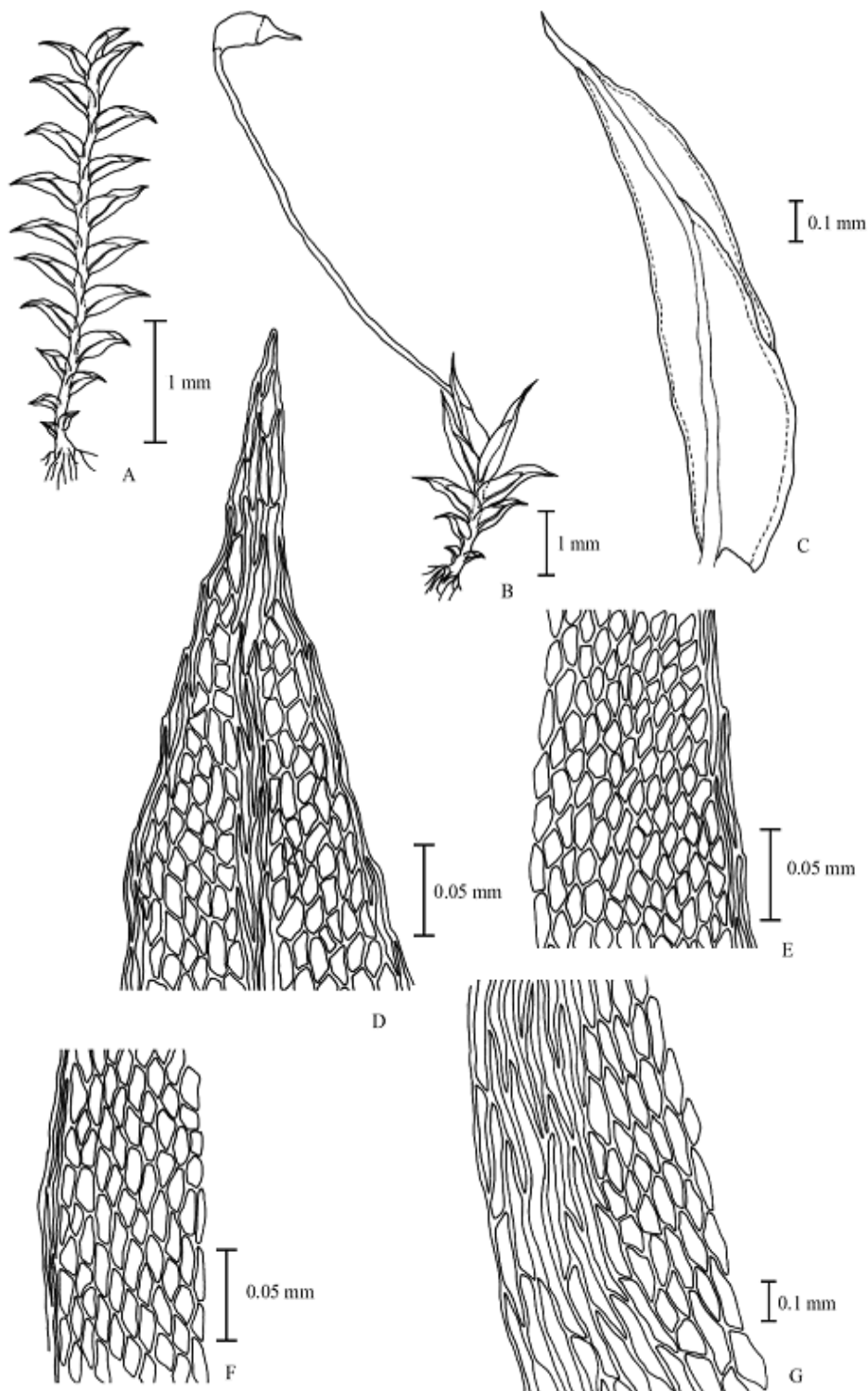


Plate 1. *Fissidens beckekeittii* Mitt. (based on *Kanjana & Tan 05-100*). A & B. Plant habit; C. Leaf showing the bending outline; D. Leaf apex; E & F. Leaf margins; G. Basal part of vaginant lamina showing the limbidium.

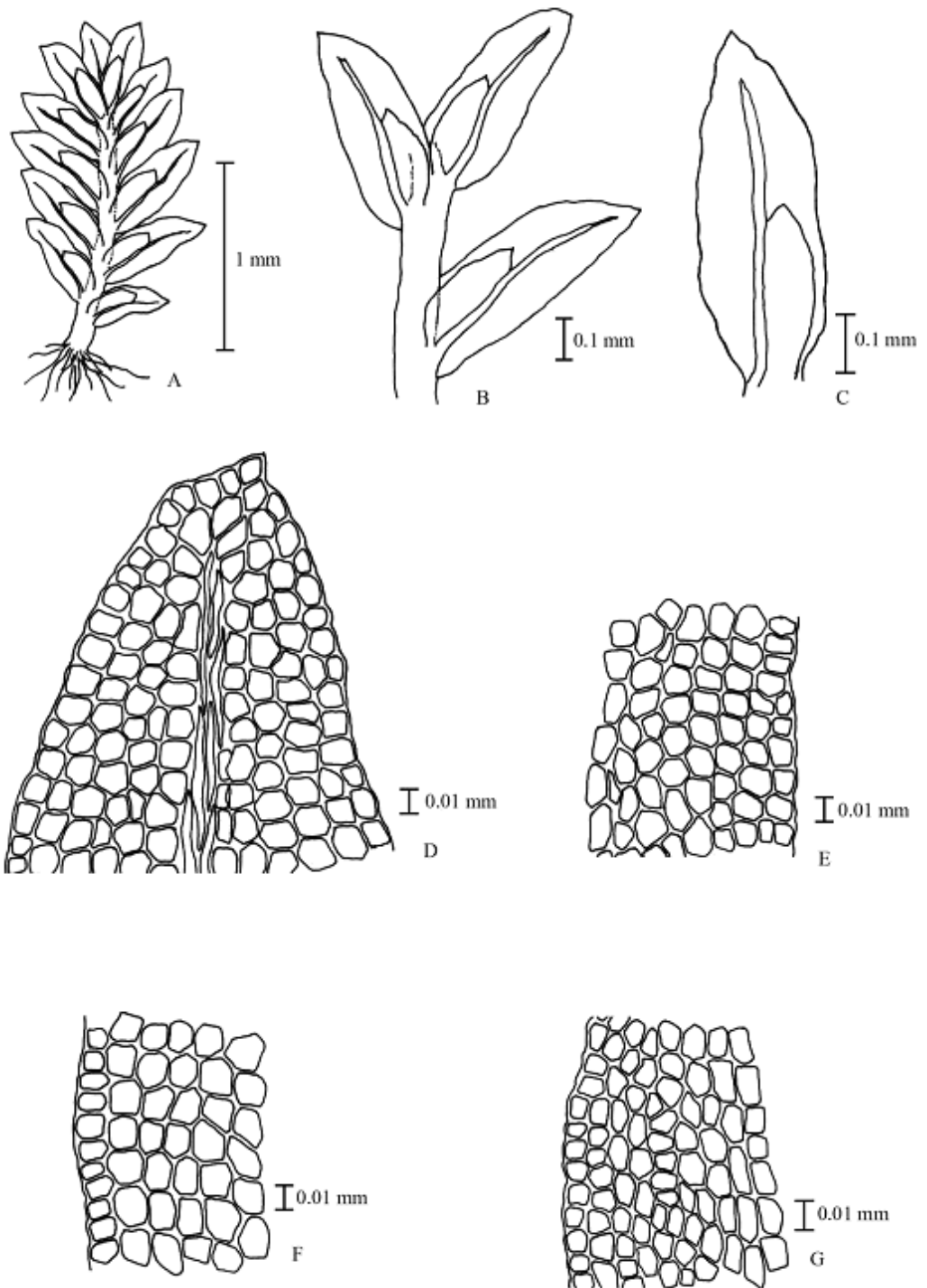


Plate 3. *Fissidens guangdongensis* Iwats. & Li (based on *Kanjana 158*). A. Plant habit; B. Stem with leaves; C. Leaf; D. Leaf apex; E – G. Portion of lamina showing the leaf cells and margin without limbidium.