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NEW AND NOTEWORTHY PLANT RECORDS FROM INDIA

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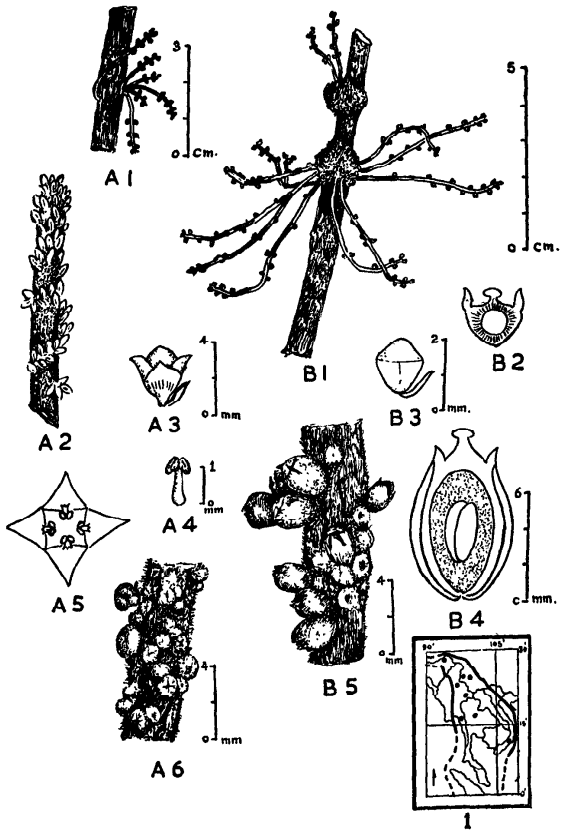
During the studies on the Flora of different parts of India, particularly the two heavy rainfall zones of the country *i.e.*, Kerala and North-East Frontier Agency, a few species as given below have been recorded either new to the country or with interesting distribution. Only such of the species which are rather very little known, are described briefly with diagrams for enabling other workers in the field to locate such species in the possible range of distribution in the country as indicated.

Phacellaria compressa Benth. in Gen. Pl. 3 : 229, 1880 ; Hook. f. in Fl. Brit. India 5: 235, 1886 ; Danser in Blumea 3(2): 2, 1939 ; Rolla S. Rao in Curr. Sci. 33(4): 121, 1964. *P. wattii* Hook. f. *l.c.* 236 ; Brandis, Ind. Trees 554, 1906 ; Pilger in Engl. Pflanzenfam. ed. 2, 16b: 71, 1935. *P. ferruginea* W. W. Sm. in Notes R. B. G. Edin. 10: 188, 1918 *non* Handel-Mazzetti.

A small, complete parasitic herb, pale yellow in colour, unisexual and dioecious. In both male and female plants: *Stems* simple, ferrugineous, or densely velvety when young and somewhat glabrous when old, short and robust, usually upto 15 cm long, 1-2.5 mm rarely 4 mm in diameter, usually unbranched but rarely branched and sometimes slightly flattened. *Flowers* unisexual, small, sessile, solitary or fascicled with few flowers in the axils of bracts ; bracts usually imbricate on young tips, nearly 1 mm long, ovate, acuminate. *Male flowers* somewhat round with 4 triangular, valvate perianth lobes. Stamens 4 each inserted at the base of lobe ; filaments short, flattened ; anthers cordate with 2 diverging lobes, dehiscing by longitudinal slit. *Female flowers* oblong when mature with 4-5 triangular perianth lobes ; ovary inferior, disc flat, style short, cylindric with truncate, 3-lobed stigma. *Fruits* ovate or ovate-oblong, upto 6 mm long, 4 mm in diameter, crowned by persistent perianth lobes.

Specimens collected : Mountain slope above Bela village (Apathanang valley, Subansiri division, NEFA) 1900 m, *Rolla* 1677, rarely seen during November, 1955.

Various species under the genus *Phacellaria* including the types have been studied by the senior author at Kew and Edinburgh Herbaria in 1964.



Phacellaria compressa Benth.

Figs. 1, A1-A6 & B1-B5 : 1. Map of South-East Asia showing the distribution of the species. A1. Male plant with the host. A2. Diagramatic representation of spiral arrangement of male flowers. A3. Open male flower with bract. A4. Stamen. A5. Top view of male flower (Diagramatic). A6. Male flowers in natural arrangement. B1. Female plant with the host. B2. L.S. of young fruit. B3. Female flower with a bract. B4. L. S. of mature fruit. B5. Female flowers in natural arrangement.

Phacellaria compressa is one of the most interesting complete parasites which is invariably parasitic on various genera of Loranthaceae like *Taxillus, Macrosolen, Elytranthe, Scurrula* and sometimes on *Henslowia* of Santalaceae. On scrutiny of wide range

of material particularly from China and Indo-China, it appears that this parasite has some special preference on species of *Taxillus* and the present collection from India (Himalayas) is also parasitic on *Taxillus vestitus* (Wall.) Danser which in turn is semi-parasitic on *Pyrus pashia* Buch.-Ham. (Rosaceae). *Phacellaria wattii* collected from Burma-India border (Burma) is however, found to be parasitic on *Macrosolen* sp.

Though the species was well described by Bentham (*l.c.* 1880) subsequent collections from India-Burma border area (Burma) and Yunnan area (China) were considered to be new by Hooker f. (*l.c.* 1886) and W. W. Smith (*l.c.* 1915) who described them as *P. wattii* and *P. ferruginea* respectively as the species is very variable due to its extensive distribution from the humid tropics to the sub-tropical belt of the Himalayas. Hooker's (1886) caution that the genus should be studied from living material or spirit material is quite significant and better understanding of the genus is hereafter possible by profuse herbarium material together with good notes made on the field and spirit collections, as living collections cannot be easily maintained and made available for study.

Danser's opinion in considering *P. wattii* and *P. ferruginea* as synonyms to *P. compressa* has been found to be correct during the recent study of the genus by Dr. H. U. Stauffer of Zurich University and subsequently during the senior author's verification at Kew Herbarium in 1964. From the study of the type of *P. wattii* (*George Watt* 6154), it is evident as indicated by Danser that the locality recorded on the sheet 'Mao' *i.e.,* Maiang Mao or Muang Maw, (on the eastern frontier of India) is not in Manipur (*vide* Fl. Brit. India *l.c.,* Deb in Bull. bot. Surv. India 3: 299, 1961) but in Burma at 2500 m altitude and as such, the present collection by the senior author is the first of its kind from India.

The genus *Phacellaria* with its seven species so far known, has been recorded from South-East Asia region with Szechwan (China) with about 32° N lat. as the northern-most limit and Selangor State (Malaya) with about 3° N lat. as the southern-most limit. It appears that the genus is restricted to mostly hilly areas of this region with the altitude ranging from 500-2500 m.

Of the seven species, *Phacellaria compressa* is the only one, widely distributed in this region, occurring in Yunnan (South China) (lat. ± 25°N as the northernmost boundary for this species), eastern and southern Burma, Thailand and South Vietnam (lat. ± 13°N as the southern-most boundary). Now, the present record from NEFA extends the northern boundary upto lat. ± 27°N and it is also equally possible to locate this species and possibly other species also in the hilly areas of Indonesia and other neighbouring areas to extend its southern boundary. In India mountain ranges along Manipur, Naga hills and all the divisions of NEFA and also possibly Bhutan are the potential avenues for locating this species and probably other species also.

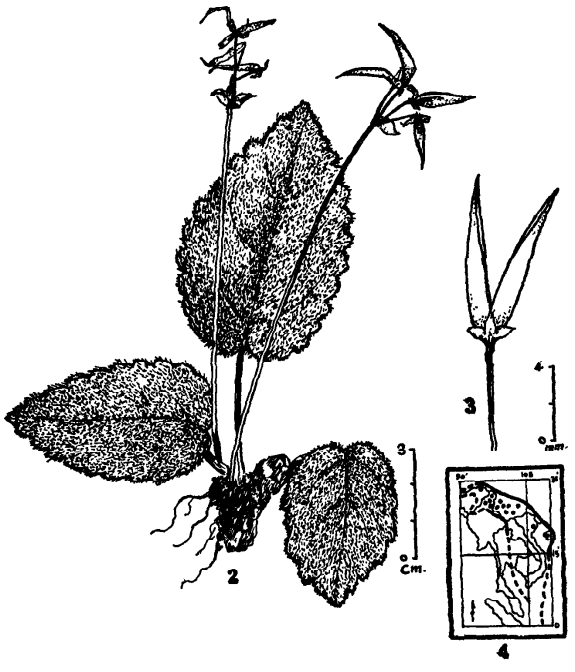
Beccarinda cordifolia (Anthony) B. L. Burtt in Notes R. B. G. Edin. 22: 63, 1955; Rolla S. Rao in Curr. Sci. 33: 120, 1964; R. S. Rao et al. in Bull. bot. Surv. India 7: 148, 1965. *Petrodoxa cordifolia* Anthony in Notes R. B. G. Edin. 18: 204, 1934.

Prostrate, densely hairy, perennial herb with thin rootstock and with very short stem, nearly 2-3 cm. *Leaves* almost radicle, 5.5-7 × 3-4 cm, crowded, ovate, cordate, acute, irregularly crenate, ciliate, densely rufo-tomentose as fawn on both surfaces, petiolate, petiole upto 1.7-4 cm in young leaves (possibly upto 5-10 cm in some leaves as noted by Anthony, *l.c.*) hairy, purplish in colour. Hairs all over, dark brownish, multicellular. *Inflorescence* as long as slightly longer than the leaves; peduncle 9-11.5 cm, sparsely hairy when young and almost glabrous in fruiting stage; bracts opposite, orbicular, margin crenate, ciliate, 6 mm. *Flowers* rose-pink shaded to light crimson sometimes creamy-yellow with a tinge of purple-blue and at times possibly fading into white and faintly scented. Calyx subequal, 5-lobed; lobes elliptic lanceolate. Corolla bilabiate, tube 5 mm long; lobes orbicular. Stamens 4, didynamous, anthers ovoid-cordate, all cohering together, longer filaments more or less terete or sharply bent in the middle. Ovary obliquely ovoid, glabrous, 2 mm long; stigma obscure, bifid. *Fruits* follicular, brownish, glabrous when mature, apex acuminate, 2 cm long. (Flower characters after Anthony, *l.c.*).

Specimens collected: Takepokong-Sirang, Siang Frontier Division, NEFA, 1700-2200 m altitude, 28°45′ N and 94°45′ E, *Rolla* 17882 (in fruits), growing sparsely in this area during November, 1958 and appearing as a *Primula* in vegetative stage.

Beccarinda O. Kuntze (Rev. Gen. 2: 470, 1891) has an interesting nomenclatural history. Griffith

named one of his collections made in 1837 from upper Burma (recorded as Naga hills, Assam) with only a generic name *Slackia* and published in



Beccarinda cordifolia (Anthony) B. L. Burtt

Figs. 2-4 : 2. Whole plant with follicles. 3. Old follicle (dehisced). 4. Map of South-East Asia showing the distribution of the genus *Beccarinda* O. Kuntze.

Notulae 4: 158, 1854; Ic. Pl. Asiat. t. 433, (non *Slackia* Griff. Itin. Notes 187, 1848 which is *Decaisnea* Hook. f. & Thoms., *nec Slackia* Griff. (Notulae 2: 162, 1851 which is *Iguanura* Bl.) without, however, proposing any specific name or suggesting any affinities of the genus. The same taxon was later published by C. B. Clarke as *Slackia griffithii* (DC., Mon. Phan. 5: 188, 1883) which forms the type species for the genus. O. Kuntze in 1891 renamed such preoccupied genus *Slackia* as *Beccarinda* and published as *B. griffithii* (C. B. Cl.) O. Kuntze, Rev. Gen. 2: 471, 1891. However, *Slackia* Griff. remained a monotypic genus upto 1926 when another species from North Vietnam (formerly French Indo-China) was described under *Slackia* only. Subsequently in 1934 another new genus *Petrodoxa* was published by J. Anthony (*l.c.* 1934) with two species from N. E. upper Burma and Yunnan. But after critical study following International Code of Botanical Nomenclature the name *Beccarinda* has been finally decided to be adopted for this taxon as the reasons for conserving *Slackia* are not cogent (M. L. Green in Kew Bull. 1935, 494, 1935).

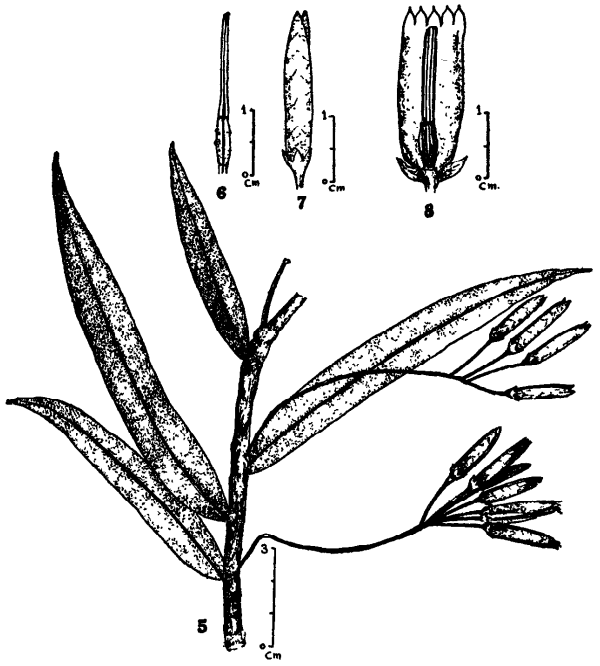
B. L. Burtt during his monographic studies in the Gesneriaceae of the old world, revives the name *Beccarinda* as per rules considering *Petrodoxa* Anthony as a synonym besides *Slackia* Griff. and records tentatively 7 species under *Beccarinda* with two as new species (specific names not yet assigned as only fruit material is available) and five as new combinations besides a few unnamed species from Indonesia, while indicating that *Beccarinda* is a natural assemblage of species. Burtt, however, admits that the status of various species needs further scrutiny expressing considerable doubt as to the distinct identity of at least two species if not more (Burtt, *l.c.* 1955).

It is interesting to record that all the seven species so far known under this genus, have been collected from tropical belt ranging from Burma to Hainan through south China and Vietnam and Burtt further supports his own opinion by the discovery of unnamed species on Great Natuna island and Sumatra right on the equatorial belt [Notes R. B. G. Edin. 29(3): 215, 1962]. Based on such data so far available, Burtt indicates the possibility of two distinct types of genera, one of tropical affinity following Burma-Hainan range and another of temperate affinity following Sino-Himalayan belt. But the present record along main range of the Himalays at a latitude of 28° 45′ is unique in indicating equally the possibility of the presence of occasional northern outlier for the tropical group as such southern outliers are available for the temperate group as south as Lushai hills of Assam.

The locality Delvi Nempea 1000 m alt. Hukawng valley north of Maingkwan, 26° 15′ N and 96° 15′ E of Griffith's collection [3852, 20 May 1837, *Holotype* (K) of *Slackia griffithii* C. B. Cl.] which is sometimes erroneously considered as part of Naga hills of Assam, is the nearest record of this genus for India and the present record as north as 28°45′ lat. is first of its kind even for the genus *Beccarinda*. It is very likely that this species grows in hilly tracts of Manipur and various divisions of NEFA if not in Khasi and Jaintia hills and Lushai hills of Assam.

Agapetes nutans Dunn in Kew Bull. 1920: 134, 1920; Burkill in Rec. bot. Surv. India 10(1): 311, 1924; R. S. Rao et al. in Bull. bot. Surv. India 7: 147, 1965.

Epiphytic glabrous shrub; stems thickened at the base. *Leaves* alternate, 13.5×2.7 cm linear to elliptic, sessile, acuminate, coriaceous, glabrous, obscurely toothed towards the apex, midrib conspicuous, margins incurved. *Flowers* in axillary, pendulous corymbs; peduncle 5-6 cm long, glabrous; pedicels 1.3-2 cm long, articulated below the calyx; bracts about 1 mm long, triangular, ovate, thinly hairy, margins dentate. Calyx glabrous, deeply 5 cleft, teeth triangular, 3 mm long. Corolla tubular 5-toothed, 2.7 cm long, lobes greenish with red V-shaped markings. Stamens 10; anthers 8 mm long, granular, each tapering into two long tubes as long as the corolla tube or slightly exerted, with apical pores; filaments small glabrous. Ovary globose; style cylindric; stigma simple.



Agapetes nutans Dunn

Figs. 5-8: 5. Twig with inflorescence. 6. Two stamens each with anther tapering into long tube and closely compact with the other. 7. Corolla showing V-shaped transverse markings. 8. Bud split open to show the position of anthers with beak-like projections.

Specimens collected: Minguing-Takepokong, 1300-2000 m, *Rolla* 17807; Takepokong-Sirang, 2000-1500 m, *Rolla* 17845; both from Siang Frontier Division, NEFA 28°42′-28°50′ N and 94°43′-94°45′ E, sparsely growing in this region in November 1958.

The species was described by Dunn from the material collected by Burkill from the Siang Frontier Division only (Abor hills) but very much south of the present range along the ridges almost near foothills, north-west of Pasighat at 28°7′ N and 95°13′ E and the inditcation by Burkill that this species might be endemic to this area, though not quite easily acceptable, still however, remains unchallenged as the species has so far not been collected elsewhere outside these ranges, even in the neighbouring divisions of NEFA which are being explored during the past ten years. This note is presented not only to record the distribution of the species further north-west in the Siang division but to enable others to spot this species even from adjoining divisions of NEFA if not from the Eastern Himalayan belt.

The species with its epiphytic habit and attractive bright rosy-red flowers, drooping from the branches, is really graceful and is worth cultivating in gardens of hill stations in India.

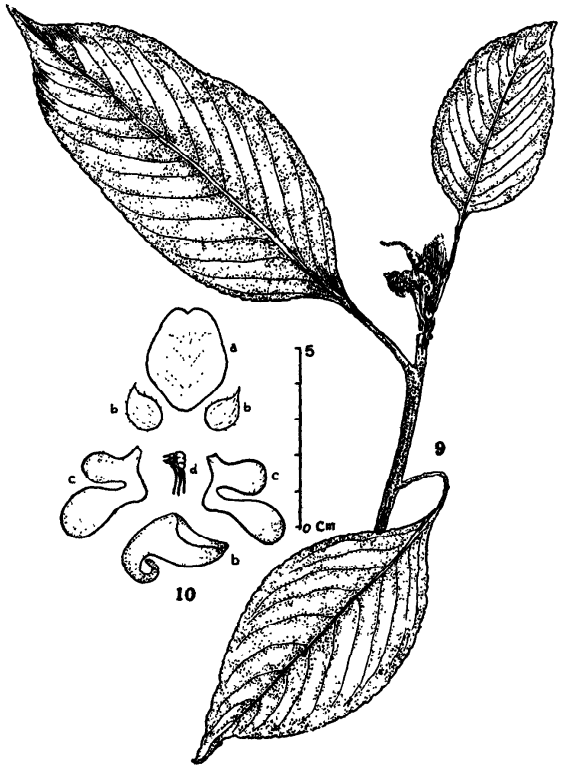
Impatiens jurpia Buch.-Ham. in Wall. Cat. 4761, 1831; Hook. f. & Thoms. in J. Linn. Soc. 4: 140, 1860; Hook. f. in Fl. Brit. India 1: 471, 1875; R. S. Rao et al. in Bull. bot Surv. India 7: 143, 1965.

A more detailed description based on field notes is given below:

Erect, annual, pubescent herb. *Leaves* alternate, petiolate, elliptic-lanceolate, caudate-acuminate, leaf base with usually, a pair of stalked glands on either side, narrowed into the petiole, margin crenate with a small conical gland in the sinus, many nerves, younger ones pubescent on both surfaces, 12.7×5.8 cm; petiole 3 cm long, very narrowly winged with a few stalked glands. *Inflorescence* axillary bearing 2-4 flowers; bracts subulate; peduncle 3-4 cm long, pubescent, slender. *Flowers* pinkish-red, 5 cm long. Sepals 1.2×.8 cm, orbicular, ovoid, apiculate, green; lip broad, saccate, acute at apex with coiled, about 1-1.5 cm long spur at the back. Petals, the standard pinkish-red in colour, large, obcordate, with a dorsal spur 6 mm long, wings 2.8-3 cm×1.8 cm, 2-lobed, lateral lobes small rounded, terminal twice as long as with ear-like auricle on the inner margin. Stamens 5, anthers cohering, filaments free, short, compressed. Ovary oblong; stigma sessile, 5-toothed. *Capsule* elongate, linear or clavate, 2.5-3 cm long, glabrous.

Specimens collected: Tumbing-Kiak, Siang Frontier Division, NEFA, 500-700 m alt., 28°20′ N and 94°40′ E, *Rolla* 17988, growing fairly common along the area and abundant at some spots, during November, 1958.

The species has so far been recorded along the Himalayas of Nepal, Sikkim and Bhutan and also Khasi hills, with present record extending its distri-



Impatiens jurpia Buch.-Ham.

Figs. 9-10 : 9. Twig with flowers. 10. Dissected flower (diagramatic) showing (*a*) standard (*b*) sepals with the spurred one on the anterior, (*c*) wings and (*d*) stamens.

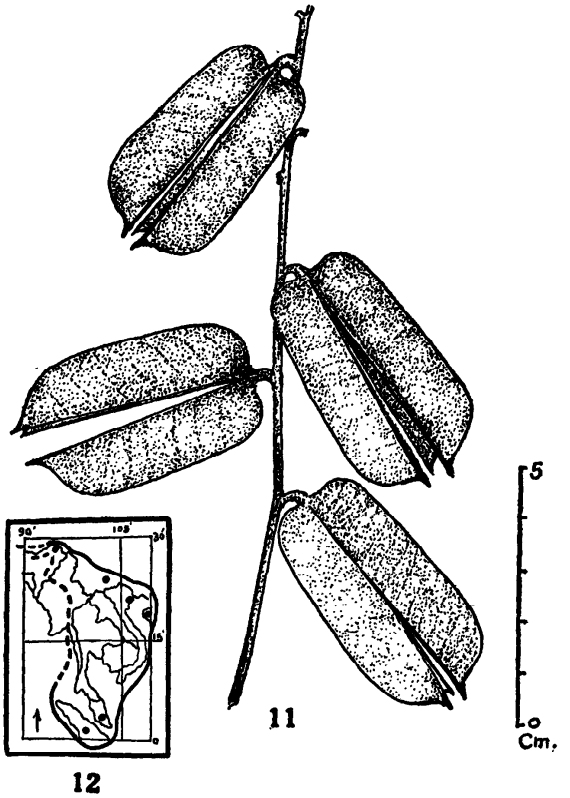
bution further east of Himalayas and also indicates its abundant growth even at lower alt. of 500 m. The occurrence of this species along the Kameng and Subansiri divisions of NEFA is also quite possible.

Dioscorea scortechinii Prain et Burkill in J. Asiat. Soc. Beng. N. S. 4: 455, 1908; Annals R. B. G. Calcutta 14(1): 186, tab. 76, 1936; Rolla S. Rao in Curr. Sci. 33(4): 120, 1964; R. S. Rao et al. in Bull. bot. Surv. India 7: 154, 1965.

The description given below is partly after Prain & Burkill (*l.c.*) and the field notes made by the senior author.

Tuber single, pyriform. *Stem* stoutly prickly at the base, pubescent when young and glabrous when mature, twining to the left. *Leaves* 3-5 foliate; leaflets unequal, elliptic, acuminate, glabours above with brown tomentum on the nerves beneath, upto 6 × 3 cm; petioles 3-6 cm long, brown tomentose when young and later glabrous; petiolules upto 5 mm. *Male flowers* on long tomentose panicles; bracts narrow, ovate acuminate, densely pubescent, 1.5 mm long; bracteoles similar but only half as long, sepals ovate, acute, 1 mm long, glabrous and with deep brown dots. Petals a little shorter, glabrous and similarly dotted. Stamens 3, staminodes 3; filaments as long as the anthers. *Female flowers* in spikes, panicled or solitary from the axils of upper leaves; bracts lanceolate, acute, densely pubescent; bracteoles similar, smaller. Sepals broadly ovate, densely pubescent, 1.5 mm long. Petals similar but thinner. *Capsule* oblong, 4.7 cm long, 2.4 cm broad, cordate at base, apex mucronate, brownish, dehiscing from the tip downwards. *Seeds* already dispersed during collection and hence not seen.

Specimens collected: Minguing, Siang, Frontier



Dioscorea scortichinii Prain et Burk.

Figs. 11-12: 11. A fruiting twig showing the mucronate tip of capsules (dehisched). 12. Map of South-East Asia showing the distribution of species.

Division, NEFA, 1200 m alt., 28°50′ N and 94°45′ E, *Rolla* 17744, on 17.11.1958, growing sparsely in this area, during November, 1958.

The species has so far been known from Vietnam, Malaysia, Indonesia and possibly S. W. China and the present record from the NEFA Himalayas is not only new to India, but also extends its distribution further north where the rainfall pattern is similar, thereby indicating the possibility of its growth along the intervening hilly regions of Burma and other division of NEFA including Manipur and Naga hills.

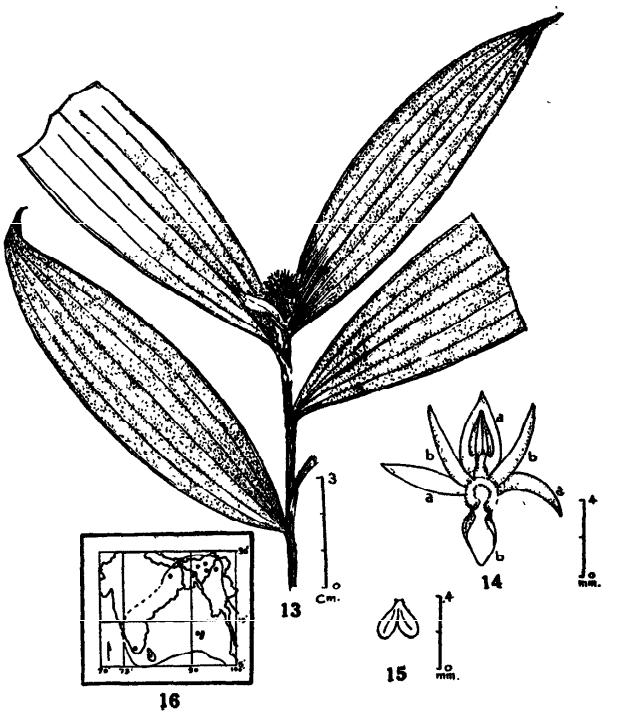
As the seed material of this species is still unknown it could be of considerable interest to locate the species with the aid of brief description and the drawing of characteristic fruits and collect the seed material during February-March.

Tropidia curculigoides Lindl. in Wall. Cat. 7386A, 1831 ; Hook. f. in Fl. Brit. India 6: 93, 1890. *Tropidia assamica* Bl. Orch. Archip. Ind. 124, 1864. *Cnemidia bambusaefolia* Thw. Enum. 314, 1861. *Tropidia curculigoides* Kurz (*non Lindl.*) ; Hook. f. *l.c.* 94. *Tropidia* sp. King in Herb. Calcutta ex Hook. f. *l.c.*

Specimens examined at CAL : Saffragam district, Ceylon, *Thwaites* 3207 (*Isotype* of *Cnemidia bambusaefolia*) ; Port Monat, South Andaman, *Kurz* s.n. ; Bamiaburu, Chotanagpur, Bihar, *Sanyal* s.n. ; Banks of Teesta, Sikkim, 1000 ft., *Kings' collector* s.n. ; Pembree, Sikkim, 1000 ft., *Pantling* 180 ; Buxa reserve, W. Duars, W. Bengal, *Gamble* 7688 ; Gauhatty, Assam, *Jenkins* 655 ; Dibrugarh, *Masters* s.n.; Silhet, E. Pakistan, *Wallich ;* Chatrik, Manipur, *Mukherjee* 3702 ; Upper Chindwin, Burma, *Thin* s.n. ; Kachin hills, Burma, *S. Mokim* s.n. ; Bhamo, Burma, *A. Huk* s.n. ; Karen hills, Burma, *Kurz* 329 ; Parak, *Wray* 3227.

Specimens examined at BSI : Moolakayam, Thenmalai, Kerala, *Subramanian* 63145 on 17.6.1960, growing fairly common.

Though *Tropidia curculigoides* is widely distributed in south-east Asia, in India it has so far been reported from West Bengal, Sikkim and Assam only. It is *T. angulosa* Bl. that grows in the high rainfall zones of India both in Sikkim and Assam on the east and Kerala on the south-west. *T. thwaitesii* Hook. f. (*Isotype Thwaites* CP. 3565 (CAL) which has been now further examined and found out to be a good species, has so far been recorded from Ceylon only. With this background on the distribution of the three species so far known from India and Ceylon, the imperfect material collected from Ceylon and Andamans could not be clarified earlier and thus treated under imperfectly known species by Hooker f. (*l.c.*).



Tropidia curculigoides Lindl.

Figs. 13-16 : 13. Twig with inflorescence. 14. Front view of flower showing (*a*) sepals with large one in the posterior and (*b*) petals with the labellum on the anterior. 15. Pollinia. 16. Map of India showing the distribution of the species.

Now, several recent collections of *T. curculigoides* from different localities in Assam and Manipur on the east and from Kerala on the south with collections from the intervening zone like Bihar and West Bengal widen the range of distribution of this taxon and confirms that the distribution pattern is almost similar to that of *T. angulosa.* With this understanding and the range of material available, the specimens representing the imperfectly known species (Hooker f. 94 *l.c.*) have been further examined by the senior author at the Central National Herbarium Calcutta (CAL) and found the considerable range of variation in the size of the plant and the leaf and thus the collections recorded earlier from Ceylon and south Andamans indicate the occurrence of this species in these areas.

As such, the present data widens the distribution of *T curculigoides* in India with Bihar, West

Bengal, Sikkim, Assam, Manipur and Andamans on the east and the island of Ceylon on the far south with the present collection from Kerala bridging the gap between north India and Ceylon. It would also be not very difficult, however, to locate this species from the hilly areas of Peninsular India in the appropriate season of mid monsoon round about the months of July-August. Similarly it is equally possible to locate in the Kerala zone *T. thwaitisii* Hook. f. a distinct, narrowly leaved species but with very poor earlier collections (*Thwaites* 3565) and thus badly in need of good material.

ACKNOWLEDGEMENTS

The authors wish to express their thanks to Mr. B. L. Burtt, Royal Botanical Garden, Edinburgh and to Dr. H. U. Stauffer, Botanical Museum, University of Zurich, Zurich for their help in the identification of *Beccarinda* and *Phacellaria* respectively and to Dr. H. Santapau, for his encouragement.