

Two new *Casearia* (Salicaceae) species from Thailand, and notes on *Casearia grewiifolia* var. *gelonioides*

BOB HARWOOD* & NOOTJAREE TATHANA**

ABSTRACT. *Casearia gallifera* Tathana and *Casearia parvistipula* Tathana are newly described, and the status of *Casearia grewiifolia* Vent. var. *gelonioides* (Blume) Jessup and *Casearia calva* Craib are discussed.

KEY WORDS: Achariaceae, *Casearia calva*, *Casearia grewiifolia*, new *Casearia* species, Thailand.

INTRODUCTION

Since Sleumer (1985) revised Flacourtiaceae in Thailand, including *Casearia* Jacq. all the genera of the family have been transferred to other families (Chase et al, 2002). Of the genera in Thailand, *Hydnocarpus* Gaertn., *Ryparosa* Blume and *Scaphocalyx* Ridl. have been transferred to Achariaceae, and the rest (*Bennettiodendron* Merr., *Casearia*, *Flacourtia* L'Her., *Hemiscolopia* Slooten, *Homalium* Jacq., *Osmelia* Thwaites, *Scolopia* Schreb. and *Xylosma* G.Forst.) to Salicaceae. Alford (<http://tolweb.org/Samydaceae/>) provides compelling evidence for including *Casearia* (and also *Osmelia*, of the genera occurring in Thailand) in Samydaceae, so further changes at family level are possible. Very little work has been done on Thai *Casearia*, the most recent (and comprehensive) being by Sleumer (1985). Some characteristics of all Thai *Casearia* species (and thus not necessarily mentioned in the descriptions and discussions below) are simple alternate leaves in one plane; pellucid dots and short lines visible on the blade of the leaf when held to the light (in some species these are also visible on the herbarium specimens, but on others they are even very difficult to see on fresh material held up to the light); new leaves with deciduous teeth on the margin, the mature leaf margin sometimes slightly serrate where teeth have fallen off, other times appearing entire; deciduous

stipules (but always present on the new growth immediately below the emerging leaf, and very useful for recognising some species); axillary fascicled inflorescences; bisexual flowers with five sepals, no petals, 7–11 stamens alternating with shorter hair-tipped disc lobes; fruits ripening yellow, seeds surrounded by a red aril.

Status of *Casearia grewiifolia* Vent. var. *gelonioides* (Blume) Jessup

Sleumer (1954, 1972, 1985) synonymised 17 species and varieties under *C. grewiifolia* Vent. var. *gelonioides* (Blume) Jessup, a taxon he regarded as being widespread in Malesia, and also occurring in Australia and Thailand. The basionym of this taxon, *C. hexagona* Decne. var. *gelonioides* Blume, is from Timor, as are *C. hexagona* var. *hexagona* and *C. uniflora* Decne., the latter two taxa also amongst those synonymised under *C. grewiifolia* var. *gelonioides* by Sleumer. In Thailand alone there are three good species that would be recognized by Sleumer as *C. grewiifolia* var. *gelonioides*, namely the two new species described below (*C. gallifera* Tathana, *C. parvistipula* Tathana) and *C. calva* Craib; the latter placed as a synonym of *C. grewiifolia* var. *gelonioides* by Sleumer.

Casearia calva is certainly more than just a variety of *C. grewiifolia*. New growth indumentum and stipules, both important characters for

* bob.harwood@yahoo.com

** Queen Sirikit Botanic Garden, The Botanical Garden Organisation, PO Box 7, Mae Rim, Chiang Mai 50180, Thailand.

distinguishing *Casearia* species, are very different in the two taxa, as are their fruits and their habitat, although Sleumer mistakenly thought the two taxa occurred together. In his Thailand treatment (1985) he wrote of *C. grewiifolia* var. *gelonioides*: 'Differs from typical *C. grewiifolia* by a pronounced glabrescence in all parts, and apparently occurring together with it in many places'. However, the two taxa do not occur together in Thailand. *Casearia grewiifolia* always occurs in more open areas, such as dry deciduous forests, while *C. calva*, as well as the two new species described here, occur in wetter, more densely forested areas. Sleumer examined at least two specimens of one of these new species, *C. gallifera*, citing one (Geesink 8260) as *C. grewiifolia* var. *gelonioides*, and the other (Van Beusekom & Phengklai 1331) as *C. flavovirens* Blume, another glabrescent or glabrous species. It is unlikely that he saw any material of the second new species, *C. parvistipula*, as the only collections at BKF are quite recent.

Casearia grewiifolia var. *gelonioides* needs to be raised to species level and split into several species. In this paper we will use the name *C. calva* for a part of *C. grewiifolia* var. *gelonioides*, although it is possible that an older name exists at the species level. We have examined specimens from Timor and found two taxa that Sleumer would recognize as *C. grewiifolia* var. *gelonioides*, including one matching the type of *C. calva* (we have also seen specimens of this taxon from Peninsular Malaysia and Java). The two Timor names that Sleumer sunk (*C. hexagona*, *C. uniflora*) are the oldest, but examination of photos of the

type specimens shows neither taxon to match *C. calva*. The type photos of some other taxa synonymised under *C. grewiifolia* var. *gelonioides* resemble *C. calva*, but the types need to be examined under a microscope to be certain. The photos suggest there may be even more good species outside Thailand than the ones discussed here.

New species

The two new species described here have affinities with *C. calva*, both having hairs on the unfurling leaf, but the hairs quickly fall off as the opened leaf below it on the stem is usually already totally glabrous (*C. calva* sometimes even lacks hairs on the unfurling leaf). The presence or absence of hairs on the new growth ('new growth' refers to any of the many stem tips on the tree that currently have new leaves unfurling, and the term includes the unfurling leaf, stipules, and the part of the stem immediately below the stipules) is not diagnostic, it seems that all species have quite a bit of variation in the amount and density of hairs present. However, characters of the hairs are diagnostic, and *C. gallifera* differs from *C. calva* by these new growth hairs being red-brown, longer and appressed. Other differences include the flowers and fruits of *C. gallifera* being on much shorter, stouter pedicels, and the fruits much larger.

Casearia parvistipula Tathana differs from *C. calva* by having much smaller stipules and the calyx lobes having hairs on the inside. This species is one of only two species of *Casearia* in Thailand to have hairs on the inside of the calyx lobes, the other being *C. clarkei* King.

KEY TO THE THAI SPECIES IN THIS COMPLEX

1. Sepals hairy inside; stipules to 1 mm long
1. Sepals glabrous inside; stipules 2–3 mm long
 2. Flower pedicels < 2 mm long; fruits > 30 mm dia.
 2. Flower pedicels to 7 mm long; fruits to 15 mm dia.

1. *Casearia calva* Craib, Bull. Misc. Inf. Kew: 405. 1930; Fl. Siam. En. 1: 735. 1931. Type: Thailand, Chiang Mai, Chom Thong (Chawm Thawng), Mae Ya, 1000 m, evergreen forest, Kerr 5365 (holotype **K**; isotype **BK!**).

Tree, to 25 m tall; bark smooth, grey-brown; new growth of stems most commonly glabrous, occasionally with relatively dense short whitish

3. *C. parvistipula*

- 2. *C. gallifera***
- 1. *C. calva***

patent hairs to 0.1 mm long, sometimes somewhat persistent. *Stipules* ovate, to 3 mm long and 2 mm wide, most commonly glabrous, occasionally with short patent whitish hairs. *Leaves*: petiole to 20 mm long, quickly glabrescent; blade quickly glabrescent, shape quite variable, ovate, elliptic, oblong or obovate, to 24 x 8 cm, base asymmetric, rounded to cuneate, margin obscurely dentate, apex acute to acuminate; up to 14 pairs of ascending lateral

veins. *Flower* pedicels to 7 mm long, most commonly glabrous, occasionally with short hairs; sepals orbicular, to 3 mm dia., usually glabrous inside glabrous except for the ciliate margin, occasionally with short hairs outside; stamens to 2 mm long, glabrous; ovary glabrous. *Fruit* ellipsoid or globose, to 30 mm long, 15 mm wide.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai [Chom Thong, *Kerr* 5365 (holotype **K**; isotype **BK!**)], Chiang Rai, Lamphun, Lampang Tak, Sukothai; NORTH-EASTERN: Loei; EASTERN: Nakhon Ratchasima; CENTRAL: Nakhon Nayok; SOUTH-EASTERN: Rayong, Chanthaburi, Trat; PENINSULAR: Trang, Songkhla.

Distribution.— Vietnam, Peninsular Malaysia, and at least in a part of Indonesia.

Ecology.— In evergreen forest, usually on granite bedrock, from lowlands to at least 1300 m altitude. Flowering: February–May; fruiting: May–August.

Note.— The majority of specimens seen have a glabrous new growth, including all the southern and south-eastern Thai specimens, and those from Malaysia and Indonesia. There are also plenty of glabrous northern specimens, but others have hairs. *Maxwell* 89-571 (Chiang Dao, Chiang Mai) has two branchlets, one with the new growth glabrous and one with relatively dense short patent hairs.

The leaves of this species often turn red before falling, like those of *C. parvistipula* (Fig. 1e).

2. *Casearia gallifera* Tathana sp. nov. *Casearia flavovirens* Blume affinis sed ea rami ad apicem in parte hornotini pilosi differt. Typus: Thailand, *Harwood* 2085 (Holotypus **BKF**).

Tree, to 10 m tall; bark smooth, grey-brown; new growth of stems with dense appressed red-brown hairs to ca 0.3 mm long, older growth with an occasional persistent red-brown hair mixed with a few much shorter mostly erect white hairs. *Stipules* ovate, to 3 mm long and 2 mm wide, appressed hairs on outside surface except for a glabrous strip inside the ciliate margin. *Leaves*: petiole to 12 mm long, quickly glabrescent; blade quickly glabrescent, shape quite variable, ovate, elliptic, oblong or obovate, to 20 x 7.5 cm, base asymmetric, rounded to cuneate, margin obscurely dentate, apex rounded to acuminate; up to 14 pairs of ascending lateral veins. *Flower* pedicels to 1.5

mm long, glabrescent; sepals orbicular, to 3 mm dia., scattered short hairs on outside, glabrous inside; stamens to 2 mm long, scattered hairs on filaments; ovary with scattered hairs near top. *Fruit* pedicel to 2 mm long, ripe fruit ellipsoid or orbicular, ca 35 mm diameter.

Thailand.— NORTHERN: Chiang Mai [Doi Chiang Dao, along trail from Ban Tham to the summit, altitude 1500 m, 20 June 1968, van Beusekom & Phengkhilai 1331 (**BKF**)]; Chiang Rai [Doi Tung, alt. 1300 m, 1 March 2010, *Harwood* 2085 (holotype **BKF**)]; Doi Tung, near temple, altitude 1300 m, 21 May 1991, *Pooma* 477 (**BKF**); same locality, 17 May 1992, *Santisuk* sn (**BKF**); Doi Tung, altitude 1250 m, 20 Aug. 2004, *Nielsen* 1847 (**BKF**); Doi Tung, altitude 1600 m, 12 Jan. 1975, *Geesink* 8260 (**BKF**); Pongphrabort Forest Park, 30 Nov. 1997, *Chayamarit* 1034 (**BKF**); Doi Tung, next to Wat Prabat, altitude 1350 m, 31 May 2007, *Maxwell* 07-350 (**CMU**); Kah Mawn Ru See, below Wat Prabat, altitude 1300 m, 1 June 2007, *Maxwell* 07-365 (**CMU**).

Distribution.— Only known from Thailand, but likely to occur in Myanmar, as at least one collection location at Doi Tung in Chiang Rai is less than 3 km from the Myanmar border.

Ecology.— In evergreen forest on granite or limestone bedrock, to 1300 m altitude. Flowering: March–May; fruiting: May–Aug.

Note.— Because of its close proximity to both the Myanmar and Laos borders, it is possible that this species may have already been described from one of those countries, but we were unable to match it to any descriptions. In both Indochina (Lescot 1970) and China (Yang and Smarzy 2007), the *C. gallifera* material keys to *C. tardieuae* Lescot & Sleumer, a species described from South Vietnam in 1970. Included in the description of *C. tardieuae* are verrucose fruits and acute apices of the stipules, both characters very useful for separating *Casearia* species, and not present in *C. gallifera* (Lescot, 1970, uses these two characteristics to distinguish *C. tardieuae* from *C. flavovirens*).

The hairs on the new growth of *C. gallifera* easily distinguish it from another species with similar large fruits, *C. flavovirens*, which has glabrous new growth, and the leaf venation is also different, that of *C. flavovirens* being more densely reticulate. The new growth indumentum also distinguishes it from the much more widespread *C. calva*, which is

more commonly glabrous, but when new growth indumentum is present it is whitish, shorter and mostly erect. The flowers and fruits of *C. calva* also are on longer pedicels, and the fruits are smaller. At Doi Tung there are mature trees of *C. gallifera* and *C. calva* growing withing 25 m of each other, so fresh material can be compared easily. There are obvious differences, but they are hard to quantify. The upper surface of the leaves of *C. calva* is more shiny, and the reticulate venation more obviously raised. The pellucid glandular dots and lines of *C. gallifera* are denser.

Etymology.— Because of the common occurrence of galled flowers in this species.

3. *Casearia parvistipula* Tathana sp. nov. *Casearia flavovirens* Blume affinis sed ea sepalis intus hirsuto, stipulis et fructibus parvae differt. Typus: Thailand, Harwood 2087 (Holotypus **BKF**). Fig. 1.

Tree, to 20 m tall; bark smooth, grey-brown; new growth of stems with dense hairs ca. 0.1 mm long, appressed to erect, older growth glabrous or with some hairs persisting. *Stipules* triangular, length and width both to 1 mm, margin always ciliate, upper surface sometimes with hairs on central region. *Leaves*: petiole to 10 mm long, quickly glabrescent; blade quickly glabrescent, elliptic or oblong, to 16 x 6 cm, base asymmetric, rounded to cuneate, margin obscurely dentate, apex acuminate; up to 16 pairs of ascending lateral veins. *Flower* pedicels to 5 mm long, short appressed to ascending hairs throughout; sepals ovate to orbicular, to 2 mm long, relatively dense short hairs on both surfaces; stamens to 1.3 mm long, filaments with short hairs for full length; ovary and style with appressed hairs for full length. *Fruit* ellipsoid or orbicular, to 20 mm long and 12 mm wide.

Thailand.— NORTH-EASTERN: Loei [Phu Luang Wildlife Sanctuary, en route from HQ to Lone Tae, altitude 1400 m, 14 May 1998, Wongprasert sn (**BKF**); same locality & details, Chayamarit 1402 (**BKF**)]; SOUTH-EASTERN: Chanthaburi [Khao Soi Dao, alt. 1200 m, 10 March 2010, Harwood 2087 (holotype **BKF**)].

Distribution.— Endemic to Thailand, only known from Phu Luang Wildlife Sanctuary in Loei and Khao Soi Dao Wildlife Sanctuary in Chanthaburi.

Ecology.— In evergreen forest on granite or sandstone bedrock, above 1150 m altitude. Flowering: February–May fruiting: March–July.

Note.— *Casearia parvistipula* most closely resembles the much more widespread *C. calva*, differences from that species include the presence of hairs on the inside of the calyx lobes and the much smaller stipules. Both species occur in the Khao Soi Dao mountains in Chanthaburi, and in similar habitats, but they do not grow together. *Casearia calva* is relatively common from altitudes of 250 m to 1100 m, and *C. parvistipula*, not quite as common, at altitudes from 1150 to 1500 m. The leaves of both species often turn red before falling.

We have not investigated the small appendages behind the stipules of *Casearia* species, but they appear to be much more prominent in *C. parvistipula* than in other species. The pellucid dots and lines are also a lot more prominent on dried specimens than of other species (Fig. 1).

Etymology.— Referring to the stipules being much smaller than those of other species occurring in Thailand.

ACKNOWLEDGEMENTS

Sue Zmarzty at K was always willing to answer any questions we had, and discussions with Mac Alford and Tharangamala Samarakoon at the University of Southern Mississippi were very useful. Bhanumas Chantarasuwan spent a lot of time taking very good photos of the new growth of many types at L for us.

REFERENCES

- Chase, M.W., Zmarzty, S., Lledó, M.D., Wurdack, K.J., Swensen, S.M. & Fay, M.F. (2002). When in doubt, put it in Flacourtiaceae: a molecular phylogenetic analysis based on plastid *rbcL* DNA sequences. *Kew Bulletin* 57: 141–181.
- Lescot, M. (1970). Flacourtiaceae. Flore du Cambodge, du Laos et du Vietnam, 11: 3–98. Firmin-Didot, Paris.
- Sleumer, H. (1954). Flacourtiaceae. Van Steenis, C.G.G.J. (ed.), *Flora of Malesiana* ser. 1, 5: 1–106. N.V. P. Noordhoff, Groningen.
- . (1972). Flacourtiaceae. Van Steenis, C.G.G.J.

(ed.), Flora of Malesiana ser. 1, 6: 944. Wolters-Noordhoff Publishing, Groningen.

Sleumer, H. (1985). The Flacourtiaceae of Thailand. *Blumea* 30: 217–250.

Yang, Q. & Zmarzty, S. (2007). *Casearia*. In: W. Zhengyi & P.H. Raven (eds.), *Flora of China* 13: 133–137. Missouri Botanical Garden Press, St. Louis.



Figure 1. *Casearia parvistipula* Tathana: A. indented pellucid dots and lines on dried leaf surface, much more prominent than in other Thai species. In fresh material they are not sunken, and only visible when leaf is held to light. The longer of the lines in the photo are ca 0.5 mm long. For a very good photo (not of this species) of typical pellucid dots and lines on fresh material, visit <http://tolweb.org/Samydaceae>; B. inflorescence showing the hairs on bud pedicels and outside of sepals; C. close-up of stipule showing ciliate margin. This stipule is 1 mm long, and 1 mm wide at the base; D. new growth with 4 stipules shown. On the left and right are the lower parts of two unfurling leaves; E. fallen ripe fruits, with fallen leaf in top left corner. (*Chayamarit* 1402, Loei). The fallen leaves of both *C. parvistipula* and *C. calva* are often red.