

Diversity and Ethnobotany of the Genus *Phlogacanthus* Nees in Assam, India

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ABSTRACT- The genus *Phlogacanthus* Nees (Acanthaceae) is represented by 49 species confined only to a few South-East Asian countries viz., Bangladesh, Bhutan, China, India, Indonesia, Myanmar and Vietnam. The genus is endemic to the region and India is represented only by 10 species which are confined only to north-east region of the country. Assam is represented by 10 taxa of the genus. Several members of the genus have been used medicinally and as vegetable by the ethnic communities of north-eastern India. It is commonly used for curing fever, cough, chronic bronchitis, asthma, and rheumatism by one or other ethnic group of northeastern India. It is also used as an antiseptic, anti-allergic and as insecticide. During the last few decades the genus has become one of the most important sources of Phlogantholide A, found in the leaves which are considered beneficial in liver and spleen diseases. The present study provides baseline information on the species diversity of the genus *Phlogacanthus* in Assam along with their therapeutic and other uses.

Key-words- *Phlogacanthus*, Assam, Diversity, Ethnobotany

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INTRODUCTION

Phlogacanthus Nees (Acanthaceae) is an endemic genus that includes species which are used as a source of traditional medicines by the ethnic groups of North Eastern region of India. Members of the genus *Phlogacanthus* are locally known as “Bahak tita” or “Titaphool”. The plants are tall herbs, shrubs and small trees. Stem stout, quadrangular, nodes swollen and flat; leaves are opposite, acuminate; flowers are borne in terminal thyrsoïd dense panicles.

The genus *Cystacanthus* established by Anderson [1] and placed in tribe Ruellieae [2] merged with *Phlogacanthus* [3-6]. But several others still recognized *Cystacanthus* as a genus independent from *Phlogacanthus* [7-12].

The genus *Phlogacanthus* has about 49 species [6-8]. In India the genus is represented only by 10 species which are restricted only to North-east region of the country [13]. Out of these 10 species, 8 are recorded in Assam [14].

The present work deals with 10 taxa (Nine species and one variety) of *Phlogacanthus* recorded to be occurring in Assam with their nomenclatural status and distribution within the state.

MATERIALS AND METHODS

Extensive field work has been carried out during 2014-2016 to document the species of *Phlogacanthus* Nees occurring in different parts of Assam. The collected specimens were processed into mounted herbarium sheets following standard herbarium techniques [15]. Collected specimens were also introduced into Botanical Garden, Botany Department, Gauhati University. Using relevant literature [16], critical examination and scrutiny of specimens deposited in ASSAM (BSI, Eastern Regional Circle Shillong), K (Royal Botanic Gardens Kew) and Jstor global plants the collected specimens were identified. The specimens were deposited in the Herbarium of the Department of Botany, Gauhati University (GUBH). Distributional status of the identified species in the world and India were recorded from literature. Uses of different species have been documented during field work from the local people. The local names of the species in the states other than Assam have been recorded from literature and provided using abbreviations Ass., G, K, Kh and DI against Assamese, Garo, Karbi, Khasi and Dimas respectively.

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RESULTS AND DISCUSSION

Phlogacanthus Nees in Wallich, Pl. Asiat. Rar. 3:76, 99. 1832 & in DC. Prodr. 11: 320. 1847; T. Anders. in Journ. Linn. Soc. 9: 506. 1867; Benth. in Benth. & Hook, f. Gen. Pl. 2: 1100. 1876; C.B. Clarke in Hook.f. Fl. Brit. Ind. 4:510, 1885; R. Ben. in H. Lec. Fl. Gen. Ind.-Chine, 4: 703. 1938.

Members of the genus *Phlogacanthus* are tall herbs, shrubs and small trees. Stem stout, quadrangular, glabrous, lower portions woody, puberulous upwards, nodes swollen and flat. The leaves of *Phlogacanthus* are opposite decussate, entire, glabrous or obscurely crenate, acuminate at both ends. The flowers borne in terminal thyrsoid dense panicles, rarely in axillary racemes or cymes, showy, orange, red, pink or yellow, bracteate, bracteolate, complete, zygomorphic, hermaphrodite, pentamerous, hypogynous; sepals 5, gamosepalous; corolla tubular, curved; petals 5, gamopetalous, valvate, 2/3 bilabiate, imbricate in bud. Stamens 2, polyandrous, epipetalous, filaments hairy at the base, sometimes with two small staminodes; anthers 2-celled, muticous, glabrous, dorsifixed. Ovary syncarpous, bilocular, superior, ovules 5-8 in each cell, placentation axile, an annular disc is present below the ovary; style long, filiform; stigma bifid. Fruit capsule, elongate, sub-tetragonous, many seeded from the base. Seeds lenticular, ovate in outline, glabrous or densely shortly hairy.

ENUMERATION

Key to the species:

- 1a. Inflorescence of short or long axillary cymes:
 - 9a. Inflorescence long ca. 11-15 cm; bracts 3, green in colour.....*Phlogacanthus jenkinsii*
 - 9b. Inflorescence short ca. 4.5-6.8 cm; bracts 2, dark brown in colour.....*Phlogacanthus pubinervius*
- 1b. Inflorescence of terminal spikes or thyrsoid panicles:
 - 2a. Corolla tube widened upwards:
 - 3a. Inflorescence more than 10cm long; corolla orange-brown or dark-red:
 - 4a. Corolla orange-brown, bracteoles present.....*P. thyrsiflorus*
 - 4b. Corolla dark-red, bracteoles absent.....*P. parviflorus*
 - 3b. Inflorescence less than 10cm long; corolla yellowish-orange, purplish-pink or white:
 - 5a. Corolla ca. 3-3.2 cm long, yellowish orange, seeds 2.5-2.8 cm long....*P. tubiflorus*
 - 5b. Corolla ca. 1.2-2 cm long, purplish-pink or white, seeds 1.9-3 cm long
 - 6a. Corolla purplish pink, lateral nerves 7-9.....*P. quadrangularis*
 - 6b. Corolla white, lateral nerves 8-10.....*P. guttatus*
 - 2b. Corolla tube not widened upwards:
 - 7a. Corolla less than 2cm long; only stigma tip is curved.....*P. gomezii*

7b. Corolla more than 2cm long; whole gynoecium is curved

8a. Epicalyx 3, staminodes 2, gynoecium white.....*P. curviflorus* var. *curviflorus*

8b. Epicalyx 2, staminodes absent, gynoecium pink. *P. curviflorus* var. *menchanensis*

The present work records the occurrence of nine species and one variety of *Phlogacanthus* from different parts of Assam-

1. *Phlogacanthus curviflorus* (Wall.) Nees in Wall. Pl. Asiat. Rar. 3: 99. 1832; C.B. Clarke in Fl. Brit. India 4: 511. 1884; Prain, Beng. Pl. 810. 1903; Heinig, Enum. 921. 1907; Haines, Bot. Bih. Or. 701. 1922; Fischer in Rec. Bot. Surv. India 12 (2): 121. 1938; Kanjilal *et al.*, Fl. Assam 3: 443. 1939; Deb. Fl. Tripura 2: 295. 1983; Harid. & R. R. Rao, Forest Fl. Meghalaya 2: 664. 1987; Giri *et al.*, Materials Fl. Arunachal Pradesh 2: 248. 2008. *Justicia curviflora* Wall. Cat. 2429. 1830, nom. & Pl. Asiat. Rar. 2:9. t. 112. 1830.

Type: Bangladesh, Mt. Sillet, Wallich, N., # 2429 a (M 0186719, E 00273556); Thailand, Siam, Hosseus, C.C., #305a, 31.12.1904 (M 0168711)

Local name: Kola bahak, Dhapat tita (Ass); Aluso (DI); Tew-phot-saw (Kh); Kham-chhit (G).

Shrubs large up to 4-5m high; stems woody and stout, glabrous, puberulous upwards, nodes smooth, slightly pubescent; leaves 25-49.4 x 13-21.5 cm, obovate, apex acute, narrowed into petiole at the base, lateral nerves 10-12 pairs on each side, primary veins more prominent on the abaxial surface. Inflorescence terminal, 12-15cm x 5-6 cm, short peduncled; bract 1, linear, 0.2 cm, bracteoles absent. Calyx 5-lobed, 0.4-0.5 cm; epicalyx 0.3-0.4 cm. Corolla ca. 2.8-3 cm long, tubular, brick red; stamens 4, glabrous, 2 fertile, 2 rudimentary. Gynoecium 2.4-2.5 cm long, stigma and style white in colour, ovary green. Capsule linear, elongate; seeds many, compressed.

Flrs. Jan-March. **Fr.** March-May.

Distribution: **World:** Bangladesh, India, Myanmar; **India:** North-east.

Occurrence: Roadsides and as forest undergrowth.

Specimen examined: India, Assam, Kamrup District, Amsang Wildlife Sanctuary, January 28, 2014, **B. Dutta**, 001; India, Assam, Sonitpur District, Balipara Reserve Forest, January 5, 2015, **B. Dutta**, 020,021; India, Assam, Tinsukia District, Bherjan- Borajan- Padumoni Wildlife Sanctuary, January 8, 2015, **B. Dutta**, 034; India, Assam, Karbi Anglong District, Nambor Wildlife Sanctuary, January 23, 2016, **B. Dutta**, 048. (GUBH)

2. *Phlogacanthus gomezii* (Nees) J.R.I. Wood in Edinburgh J. Bot. 51(2): 182. 1994; *Loxanthus gomezii* Nees in Wall., Pl. Asiat. Rar. 3: 99. 1832; *P. wallichii* C.B. Clarke in Hook f., Fl. Brit. Ind. 4: 511. 1884; C.E.C. Fisch. in Rec. Bot. Surv. India 12(2): 121. 1938; Kanjilal *et al.*, Fl. Assam 3: 442. 1939.

Type: Bangladesh, Sillet, s. coll., #7170, K000950023.

Local name: Banaria tita phul / Moupia (Ass), Nimso pechok, Jok an ke-er (Karbi).

Shrubs up to 3m high; stem woody, glabrous, quadrangular. Leaves elliptic, lanceolate, acuminate, 23-32 x 9-10 cm, narrowed at base; lateral nerves 10-11 pairs. Inflorescence terminal thyrse, villous, 10-14 x 9-10 cm. Calyx villous, 0.9-1 cm; bracts 2, 1-1.3 cm; bracteoles 4, 0.2-0.3 cm. Corolla dark red, 1.6-1.8 cm, tubular, widened upwards, curved. Stamen glabrous. Gynoecium pinkish white, curved, 1.5-1.7 cm. Seeds 2.3-2.5 cm, glabrous.

Flrs. Jan-March. **Fr.** March-May.

Distribution: **World:** Bangladesh (Sillet), India; **India:** Assam, Meghalaya, Mizoram.

Occurrence: As forest undergrowth

Specimen examined: India, Assam, Kamrup District, Amsang Wildlife Sanctuary, January 30, 2014, **B. Dutta**, 007,008,009.

3. *Phlogacanthus guttatus* Nees in Pl. Asiat. Rar. 3: 99. 1832; Clarke in Hook. f. Fl. Brit. Ind. 4: 512. 1885; C.E.C. Fisch. In Rec. Bot. Surv. India 12 (2): 121. 1938; Kanjilal *et al.*, Fl. Assam 3: 442. 1939; Deb, Fl. Tripura 2: 295. 1983. ***Justici guttata*** Wall., Pl. Asiat. Rar. 1: 24. t. 28. 1830; D.C. Prodr. 11: 321. 1847; Journ. Linn. Soc. 9: 507. 1867; Bot. Reg. t. 1334.

Type: Bangladesh, Mount Silhet, Wallich, N., #2431, 1830, (E00273555, P00719589).

Local name: Not known.

Shrubs up to 1-2m high, pubescent when young; stem thin; leaves elliptic or oblanceolate, 7-13 x 4-5cm, base cuneate, apex acuminate, lateral nerves 8-10, petiole 2.5-3.2 cm. Inflorescence terminal, not very dense, 7-9.5 cm; bracts and bracteoles absent. Calyx pubescent, 1-1.2 cm. Corolla white, 1.5-1.8 cm, shortly 2-lipped; upper lip sub erect, 2-lobed; lower 3-lobed; lobes with purple spots, recurved; stamens 2; anthers long. Gynoecium 1.8-2.2 cm, ovary glabrous. Seeds 2.5-3 cm.

Flrs. Dec-Feb. **Fr.** March-April

Distribution: **World:** Bhutan, China, India, Malaysia; **India:** Arunachal Pradesh, Assam, Meghalaya, Mizoram and Tripura.

Occurrence: As forest undergrowth and in open forest of low hills.

Specimen examined: India, Assam, Karbi angling District, Ulukunchi, March 3, 2016, **B. Dutta**, 051, 052.

4. *Phlogacanthus jenkinsii* C.B. Clarke in Fl. Brit. India 4(11): 511. 1884; Kanjilal *et al.*, Fl. Assam 3: 445. 1939

Type: India, Assam, s. coll., # s.n., 1829, K 000950016, K 000950014; India, upper Assam, Jenkins, F., #s.n., K 000950015.

Local name: Baheka (Ass)

Shrubs up to 4-5m high; stem stout, quadrangular, glabrous, puberulous upwards; leaves broad, large, apex acute-acuminate, 30-34 x 10-15cm, petiole 3.3-3.5 cm, lateral nerves 11-13 pairs. Inflorescence axillary raceme, 11-15 x 2.6-3.2 cm; bracts 3, 2 short, 1.2-1.3 cm and 1 long, 1.5-1.7 cm; bracteoles absent. Calyx 1.2-1.4 cm, linear lanceolate. Corolla pubescent, yellow, 2.8-3 cm; stamens 2, glabrous; anthers short, exserted. Gynoecium 2.9-3.1 cm, ovary glabrous. Seeds small, 2.5-2.8 cm.

Flrs. Dec-Feb. **Fr.** Jan-March.

Distribution: **World:** India; **India:** North-east.

Occurrence: In open forest of low hills.

Specimen examined: India, Assam, Karbi Anglong district, Hamren, January 25, 2016, **B. Dutta**, 049, 050.

5. *Phlogacanthus parviflorus* T. Anders. in Journ. Linn. Soc. 9: 506. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 512. 1884; A.S. Chauhan in Hajra, Contrib. Fl. Nandapha 243. 1996.

Type: Myanmar, Patkoye Namyoon. s. coll., #s.n., K000950021; India, East Bengal, Griffith W., #6155, P00719592.

Local name: Tita phul (Ass)

Shrubs up to 3-4 m high; stem stout, quadrangular; leaves 28-30 x 6-8 cm, broadly lanceolate, acuminate at both ends, paler and glabrous beneath; lateral nerves 12-13 pairs on each side. Inflorescence 23-26 x 7-9 cm, terminal; bracts 2, 1-1.1 cm; bracteoles 4, 0.5-0.6 cm. Calyx linear lanceolate, 1.3-1.5 cm. Corolla 2.6-3 cm, tubular, widened upwards, dark red; stamens 2, exserted. Gynoecium deep red, 2.3-2.5 cm; ovary glabrous.

Flrs. Dec-Feb. **Fr.** Jan-March.

Distribution: **World:** India, Myanmar (Patkoye Namyoon); **India:** East Bengal and SE Assam.

Occurrence: In open forest of low hills.

Note: This species was recorded to be found in Assam by Clarke (1884). However, it was not included in any subsequent works (Kanjilal *et al.*, Fl. Assam 3 : 443. 1939; Deb, Fl. Tripura 2 : 295. 1983; Giri *et al.*, Materials Fl. Arunachal Pradesh 2 : 248. 2008).

Specimen examined: India, Assam, Sonitpur District, Balipara, January 5, 2015, **B. Dutta**, 022, 023.

6. *Phlogacanthus pubinervius* T. Anderson in J. Linn. Soc. 9: 508. 1867; C.B. Clarke in Hook. f., Fl. Brit. India 4: 513. 1885; Brandis, Ind. Trees 501. 1906; Kanjilal *et al.*, Fl. Assam 3: 444. 1939; Haridasan & Rao, For. Fl. Meghalaya 2: 664. 1987.

Type: India, Sikkim, Hooker, J.D., #s.n., (C10005087, K000950013, NY00312245); Bhutan, Dgiri Hills, Griffith, W., #2422, K0009500013; China, Kouy zcheou, Esquirol, J.H., #737, K000950027.

Local name: Titay (Sikkim)

Shrubs up to 1.5-2 m high; highly branched and spreading; stem light brown in colour; leaves elliptic-lanceolate, 11-28.5 x 5.5-7 cm, base attenuate, apex acute, glabrous, lateral nerves 7-9 pairs; petioles 1.2-3.8 cm. Inflorescence axillary, 4.5-6.8 cm; bracts 2, 0.3 cm, dark brown; bracteoles absent; calyx 0.6-0.7 cm, pubescent, lobes curled; corolla orange with distinct red veins, 3-3.1 cm, tubular, curved, inflated, 2-lipped, upper lip longer than lower; stamens 2; anthers long, exserted. Gynoecium 3cm, light green with orange stigma. Capsules glabrous, terete, 3-3.1 cm long.

Flrs. Dec- Feb. **Fr.** Feb-March.

Distribution: Bhutan, China, India, Malaysia; **India:** Assam, Meghalaya, Mizoram

Occurrence: In open forest of low hills.

Specimen examined: India, Assam, Dima Hasao District, Haflong, March 26, 2016, **B. Dutta**, 053, 054, 055.

7. *Phlogacanthus thyrsiflorus* (Roxb. ex Hardw.) Mabb. in Manilal, Bot. & Hist. Hort. Malab.: 83.1980. ***Justicia thyrsiformis*** Roxb. ex Hardw. In Asiat. Res. 6: 349. 1799. ***Phlogacanthus thyrsiflorus*** (Roxb.) Nees in Wall., Pl. Asiat. Rar. 3: 99. 1832; C.B. Clarke in Hook. f. Fl. Brit. India 4: 512.1884; Kanjilal *et al.*, Fl. Assam 3: 443. 1939

Type: Smith, J.C., #s.n., K000950020

Local name: Tita phul, tita bahak, Ram bahak (Ass); Jok-an, Tadongmiow (K); Elliot (G); Dieng-soh-kajut, Ja-boit (Kh).

Shrubs up to 2-3 m high; stem erect, long, glabrous; leaves 13-24 x 7-9 cm, elliptic, lanceolate, acute; lateral nerves 9-10 pairs. Inflorescence 10-12 x 4-5cm, terminal, pubescent; bracts 3, 1.3-1.4 cm, linear; bracteoles absent. Calyx densely pubescent, 1-1.2 cm. Corolla orange brown, 2.4-2.4 cm, tubular, closely villous; stamens 2, exserted, glabrous. Gynoecium pinkish white, 2.5-2.6 cm; ovary glabrous. Seeds long, sub-tetragonous, compressed, thin, *ca.* 3.8 cm.

Flrs. Jan- March. **Fr.** March-May

Distribution: World: Bhutan, India; **India:** North-east and West Bengal

Occurrence: Roadside in dry areas, as forest undergrowth, also grown as ornamental plants.

Specimen examined: India, Assam, Kamrup District, Sonapur, January 30, 2014, **B. Dutta**, 002, 003, 004, 005, 006; India, Assam, Kamrup District, Boko, January 11, 2015, **B. Dutta**, 024, 025, Jalukbari, January 11, 2015, **B. Dutta**, 026,030; India, Assam, Karbi Anglong, Diphu, January 24, 2015, **B. Dutta**, 038, 040; India, Assam, Jorhat District, Tarajan, January 17, 2016, **B. Dutta**, 043, 044, 045; India, Assam, Sivsagar District, Geleki, January 19, 2016, **B. Dutta**, 046, 047.

8. *Phlogacanthus tubiflorus* Nees in Wall. Pl. Asiat. Rar. 3: 99. 1832, & in DC. Prodr. 11. 321; C.B. Clarke in Hook. f. Fl. Brit. Ind. 4: 511. 1884; C.E.C. Fisch. in Rec. Bot. Surv. India 12(2): 121. 1938; Kanjilal *et al.*, Fl. Assam 3: 443. 1939; Deb, Fl. Tripura St. 2. 296. 1983; Haridasan & Rao, For. Fl. Meghalaya 2: 665. 1987; Chauhan *et al.*, in Hajra, Fl. Namdapha 234. 1996; Bora & Kumar, Fl. Div. Assam Pabitora WLS. 254. 2003.

Type: India, Goalpara, Buchanan-Hamilton, F., #wall. cat. n. 2428, 12.11.1808, GZU000251442.

Local name: Tita phool, Bhataitita (Ass); Alubabui (DI); Jok-anke-et, Nimsopechok, Pichok lok, Kabrotudong miow (K); Som rongtek (Kh).

Shrubs up to 3-4m high; stems obscurely angled. Leaves oblong-lanceolate, 22-30 x 8-9 cm, base cuneate, apex acuminate, pubescent beneath; lateral nerves 8-10 pairs on each side. Inflorescence, terminal thyrses, 13-16 x 2-3 cm; bracts 3, 1-1.4 cm; bracteoles absent. Calyx triangular lanceolate, 1-1.2 cm. Corolla yellowish orange, 3-3.2 cm long, widened upwards, shortly 2-lipped; stamens 2, glabrous. Gynoecium whitish green, 2.2-2.4 cm, ovary glabrous. Seeds long, 2.5-2.8 cm, compressed, glabrous.

Flrs. Jan-March. **Fr.** March-May.

Distribution: World: India; **India:** Arunachal Pradesh, Assam, Meghalaya and Tripura.

Occurrence: In open forest of low hills, also grown as ornamental plants.

Specimen examined: India, Assam, Kamrup (Rural), Hahim, January 11, 2015, **B. Dutta**, 027, 028, 029; Karbi Anglong District, Diphu, January 24, 2015, **B. Dutta**, 037, 039.

9. *Phlogacanthus quadrangularis* (Hook.) Heine in Bull. Mus. Natl. Hist. Nat. (Paris) 4e ser. 10, sect. B, Adonsonia No. 2: 148. 1988; ***Justicia quadrangularis*** Hook. In Curtis, Bot.Mag. (Ed.Hook.) 55: t.2845.1828 & in Edwards' Bot.Reg. (Ed.Lindl.) 16: t. 1340. 1830-1831; ***Justicia asperula*** Lodd., Bot. Cab. 17, t. 1681. 1831; ***P. vitellinus*** (Roxb.) T. Anderson J. Linn. Soc., Bot. 9: 507. 1867; ***P. asperulus*** (Lodd.) Nees in Wall. Pl. Asiat. Rar. 3: 99. 1832; Fl. Brit. Ind. 4: 512. 1884; Fl. As. 3: 444. 1939; A.S. Chauhan in Hajra, Contrib. Fl. Namdapha 242, 1996.

Local name: Baheka (Ass).

Shrubs up to 1m; stem thin. Leaves 13-15 x 6-7 cm, elliptic, acuminate, lanceolate; lateral nerves 7-9 pairs. Inflorescence 3.5-4 x 1-1.4 cm, terminal; bracts 2, 0.2-0.3 cm, bracteoles absent. Calyx 0.4-0.6 cm, puberulous. Corolla inflated at the mouth, widened upwards, purplish pink, 1.2-1.3 cm, pubescent. Gynoecium light pink, 1-1.1 cm. Seeds 1.9-2 cm, glabrous.

Flrs. Feb-April. **Fr.** March-June.

Distribution: World: Bangladesh, Bhutan, India and West Bengal; **India:** Assam, Darjeeling and Meghalaya.

Occurrence: As forest undergrowth.

Specimen examined: India, Assam, Karbi Anglong District, Lahorijan, March 7, 2015, **B. Dutta**, 041, 042.

CONCLUSION

In the present work 10 taxa has been recorded from different parts of Assam. Out of these, *P. thyrsiflorus* is the most common which is found in almost all the districts of the state. Although *P. curviflorus*, *P. gomezii*, *P. pubinervius* and *P. tubiflorus* are used as dietary supplement and also as medicine by different ethnic communities of the region yet the most commonly used species is *P. thyrsiflorus*. As the members of the genus is medicinal and cures a number of diseases, so it is also sold locally in the hilly districts of Karbi-anglong, North Cachar hills, Barak valley and in the some parts of Meghalaya. As the members of the genus are endemic so *ex-situ* conservation and mass propagation can be taken up for their perpetuation. Introduction in botanical gardens will also help in the conservation of this genus.

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Table 1: Ethnobotanical uses of the members of *Phlogacanthus* in Assam

S. No.	Name of the species	Parts Used	Uses
1.	<i>Phlogacanthus curviflorus</i> var. <i>curviflorus</i> (Wall.) Nees	Whole Plant Stem	<ul style="list-style-type: none"> Used in jaundice, skin infection, fever, sore throat and as leafy vegetable. Yields red dye used for dyeing yarn.
2.	<i>P. curviflorus</i> var. <i>menchanensis</i> Barnali Dutta & S. K. Borthakur	Leaves and flowers Leaves Whole plant Roots	<ul style="list-style-type: none"> Cooked and eaten as vegetable. Decoction is used to cure muscular pain. Used in the treatment of cold, fever, sore throat, swellings and bruises. Used in treatment of malaria.
3.	<i>P. gomezii</i> (Nees) J. R. I. Wood	Inflorescence Leaves	<ul style="list-style-type: none"> Fried boiled or baked and cooked with fish. Used in treatment of stomach pain of female post child birth
4.	<i>P. guttatus</i> Nees	—	—
5.	<i>P. jenkinsii</i> C. B. Clarke	Leaves	<ul style="list-style-type: none"> Decoction of leaves is used in spleen and liver diseases.
6.	<i>P. parviflorus</i> (T. Anderson) J.B. Imlay	—	—
7.	<i>P. pubinervius</i> T. Anderson	Flowers Leaves	<ul style="list-style-type: none"> Cooked with rice to regulate the blood pressure and normal functioning of the body. Dried leaves are eaten to cure dysentery. Decoction is used to cure malaria.
8.	<i>P. thyrsiflorus</i> (Roxb. ex Hadw.) Mabb.	Inflorescence Whole plant Whole plant Fruit and Leaf Flowers Aerial portion	<ul style="list-style-type: none"> Boiled or baked with dried fish, meat and eaten as chutney; used to relieve stomach ache. Used in fever, skin disease, abdominal tumour, chronic bronchitis, asthma, dysentery, haemoptysis, painful swellings, neuralgia, scabies, malaria and whooping cough. Used in Bathou Puja by Bodo people. Ash is used in fever by Jaintia tribe of Meghalaya and Karbi tribe of Assam. Antidote to pox; prevents skin diseases like scabies, sore; used in jaundice. Curry is eaten orally to cure allergy.
9.	<i>P. tubiflorus</i> Nees	Whole plant Flowers Leaves Bark	<ul style="list-style-type: none"> Used in Chojun (a ritual of the Karbi people). Boiled or baked with alkali solution and eaten with fish; used as vegetable in intestinal worm, rheumatism, cold and cough. Used to wash hair to destroy head louse and nit and as detergent to wash clothes and hair; powder is smoked in asthma. Decoction given in asthma.
10.	<i>P. quadrangularis</i> (Hook.)	Flowers	<ul style="list-style-type: none"> Tea tribe of Upper Assam uses it as vegetable.

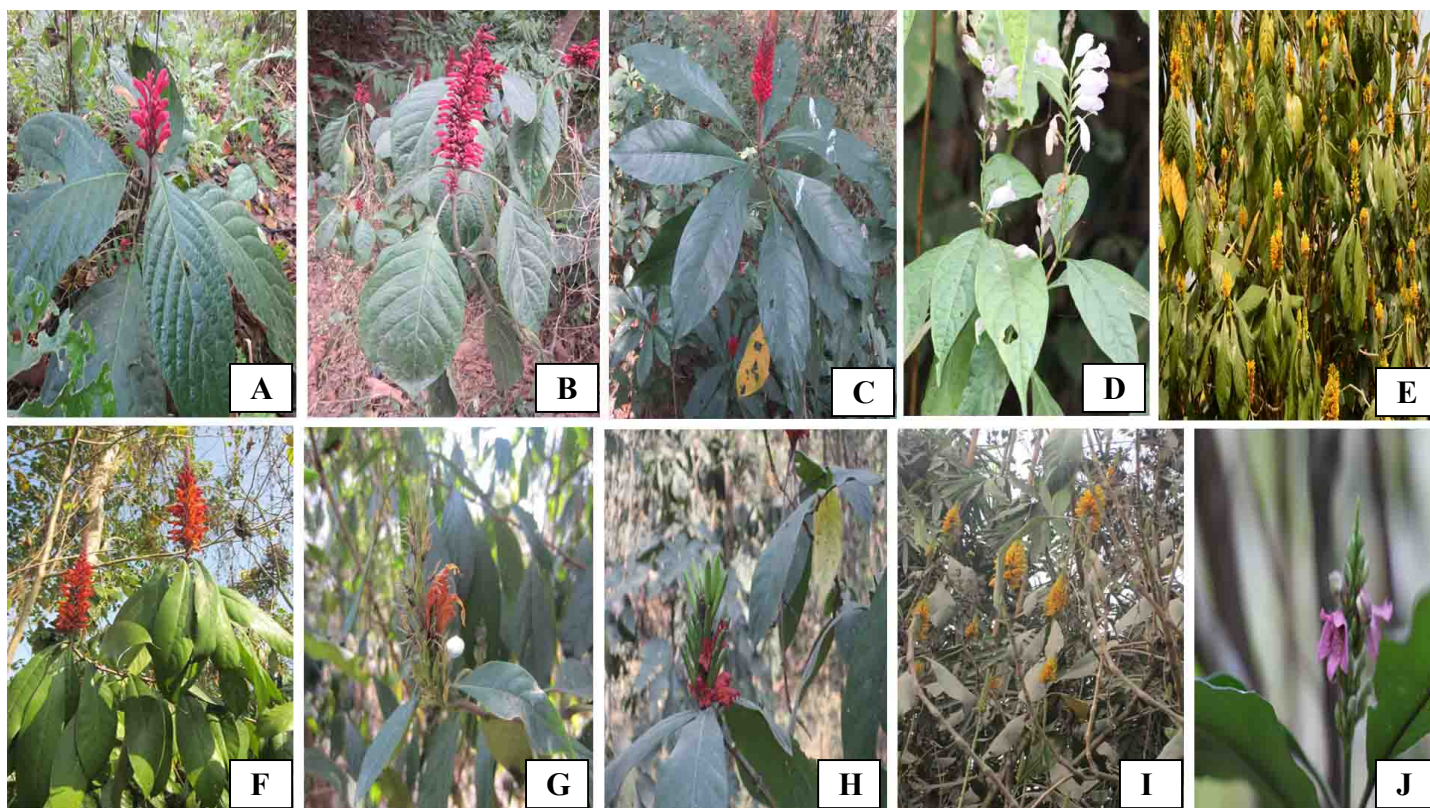


Fig. 1: Habit of *Phlogacanthus* spp.

**A. *Phlogacanthus curviflorus* var. *curviflorus*, B. *P. curviflorus* var. *menchanensis*, C. *P. gomezii*,
D. *P. guttatus*, E. *P. jenkinsii*, F. *P. parviflorus*, G. *P. pubinervius*,
H. *P. thyrsoflorus*, I. *P. tubiflorus*, J. *P. quadrangularis***

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