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NOTES ON ZINGIBERACEAE FROM ASSAM

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ABSTRACT

These notes based on a study of live plants and related herbarium material include the description of the hitherto unknown vegetative phase of *Amomum pauciflorum* Baker; distribution of *Amomum corynostachyum* Wall.; detail description of *Hornstedtia loroglossa* (Gagnep.) Schum. and additional remarks on *Globba clarkei* Baker, *Kaempferia involucrata* King ex Baker and *Mantisia saltatoria* Sims.

These notes emerged while we were engaged in a critical study of the Zingiberaceae collections in the Kanjilal Herbarium of the Botanical Survey of India, Shillong and plants in their natural habitat in the Khasia & Jaintia Hills, as also after their subsequent introduction in our experimental garden at 'Woodlands', Shillong.

Amomum corynostachyum Wall. Pl. Asiat. Rar. 1:48 pl. 58. 1830.

A specimen from Naga Hills, *Bor* 2240, having a long pedunculate subglobose spike, small, *ca* 3 cm long flowers and a petaloid, orbicular anther crest was found to be neither *Amomum aromaticum* Roxb. nor *A. fulviceps* Thw., as annotated earlier, but *A. corynostachyum* Wall. This identification was further confirmed by comparing with *Wall. Cat.* 6561 under *A. corynostachyum* Wall., at Calcutta herbarium.

So far, the species is known only from three collections *viz.* Sikkim Himalayas, *Kurz;* Martaban, *Wallich* and Pegu, *Kurz.* Its presence in Naga Hills somewhat reduces the wide gap between the Sikkim Himalayas and the other two localities in Burma. (Fig. 4).

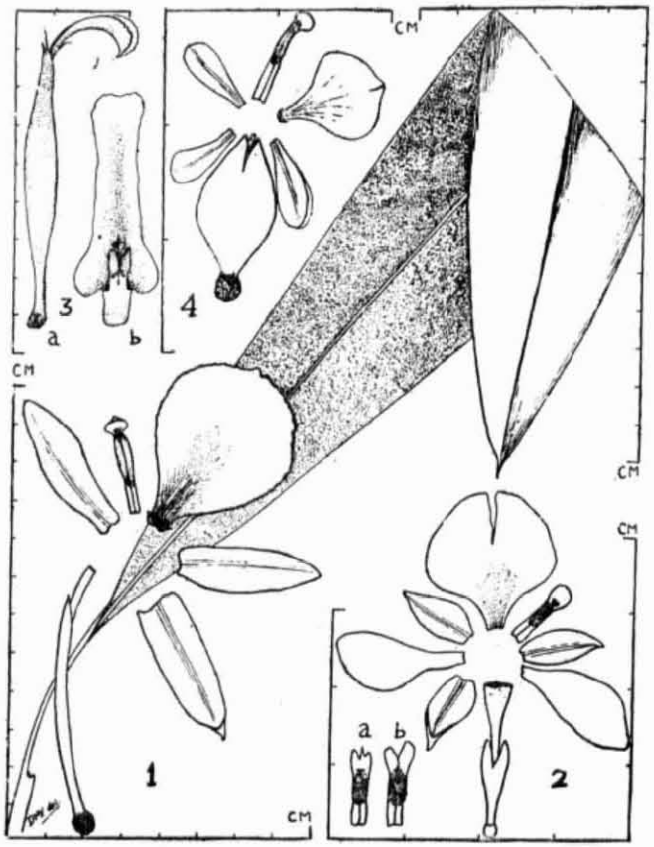
Specimens examined: INDIA: Nagaland, without precise loc., *Bor* 2240, June, 1935 (ASSAM, BURMA: Martaban, *Wallich* 6561 (CAL).

A. pauciflorum Baker in Hook. f. Fl. Brit. Ind. 6: 238. 1892.

The species was described on a solitary gathering of *Hook. f. & Thoms.* in Khasia Hills, near Nunklow, consisting of rootstock and flowers only. This appears not to have been collected again and the vegetative shoot remained unknown. In a search for it in the Khasia Hills, we located it in Umsning forest in July, 1966, again in flowers only. In an effort to study its hitherto unknown vegetative phase its rootstock was marked in its natural habitat and in a subsequent visit, in Feb. 1967, the plant was collected in leaf. Obviously, like in some of the other Zingiberaceae the vegetative and reproductive phases of this species occur in different seasons. Incidentally, the rootstock introduce in our experimental garden at Shillong did not survive. Based on live material, the following description is provided which includes the hitherto unknown vegetative shoot and supplements other data.

Rhizomes creeping just below the soil surface, 1-2 m long, *ca* 6 mm thick, scaly, pinkish-white outside, white inside, faintly aromatic; scales broadly ovate-oblong, *ca* 2 cm long, brownish; roots stout. *Leafy stem* (Feb. 1967) *ca* 60 cm high. *Leaves* 5; petiole 2-4 cm long; lamina oblanceolate, 29-31 cm long, 5-6 cm broad, submucronate, narrowed at base, upper surface glabrous, lower sericeous; ligule 1-1.5 mm long, bilobed, glabrous, *Peduncles* (July, 1966) several, distant, *ca* 3.5 cm long, *ca* 5 mm thick, covered with 2-3 sheaths, bearing 6-7 succesively opening flowers on a very short rachis, appearing as if in a cluster; bracts partially imbricating, lanceolate, upto 7.5 cm long, 1.2 cm broad, white, with a reddish, *ca* 1 mm long spinule at the tip, 1-flowered; bracteole linear, *ca* 2.5 cm long, white. *Calyx* 3-6 cm long, 3-lobed, deeply split on one side, white; corolla white; tube 3.8-7 cm long; lobes oblong, 3.5-4.5 cm long, *ca* 1.3 cm broad; staminodes a pair of subulate processes at the base of the lip, *ca* 3 mm long, pinkish-white, hairy; lip clawed, obovate, 4.8-5.2 cm long, 3.5-4 cm broad, white with a fleshy orange median band towards base, margined with purple dots and a yellow central blotch. claw *ca* 5 mm long, apex rounded, faintly notched, margins very crumpled, irregularly crenulate; filament 5-8 mm long, reddish-

white; connective puberulus; anther *ca* 1.6 cm long, cells parallel, white; crest entire, transversely oblong, obscurely 3-lobed, sides involute, tip revolute, 4-5 mm high, 6-7 mm broad, white; ovary oblong, 5 mm long, villous; stigma campanulate. *Fruit* (young), white, hairy, ribbed. (Fig. 1).



Figs. 1-4 : 1. *Amomum pauciflorum* Baker, leaf & flower (*Verma* 35607). 2. *Kaempferia involucrata* King ex Baker, flower with normal anther crest. a. & b. Variations in anther crests (*A. S. Rao* 35615). 3. *Hornstedtia loroglossa* (Gagnep.) Schum. a. Flower. b. Lip & stamen (*Verma* 35606). 4. *Amomum corynostachyum* Wall. Flower (*Bor* 2240).

Specimen examined: ASSAM: K. & J. Hills, Umsning forest, *Verma* 35607 (ASSAM).

Globba clarkei Baker in Hook. f. Fl. Brit. Ind. 6:201. 1890.

The leaves of this species have been hitherto described as glabrous and the panicle with most of the upper flowers changed into bulbils. The study of herbarium materials and live plants in Khasia hills clearly establish that the leaves are shortly hairy on the lower surface towards base or almost throughout, particularly along the midrib. In the panicle, the bulbils start appearing about a fortnight to a month after commencement of flowering. It is only the old plants that are loaded with bulbils; fruits are seldom formed. Incidentally, in the plants collected from Subansiri (N.E.F.A.) in 1965 and introduced in our experimental garden here, during subsequent three flowering seasons, the yellow lip constantly had twin minute brown dots at its base, in 1968 however, the lip was of normal colour and never showed any sign of these dots. What causes us to put these variations on record, which may appear insignificant, is the apparent confusion of *G. clarkei* Baker, with *G. racemosa* Smith and *G. orixensis* Roxb., as evidenced by a large number of misidentifications in the herbaria. We have checked the identification of our plants with *Hook. f. & Thom. Herb. Ind. Or.* No. 9 under *G. clarkei* Baker at Calcutta herbarium. In this particular collection the leaves are mostly rolled, but at a few places where the lower surface could be examined, it resembled our Assam plants in being distinctly hairy. Further, the specimen not bearing bulbils, obviously was collected in the earlier phase of flowering.

Many of the collections of *G. clarkei* Baker, without bulbils, have been misidentified to *G. racemosa* Smith, probably because of hairy leaves and to *G. orixensis* Roxb., probably because of stout panicle, the bulbils being absent in both of these. Such specimens of *G. clarkei* Baker, can be distinguished from the other two by its yellow, brown-tinged flowers, and larger floral parts *viz.* corolla lobes 7-9 mm long, staminodes 9-13 mm long, lip 15-19 mm long, filament 20-25 mm long, anther 4-6 mm long.

Incidentally, it may also be mentioned that *G. orixensis* Roxb. was originally described from Northern Circars. Baker (*l. c.*) also records Sikkim Himalaya (*Hook. f. & Thom. Herb. Ind. Or.* No. 15). The locality Sikkim on this specimen at Calcutta herbarium has been cut and Khasia written in pencil. Apart from this the specimen is very poor having only a solitary flower bud and we suspect it to be *G. racemosa* Smith. Although *G. orixensis* Roxb. has been reported in several enumeration papers on Assam flora, we have not seen any typical specimen of this species among Assam collections. It is possible that it is limited to Northern Circars or as doubted by Haines (*Bot. Bihar & Orissa*, 1epr. ed. 1961, 3 : 1180, 1924) conspecific with *G. racemosa* Smith. This needs further investigation.

G. clarkei Baker is also likely to be confused with the imperfectly known *G. hookerii* Clarke ex Baker, which is distinguished only by broader leaves. The typical material of this has been examined among Sikkim collections at Calcutta herbarium. Some times the leaves of *G. clarkei* Baker are equally broad. A comparative study of live plants from Sikkim can only show the true distinction.

The differences among the four species appear so minor that, in our opinion, they may all be better treated as varieties of *G. racemosa* Smith. Presently we refrain from taking any decision as we have neither seen the Types nor live plants of *G. orixensis* Roxb. and *G. hookerii* Clarke ex Baker.

Specimens examined: NEFA: Subansiri. Rizampaka, *Sastry* 45595. Tirap. Kheti-Tirichha, *Panigrahi* 14642. ASSAM: N. Kamrup. Motharguri, *Panigrahi* 9972. K. & J. Hills. Cherrapunji, *G. K. Deka* 21779; *Panigrahi* 3462. Dumpep, *P. C. Kanjilal* 8218. Jowai, *G. K. Deka* 17138. Laityngkot, *De* 16846. Mawmloo, *Sharma* 10433. Mawphlong, *Bor* 19664. Nongstoin, *Panigrahi* 16494. Pynursla, *Panigrahi* 2929. Shillong, *G. K. Deka* s.n. (acc. no. 54); *H. Deka* 21826; *U. N. Kanjilal* 7394 (ASSAM); without precise loc. *Hook. f. & Thom. Herb. Ind. Or.* No. 9 (CAL).

Hornstedtia loroglossa (Gagnep.) Schum. in Engl. Pflreich, 20:196, 1904.

Amomum loroglossum Gagnep. in Bull. Soc. Bot. Fr. 49:258. 1902.

The species was described on a solitary collection of *Hook. f. & Thom.* from Khasia hills and has not been reported again. It was differentiated from *H. linguiformis* (Roxb.) Schum. in its lip being entire, while in the latter it is distinctly bilobed with an almost 2 cm deep sinus. The original description of *H. loroglossa* based on a herbarium specimen, lacked reference to the colour of the flower and other details observable only in live plants. An opportunity of study of a large population of these plants in Umsning forest, K. & J. Hills, has afforded us to furnish below a detailed description.

Rhizome long, creeping along the substratum, pubescent, scaly, brownish outside, white, fibrous and aromatic inside; segments ovoid, 1.5-2 cm long. *Stem* 1.5-2.5 m high. *Leaves* subsessile or petiole upto 1.5 cm long; lamina oblong-lanceolate, 40-60 cm long, 6-15 cm broad, acuminate, glabrous; ligule .5-1.5 cm long, entire. *Peduncles* 3-7 cm long, curved, sheathed; sheaths oblong, brownish-white; spike ellipsoid, 6-9 cm long; bracts oblong, 4-6 cm long, 2.5-3 cm broad, closely imbricating, acute or spinescent at tip, puberulus, white below, greenish above, red-tinged with age, the outer sterile (involucral) bracts clasping the inflorescence and enclosing the floral bracts with a small aperture at tip through which 1-3 flowers emerge at a time; floral bracts 1-flowered. *Calyx* tubular, 3-lobed, 5.5-7 cm long, split on one side, reddish below, deep red upwards, side lobes ending in a thread like process, mid-lobe acuminate; corolla tube 2.8-4 cm long, pale reddish; lobes suberect, lanceolate, 2.3-3 cm long, .6-1 cm broad, obtuse, bright red; lip ligulate, 5.5-6.2 cm long, 1-1.8 cm broad, yellow with a bright red, fleshy median band, margins crumpled, involute below, base cordate, apex entire; rarely notched; stamen fused with the lip for *ca* 1 cm forming a reddish-white staminal tube; filament *ca* 3 mm long, *ca* 5 mm broad; anther *ca* 8 mm long, *ca* 7 mm broad, white; ovary villous; stigma red. (Fig. 3).

Specimen examined: ASSAM: K. & J. Hills. Umsning forest, *Verma* 35606.

Kaempferia involucrata King ex Baker in Hook. *f.* Fl. Brit. Ind. 6: 221. 1890.

In the genus *Kaempferia* L. the lobation of anther crest is given prime importance and is one of the few characters used for subgeneric and sectional divisions. In recording below variability in this important character we would impress upon the need for observing live plants over long periods.

In 1965 rootstock of this species was collected from Southern Kamrup and introduced in 'Woodlands'. The subsequent year flowering started prior to leaves but continued for sometime during vegetative phase also. In the 17 flowers examined, 15 had the anther crest deeply bilobed, sometimes divided almost to the base, while in the other two it was 3-notched. It was doubted to be a new species but since the plants did not differ in other respects we preferred further observation. The following year flowers were normal, with suborbicular, entire, anther crests. (Fig. 2).

Specimens examined: NEFA: Kameng. Kalaktang to Baha, *Panigrahi* 15408; Aka Hills, *Bor* 504. ASSAM: K. & J. Hills. Nongpoh, *Joseph* 37550. S. Kamrup. Rajapara, *A. S. Rao* 35615, 38891 (ASSAM).

Mantisia saltatoria Sims in Curtis, Bot. Mag. pl. 1320. 1810.

This species was introduced from Mizo (Lushai) Hills in 1963 in 'Woodlands'. In 1967 some abnormal flowers were noticed in which the usually bilobed lip was with a tooth-like structure in the sinus, while in still other flowers an additional ovate, petaloid structure resembling the corolla lobe was observed underneath the lip at base.

Specimens examined : ASSAM: K. & J. Hills, experimental garden, Shillong, *Verma* 35651 (ASSAM.)