



## Report of two medicinal and aromatic gingers from Andaman and Nicobar Islands, India

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The Andaman and Nicobar Islands are the largest archipelago situated 1200km off the southeastern coast of India in the Bay of Bengal stretching from Myanmar in the north to Sumatra in the south. These islands, forming an arc, are situated between 06°45'–13°41'N and 92°12'–93°57'E with a total geographical area of 8,249km<sup>2</sup>. The islands have developed a luxuriant tropical lowland vegetation, owing to the tropical hot, humid, and wet conditions, facilitating the formation of luxuriant tropical evergreen forests, wetland forests, tidal swamp forests, mangroves and sandy beach vegetation. The phytodiversity of these

islands is unique and is one of the richest in the country in terms of endemics with a remarkable degree of genetic variations.

While working on 'Quantitative Assessment and Mapping of Plant Resources of the Andaman and Nicobar Islands', some specimens belonging to the family Zingiberaceae were collected from Mayabundar forest division of North Andaman Islands. On critical study and detailed examination of these specimens, they were identified as *Alpinia conchigera* Griff. and *Etlingera linguiformis* (Roxb.) R.M. Sm. Consultation of literature (Srivastava 1998; Sinha 1999; Pandey & Diwakar 2008; Gingers of India 2011) reveals that these two species have not been reported so far from the Andaman and Nicobar Islands. Therefore, the present finding constitutes a new distributional record of *A. conchigera* and *E. linguiformis* for the Andaman and Nicobar Islands.

**Alpinia conchigera** Griff. in Not. Pl. Asiat. 3: 424.

1851; Baker in Hook.f., Fl. Brit. India 6: 253. 1893.

(Image 1)

Rhizomatous herbs, 1–1.5 m tall; rhizomes aromatic; basal portion of aerial stems pinkish. Leaves simple, distichous; lamina oblong to lanceolate, 15–20 × 1–3 cm, obtuse at base, acute to acuminate at apex, dark green above, pale beneath, glabrous on upper and lower surfaces; ligule entire, ca. 5mm long, glabrous; petiole 5–10 mm long. Panicles 1- or 2-branched, 15–30 cm long; peduncle pubescent with sterile bracts; bracts ca. 5mm long; bracteoles funnel-shaped, 3–4 mm long, obliquely truncate at apex; pedicels ca. 5 mm long. Calyx cupular, 3–4 mm long, 3-cleft at apex, pale green. Corolla tube as long as calyx; lobes 5–8 mm long, central one rounded at apex, pale green. Lateral staminodes quadrate, ca. 1.5mm long, red. Labellum orbicular, concave, ca. 5×5 mm, pale yellow with pinkish and reddish streaks, base with a purple callosity covering corolla throat. Filaments slender, ca. 5mm long, pinkish to yellow. Anther ca. 2mm long. Ovary pyriform, glabrous. Capsule globose, ca. 10mm in dia., with persistent calyx, bluish-black when ripe; seeds 3–5, strongly aromatic.

Specimens examined: 28.viii.2011, 12°49'40.4"N & 92°54'58.9"E, 12m, Karmatang 10, Mayabunder, North Andaman, Andaman & Nicobar Islands, India,

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**Image 1. *Alpinia conchigera* Griff.**  
**A - Habit; B - rhizome; C - Inflorescence; D - flower; E - capsules.**

M.V. Ramana & J.K. Tagore 0424 (PBL, CAL) (Image 2).

**Flowering & Fruiting:** August–October.

**Habitat:** The species was found growing in damp marshy localities along forest edges and water canals in evergreen forests; not common.

**Distribution:** Bangladesh, Cambodia, India (northeastern India and now from Andaman and Nicobar Islands), Indonesia, Laos, Malaysia, Myanmar, Thailand and Vietnam.

**Local use:** Young leaves and shoots are used as leafy vegetables; rhizomes are used as medicine to cure jaundice by the Karen people (of Burmese origin) in the Mayabundar forest range, North Andaman Islands.

**Active principles:** The slender rhizomes of *A. conchigera* are a stimulating, diaphoretic, and regulatory in uterine haemorrhage and used to treat bronchitis, jaundice, headache, vertigo, metritis (inflammation of the endometrium of the





Image 2. Herbarium specimen of *Alpinia conchigera* Griff.

uterus). It is also used externally for treatment of rheumatism and arthritis (Holttum 1950). It showed antimicrobial activities (Wasuwat et al. 1986), and anti-inflammatory activities (Lee et al. 2006). The major components in the essential oil extracted from the rhizomes, according to Sirat et al. (1995), are  $\beta$ -sesquiphellandrene (20.5%),  $\beta$ -bisabolene (12.1%) and 1,8-cineole (11.6%). Anita et al. (2000) reported that the essential oil contains bi-cyclo 4,1,11-trimethyl-8-methylene-undec-4-ene and  $\beta$ -bisabolene and Wong et al. (2005) reported the presence of terpenoids with  $\beta$ -bisabolene (28.9%), 1,8-cineole (15.3 %) and  $\beta$ -caryophyllene (10.0%). The rhizomes are also found to be rich in  $\beta$ -sitosterol, stigmaterol, cardamomin, chalconaringenin 2-*O*-methyl ether, alpinetin and naringenin 5-*O*-methyl ether (Le et al. 2007).

***Etilingera linguiformis* (Roxb.) R.M. Sm.** in Notes Roy. Bot. Gard. Edinburgh 43(2): 246. 1986. *Alpinia linguiformis* Roxb., Fl. Ind. 1: 73. 1820.

(Image 3)

Rhizomatous perennial herbs, up to 2m tall; rhizomes stoloniferous, strongly aromatic; aerial stems robust, yellowish, shining. Leaves simple, distichous, lamina oblong to lanceolate, 20–35 × 4–6 cm, glabrous, shining above, rounded to acute at base, acute to acuminate at apex; ligules entire, ca. 5mm long, glabrous, ciliate at apex; petioles ca. 2cm long. Spikes few-flowered, arising from rhizomes, oblong, narrowed at both ends, 6–8 cm long, red, flowers arranged in 3–4 concentric circles; peduncles short, 1.5 to 2 cm long, raised above the ground level with sterile bracts; bracts orbicular, concave, ca. 2×2 cm, pinkish green; bracteoles oblong, ca. 3.5×1.5 cm, acute at apex. Calyx tubular, ca. 3cm long, split on one side, 2-toothed at apex. Corolla tube as long as calyx, 3-lobed, lobes shorter than tube. Lateral staminodes absent. Lip oblong, tongue-shaped, ca. 5cm long, bright yellow with reddish tinge, deflexed, folded below the middle, 2-lobed or entire at apex. Stamens as long as style; anthers ca. 8mm long. Ovary oblong, ca. 4mm long, silky hairy, 3-loculed; ovules numerous per locule; style ca. 6cm long; stigma capitate.

**Specimens examined:** 27.viii.2011, 12°49'04.9"N & 92°55'48.4"E, 30m, Karmatang 11, Mayabunder forest division, North Andaman, Andaman and Nicobar Islands, India, M.V. Ramana & J.K. Tagore 0402 (PBL, CAL) (Image 4).

**Flowering & Fruiting:** August–November.

**Habitat:** The species was found growing in damp marshy places in forest edges and along water canals in evergreen forests; planted near houses for its aromatic stolons and rhizomes that are used as local medicine; not common.

**Distribution:** India (northeastern India and now from Andaman and Nicobar Islands), Myanmar

**Local use:** The stoloniferous rhizomes give an aroma similar to that of *Foeniculum vulgare* (Apiaceae). The rhizomes are crushed and the extract, mixed with water, is consumed to treat fever chiefly by the Karen people of the Mayabundar forest range, North Andaman Islands.

**Active principles:** The stoloniferous rhizomes of *E. linguiformis* are strongly aromatic. Fresh rhizomes contain about 0.4% essential oil with a fennel like smell,



Image 3. *Etlingera linguiformis* Roxb. - R.M. Sm.  
A - Habit; B - Inflorescence; C - Spike; D - Lip.

composed of about 19 components, a few of them are methyl chevicol (49.93%), methyl eugenol (32.3%),  $\beta$ -pinene, asarone, eucalyptol and  $\alpha$ -pinene. The fresh leaves contain 0.15% essential oils, composed of about 39 components; a few are eucalyptol (39.69%),  $\beta$ -pinene (13.34%),  $\alpha$ -pinene (7.80%), linalool (7.39%),  $\beta$ -elemene,  $\alpha$ -selinene,  $\beta$ -terpinyl acetate,  $\alpha$ -phellandrene and juniper camphor (MPB 2011).

## REFERENCES

- Anita, H., A.M. Mustafa & I. Halijah (2000). Studies on essential oils of *Alpinia conchigera* Griff. from Malaysia. *Malaysian Journal of Science* 9(1): 1–5.
- Gingers of India (2011). <<http://www.gingersofindia.com>>. Online version dated 23 September 2011.
- Holttum, R.E. (1950). The Zingiberaceae of the Malay Peninsula. *Gardens' Bulletin Singapore* 13: 147.
- Le, H.T., M.G. Phan & T.S. Phan (2007). Further study on chemical constituents and biological activities of *Alpinia conchigera* Griff. (Zingiberaceae). *Tap Chi Hoa Hoc* 45(2): 260–264.
- Lee, J., S.J. Haeng, M.G. Phan, J. Xuejun, S. Lee, T.S. Phan, D. Lee, Y. Hong, K. Lee & J.L. Jung (2006). Blockade of nuclear factor- $\kappa$ B signalling pathway and anti-inflammatory activity of cardamomin, a chalcone analog from *Alpinia conchigera*. *Journal of Pharmacology and Experimental*





Image 4. Herbarium specimen of *Etilingera linguiformis* (Roxb.) R.M. Sm.

*Therapeutics* 316(1): 271–278.

**Medicinal Plants of Bangladesh [MPB] (2011).** *Etilingera linguiformis*. <<http://www.mpbd.info/plants/etlingera-linguiformis.php>>. Online version dated 23 September 2011.

**Pandey, R.P. & P.G. Diwakar (2008).** An Integrated Checklist of Andaman and Nicobar Islands, India. *Journal of Economic and Taxonomic Botany* 32(2): 403–500.

**Sinha, B.K. 1999.** Zingiberaceae, pp. 447–449. In: Hajra, P.K. & P.S.N. Rao (eds.). *Flora of Great Nicobar Island*. Botanical Survey of India, Calcutta.

**Srivastava, S.K (1998).** Zingiberaceae in Andaman & Nicobar Islands, India. *Indian Journal of Forestry, Additional Series* 10: 1–33.

**Wasuwat, S., P. Wannissorn, W. Chamchaang, T. Suntornatanasat, P. Soontornsaratune & A. Chotippong (1986).** Pharmaceuticals from medicinal plants: Pharmacological study on the antibacterial and antifungal activity of active principles from *Alpinia conchigera* Griff. Thailand Institute of Scientific and Technological Research, Bangkok, 19p.

**Wong, K.C., B.C. Lee, N.F. Lam & P. Ibrahim (2005).** Essential oils of the rhizomes of *Alpinia conchigera* Griff. and *Alpinia latilabris* Ridl. *Flavour and Fragrance Journal* 20(4): 431–433.

