**Pleocnemia conjugata** (Dryopteridaceae), a new record for Thailand

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ABSTRACT. *Pleocnemia conjugata* (Blume) C.Presl, a new record for Thailand, is described and illustrated.

KEY WORDS: Dryopteridaceae, fern, new record, *Pleocnemia conjugata*, Tectariaceae, Thailand.

**INTRODUCTION**

Until recently, the fern genus *Pleocnemia* C.Presl was thought to be represented in Thailand by only three species, *P. hemiteliiformis* (Racib.) Holttum, *P. irregularis* (C.Presl) Holttum and *P. submembранacea* (Hayata) Tagawa & K.Iwats. These were treated under Dryopteridaceae in the Flora of Thailand (Tagawa & Iwatsuki, 1988) and under Tectariaceae by Lindsay et al. (2009). However, the recent phylogenetic work of Liu et al. (2014) supports their retention in Dryopteridaceae.

In May 2005 and June 2007 several specimens of an interesting but unfamiliar *Pleocnemia* species were collected in Khao Pu Khao Ya National Park, Phatthalung province. Subsequent herbarium and library research revealed this species to be *Pleocnemia conjugata* (Blume) C.Presl. As this is a new record for Thailand, the key to *Pleocnemia* given in the Flora of Thailand needs to be amended and a thorough description needs to be provided.

**AMENDED KEY TO THE SPECIES OF PLEOCNEMIA IN THAILAND**

1. Frond bipinnatifid or bipinnate, sori without indusia
   - *P. irregularis*

2. Frond bipinnatifid; veins copiously anastomosing to form areoles other than costal and costular ones
   - *P. hemiteliiformis*

3. Base of pinnules not widened; no glands on sporangia
   - *P. submembранacea*

4. Base of pinnules conspicuously widened; glands present on sporangia
   - *P. conjugata*

**DESCRIPTION**


Terrestrial. *Rhizome* short, stout, erect or decumbent, the apex appearing woolly due to a dense

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covering of very long, soft, linear scales. **Scales** basally attached (although rather loosely so), up to 25 mm long and 0.8 mm wide (at the base, less than 0.1 mm wide above the base), concolorous brown or reddish-brown, margins coarsely toothed. **Stipe** to ca 115 cm long, densely scaly at base (with scales similar to those on the rhizome), glabrous or apparently so above the base (with a good microscope, sparse, small, appressed, scales can sometimes be seen). Stipe slightly flattened above, not grooved in fresh material (but often grooved when dry), reddish-brown at base and below for its entire length, green above. **Lamina** tripinnate, deltoid-ovate in outline, up to ca 120 cm long and ca 125 cm wide, green and slightly shiny above, much paler and not shiny below, subcoriaceous. **Rachis** similar to stipe, reddish-brown below, at least in lower part, green above, not grooved when fresh. **Pinnæ** up to ca 17 pairs of free pinnæ consisting (from the base upwards) of one pair of tripinnate pinnæ, up to 4 pairs of widely-spaced bipinnate pinnæ, and up to 15 pairs of pinnatifid or more shallowly-lobed pinnæ. The basal pinnæ or suprabasal pinnæ usually the longest or the lowermost 2 or 3 pairs of pinnæ more-or-less the same length. Basal pinnæ up to ca 70 cm long and 45 cm wide, long-stalked (to 6.5 cm), reflexed, asymmetrically triangular due to several enlarged basiscopic pinnule, the first (basal) basiscopic pinnule pinnate, to 35 cm long and 8.5 cm wide, the second (and sometimes third) basiscopic pinnule always absent. Suprabasal and other large bipinnate pinnæ up to ca 70 cm long and 25 cm wide, shortly stalked or sessile, not reflexed, oblong or lanceolate, base truncate, apex acuminate, with 14–17(–20) pairs of free pinnules before the pinnatifid apex. **Pinnules** (excluding those of the basal pinnæ), sessile, angled at about 60 degrees to the costae, the largest ca 6–10(–13) cm long × 1.3–1.8 (–2.3) cm wide, somewhat oblong, base truncate, apex acuminate, the margins lobed to a little more than half way to costule. **Lobes** 4–6 mm wide, falcate, apex rounded or blunt, margins toothed distally. Each pair of lobes separated by a narrow sinus, a short blunt tooth-like structure at the base of each sinus (projecting from the dorsal surface of the lamina before being pressed). **Veins** distinct on both surfaces, veinlets anastomosing to form long costular areoles (between the midveins of the lobes) and a few irregularly shaped areoles between the costules and the sinuses; a few additional irregularly shaped areoles on each side of the midveins of the lobes but usually only in the basal part of the lobes, the more distal veins being free, forked once or twice. **Indumentum**: the midveins of the lobes and some veinlets bearing oblong, unicellular, translucent-yellow, glandular hairs below, without such hairs above. **Veinlets** sometimes also bearing very sparse, fine, transparent, patent, uniseriate glandular hairs below, without such hairs above. Costae and costules bearing numerous transparent, patent, uniseriate hairs below. **Costae** densely covered with similar but shorter hairs above. **Costules** glabrous above. **Rachis** glabrous or sparsely hairy below (with or without sparse, small, appressed scales similar to those on the stipe), sparsely or densely hairy above. **Sori** round, dorsal on veinlets, mostly medial (midway between the midvein and margin of each fertile lobe), some supramedial (slightly closer to the margin than to the midvein of each fertile lobe), indusiate, indusia round-reniform, glabrous, persistent, usually folded in half at maturity. **Sporangia** long-stalked, glabrous. **Sporophores** monolette, bilateral, bean-shaped with winged perispore.

**Thailand.**—— **Peninsular**: Phatthalung [Si Banphot District, Khao Pu Khao Ya National Park, Riang Thong Waterfall, 180 m, 12 May 2005, Simma et al. 190 (**BKF**, 2 specimens); same locality, 20 June 2007, Simma & Kaewkhao 288 (**BK, BKF, SING**); same locality, 20 June 2007, Simma & Kaewkhao 294 (**BKF**)].

**Distribution.**—— Southern Myanmar, Malaysia (Peninsular, Sabah, Sarawak), Singapore, Indonesia (Kalimantan, Java, Sumatra, Sulawesi, Lesser Sunda Islands, Moluccas), Philippines, Papua New Guinea (Holttum, 1974). Records from Hong Kong (e.g. Holttum, 1991) were misidentifications for other **Pleocnemia** species.

**Ecology.**—— **Pleocnemia conjugata** is a large terrestrial fern. In Thailand, it grows on the banks of a stream in evergreen forest at an altitude of 180 m. In Peninsular Malaysia, it grows in semi-shade in lowland dipterocarp forest and hill dipterocarp forest up to 560 m altitude (Jaman & Latiff, 1999). Throughout its range it appears to have a preference for lightly shaded or rather open forest and, according to Holttum (1955), “it certainly does not occur in normal fully shaded primitive forest”. Holttum (1991) also concluded that **P. conjugata** grows in places...
with a short regular dry season but its discovery in Pulau Tioman and Singapore (since 1991) indicates that it is capable of growing in aseasonal forests.

Proposed IUCN conservation assessment.— Least Concern (LC). This species is widespread with a large AOO and EOO and with no known uses leading to discernable threats.

Notes.— (1) The indumentum of Pleocnemia conjugata is somewhat variable across its range. All plants are characterized by the presence of at least some unicellular translucent-yellow glandular hairs below (at least when fresh; often discoloured, damaged or destroyed by alcohol and/or drying) and transparent uniseriate hairs on many axes above and/or below. However, the density and distribution of these hairs is somewhat variable (e.g. Singaporean plants have yellow glandular hairs on the costae and costules as well as on the midveins of the lobes and veinlets; and the costae, costules and rachises have no uniseriate hairs below). The description of the indumentum given above is based on Thai material.

(2) There is some uncertainty as to whether or not the type of Aspidium conjugatum Blume still exists. Holttum (1991) implied that the holotype was at L, with an isotype at K, but Peter Hovenkamp has been unable to trace any original material in Leiden and the so-called isotype at K (which, from its annotations, is obviously the specimen to which Holttum refers) appears not to bear Blume’s handwriting and is labelled as being from Java rather than from the Moluccas as stated in the protologue. Another problem with the Kew ‘type’ is that although it has only 6 sori these are submarginal not on-medial sori although he omitted to mention this possibility in his later Flora Malesiana description (Holttum, 1991).

(3) Holttum’s descriptions of P. conjugata are a little confusing because he refers to costae as “pinna-rachises” or simply “rachises” and to “costal areoles” instead of “costular areoles”, etc. In our description we use the words rachis and costae in their more conventional senses; that is, that the rachis is the main axis of the lamina, the axes arising from it are costae, the axes arising from costae are costules and the axes arising from the costules are (in this species which has lobes not pinnules) the midveins of the pinnule lobes.

(4) Although the basal pinna illustrated in Figure 1 was drawn from Simma et al. 190, both of the duplicates at BKF now, unfortunately, lack their basal pinnae. The most complete specimens are Simma & Kaeowkhaeo 294 (BKF) and Simma & Kaeowkhaeo 288 (BKF, SING).

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REFERENCES


Figure 1. Pleocnemia conjugata (Blume) C.Presl; (A) basal pinna attached to stipe and rachis; (B) pinnule lobes with sori (same as Fig. 2B); (C) stipe scale. Drawn from R. Simma et al. 190 (BKF) by R. Simma.


Figure 2. Pleocnemia conjugata (Blume) C.Presl; (A) plant in nature; (B) pinnule lobes with sori (same as Fig. 1B); (C) whole frond showing the tripinnate basal pinnae. All photos by R. Simma.