

An account of Araceae Juss. in the flora of West Bengal, India

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Abstract

The present investigation records 38 species representing 14 genera of Araceae Juss. from West Bengal. *Arisaema* Mart. is the dominant genus with 11 species. Out of 38 species, 14 species are distributed in the plains (of which *Cryptocoryne ciliata* (Roxb.) Fisch. ex Wydler, *C. retrospiralis* (Roxb.) Kunth, *C. spiralis* (Retz.) Fisch. ex Wydler, *Lasia spinosa* (L.) Thwaites and *Pistia stratiotes* L. are aquatic) and rest 24 species are terrestrial and are generally distributed at altitudinal regions up to 3900 m. The percentage of herbs and climbers are 86.84% and 13.15% respectively. *Typhonium roxburghii* Schott and *T. roxburghii* var. *longispathum* S. Nirola & A.P.Das are stated to be rare in West Bengal. *T. roxburghii* var. *longispathum* S. Nirola & A.P.Das is endemic to Darjeeling Hills. *Arisaema intermedium* Bl. is the only species of Araceae which is endemic to Singalila Range of Darjeeling. Artificial key for identification of concerned genera and species have been provided along with their botanical features, vernacular name(s), flowering and fruiting periods, status and distribution.

Keywords: account, araceae, flora, west bengal

1. Introduction

The monocotyledonous family Araceae Juss. is known as "Arum family" or "Aroids". It belongs to the series Nudiflorae for its achlamydeous flowers^[1]. Araceae is a family with over 1000 species under 100 genera and are mostly distributed in tropical regions and some occur in temperate countries of world^[1]. According to^[2], Araceae is consisting of about 3300 species under 105 genera. So far, about 140 species under 25 genera have been reported from India^[3]. Though aroids are warm loving yet are distributed even up to the cold-temperate regions in different parts of India. In West Bengal, they are naturally distributed in all the districts including the southernmost Sundarbans (24-Paraganas, Purba Medinipur) to the temperate regions of Darjeeling and Kalimpong districts.

Vegetation survey is one of the best methods to know about floral components of a particular area or a region. This information ultimately gives a sphere to construct a data bank and subsequently this data bank can be utilized for preparation of district, state and regional flora, etc. As biodiversity is the ultimate source of medicines, foods, fodders, fuels, etc. so with this view, present initiative has been taken for systematic treatment as well as inventories to certain extent about Araceae members from this region and their possible conservations as topmost priority.

2. Materials and Method

Study Area

Geographically, West Bengal is situated in between 21°45' and 27°16' N latitudes and 85°55' and 89°56' E longitudes. Present day, West Bengal is surrounded by Sikkim, Nepal and Bhutan in North and by Assam and Bangladesh in East. The Southern part is demarcated by The Bay of Bengal and Odisha. The West part is bounded by Jharkhand and Bihar. Due to diversity in soil compositions of West Bengal, it was observed that districts like Bankura, Purulia and Paschim Medinipur possess lateritic soil and Purba Medinipur

contains alluvial type. In 24-Paraganas, soil types mainly vary from sandy to clay-sandy. Clay to Sandy loam textured soil is found in Duars region while only sandy loam soil occurs in Terai and Darjeeling.

The physiographic condition of Indian state West Bengal is unique and suitable for housing diversified floristic elements. Generally the vegetation of the state can be broadly categorised into five vegetation zones viz. Moist tropical forest, Tropical moist deciduous forest, Littoral and swamp forest, Temperate forest and Grassland^[4].

Collection of specimens

Present work is based on intensive study of pertinent literatures, specimens preserved in the Central National Herbarium (CAL) and collection from field survey along with few previous works by other eminent researchers^[5-16]. As in present study the Bentham & Hooker's system of classification was followed, so the genera like *Lemna*, *Spirodela* and *Wolffia* of Lemnaceae was not included. For updating species names, the website of The Plant List^[29] was consulted. For easy identification of plants artificial keys for genera and species have been prepared. The recorded taxa are arranged alphabetically with accepted name, citation, synonyms and basionyms (wherever necessary), botanical features, local name (s), flowering and fruiting time, status and distribution.

In India including Darjeeling Himalayas, a number of workers have reported floristic information regarding Araceae^[17-28]. Vegetation survey is one of the best method by means of which we can construct a data bank of district, state, regional as well as national flora of its own. This data can be utilised by the researchers, plant explorers as a prerequisite for their further studies.

In view of this an initiative has been taken to record the diversity of the members of Araceae in the flora of West Bengal and their possible conservation.

2.1. Results

Detailed information about members of Araceae in West Bengal flora is enumerated below:

Systematic Enumerations

Generally, Araceae consists of herbs, shrubs and climbers. Herbs are glabrous or rarely spiny with short rootstocks or tubers; shrubs with sympodial branches; climbers with aerial roots. Leaves of herbs are solitary or clustered; in shrubs alternate, distichous. Petioles with sheathing leaf base; flowers 1-sexual or hermaphrodite sessile on a spadix, which is more or less completely enclosed in a spathe; perianth absent or of a few scales, rarely copular or urceolate; stamens connate; carpels connate in a sessile, 1-3 celled ovary; fruits connate berries or drupes; seeds with mucilaginous pulp.

Key to the genera

1. Plants aquatic	2	
1. Plants terrestrial	4	
2. Plants always submerged		<i>Cryptocoryne</i>
2. Plants never submerged	3	
3. Flowers bisexual		<i>Lasia</i>
3. Flowers unisexual		<i>Pistia</i>
4. Plants always climbing	5	
4. Plants never climbing	7	
5. Perianth of 4-6 segments present		<i>Pothos</i>
5. Perianth wanting	6	
6. Berries free; ovules solitary, basal		<i>Scindapsus</i>
6. Berries confluent; ovules many, parietal		<i>Rhaphidophora</i>
7. Leaves broadly lobed	8	
7. Leaves partite	9	
8. Stem with cataphylls; peduncle short		<i>Ariopsis</i>
8. Stem never cataphylls; peduncle long	10	
9. Ovules anatropous		<i>Amorphophallus</i>
9. Ovules basal		<i>Sauromatum</i>
10. Plants without hood	11	
10. Plants with hood	12	
11. Plants with parietal placentaion; ovules many	13	
11. Plants with basal placentation; ovules few		<i>Alocasia</i>
12. Plants monoecious or often dioecious		<i>Arisaema</i>
12. Plants always monoecious		<i>Typhonium</i>
13. Limb erect		<i>Colocasia</i>
13. Limb erect or spreading		<i>Remusatia</i>

Alocasia (Schott) G. Don

Key to the species

- Basal leaf lobes triangular, connate at base; berries scarlet
A. fornicata
- Basal leaf lobes ovate, rounded at base; berries yellow
A. macrorrhizos
- 1. *Alocasia fornicata*** (Roxb.) Schott in Oesterr. Bot. Wochenbl. 4: 410.1854; Hook.f., Fl. Brit. India 6:526.1893; Prain, Bengal Pl. 2:1111.1903; Engler & Krause in Engler, Pfl.reich 94:66.1920; Guha Bakshi, Fl. Mursd. Dist. 335.1984. *Arum fornicatum* Roxb., Fl. Indica 3:501.1832 non Wight (excl.t. 792). 1844.

Vernacular name: Salu-kachu (Bengali).

Botanical features: Herbs with perennial rootstocks; leaves ovate-sagittate; basal leaf lobes triangular, connate at base; spadix is shorter than spathe; placentation basal; ovules few; berries obovate, scarlet.

Status: Common. Mostly cultivated in gardens.

Flowering and fruiting: May to December.

Distribution: India (West Bengal, Odisha, Assam, Meghalaya, Tripura, Bihar, Andhra Pradesh); Bangladesh (Chittagong, Sylhet); China, Sri Lanka.

Exsiccatae: Krishnapur, Murshidabad 1545 (Guha Bakshi, 1984).

- 2. *Alocasia macrorrhizos*** (L.) G. Don in R. Sweet, Hort. Brit.ed.3: 631.1893; Hook.f., Fl. Brit. India 6:526.1893; Nicolson in Smith, Fl. Vitiensis Nova 1:455.1779; Guha Bakshi, Fl. Mursd. Dist. 335.1984. *Arum macrorrhizon* L., Sp. Pl. 965.1753. *Arum indicum* Lour., Fl. Cochinch. 536.1790. ed.Willd. 655.1793. *Colocasia indica* Kunth, Enum. Pl. 3:39.1841. *Alocasia indica* Spach, Hist. Nat. Veg. Phan 12: 47.1846; Hook.f., Fl. Brit. India 6: 526.1893; Prain, Bengal Pl. 2: 1111.1903.

Vernacular name: Man-kachu (Bengali).

Botanical features: Herbs with massive sub-aerial rootstocks; leaves sagittately-cordate; basal leaf lobes ovate, rounded; spadix is shorter than spathe; placentation basal; ovules few; berries yellow.

Status: Very common. Naturally occurring, sometimes cultivated.

Flowering and fruiting: April to June.

Distribution: India (West Bengal, Assam, North East India, Andaman Islands); Bangladesh, Sri Lanka, Southeast Asia to Pacific Islands.

Exsiccatae: Radhakantapur, Paschim Medinipur, Samanta, 515; Kandi, Murshidabad 1591 (Guha Bakshi, 1984).

Amorphophallus Bl. ex Decne.

Key to the species

- Leaves bulbiferous; spathe erect; peduncle short

A. bulbifer

- Leaves pinnatifid; spathe campanulate; peduncle elongated

A. paeoniifolius

- 3. *Amorphophallus bulbifer*** (Roxb.) Bl. in Rumphia 1: 148.1837; Hook.f., Fl. Brit. India 6: 515.1893; Prain, Bengal Pl. 2: 1110.1903 (Rep.ed 2: 836.1963); Engler in Engler, Pfl.reich 48:98.1911; Blatter in J. Bombay Nat. Hist. Soc.35: 27.1932; Bennet, Fl. Howrah Dist., 93.1979; Guha Bakshi, Fl. Mursd. Dist. 336.1984. *Arum bulbiferum* Roxb. Fl. Indica 3: 510.1832; Sanyal, Fl. Bankura Distt. 451.1994.

Vernacular name: Amla Bela (Bengali).

Botanical features: Globose robust herbs with tubers; leaves bulbiferous; spathe 15.7 -25.12 cm long; appendages oblong-cylindrical; spadix elongated; peduncles short; berries globose, yellow; ovule anatropous.

Status: Common. Mostly found growing along railway-tracks.

Flowering and fruiting: April to July.

Distribution: India (West Bengal, Sikkim, Khasia Hills); Myanmar.

Exsiccatae: Ranibandh, Bankura 1334 (Sanyal, 1984); Bhagawangola, Murshidabad 912 (Guha Bakshi, 1984).

4. *Amorphophallus paeoniifolius* (Dennst.) Nicolson in Taxon 26:338.1977; Guha Bakshi, Fl. Mursd. Dist. 336.1984. *Dracontinum paeoniaefolium* Dennst., Schlus Hort.- Malabar 13.21.38.1818; Manitz in Taxon 17:499.1968. *Arum campanulatum* Roxb., Pl. Corom. 3:36.t.272.1819.nom.illeg.*Amorphophallus campanulatus* (Roxb.) Bl. ex Decne. in Ann. Mus. Hist. Nat. Paris 3:366.1834; Hook.f., Fl. Brit. India 6:513.1893; Sanyal, Fl. Bankura Dist. 451.1994; Guha Bakshi, Fl. Mursd. Dist. 336.1984.

Vernacular name: Ol (Bengali).

Botanical features: Strong perennial herbs with sub-globose tubers; leaves pinnatifid; spathe campanulate; peduncles elongated; spadix stout; berries obovoid, red; ovule anatropous.

Status: Common. Wild.

Flowering and fruiting: April to December.

Distribution: India (West Bengal, Kerala); Bangladesh, Sri Lanka, Myanmar and Java (Indonesia).

Exsiccatae: Barnaboni, Paschim Medinipur, Samanta, 453; Bhabta, Murshidabad, 1544 (Guha Bakshi, 1984).

Ariopsis Nimmo

5. *Ariopsis peltata* Nimmo in Graham, Cat. Pl. Bombay 252. 1839; Hook.f., Fl. Brit. India 6:519.1893.

Botanical features: Small slender herbs with tuberous rootstocks; sub-globose stems with cataphylls; leaves solitary, petioles 5.6-14 cm long; lamina cordate-ovate, peltate; peduncles 4-5 cm long, longer than spathe; spadix shorter than spathe; spathe boat-shaped; berries 4-6 angled; stigma persistent.

Status: Common on rocks besides streams (1350-2000 m).

Flowering and fruiting: May to June.

Distribution: India (Darjeeling, Sikkim, Himalaya, West Bengal, Decan Peninsular Assam); Nepal, Nepal, Bhutan, Myanmar, Thailand.

Exsiccatae: Leborg (Darjeeling), C.B. Clarke, 496930 (CAL); Darjeeling, T. Anderson, 496933 (CAL).

Arisaema Mart.

Key to the species

- | | |
|---|-----------------------|
| 1. Leaves always tri-foliolate | 2 |
| 1. Leaves either radiate or pedatisect | 3 |
| 2. Limb of spathe broad, rounded truncate, retuse or 2-lobed; all dioecious | 4 |
| 2. Limb of spathe lanceolate acuminate or cordate; all dioecious | 6 |
| 3. Leaves always pedatisect | <i>A. tortuosum</i> |
| 3. Leaves always radiate | 8 |
| 4. Lamina rhombic acuminate, crenate | <i>A. griffithii</i> |
| 4. Lamina either rhombic ovate or crenate or always ovate-cordate | 5 |
| 5. Leaflets rhombic ovate or ovate crenate, crenate | <i>A. utile</i> |
| 5. Leaflets always ovate or cordate | <i>A. intermedium</i> |
| 6. Limb of the spathe filiform | <i>A. speciosum</i> |
| 6. Limb of the spathe either sub-erect or incurved | 7 |
| 7. Limb of the spathe sub-erect | <i>A. propinquum</i> |
| 7. Limb of the spathe incurved | <i>A. costatum</i> |
| 8. Number of leaflets ranges in between 5-7 | 9 |

8. Number of leaflets ranges in between 7-20 10

9. Leaflets always 5 *A. nepanthoides*

9. Leaflets always ranges in between 5-7 *A. jaquimantii*

10. Leaflets always ranges in between 7-11 *A. concinnum*

10. Leaflets always ranges in between 10-20 *A. consanguineum*

6. *Arisaema concinnum* Schott in Bonpland. 7:27.1859; Hook.f., Fl. Brit. India 6:505.1893; Hara, H., Fl. East. Him. 1 (Rep.): 394.1966; Chatterjee in Bull. Bot. Soc. Bengal 8:122.f.I.1955; Das & Chanda in Trans. Bose Res. Ins. 50 (4): 106.1987.

Vernacular name: Sanpko Makai (Nepali).

Botanical features: Geophytes with tubers; leaves 3-5 sects; lamina obovate or oblanceolate; flowers monoecious sometimes dioecious; spadix with snake-hood like spathe; appendages slender, erect, tip clavate.

Status: Less common. Naturally occurring at high altitude areas (1650-2200 m).

Flowering and fruiting: April to June.

Distribution: India (West Bengal, NEFA, Khasi Hills, Simla); Nepal, Myanmar, Tibet, Bhutan.

Exsiccatae: s.n. (Hara, 1966); s.n. (Das & Chanda, 1987).

7. *Arisaema consanguineum* Schott in Bonpland. 7:27.1859; Hook.f., Fl. Brit. India 6:505.1893; Das & Chanda in Trans. Bose Res. Ins. 50 (4): 106.1987.

Vernacular name: Himalayan Cobra Lily (English).

Botanical features: Geophytes with tubers; leaves 3-5 sects; leaflets narrow; flowers monoecious or dioecious, multi-colour; hooded spathe with thread-like tail; spadix club-shaped.

Status: Common. Grows in high altitude areas of Darjeeling Himalaya (2100-2600 m).

Flowering and fruiting: April to June.

Distribution: India (West Bengal, Garwal Himalayas, Assam, Manipur); Nepal, Bhutan, N. Thailand, W. & C. China, Formosa.

Exsiccatae: s.n. (Hara, H., 1966); s.n. (Das & Chanda, 1987).

8. *Arisaema costatum* (Wall.) Mart. in Flora 14 (2):459.1831; Hook.f., Fl. Brit. India 6:501.1893; Hara, H., Fl. E. Himal. 2nd (Rep.) 152.1971; Das & Chanda in Trans. Bose Res. Ins. 50 (4): 106.1987. *Arum costatum* Wall, Tent. Fl. Nepal., 28, t.19.1824.

Vernacular name: Sanpko Makai (Nepali).

Botanical features: Geophytes with tubers; leaves solitary, 3-5 sects; leaflets elliptic-ovate; flowers monoecious or dioecious; spathe snake-hood like curve with longitudinal white stripe.

Status: Common. Occurring at hilly regions (2200-3500 m).

Flowering and fruiting: April to May.

Distribution: India (West Bengal, Gujarat, Maharashtra); C. Nepal.

Exsiccatae: s.n. (Hara, 1971)^[8]; s.n. (Das & Chanda, 1987).

9. *Arisaema griffithii* Schott in Syn. Aroid., 26.1856; Hook.f., Fl. Brit. India 6:499.1893; Hara, H., Fl. E. Him. 1 (Rep.): 395.1966; Das & Chanda in Trans. Bose Res. Ins. 50 (4): 106.1987. *Arisaema hookerianum* Schott in Oesterr. Bot. Wochenbl. 7:334.1857. *Arisaema hookeri* Schott, Gen. Aroid.t.6, f.11-19.1858.

Vernacular name: Cobra Lily (English).

Botanical features: Geophytes with leaflets, 3-5 sects, rhombic-orbicular; flowers monoecious or dioecious; limb spathe broad, spathe varies; spadix short.

Status: Less common. Found at high altitude areas (2300-2600 m).

Flowering and fruiting: April to May.

Distribution: India (West Bengal, Sikkim); Bhutan.

Exsiccatae: s.n. (Hara, 1966); s.n. (Das & Chanda, 1987).

10. *Arisaema intermedium* Bl. in Rumphia 1: 102.1836; Hook.f., Fl. Brit. India 6:500.1893; Karthikeyan *et al.*, Fl. Indica, Ser.4: 8.1989; Hara, H., Fl. East. Him. 2 (Rep.): 153.1971.

Botanical features: Tuberous herbs, Spathe yellowish green, limb gradually attenuates to a long drooping flagellum, (8-16) cm long.

Status: Rare. Distributed mainly at high altitude regions (3300-3600 m).

Flowering and fruiting: June to July.

Distribution: Endemic to Singalila Range.

Exsiccatae: s.n. (Hara, 1966).

11. *Arisaema jacquemontii* Bl., Rumph. 1:95.1836 Hook.f., Fl. Brit. India 6:505.1893; Hara, H., Fl. E. Him. 1 (Rep.): 395.1966; Karthikeyan *et al.*, Fl. Indica, Ser.4: 195.1989. *Arisaema cornutum* Schott in Bonplandia 7:27.1859.

Botanical features: Tuberous herbs; leaflets 5-7; lamina elliptic or ovate-lanceolate; tube of spathe narrow, green; limbs long, ovate-lanceolate, incurved, with drooping tail.

Status: Less common. Prevailing at high altitude areas (2800-3900 m).

Flowering and fruiting: May to July.

Distribution: India (Darjeeling, Sikkim, Himalayas, Kashmir); Nepal, Bhutan, Afghanistan.

Exsiccatae: s.n. (Hara, 1971).

12. *Arisaema nepenthoides* (Wall.) Mart. in Flora 14:458.1831; Hook.f., Fl. Brit. India 6:504.1893; Karthikeyan *et al.*, Fl. Indica, Ser.4: 9.1989. *Arum nepenthoides* Wall., Tent. Fl. Nepal. 26, t. 18.1824. *Arisaema ochraceum* Schott sensu Lacaita in Journ. Linn. Soc. 43:483.1916.

Botanical features: Tuberous globose, large herbs; leaves sessile, 5-sects; lamina elliptic or oblanceolate, tube of spathe elongate; limb elliptic-ovate, spathe board, green spotted; spadix white; fruits obovoid.

Status: Less Common. Occurs at high altitude (2400-3100 m).

Flowering and fruiting: May to June.

Distribution: India (West Bengal, Khasi Hills); Nepal, N. Bhutan, W. China.

Exsiccatae: s.n. (Hara, 1966); s.n. (Karthikeyan *et al.*, 1989).

13. *Arisaema propinquum* Schott in Oesterr. Bot. Wochenbl. 7:333.1857; Hook.f., Fl. Brit. India 6:501.1893; *Arisaema wallichianum* Hook.f., Fl. Brit. Ind. 6:500.1893; Hara, H., Fl. E. Himal. 2nd (Rep.): 154.1971.

Botanical features: Rootstocks depressed globose; leaflets sessile, acuminate; petiole as long as peduncle, spathe like that of *A. speciosum*; limb suberect; spadix pink.

Status: Less common. Normally grows at high altitude (3800-3900 m).

Flowering and fruiting: June to July.

Distribution: India (West Bengal, Sikkim, Kashmir), Nepal, Bhutan.

Exsiccatae: s.n. (Hara, 1971); s.n. (Karthikeyan *et al.*, 1989).

14. *Arisaema speciosum* (Wall.) Mart. in Flora, 458.1831; Hook.f., Fl. Brit. India 6:500.1893; Hara, H., Fl. E. Him. 1(Rep.): 396.1966. Das & Chanda in Trans. Bose Res. Ins, 50 (4): 106.1987. *Arum speciosum* Wall., Tent. Fl. Nepal. 29, t. 20.1824. *Arisaema eminens* Schott in Oester. Bot. Wochenbl. 7: 357. 1857.

Vernacular name: Cobra Lily (English).

Botanical features: Geophytes with rootstocks; leaflets vary in shapes, 3-5 sects; flowers monoecious or dioecious; spathe ovate-lanceolate; base of appendages ovoid; rhombic-orbicular; spathe varies; spadix short.

Status: Less common. Dwells at high altitudes (900- 2300 m).

Flowering and fruiting: May to June.

Distribution: India (Darjeeling, Himalayas, Assam, NEFA); Nepal, Bhutan, W. China.

Exsiccatae: s.n. (Hara, 1966); s.n. (Das & Chanda, 1987) ; s.n. (Karthikeyan *et al.*, 1989).

15. *Arisaema tortuosum* (Wall.) Schott in Melet. Bot. 1: 17.1832; Hook.f., Fl. Brit. India 6:502.1893; Hara, H., Fl. E. Him. 1(Rep.): 396.1966; Das & Chanda in Trans. Bose Res. Ins. 50 (4): 106.1987. *Arum tortuosum* Wall., Pl. Asiat. Rar.2:10, t.114.1830. *Arisaema helloborifolium* Schott, Syn. Aroid. 29.1856.

Vernacular name: Sanpko Makai (Nepali).

Botanical features: Erect geophytes; leaves pedate; 3-5 sects; leaflets broadly-ovate-lanceolate; flowers monoecious or dioecious; snake-hood curved spathe, limb cymbiform.

Status: Commonly occurring at high altitudes (2200-2250 m).

Flowering and fruiting: April to May.

Distribution: India (West Bengal, Sikkim, Manipur, Khasia, Nilgiri Hills); Nepal, Bhutan, W. China.

Exsiccatae: s.n. (Hara, 1966); s.n. (Das & Chanda, 1987); s.n. (Karthikeyan *et al.*, 1989).

16. *Arisaema utile* Hook.f.ex Schott, Prodr. Syn. Aroid. 30.1860; Hook. f., Fl. Brit. India 6:499.1893. Karthikeyan *et al.*, Fl. Indica, Ser.4: 9.1989.

Botanical features: Tuberous herbs much smaller than *A. Griffithii*; leaf solitary; leaflets 3-5 sects; lamina rhombic-ovate or ovate-cuneate; spathe longer than tube; limb spathe broad, tail filiform.

Status: Commonly grows at high altitude areas (2200-3800 m).

Flowering and fruiting: May to July.

Distribution: India (West Bengal, Sikkim, Himalayas, Punjab); Nepal, Bhutan.

Exsiccatae: s.n. (Hara, 1971); s.n. (Karthikeyan *et al.*, 1989).

Colocasia Schott

Key to the species

1. Petioles up to 35 cm long; lamina orbicular-ovate 2
2. Petioles up to 80 cm long; lamina triangular-ovate *C. esculenta*

3. Stigma sessile or sub-sessile *C.fallax*
 4. Stigma always sessile *C.affinis*

17. *Colocasia affinis* Schott in Bonpland. 7: 28.1859; Hook.f., Fl. Brit. India 6:523.1893.

Botanical features: Small herbs; petioles 15-20 cm long, slender; lamina ovate or orbicular ovate; peduncles 8-12 cm long; spathe 10-15 cm long, refracted, with a narrow neck; anthers not stellate; stigma disciform, Stigma always sessile; placentation parietal; ovules many.

Status: Common at hilly regions (650-1350 m).

Flowering and fruiting: October to December.

Distribution: India (West Bengal, Sikkim, Assam, Manipur); Bangladesh, Nepal, Burma. **Exsiccatae:** s.n. (Karthikeyan *et al.*, 1989).

18. *Colocasia esculenta* (L.) Schott in Melet. Bot. 1:18.1832; *Arum esculentum* L., Sp. Pl. 965.1753; Guha Bakshi, Fl. Mursd. Dist., 337.1984. *Colocasia antiquorum* Schott in Schott & Endl. Melet. Bot. 18.1832; Hook.f., Fl. Brit. India 6:523.1893; Prain, Bengal Pl. 2:1112.1903 (Rep.ed 2:836.1963); Sanyal, Fl. Bankura Dist. 450.1994.

Vernacular name: Alti, Kachu (Bengali).

Botanical features: Perennial rhizomatous herbs; petioles 60-80 cm long, lamina triangular-ovate; spadix very shorter than spathe; spathe up to 25 cm long; refracted; placentation parietal; ovules many; berries oblong.

Status: Very common. Found growing in damp/ moist places.

Flowering and fruiting: May to October.

Distribution: India (West Bengal, Assam, Odisha, Punjab, Andhra Pradesh, Tamil Nadu, Himachal Pradesh); Sri Lanka.

Exsiccatae: Dadpur, Murshidabad 1315 (Guha Bakshi, 1984); Markha, Bankura 758 (Sanyal, 1994).

19. *Colocasia fallax* Schott in Bonpland. 7: 28.1859; Hook.f., Fl. Brit. India 6:524.1893.

Botanical features: Small tuberous herbs; petioles 23-35 cm long; lamina orbicular-ovate; spathe shorter than lanceolate limb; spathe and spadix much longer than *C. affinis*; anthers stellate; style disciform; Stigma sessile or sub-sessile; placentation parietal; ovules many; berries sub-spherical.

Status: Common in hilly regions (350-1350 m).

Flowering and fruiting: September to November.

Distribution: India (West Bengal, Sikkim, Assam, Khasi Hills).

Exsiccatae: s.n. (Karthikeyan *et al.*, 1989).

Cryptocoryne Fisch. ex Wydler

Key to the species

1. Tube of the spathe strongly twisted; limb lamellate within *C. spiralis*
 1. Tube of the spathe narrow; longer than the limb 2
 2. Limb of the spathe glabrous; tube closely twisted *C. retrospiralis*
 2. Limb of the spathe densely fimbriate; tube straight *C. ciliata*

20. *Cryptocoryne ciliata* (Roxb.) Fisch. ex Wydler in Linnaea 5:428.1830; Hook.f., Fl. Brit. India

6:524.1893. Prain, Bengal Pl. 2: 1105. 1903; Engler 73:248.1920; Bennet, Fl. Howrah Dist., 95.1979. *Ambrosinia ciclita* Roxb. Corom, Pl.7:90, t. 294.1820.

Botanical features: Marshy or aquatic submerged herbs with rootstocks; lamina linear-oblong often linear-lanceolate; spathe axillary; tube 7.5-22 cm long, not twisted; limb 4-7 cm long; limb of spathe fimbriate; Berries coriaceous, many seeded.

Status: Less common. Noticed at the sides of ponds, ditches, muddy places, etc.

Flowering and fruiting: May to July.

Distribution: India (West Bengal, Sikkim); Malaysia.

Exsiccatae: Panchpara, Howrah 781 (Bennet, 1979).

21. *Cryptocoryne retrospiralis* (Roxb.) Kunth, Enum. Pl. 3: 12.1841; Hook.f., Fl. Brit. India 6:493.1893; Karthikeyan *et al.* In Fl. Indica, Ser.4: 9.1989. *Ambrosinia retrospiralis* Roxb., Fl. Ind. 3:492.1832. *Cryptocoryne dalzellii* Schott in Bonplandia 5:221. 1857.

Botanical features: Aquatic submerged herbs with rootstocks; narrow leaved; lamina lanceolate to narrowly linear; Limb of spathe glabrous, deep green streaked with purple; tube closely twisted; stigmas orbicular.

Status: Common in plains.

Flowering and fruiting: May to July

Distribution: India (West Bengal, Kerala, Maharashtra); Bangladesh, Myanmar, Thailand, and Laos.

Exsiccatae: s.n. (Karthikeyan *et al.*, 1989).

22. *Cryptocoryne spiralis* (Retz.) Fisch. ex Wydler in Linnaea 5: 428. 1830; Hook.f., Fl. Brit. India 6:494.1893. *Arum spirale* Retz., Obs. Bot. 1: 30.1779. *Cryptocoryne huegelii* Schott, Aroid. 8, t. 12. 1853. *Cryptocoryne tortuosa* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35:16. 1931.

Botanical features: Small grass like submerged herbaquatic herbs; lamina linear to lanceolate; Tube of the spathe strongly twisted; limb lamellate within; stigmas broadly elliptic.

Status: Commonly grows in the plains.

Flowering and fruiting: May to July.

Distribution: India (West Bengal, Tamil Nadu, Kerala, Maharashtra). Bangladesh.

Exsiccatae: s.n. (Karthikeyan *et al.*, 1989).

Lasia Lour.

23. *Lasia spinosa* (L.) Thwaites in Enum. Pl. Zeyl.336.1864; *Dracontium spinosum* L., Sp.Pl.2:967.1753; Guha Bakshi, Fl. Mursd. Dist., 337.1984. *Pothos heterophyllum* Roxb., Fl. Ind.1:457.1820. *Lasia heterophylla* Schott, Melet. 1:21.1832; Hook.f., Fl. Brit. India 6:550.1893.

Vernacular name: Kanta Kachu (Bengali).

Botanical features: Marshy, herbs with branched rhizome; lamina hastate or sagittate; flowers bi-sexual; spathe greenish purple; Berries muricate.

Status: Less common. Thrives on river banks, swampy areas, etc.

Flowering and fruiting: November to February.

Distribution: India (West Bengal, Sikkim, Assam); Sri Lanka, Singapore, Malaysia and China.

Exsiccatae: Dafarpur, Howrah 983 (Bennet, 1979); Kandi, Murshidabad 1588 (Guha Bakshi, 1984).

Pistia L.

24. *Pistia stratiotes* L., Sp. Pl. 963.1753; Hook.f., Fl. Brit. India 6:497.1893; Prain, Bengal Pl. 2:1105.1903 (Rep.ed.2) 831.1963; Guha Bakshi, Fl. Mursd. Dist., 338.1984. Sanyal, Fl. Bankura Dist. 451-452. 1994. *Pistia stratiotes* var. *cuneata* Engl. in Fl. Bras.3, 2:214.1879. *Pistia stratiotes* var. *spathulata* Engl., in Fl. Bras.3, 2:214.1879.

Vernacular name (s): Topapana (Bengali).

Botanical features: Aquatic stoloniferous, free floating herbs; leaves sessile, lamina ovate-cuneate; flowers unisexual; spathe tubular; fruits ovoid.

Status: Common. Mainly floats on tanks, pools, marshy lands, etc.

Flowering and fruiting: August to May.

Distribution: India (Darjeeling, West Bengal, other provinces); Sri Lanka.

Exsiccatae: Andul, Howrah 104 (Bennet, 1979); Motijhil, Murshidabad 718 (Guha Bakshi, 1984).

Pothos L.**Key to the species**

Spadix much smaller 0.04-0.05 cm long; lamina obovate
P. roxburghii

Spadix 0.7 -1. cm long; lamina ovate-oblong
P. chinensis

25. *Pothos chinensis* (Raf.) Merr. in J. Arnold Abor., 29:210.1948. *Pothos cathcartii* Schott Aroid, 1, 22, t, 44, 45; Hook.f., Fl. Brit. India 6:552.1893; Das & Chanda in Trans. Bose Res. Ins. 50 (4): 123.1987.

Vernacular name (s): Chepari -Lahara, Sanukan-Chirma (Nepali).

Botanical features: Shrubby perennial root-climbers; leaves alternate, lamina ovate-oblong; spathe sub-orbicular, mucronate; perianth of 4-6 segments; spadix globose, 0.7-1 cm long; berries obovoid or oblong, scarlet.

Status: Common. Distributed in high altitude regions (400-1800 m).

Flowering and fruiting: May to June.

Distribution: India (Darjeeling, Himalayas, West Bengal, Assam, Khasi Hills, Manipur); Myanmar and China.

Exsiccatae: s.n. (Das & Chanda, 1987).

26. *Pothos roxburghii* devriese in Miq., Pl. Jung. 1:103.1851; Hook.f., Fl. Brit. India 6:551-552.1893. *Pothos scandens* L., Sp. Pl. 968.1753; Hook. f., Fl. Brit. India 6:551.1893.

Botanical features: Similar to *P. cathcartii* but stem weak, profusely rooting from nodes; lamina obovate, entire, acute to apiculate; spadix 0.04-0.05 cm long; inflorescence much smaller.

Status: Common. Distributed in high altitude regions, up to 1900 m.

Flowering and fruiting: May to June.

Distribution: India (West Bengal, Sikkim); Myanmar, Malaysia and China.

Exsiccatae: s.n. (Karthikeyan *et al.*, 1989).

Remusatia Schott**Key to the species**

1. Lamina ovate-oblong; limb broad *R. hookeriana*

1. Lamina ovate-oblong to lanceolate; limb narrow *R. vivipara*

27. *Remusatia hookeriana* Schott in Oestr. Bot. Wochenbl. 7:133.1857; Hook.f., Fl. Brit. India 6:522.1893.

Botanical features: Tuberous herbs; shoot broadly branched; leaves solitary, lamina ovate-oblong; spathe (3.8-6.5)cm long; limb of spathe erect, broad, sometimes coppery or convolute.

Status: Commonly occurs at high altitudinal regions (2000-2250 m).

Flowering and fruiting: May to June.

Distribution: India (West Bengal, Sikkim Himalayas, Himachal Pradesh).

Exsiccatae: s.n. (Hara, 1966); s.n. (Das & Chanda, 1987); s.n. (Karthikeyan, 1989).

28. *Remusatia vivipara* (Roxb.) Schott in Melet. Bot. 1:18.1832; Hook.f., Fl. Brit. India 6:521-522.1893. *Arum viviparum* Roxb., Hort. Beng. 65. 1814 & Fl. Ind. 3:496.1832 ("viviparum"). *Caladium viviparum* Lodd., Bot.t.281. 1818.

Botanical features: Tuberous perennial herbs; shoot shortly branched; leaves solitary, lamina oblong-ovate to lanceolate with sheathing petiole base; limb of spathe erect, green, broadly orbicular-ovate cuspidate.

Status: Common. Exist at high altitudes (625-1450 m).

Flowering and fruiting: May to June.

Distribution: India (Darjeeling, Sikkim, Himalayas, West Bengal, Bihar, Khasi Hills); Burma, Sri Lanka and Java.

Exsiccatae: s.n. (Das & Chanda, 1987).

Rhaphidophora Schott**Key to the species**

1. Petioles less than 20 cm long; lamina ovate but asymmetric *R. calophylla*

1. Petioles more than 20 cm long; lamina ovate-elliptic *R. glauca*

29. *Rhaphidophora calophylla* Schott in Bonpland. 5:45.1859. *Rhaphidophora peepla* Schott in Bonpland. 5:45.1857; Hook.f., Fl. Brit. India 6:545.1893.

Botanical features: Large stout root-climbers; stem slender, diam. 0.5-0.8 cm; petioles less than 20 cm; lamina ovate but asymmetric; spadix narrower, held with an angle of curved peduncle apex; berries confluent; ovules many, parietal.

Status: Less common. Mostly observed at hilly regions (300-2000 m).

Flowering and fruiting: July to January.

Distribution: India [Eastern Himalaya (Darjeeling-Sikkim), Khasi Hills]; Myanmar.

Exsiccatae: s.n. (Das & Chanda, 1987).

30. *Rhaphidophora glauca* (Wall.) Schott in Bonpland., 5:45.1857; Hook.f., Fl. Brit. India 6:547.1893. Das & Chanda in Trans. Bose Res. Ins. 50 (4): 125. 1987.

Vernacular name: Kanchirna (Nepali)

Botanical features: Large stout root-climbers; petioles more than 20 cm long; lamina ovate-elliptic; spathe oblong-ovate, acuminate; berries confluent; ovules many, parietal; fruits ellipsoid.

Status: Common. Mostly found in hilly regions (1400-2200 m).

Flowering and fruiting: September to May.

Distribution: India (West Bengal, Manipur); Nepal.

Exsiccatae: s.n. (Das & Chanda, 1987).

Sauromatum Schott**Key to the species**

1. Tuber globose; peduncle 5-25 cm long; spathe acuminate *S. diversifolium*
2. Tuber depressed globose; peduncle short 2-2.5 cm long; spathe lanceolate *S. brevipes*

31. *Sauromatum brevipes* (Hook.f.) N.E.Br. in Gard. Chorn.ser.3, 34:39.1903. *Typhonium brevipes* Hook.f., Fl. Brit. India 6 (19): 511.1893.

Botanical features: Herbs with globose depressed tubers; petioles 15-30 cm long; leaves pedately 5-7 partite; leaflets elliptic; peduncles short, 2-2.5 cm long; spathe lanceolate with narrow linear tail, spathe yellowish brown with purple i.e. faint purple outside and dark purple inside.

Status: Common at the hilly regions, up to 2300 m.

Flowering and fruiting: July to September.

Distribution: India (West Bengal, Sikkim); Nepal.

Exsiccatae: s.n (Hara, 1971).

32. *Sauromatum diversifolium* (Wall. ex Schott) Cusimano & Hett. Taxon 59 (2): 445.2010. *Typhonium diversifolium* Wall. ex Schott, Aroideae Fasc.2:13,t.20.1855; Hook.f., Fl. Brit. India 6: 510-511.1893.

Botanical features: Tuber globose, leaves lobed, variable in size; peduncles 5-25 cm long; spathe erect, acuminate, without tail, appendages stout.

Status: Common at the hilly regions (2350-3600 m).

Flowering and fruiting: April to September.

Distribution: India (West Bengal, Sikkim, Himachal Pradesh); Nepal, Bhutan.

Exsiccatae: s.n (Karthikeyan *et al.*, 1989).

Scindapsus Schott

33. *Scindapsus officinalis* (Roxb.) Schott in Scott & Endl. Melet. Bot. 1:21.1832; Hook.f., Fl. Brit. India 6:541.1893. *Pothos officinalis* Roxb., Fl. Ind.1:431.1832

Vernacular name: Gaj-pipul (Bengali).

Botanical features: Large stout root-climbers; leaves elliptic-ovate; spathe oblong, coriaceous; spadix cylindrical; berries free.; ovules solitary, basal.

Status: Common. Prefers to grow on forest trees.

Flowering and fruiting: January to December.

Distribution: India (West Bengal, Sikkim, Andaman and Nicobar Islands); Bangladesh, Burma.

Exsiccatae: Vishnupur, Bankura 703 (Sanyal, 1994); Baranagar, Murshidabad 663 (Guha Bakshi, 1984).

Typhonium Schott**Key to the species**

- | | |
|---|---|
| 1. Spathe with long slender apical tail | <i>T. flagelliforme</i> |
| 1. Spathe without apical tail | 2 |
| 2. Petioles short | 3 |
| 2. Petioles long | 4 |
| 3. Spathe ovate-lanceolate | <i>T. roxburghii</i> |
| 3. Spathe linear-lanceolate | <i>Typhonium roxburghii</i> var.
<i>longispathum</i> |
| 4. Petiole 20-30 cm long | <i>T. trilobatum</i> |
| 4. Petiole 12-20 cm long | <i>T. trilobatum</i> var. <i>schottii</i> |

34. *Typhonium flagelliforme* (G.Lodd.) Bl., Rumphia 1:134.1835; Engler in Engler, Pfl.-reich73:112.1920; Guha Bakshi, Fl. Mursd. distr. 339.1984. *Arum flagelliforme* G.Lodd. Bot. Cab.t.396.1819. *Typhonium cuspidatum* (Blume) Decne, Herb. Timor in Ann. Hist. Nat. 1834; Hook.f., Fl. Brit. India 6:511.1893.

Botanical features: Tuberous sub-globose erect herbs; leaves hastately 3-lobed; flowers monoecious; spathe with long slender apical tail; fruits clavate type.

Status: Common. Observed along side ponds and open moist places.

Flowering and fruiting: June to September.

Distribution: India (Lower Himalaya, West Bengal); Vietnam, Malaysia, Marianne Islands.

Exsiccatae: Beldanga, Murshidabad 1586 (Guha Bakshi, 1984); Bargachia, Howrah 1161 (Bennet, 1979).

35. *Typhonium roxburghii* Schott, Aroideae1:12.1853; Hook.f., Fl. Brit. India 6:510.1893.

Botanical features: Herbs with tuberous roots; bulbils tuberous, develops at the apex of petiole or petiolule, leaves 1-3 sects; globose brown; flowers monoecious; peduncles 2-7 cm long; spathe ovate-lanceolate; spadix, conical-cylindrical 0.4-0.5 cm in diam.

Status: Rare at hilly regions (110-250 m).

Flowering and fruiting: April to June.

Distribution: India (West Bengal, Andhra Pradesh); Sri Lanka, Bangladesh, Japan, Thailand, Indonesia, Philippines, New Guinea, Africa, W. Australia, South America.

Exsiccatae: Jaldapara National Park (WB), K. Karthigeyan, 08.05.2014, 61444; Hort. Bot. Calcutt. (Nursery), *D.Prain*, 496457 (CAL); Hort. Bot. Calcutt. (Wild), *M. Davies*, 496462 (CAL).

36. *Typhonium roxburghii* var. *longispathum* S.Nirola & A.P.Das, var. nov. in *Pleione* 8 (2): 498-500.2014.

Botanical features: Herbs with tuberous roots; bulbils elongated; leaves completely tri-foliolate; flowers monoecious; spathe blade linear-lanceolate; appendix very long and filiform, 0.1-0.2 cm diam., pale white.

Status: Rare. First reported from West Bengal (Nirola & Das, 2014) at 400 m.

Flowering and fruiting: April to June.

Distribution: Endemic to Darjeeling Hills, West Bengal.

Exsiccatae: Holotype: Below Rongtong, 400 m, S Nirola & AP Das 1237A, dt. 26.04.2010 (CAL).

37. *Typhonium trilobatum* (L.) Schott in Wien. Zeitschr. 3:72.1829; Hook.f., Fl. Brit. India 6:509.1893; Guha Bakshi, Fl. Mursd. distr. 339.1984. *Arum trilobatum* L., Sp. Pl. 965.1753.

Vernacular name: Ghet-Kachu (Bengali).

Botanical features: Tuberous sub-globose herbs; petioles 20-30 cm long; leaves hastately tri-lobed; flowers monoecious; Spathe without apical tail; spadix present; berries linear-cylindrical, muricate.

Status: Commonly found in wild conditions but prefer to grow in gardens.

Flowering and fruiting: April to September.

Distribution: India (Lower Himalaya, West Bengal); Burma, Srilanka, Malaysia.

Exsiccatae: Murshidabad, 1054 (Guha Bakshi, 1984); Dumjoor, Howrah 211 (Bennet, 1979).

38. *Typhonium trilobatum* var. *schottii* (Prain) Engler in Engler, Pfl.-reich 73:118.1920; Guha, Bakshi, Fl. Mursd. distr. 339.1984. *Typhonium schottii* Prain in J. Roy. Asiatic Soc. Bengal 64: 303.1895; Prain, Bengal Pl. 2: 1108. 1903.

Vernacular name: Ghet-kachu (Bengali).

Botanical features: Globose herbs with tubes; leaves 1-3 sects; petioles 12-20 cm long; leaves not deeply lobed; rest features are similar to that of *T. trilobatum*.

Status: Less common. Prefer to grow in shady hedges.

Flowering and fruiting: June to August.

Distribution: India (Lower Himalaya, West Bengal); Sri Lanka, Thailand, Malaysia.

Exsiccatae: Jiagunge, Murshidabad 1127 (Guha Bakshi, 1984).

3. Discussion

Present investigation about Araceae in the flora of West Bengal reveals 38 species under 14 genera of which 28 species are terrestrial herbs (e.g. *Alocasia fornicata*, *A. macrorrhizos*; *Amorphophallus bulbifer*, *A. paeoniifolius*; *Ariopsis peltata*; *Arisaema concinnum*, *A. consanguineum*, *A. costatum*, *A. griffithii*, *A. intermedium*, *A. jacquemontii*, *A. nepenthoides*, *A. propinquum*, *A. speciosum*, *A. tortuosum*, *A. utile*; *Colocasia affinis*, *C. esculenta*, *C. fallax*; *Remusatia hookeriana*, *R. vivipara*; *Sauromatum brevipes*, *S. diversifolium*; *Typhonium flagelliforme*, *T. roxburghii*, *T. roxburghii* var. *longispathum* S.; *T. trilobatum*, *T. trilobatum* var. *schottii*; 5 species are aquatic-*Cryptocoryne ciliata*, *C. retrospiralis*, *C. spiralis*, *Lasia spinosa* and *Pistia stratiotes* and 5 species are root-climbers-*Pothos chinensis*, *P. roxburghii*, *Rhaphidophora calophylla*, *R. glauca* and *Scindapsus officinalis*. From altitudinal distribution perspective, it was found that 14 species are distributed in the plains whereas the rest 24 species are distributed in the high altitude regions up to 3900 m.

Only two species - *Typhonium roxburghii* and *T. roxburghii* var. *longispathum* are stated to be rare in West Bengal. *T. roxburghii* var. *longispathum* is endemic to Darjeeling Hills. *Arisaema intermedium* is the only species of Araceae which is endemic to Singalila Range of Darjeeling^[13].

Out of 38 recorded species, 36 are wild, only two are cultivated (i.e. *Amorphophallus paeoniifolius* and *Colocasia esculenta* and are considered as food yielding plants^[15]).

4. Conclusion

On critical observation, it was found that some of the species were absent within our studied areas, possibly due to over exploitation, rapid urbanisation, ecological fragmentation, habitat loss, unauthorised grazing, calamities like cyclones (i.e. Aila, Bulbul, Amphan, etc.), abrupt climate changes, etc. are the prime factors for their gradual disappearance. Generally, vegetation plays a key role for maintaining stability of an ecosystem and also is the major sources of foods, fodders, medicines, building goods, fuels, etc. For the need of sustainable development, existence of future generation; rare, endangered and economically potent species can be maintained by implementing *ex-situ* and *in-situ* conservational strategies with topmost priority.

5. Acknowledgement

The author is very much grateful to Dr. Tapan Kumar Das (Former Associate Professor), Department of Botany,

Midnapore College, for his constructive suggestions and inspiration to prepare this paper.

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