

**THE IDENTITY OF *HEDYCHIUM MARGINATUM* C.B. CLARKE  
(ZINGIBERACEAE), AND A NEW SPECIES, *H. NAGAMIENSE*  
FROM NORTH-EASTERN INDIA**

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*Keywords: Hedychium luteum; H. marginatum; H. nagamiense; New species; New synonym;  
Taxonomic identity; Zingiberaceae.*

**Abstract**

The identity of *Hedychium marginatum* C.B. Clarke is corrected based on the type and protologue studies and *H. luteum* Baker is reduced as its synonym. *H. nagamiense* Sanoj *et al.* sp. nov., from Nagaland, India is described and illustrated. Nomenclatural notes, phenology, geographical distribution and IUCN status of both species are provided.

**Introduction**

Genus *Hedychium* was established by Koenig (1783) with *H. coronarium* as the type species, based on Rumphius' (1747) illustration. Since then, a number of taxa have been described by various authors from India and adjacent countries, mainly by Smith (1811), Roxburgh (1820), Roscoe (1824-1828), Wallich (1853), Baker (1892), Schumann (1904) and Rao and Verma (1969). Now it holds about 80 species mainly distributed in eastern Himalaya to southern China, India and south-eastern Asia (Sirirugsa and Larsen, 1995). This is the largest genus of the family Zingiberaceae in India with about 44 taxa, mostly restricted to north-eastern states (Sanoj, 2011).

During the revision of *Hedychium* in India, the examination of nomenclature and types of *H. marginatum* C.B. Clarke and *H. luteum* Baker revealed that both are one and the same species; hence, the latter is reduced as a new synonym of the former. A new species, *H. nagamiense*, is also described, which was misidentified as *H. luteum* by Rao and Verma (1972). A detailed description, illustration with relevant notes and a key to allied species are provided here to facilitate its identification in the field.

**Taxonomic treatment**

**1. *Hedychium marginatum*** C.B. Clarke, J. Linn. Soc., Bot. 25: 75. t. 31 (1889); Baker in Hook. f., Fl. Brit. Ind. 6: 226 (1892).

*Type:* India, Kohima, 4500 ft., 3.11.1885, C.B. Clarke 41513 (*Holotype* - K!; *Isotypes* - BM!, CAL!). **(Fig. 2b)**

*Hedychium luteum* Baker in Hook. f., Fl. Brit. Ind. 6: 232. (1892), *syn. nov.*

*Type:* T. Thomson, illustration at Calcutta Herbarium, 11.1854 (*Iconotype*: CAL!). **(Fig. 2a)**

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Terrestrial, perennial rhizomatous herbs. Rhizome 2.2-3.0 cm wide, monopodial branching, creamy white internally, aromatic. Leafy shoot 105-150 cm high, slanting. Leaves 15-22, 5.7-10.0 cm apart, spreading on plant, sessile; ligule 2.6-3.6 × 1.0-1.8 cm, lanceolate, single lobed, pale green, sericeous, externally membranous, closely appressed to stem, tip obtuse; lamina 24.2-30.6 × 6.0-6.5 cm, elliptic-ob lanceolate, dark green and glabrous above, pale green (pale pink tinged towards base on lower leaves) and sericeous below; margin non-ciliate, translucent, pale pink tinged; tip twisted, long acuminate; base obtuse; midrib pale green above. Inflorescence 6.5-10.0 cm long, elliptic, dense. Bracts 3.9 × 1.6 cm, spatulate, boat-shaped, green with red tinge, sparsely pubescent externally, moderately coriaceous, imbricating; margin non-ciliate, translucent; tip rounded, tuft of hairs at tip, hairs brown; cincinnus 2-4 -flowered. Bracteoles c. 1.6 × 1.0 cm, white with red tinge, pubescent externally, membranous, translucent, non-tubular; margin non-ciliate. Flower 9.8-10.2 cm long, lemon-yellow (turn to much dark yellow on second day), spreading, 4-8 flowers opened at a time. Calyx 3.4-3.5 cm long, c. 2.5 mm wide at mouth, pale greenish-yellow with red tinge, pubescent externally, membranous, translucent, upper half slightly inflated, lower half closely appressed to corolla tube, unilaterally split up to 1.1 cm deep, obscurely 3-toothed at tip, unequal. Corolla tube 6.5-6.6 cm long, c. 3 mm wide at mouth, lemon-yellow, whitish towards base, slightly arching, glabrous externally, hairy internally along the margin of filament groove, hairs downwardly directed. Corolla lobes lemon-yellow, membranous, drooping from flower, glabrous, margin rolled inside, slightly coiled like an expanded spring; dorsal lobe 3.5-3.6 × c. 0.4 cm, 1.5-2.0 mm long beaked at tip; lateral lobes 3.1-3.3 × c. 0.4 cm, non-beaked at tip. Lateral staminodes 2.8-3.0 × 0.4-0.5 cm, oblanceolate, lemon-yellow, upper half reflexed back, outer margin undulate, tip obtuse. Labellum 2.6-2.7 × c. 1.7 cm, obovate, lemon-yellow, upper half reflexed back spreading on flower, gradually clawed at base; claw c. 5 mm wide; sinus 8-9 mm deep; lobes obtuse at tip; outer margin undulate. Stamens 3.7-3.8 cm long; filament 2.6-2.7 cm long, c. 1.5 mm wide at base, lemon-yellow, slightly arching; anthers c. 1.2 × 0.3 cm, oblong, lemon-yellow, oblong, lobes parallel, split opens from top to bottom, attached with the filament at c. 1.5 mm above from base, anthers parallel with the filament axis; connective yellow, glabrous, prolonged into a very minute crest (c. 0.5 mm long), truncate at tip. Ovary c. 2.5 × 2.5 mm, barrel-shaped, pale red, densely pubescent externally, trilobular, ovules many, placentation axile; style filiform, white, glabrous, broadens and green tinged towards stigma; stigma c. 1.5 mm wide, green, stigmatic head flat, slanting with a depression at center, hairy, hairs hook-like, bulbous based. Epigynous glands 2, c. 2.5 mm long, oblong, yellow.

*Flowering and fruiting:* It flowers profusely in August-September and so far no fruiting has been observed.

*Geographical distribution:* Assam to Myanmar. In India, common in Kohima, Phek and Mokokchung districts of Nagaland but known only from solitary collections from Meghalaya, Mizoram and Tripura.

*IUCN Red list Category:* The species is common at Kohima, Mokokchung and Phek districts of Nagaland (about 6,750 sq. km) and sparse at Mizoram and Tripura, and is facing high risk of

threat in the wild. Hence, the species is assessed as Vulnerable (VU) [CRB1ab (i,ii,iv)+2ab (i,ii,iv)] as per IUCN guidelines (IUCN 2001, IUCN Standards and Petitions Subcommittee, 2010).

*Specimens examined:* **Manipur:** Imphal district - Imphal, 17 Aug 1951, *D.B. Deb* 290 (CAL), 16.8.1951, *D.B. Deb* 337 (CAL). **Mizoram:** Champhai district - 2 km from Murlin village towards Vapar, 24.8.2008, *A.V. Prasanth & M.C. Shameer* 115412 (CALI). **Tripura:** Sardukchira, *D.B. Deb* 1460 (CAL). **Nagaland:** *s. loc.* *D.M. Verma* 34649 (CAL); Kohima district - Piffinsa (3000 ft.), 18.10.1885, *C.B. Clarke* 42094 (CAL); Kohima (4000 ft.), 19.10.1885, *C.B. Clarke* 40926 (CAL), 4.9.1937, *G.K. Deka* 19654 (ASSAM). Mokokchung district - Meinkiong (1400 m.), N 26°21'40" E 094°33'56", 20.5.2006, *M. Sabu & A.K. Pradeep* 103621 (CALI); Meinkiong, 27.8.2006, *E. Sanoj & V.P. Thomas* 105536, 105539 (CALI); 5 km from Phek to Kutsepo, 6.9.2006, *E. Sanoj & V.P. Thomas* 105611, 105615 (CALI). Phek district - Jotsoma, July 1886, *D. Prain* 9, 16, 18 (CAL); 2 km from Kohima city (1400 m), 23.5.2006, *M. Sabu & A.K. Pradeep* 103629 (CALI); 31.8.2006, *E. Sanoj & V.P. Thomas* 105569 (CALI). Tuensang district - Phalong, Naga Hills, 4000 ft., 12.1907, *A. Meebold* 7086 (CAL).

*Note:* *H. marginatum* was described by Clarke (1890) based on a specimen collected by him from Kohima (C.B. Clarke 41513). He described it as a distinct species mainly because of the villous nature of the tips of bracts and yellow labellum. The plate number XXXI associated with the protologue does not match with the type material mainly on the winged filaments, bifid ligule, cylindrical inflorescence and single flowered bracts.

Subsequently, Baker (1892) described another species *H. luteum* based on a colour plate made at Calcutta Herbarium under the supervision of T. Thomson, the then superintendant of Royal Botanical Garden in November 1854. However, H.F. Link mentioned the same epithet *H. luteum* long back in 1st volume of his 'Enumeratio Plantarum Beroliensis' (443. 1821) under "Addenda et Emendanda" as "*H. coccineum et angustifolium Bot. Mag. non differre videntur. Accepimus quoque H. luteum ex hort. angl. quod nondum floruit*" (translated as - *H. coccineum* and *H. angustifolium* of the Botanical Magazine do not differ. We have also received *H. luteum* of English gardener which has not yet flowered). Link's species is invalid as there is not a descriptive word or a reference, as is usual with names in horticulture. While describing *H. luteum*, Baker (1892) did not refer to Link and he described the species only on the basis of the drawing of Thomson at CAL. The Code (McNeill *et al.*, 2006) has no restrictions for a later use of "*luteum*" in the genus, and so it is quite acceptable when it was used in the 'Flora of British India'. Hence it is also difficult to say whether *H. luteum* of Baker and that of Link are one and the same. Later, the drawing of Thomson was reproduced by King and Prain (1898) as *H. luteum*, and the original illustration is available at Calcutta Herbarium.

Baker (1892) placed *H. marginatum* under the subgenus *Gandasulium* Horan. (Stamen never much longer than lip) and *H. luteum* under the subgenus *Macrostemium* Horan. (Stamen much longer than lip). However, in both species, the stamens are longer than the lip (stamen rather longer than lip, and stamens half as long again as lip respectively), as evidenced by types. While

describing *H. luteum* Baker mentioned the “labellum orbicular, bifid and distinctly clawed”. This statement is a mistake made by Baker while interpreting Thomson’s drawing. Based on the many live specimens from Kohima, Mokokchung and Phek districts of Nagaland and Champhai district of Mizoram revealed that, the labellum is obovate, bifid up to 8-9 mm deep and gradually clawed. Moreover it is one of the species which shows a wide range of variation in labellum size, shape and length and nature of claw. Schumann (1904) also treated *H. marginatum* and *H. luteum* under two subgenera, viz., *Gandasulium* and *Euosmianthus* K. Schum., respectively. Based on these evidences and the detailed protologue and type studies, we concluded that, both are conspecific. Recently, Rao and Verma (1972) also treated *H. marginatum* and *H. luteum* as separate species. But they misidentified and described another taxon as *H. luteum*. The detailed studies on the possible material used by them (D.M. Verma 34646 [ASSAM]) and the description provided turned out to be a new species. During the revisionary work of Indian *Hedychium*, we could collect live plants of this species from Nagaland and is described below.

**2. *Hedychium nagamiense* Sanoj, M. Sabu & V.P. Thomas, sp. nov. (Fig. 1, 2c)**

*Type:* India, Nagaland, Mokokchung district. Way to Alichen, 28.8.2006, *E. Sanoj & V.P. Thomas* 105552 (*Holotype* - CALI; *Isotypes* - CAL, MH).

*H. luteum auct. non* Baker: A.S. Rao & D.M. Verma, *Bull. Bot. Surv. India* 14(1-4): 134 (1972); Chaturv. & Moakum, *Folia Malaysiana* 9(2): 134 (2008).

**Diagnosis:** *Hedychio marginato similis bracteis apice pilis densis, sed lamina maioribus* (36.5-45.0 × 6.6-9.5 contra 24.2-30.6 × 6.0-6.5 cm), *inflorescentia longiore* (15.5-22.0 contra 6.5-10.0 cm) *cylindrica, bracteis convolutis, floribus longioribus* (11.8-12.0 contra 9.8-10.2 cm) *cremeoluteis, calyce longiore* (4.0-4.3 contra 3.4-3.5 cm), *staminis* (5.5-5.7 contra 3.7-3.8 cm) *differt.*

Terrestrial, perennial rhizomatous herbs. Rhizome 2.6-3.0 cm wide, creamy white internally, pale pink externally, slightly aromatic, covered with brown scales. Leafy shoot 135-180 cm high, slanting with erect inflorescence, robust. Leaves 12-16, 5.3-9.5 cm apart, spreading, sessile; sheath 1.6-1.8 cm wide, margin green, membranous, translucent, pubescent; ligule 2.3-3.0 × c. 1.4 cm, ovate, single lobed, rounded-truncate at tip, pink, sericeous externally, membranous, translucent, papery, closely appressed to the stem; lamina 36.5-45.0 × 6.6-9.5 cm, lanceolate, dark green and glabrous above, pale green and sericeous below; margin undulate, membranous, translucent, white tinged, non-ciliate; tip long caudate, twisted; base cuneate-obtuse; midrib densely sericeous below. Inflorescence 15.5-22.0 cm long, cylindrical, lax, erect. Bracts 4.7-5.5 × 2.0-2.4 cm, obovate, green with red tinge, pubescent, densely pubescent towards tip margins, coriaceous, convolute; margin non-ciliate, translucent, membranous, white, tip obtuse, cincinnus 5-8 flowered; bracteoles 2.4-3.3 × 1.2-1.6 cm (outer tubular), slightly translucent, obscurely 2-lobed at tip, pale red with green tinge, white towards base, pubescent externally, sparsely hairy towards base, outer one completely encircles the cincinnus, membranous. Flowers 11.8-12.0 cm long, creamy yellow, 8-14 flowers opens at a time, ascending, slightly fragrant. Calyx 4.0-4.3 cm long, c. 2.5 mm wide at

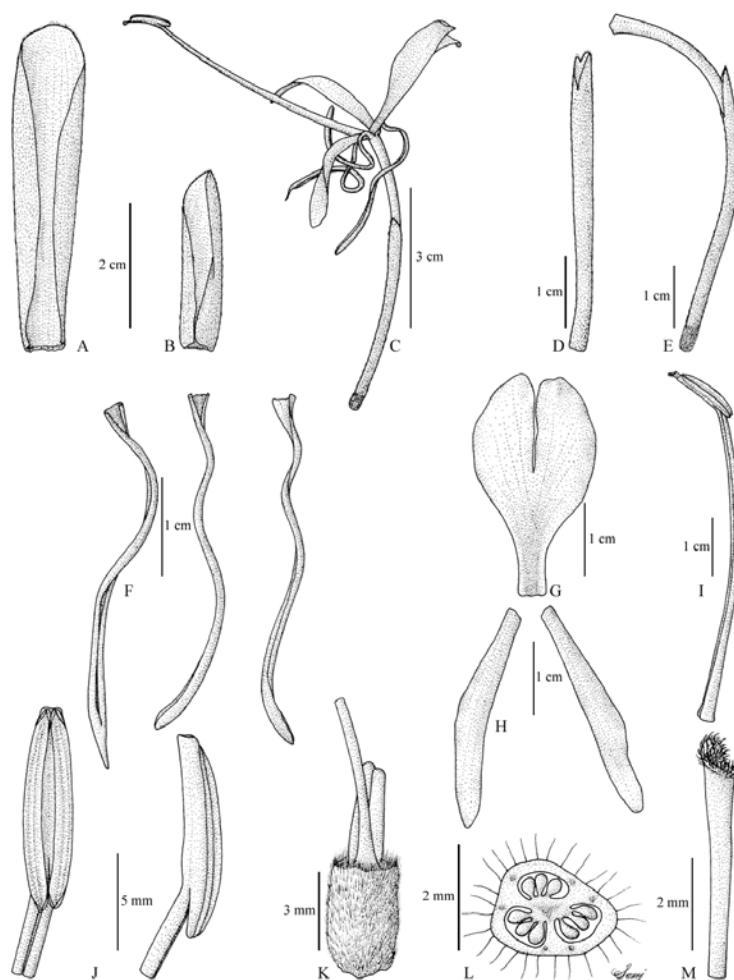


Fig. 1. *H. nagamiense* (A) Bract, (B) Bracteole, (C) Single flower, (D) Calyx, (E) Corolla tube with calyx and ovary, (F) Corolla lobes, (G) Labellum, (H) Lateral staminodes, (I) Stamen, (J) Anther front view (left) and lateral view (right), (K) Ovary with epigynous glands and base of style, (L) Cross section of ovary, (M) Stigma with a part of style (E. Sanoj & V.P. Thomas 105552, CALI).

mouth, pale green, white towards base, pubescent externally, membranous, translucent, closely appressed to corolla tube, unilaterally split up to 5-8 mm deep, 3-toothed at tip. Corolla tube 5.8-6.0 cm long, c. 3 mm wide at mouth, white, slightly yellowish towards tip, slightly arching, hairy internally, hairs downwardly directed; lobes oblanceolate, pale green, creamy-yellow tinged towards base, membranous, drooping from flower, glabrous, margins rolled inside, slightly coiled like an expanded spring; dorsal lobe 3.7-3.9 × c. 0.4 cm, 2.5-3.0 mm long beaked at tip; lateral lobes 3.5-3.6 × c. 0.3 cm, very minutely beaked at tip. Lateral staminodes 2.9-3.0 × 0.4-0.5 cm, sword-shaped, creamy-yellow, spreading on flower, reflexed back, outer margin undulate, tip

obtuse. Labellum 2.9-3.0 × 1.5-1.7 cm, obovate, creamy yellow, slightly deep coloured at centre, spreading on flower, upper half reflexed back, gradually clawed at base; claw 3.0-3.5 mm wide; sinus 1.0-1.4 cm deep; outer margin undulate, lobes tip rounded. Stamens 5.5-5.7 cm long filament 4.7-4.9 cm long, c. 2 mm wide at base, creamy yellow, slightly arching, anther 1.0-1.5 × c. 0.3 cm, elliptic, yellow at openings, split opens from top to bottom, attached with the filament at c. 2.5 mm above from base, thecae axis at an angle of c. 25° with the filament; connective creamy yellow, glabrous, non-crested, tip truncate-slightly notched. Ovary 3.5-4.0 × c. 2.5 mm, oblong,

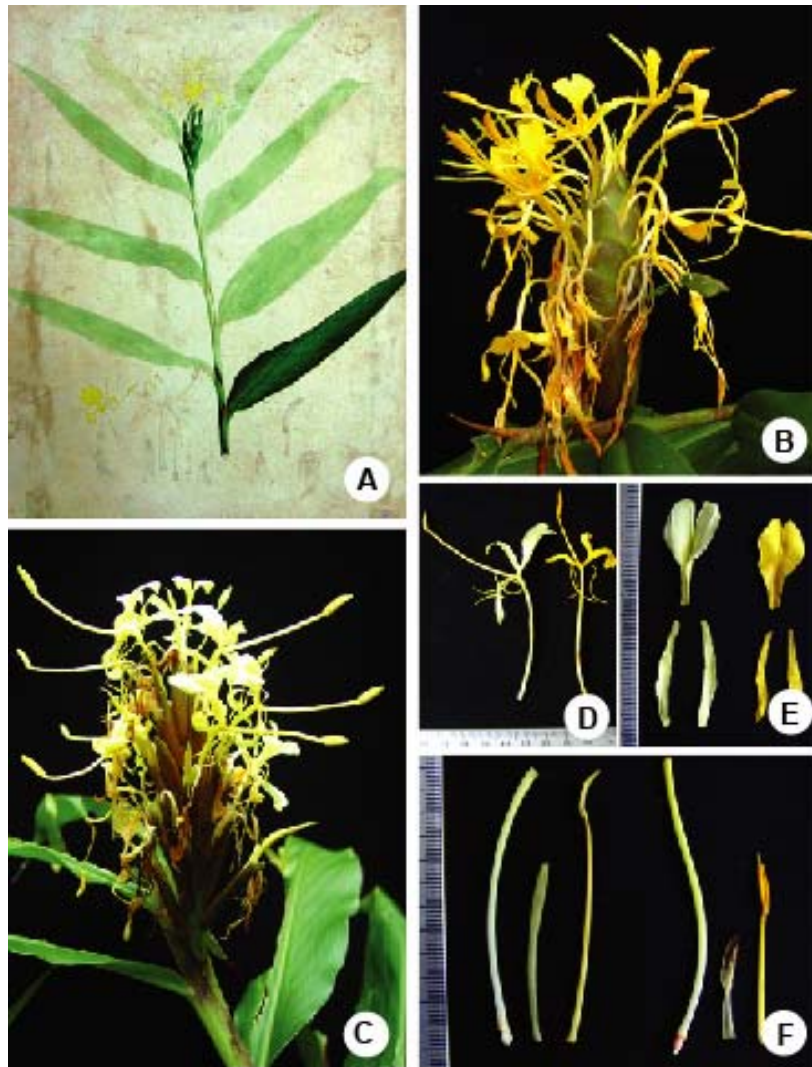


Fig. 2. (A) *Hedychium luteum* - iconotype (T. Thomson CAL), (B) *H. marginatum* - inflorescence, (C) *H. nagamiense* - inflorescence, (D, E & F) Comparison of flower and flower parts of *H. nagamiense* (left) and *H. marginatum* (right).

white, pubescent externally, trilocular, ovules many, placentation axile; style filiform, white, glabrous, broadens and green tinged towards stigma; stigma c. 2 mm wide, green, cup-shaped, slanting with a depression at center, pubescent, hairs hook-like, bulbous based, c. 1.5 mm exerted from the anthers. Epigynous glands 2, 4.5-5.0 mm long, oblong, yellow.

*Etymology:* The specific epithet '*nagamiense*' is derived from the name of the tribe 'Nagas', which is the prominent ethnic group of Nagaland. The type specimen belongs to Alichen, Mokokchung district of Nagaland.

*Flowering and fruiting:* It flowers in late August to November and so far no fruiting has been observed.

*Geographical distribution:* Endemic to Nagaland, India. Reported only from the type locality, one introduced material at the Woodlands, Meghalaya and Ungma, Mokokchung district of Nagaland (Chaturvedi and Moakum, 2008).

*IUCN Red list Category:* The species is known only from the type locality and another introduced plant at Woodland with unknown locality, most probably from Nagaland. It is facing high threats due to construction of roads, mining and land sliding. Due to the rarity and very restricted distribution of *H. nagamiense*, it is assessed here as Critically Endangered (CR) (CRB 1ab(i,ii,iii,v) + 2ab(i,ii,iii,v); D) according to IUCN guidelines (IUCN, 2001; IUCN Standards and Petitions Subcommittee, 2010).

*Specimens examined:* INDIA. **Meghalaya:** East Khasi Hills district. Woodlands, cultivated, 16.8.1971, *D.M. Verma* 34646 (ASSAM).

*Notes:* Allied to *H. marginatum* C.B. Clarke in having dense hairs at the tip of bracts, but mainly differs from it in having larger lamina, longer and cylindrical inflorescence, convolute bracts, longer and creamy yellow flowers with longer calyx and stamen (Fig. 2d-f, Table 1).

**Table 1. Main differential characters of *H. marginatum* and *H. nagamiense*.**

Characters	<i>H. marginatum</i>	<i>H. nagamiense</i>
Lamina	24.2-30.6 × 6.0-6.5 cm	36.5-45.0 × 6.6-9.5 cm
Inflorescence	6.5-10.0 cm long, ellipsoidal, dense	15.5-22.0 cm long, cylindrical, lax
Bracts	Imbricate	Convolute
Flower	9.8-10.2 cm long, lemon yellow	11.8-12.0 cm long, creamy-yellow
Calyx length	3.4-3.5 cm	4.0-4.3 cm
Corolla tube length	6.5-6.6 cm	5.8-6.0 cm
Stamen length	3.7-3.8 cm	5.5-5.7 cm
Filament length	2.6-2.7 cm	4.7-4.9 cm
Ovary	2.5 × 2.5 mm	3.5-4.0 × 2.5 mm

### Acknowledgements

We are thankful to Council of Scientific Industrial Research, New Delhi for the award of Senior Research Fellowship to the first author (9/43(0138)2K9-EMR I) and Department of

Science and Technology, New Delhi for the project on Indian Zingiberaceae (SP/SO/PS-115/2009). We are also grateful to the Director, Botanical Survey of India and Curators of BM, E and K for the permission of consultation of Herbaria. We are thankful to Dr. J.F. Veldkamp (Leiden) for Latin diagnosis. The help rendered by Dr. S.K. Chaturvedi and Mr. Moakum of Department of Botany, Nagaland University is gratefully acknowledged.

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(Manuscript received on 26 August, 2011; revised on 8 December, 2011)