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## INVENTORY OF THREATENED PLANTS OF BANGLADESH AND THEIR CONSERVATION MANAGEMENT

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### Abstract

The study aimed at inventorying of threatened plant species of Bangladesh to determine their status of occurrence for emphasizing the setting-up of national conservation strategies and sustainable management. Complete inventory of two families, the Apocynaceae and Vitaceae, has been made and recognized 28 threatened species facing environmental threats, and need sustainable conservation management. The study was based on long-term field investigation, survey of relevant floristic literature and examination of herbarium specimens. An enumeration of threatened taxa is prepared with updated field data on conservation status to include into Red Data Book of Bangladesh.

Key words: Inventory, threatened plant species, conservation, management, Bangladesh.

### Introduction

Global biodiversity is depleting at an alarming rate due to human interferences and environmental degradation, causing high risk of extinction. Human impact on nature has reached at such a high proportion that the world is today witnessing an unprecedented rate of species loss. Many more species are disappearing from the nature before their discovery and determination. The 1997 IUCN Red List of Threatened Plants revealed that 12.5% or c.34,000 of the world's vascular plant species are at risk of extinction, including 7% of family

Apocynaceae and 5% of Vitaceae (Walter & Gillett, 1998). Later, the 2004 IUCN Red List includes 11,824 species of plants, of which 8,321 are threatened. However, only about 4% of the described plant species were evaluated so far, of which about 3% are threatened (Baillie *et al.*, 2004). The IUCN's Threatened Plants Unit at the Royal Botanic Gardens, Kew, has produced a global data of 50,000 plant species, of which around 20,000 species fall under threatened categories. A conservative estimate of IUCN's Threatened Plants Unit shows that about 60,000 plant species (25%) would become either extinct or nearly extinct by the year 2050 (Uberoi, 2010). Around 50% of world's flora might be threatened at risk of extinction, if an appropriate assessment is made following IUCN's criteria (Pitman and Jorgensen, 2002). In the current wave of multiple threats, humans are unable to predict the impact and consequences of plant extinctions. According to USDA (1993), extinction of even a single plant species may result in the disappearance of 30 associated species of plants and wildlife. Hence, biodiversity conservation has become a global concern, and almost all developed countries have adopted and implemented National Conservation Strategies.

Bangladesh is enriched with high plant diversity, since it lies in a transition of two mega-biodiversity hot spots, *viz.*, Indo-Himalayas and Indo-Chinese. Historically, Bangladesh forests are highly vulnerable to anthropogenic disturbances and climate change (Khan, 2003). It has been estimated that out of *c.*5000 angiosperm species, at least 8-10% are facing threats to extinction due to habitat loss, population pressure and over-exploitation of natural resources in Bangladesh (Khan, 1991; Rahman *et al.*, 2010). Nevertheless, there have been no concrete steps taken to arrest the process (Khan *et al.* 2001). It has been, therefore emphasized by Khan *et al.* (2001) and Rahman *et al.* (2010) that the first and foremost step in this direction is to make complete inventory of the threatened species with assessment of their conservation status in the flora in order to produce Red Data Book of Bangladesh for framing and implementing National Conservation Strategies.

The subject of threatened plants in Bangladesh with their importance of inventory was first highlighted by Khan (1991) with a tentative list of 12 threatened vascular plants in Bangladesh. Later, IUCN Red List of Threatened plants included 24 vascular plant species (IUCN, 1997). Khan *et al.* (2001) produced Red Data Book of Vascular plants of Bangladesh with 106 threatened plants. Later, Rahman (2003) reported 18 threatened plants, and thereafter Rahman *et al.* (2010) reported 58 species as threatened in the wild with different IUCN-Categories. The inventory of threatened taxa for production of Red Data Book is in progress. In connection with this, the present report endowed with 28 threatened species into two families, Apocynaceae and Vitaceae, which have been inventoried with 46 and 29 species respectively, to be included in the Flora of Bangladesh (Rahman, 2008, 2009).

## **Materials and Methods**

In this study, family Apocynaceae and Vitaceae were considered to make an inventory of threatened plants of Bangladesh. In order to determine the threatened species, major IUCN threatened categories *viz.*, Vulnerable (VU), Endangered (EN), Critically Endangered (CR) and Extinct (EX) (IUCN, 1994) were considered. The assessment of distribution, abundance and status of occurrence of each species has been made through field investigations, literature survey, and consultation of herbarium specimens preserved in regional, national and international herbaria.

*Field investigation:* Investigations for collection and assessment of status of occurrence of plant species of Apocynaceae and Vitaceae families have been made through repeated field surveys throughout the year in different seasons by an expert team of AU-CU Biodiversity Link Project since 1997. Fertile specimens were collected, identified, characterized, and preserved at Herbarium of Chittagong University (HCU). Conservation status of individual plant species were assessed based on their abundance and distribution.

*Literature Survey:* Relevant literature, such as Hook. f. (1872-1897), Prain (1903), Heinig (1925), Cowan (1926), Raizada (1941), Sinclair (1956), Huq and Khan (1984), Khan (1991), Khan *et al.* (1994), Rashid and Rahman (1996), IUCN (1997), Rahman and Uddin (1997), Uddin *et al.* (1998), Uddin and Rahman (1999), Rahman *et al.* (2000), Rashid *et al.* (2000), Khan *et al.* (2001), Rahman *et al.* (2001), Khan (2003), Rahman (2003), Uddin and Hassan (2004), Rahman (2008, 2009), Tutul *et al.* (2009, 2010), Rahman *et al.* (2010), Uddin and Hassan (2010), Arefin *et al.* (2011), Uddin and Hassan (2012), Rashid and Chowdhury (2013), and Uddin *et al.* (2013) etc. were consulted for confirmation of occurrence and distribution of these plant species in the flora of Bangladesh.

*Herbaria Consulted:* In order to study the preserved specimens of the members of Apocynaceae and Vitaceae of Bangladesh, various herbaria were visited like Herbarium of Botanical Survey of India, Eastern Regional Centre, Shillong (ASSAM), Bangladesh Council for Science and Industrial Herbarium at Chittagong (BCSIRH), Bangladesh Forest Research Institute Herbarium at Chittagong (BFRIH), Central National Herbarium, Howrah (CAL), Bangladesh National Herbarium, Dhaka (DACB), Dhaka University Salar Khan Herbarium (DUSH), Royal Botanic Garden Edinburgh Herbarium (E), Herbarium of Chittagong University (HCU) and Kew Herbarium, London (K) following Rahman *et al.* (2010). The plant specimens were examined, identified and documented along with collection localities.

*Enumeration:* The threatened plant species belonging to the family Apocynaceae and Vitaceae have been enumerated. Under each family, genera and species are arranged alphabetically. Each species is cited with current nomenclature, basionym, synonyms, local names, habitat, potential values, botanical identification, Flowering and Fruiting time, status of occurrence, threats to the species, conservation status, occurrence in Bangladesh, global distribution, conservation measures taken, conservation measures proposed, and citation of representative specimens.

## **Results and Discussion**

The present study reveals that out of 75 total species of the Apocynaceae and Vitaceae, 28 are threatened under different IUCN categories which is about 37%. Individually, about 50% species are found to be threatened in the family Vitaceae while in the Apocynaceae it is about 31% (Table 1). The species which have no reports of occurrence after their first collection from the area of Bangladesh for about 80 to 200 years were presumed Extinct (EX). Extinction rate is found much higher (21%) in the Vitaceae than that of the Apocynaceae (4%). In Vitaceae, six species were found Extinct (EX), these are: *Ampelopsis rubifolia*

(Wall.) Planch, *Cissus verticillata* (L.) Nicolson & C.E. Jarvis, *C. vitiginea* L., *Cyphostemma auriculatum* (Roxb.) Singh & Shetty, *Tetrastigma rumicispermum* (Laws.) Planch., and *Vitis flexuosa* Thunb. On the other hand, only two apocynads were found Extinct (EX) and these are: *Chonemorpha verrucosa* (Blume) Middleton and *Urceola micrantha* (Wall. ex G. Don) Middleton.

It is found that Extinction rate is much higher in the Vitaceae (21%) than that of the Apocynaceae (4%). Table 1 also revealed that 11 species are endangered in the Apocynaceae and 4 in the Vitaceae which represents 22% and 14% respectively. All these species, as stated in the enumeration are found to be very potential resources of the flora in both economically and environmentally and hence to be emphasized for taking and implementing appropriate conservation management by the concerned department of the government. 10 species (5 in each family) are recognized as medicinally important, which represents about 13% of total species of which, *Cissus verticillata* (L.) Nicolson & C. E. Jarvis of the family Vitaceae has already been Extinct (EX), and *Willoughbeia edulis* Roxb. of the family Apocynaceae is in Vulnerable (VU) condition. Another 8 species are found to be Endangered (EN) in the wild.

**Table 1. Summary of the inventory of plants of Apocynaceae and Vitaceae**

Family	No. of species	No. of TS	% of TS	IUCN Categories					Potential values			
				EX	EN	CR	VU	Others	Md	Tm	Fe	Others
<b>Apocynaceae</b>	46	14	30.43	2	11	-	1	-	5	5	1	9
<b>Vitaceae</b>	29	14	48.28	6	4	-	-	4	5	-	6	7
<b>Total</b>	<b>75</b>	<b>28</b>	<b>37</b>	<b>8</b>	<b>14</b>	<b>-</b>	<b>1</b>	<b>5</b>	<b>7</b>	<b>1</b>	<b>3</b>	<b>16</b>

TS = Threatened species; EX= Extinct; EN= Endangered; CR = Critically Endangered; VU= Vulnerable; Md= Medicinal; Tm= Timber; Fe= Fruits edible

## Conclusion

It has been determined that the flora of Bangladesh is extremely under environmental threat and barge of extinction. The data of these two families indicate that the flora is depleting at a very alarming rate which conforms the report of Rahman (2013) on the family Asclepiadaceae, which is represented in the flora by 51% threatened taxa including 19 Extinct (EX) species. It is revealed that the extinction rate is 28% in the Asclepiadaceae followed by the Vitaceae with 21%. On the other hand, the rate of extinction is much less in the family Apocynaceae (4%). The study also revealed that 10 medicinally important species of these two families representing about 13% of total species are facing threats in various categories. *Cissus verticillata* (L.) Nicolson & C. E. Jarvis belong to the family Vitaceae has already been Extinct (EX), *Willoughbeia edulis* Roxb. of the family Apocynaceae which is in Vulnerable (VU) condition and other are in Endangered. It is, therefore, an urgent need to make complete inventory of threatened species of the flora, and production of Red Data Book of the country for taking and implementing National Conservation Strategies (NCS) and

sustainable management of the environment. Furthermore, public awareness should be created to stop over-exploitation and habitat destruction.

### ***Enumeration of threatened plant taxa***

FAMILY: APOCYNACEAE

**1. *Aganosma marginata* (Roxb.) G. Don, Gen Hist. 4: 77 (1837). **Fig. 5****

**Basionym:** *Echites marginata* Roxb. (1832).

**Synonym:** *Echites acuminata* Roxb. (1832).

**Local name(s):** *Bara-kaoringia, Chhoto kuruz.*

**Habit:** Twining shrub.

**Habitat:** Rain forests.

**Potential value:** Ornamental plant.

**Botanical identification:** A large evergreen twining shrub. Leaves linear-oblong, oblong lanceolate, bluntly acuminate, glabrous above, obscurely puberulous beneath. Cymes axillary, lax, puberulous. Flowers white; calyx lobes lanceolate, acuminate. Follicles 2. *Flowering and Fruiting:* June-January.

**Status of occurrence:** Endangered (EN).

**Threats to the species:** Deforestation and habitat destruction.

**Conservation status:** Although it had been collected from about ten localities of Chittagong, Cox's Bazar and Sylhet districts, the present field investigation showed that due to deforestation and felling of old trees, the plant is disappearing from its collection sites.

**Occurrence in Bangladesh:** Chittagong (*Sitakunda, Deyang Hill*); Cox's Bazar (*Himchari, Bara Inani, Mehergona, Upper Rezu*) and Sylhet (*Jafflong, Singla*).

**Global distributions:** Bangladesh, Java, Myanmar, Sumatra and the Philippine Islands.

**Conservation measures taken:** None.

**Conservation measures proposed:** *In-situ* conservation management should be taken immediately.

**Herbarium specimens:** Chittagong: Deyang Hill, 24.03.1996, *Rahman* 146 & 150 (HCU); Harbang, 09.06.1979, *Khan et al.* 10298, K.5460 (DACB), Cox's Bazar: Himchari National Park, 27.08.1996, *Rahman* 283b (HCU); Goalmara, 04.08.1990, *Khan et al.* K.8432 (DACB); Chakaria, *Khan et al.* K.5589 (DACB); Bara Inani, 22.12.1996, *Rahman* 607 (HCU); Mehergona, 24.02.1997, *Rahman* 778 (HCU); Sylhet: Jafflong, *Huq & Mia* H.7912 (DACB), *Khan et al.* K.3326 (DACB), *Huq et al.* H.5103, H.6363 (DACB); Singla, *Kanjilal* 4909 (ASSAM).

**2. *Alstonia neriifolia* D. Don, Prodr.: 131 (1825). **Fig. 1****

**Synonym:** *Blaberopus neriifolius* A. DC. (1844).

**Local name(s):** *Chhatim, Chaitan.*

**Habit:** Small tree.

**Habitat:** Moist evergreen forests.

**Potential value:** Timber and Medicinal.

**Botanical identification:** A small tree. Leaves a few in a whorl, coriaceous, pubescent beneath. Cymes sub-umbellate. Flowers small; calyx lobes tri-angular-ovate, acute. Follicles long, up to 18 cm long. *Flowering and Fruiting:* Not known.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction and fire wood collection.

**Conservation status:** Its occurrence is very rare in a few localities of the forests of Chittagong (Hazarikhil) and Moulvi Bazar (Lawachara National Park) with rapid decrease of population.

**Occurrence in Bangladesh:** Chittagong (*Hazarikhil*), Moulvi Bazar (*Lawachara National Park*).

**Global distributions:** Bangladesh, Bhutan, India including tropical Himalaya and Nepal.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimen:** Moulvi Bazar, Lawachara forest, 18.06.2009, *Rahman et al. s.n.* (HCU).

**3. *Beaumontia grandiflora* Wall., Tent. Fl. Nepal 1: 15 t. 7 (1824). Fig. 2**

**Synonym:** *Echites grandiflora* Roxb. (1820).

**Local name:** Not available.

**Habit:** Large woody climber.

**Habitat:** Evergreen forests.

**Potential value:** Ornamental.

**Botanical identification:** Large woody climber. Leaves ovate, oblong or elliptic-oblong, acuminate, sparsely tomentose beneath; lateral nerves 15-20 pairs, sub parallel. Cymes terminal, pedicels pubescent. Flowers white, fragrant, very large. Stamens included, adnate at the mouth of the tube. Follicles divaricate, oblong. *Flowering and Fruiting:* June-January.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Deforestation and habitat destruction.

**Conservation status:** It was first recorded from Sylhet and Chittagong by Hook. f. (1882) without citing any locality. It has been rediscovered from Kaptai Rampahar forest of Rangamati by *Rahman et al.* in 2011. No locality in Chittagong and Sylhet districts could be traced yet.

**Occurrence in Bangladesh:** Chittagong (*Ink*), Rangamati (*Kaptai Rampahar*) and Sylhet (*Ink*).

**Global distributions:** Bangladesh, India, Myanmar, Nepal, China and Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management should be taken immediately.

**Herbarium specimen:** Rangamati, Kaptai Rampahar forest, 04.05.2011, *Rahman et al.* 8480 (HCU).

**4. *Chonemorpha assamensis* Furtado in Gard. Bull. Str. Settlements 9: 115 (1935). Fig. 6**

**Synonym:** Not available.

**Local name:** Not available.

**Habit:** Climbing shrub.

**Habitat:** Evergreen forests.

**Potential value:** Bark fibre.

**Botanical identification:** A large woody climbing shrub. Leaves opposite, broadly obovate-oblong, acute, base cuneate, rounded. Cymes axillary or sub-terminal. Flowers showy, white, fragrant. Follicles 2, divaricate, glabrous. *Flowering and Fruiting:* June-January.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Deforestation and habitat destruction.

**Conservation status:** It has been located to only two localities in the forests of Cox's Bazar and Rangamati. No collection after Rahman *et al.* from Shublong area of Rangamati in 1999, is available.

**Occurrence in Bangladesh:** Cox's Bazar (*Paner chara*) and Rangamati (*Shubalong*).

**Global distributions:** Bangladesh and India.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimens:** Cox's Bazar: Paner Chara, 15.10.1998, *Rahman et al.* 3843 (HCU). Rangamati: Shubalong, 05.09.1999, *Rahman et al.* 5668 (HCU).

### 5. *Chonemorpha griffithii* Hook. f., Fl. Brit. India 3: 662 (1882). **Fig. 7**

**Synonym:** Not available.

**Local name:** Not available.

**Habit:** Woody climber.

**Habitat:** Evergreen forests.

**Potential value:** Wildlife supporting plant.

**Botanical identification:** A large woody climber. Leaves coriaceous; ovate, orbicular, obtuse, base rounded or sub-cordate, glabrous above. Cymes terminal, trichotomously branched, pubescent. Flowers large, white, fragrant. Follicles 2, recurved. *Flowering and Fruiting:* August-January.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction.

**Conservation status:** It has been located to Sadhanpur area of Chittagong, Whykeong forest of Cox's Bazar and Kaptai Sitapahar forest of Rangamati. No collection could be made after Rahman *et al.* from Kaptai Sitapahar in 1999.

**Occurrence in Bangladesh:** Chittagong (*Sadhanpur*), Cox's Bazar (*Whykeong*) and Rangamati (*Kaptai Sitapahar*).

**Global distributions:** Bangladesh and India.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimens:** Chittagong: Sadhanpur, 24.05.1996, *Rahman* 230 (HCU); Cox's Bazar: Whykeong, 25.12.1996, *Rahman* 627, 629 (HCU); Rangamati: Sitapahar, 23.02.1999, *Rahman et al.* 4351 (HCU).

### 6. *Chonemorpha verrucosa* (Blume) Middleton in Novon 3: 455 (1993). **Fig. 3**

**Basionym:** *Tabernaemontana verrocosa* Blume (1826).

**Synonym:** *Echites elliptica* Wall. (1829).

**Local name(s):** Not available.

**Habit:** Twining shrub.

**Habitat:** Evergreen forests.

**Potential value:** Bark fibre.

**Botanical identification:** A large woody twining shrub with profound milky latex. Leaves opposite or alternate, coriaceous, glabrous; elliptic-ovate or elliptic-oblong, acuminate or acute, base cuneate or rounded. Cymes axillary or sub-terminal, lax, panicle, puberulous. Flowers showy, white. Follicles 2, pendulous. *Flowering and Fruiting:* May-January.

**Status of occurrence:** Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** It was reported to occur in Sylhet (Wall. 1830) and Chittagong but no locality is traced yet.

**Occurrence in Bangladesh:** Chittagong (*lnk*) and Sylhet (*lnk*).

**Global distributions:** Bangladesh, Bhutan, China, India, Indonesia Laos, Malaysia, Myanmar, Thailand and Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** The plant is to be traced in its collection locality for *in-situ* or *ex-situ* conservation management as appropriate.

**Herbarium specimen:** No specimen is available at any herbaria consulted.

**7. Melodinus khasianus** Hook. f., Fl. Brit. India 3: 629 (1882). **Fig. 11**

**Synonym:** Not available.

**Local name:** Not available.

**Habit:** Climbing shrub.

**Habitat:** Hilly evergreen forests.

**Potential value:** Wildlife supporting plant.

**Botanical Identification:** A large climbing shrub with milky latex. Leaves narrowly elliptic, apex short acuminate, base cuneate. Cymes short, few flowered. Flowers small, corolla white, corolla lobes orbicular, tube very short. *Flowering and Fruiting:* May-June.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** Alam (1988) recorded its distribution in Sylhet without citing any locality. No other report of its collection from elsewhere in Bangladesh is available.

**Occurrence in Bangladesh:** Sylhet (*lnk*).

**Global distribution:** Bangladesh, China and India.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of occurrence is to be determined and then *in-situ* or *ex-situ* conservation management to be taken as appropriate.

**Herbarium specimen:** No specimen is available at any herbaria consulted.

**8. Melodinus monogynus** Roxb., Fl. Ind. 2: 56 (1832). **Fig. 12**

**Synonyms:** *Nerium piscidium* Roxb. (1832).

**Local name(s):** Not available.

**Habit:** Climbing shrub.

**Habitat:** Hilly evergreen forests.

**Potential value:** Wildlife supporting plant.

**Botanical identification:** A large climbing shrub with milky latex. Leaves opposite, elliptic-oblong or ovate-oblong, acuminate, base cuneate or rounded. Cymes terminal, trichotomously branched, panicle. Flowers white. Fruits berry, globose with hard or leathery pericarp, orange red, smooth. *Flowering and Fruiting:* April-January.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Deforestation and habitat loss.

**Conservation status:** Its location has been traced to a few areas of the forests of Chittagong and Cox's Bazar. No collection could be made after Rahman *et al.* from Ramu Upper Rezu reserve forest of Cox's Bazar in 1997.

**Occurrence in Bangladesh:** Chittagong (*Deyang hill, Baraidhala*) & Cox's Bazar (*Ramu Upper Rezu reserve forest*).

**Global distributions:** Bangladesh and India.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimens:** Chittagong: Deyang hill, March-June, 1996, *Rahman* 152, 172 & 253 (HCU); Baraidhala, 23.06.1993, *Mia et al.* M.3255 (DACB); Cox's Bazar: Upper Rezu reserve forest, 13.06.1997, *Rahman et al.* 1367 (HCU).

**9. Rauvolfia serpentina** (L.) Benth. *ex* Kurz, Forest Fl. Burma 2: 171 (1877).

**Fig. 4**

**Basionym:** *Ophioxylon serpentinum* L. (1753).

**Synonyms:** *Ophioxylon trifoliatum* Gaertn. (1791); *Tabernaemontana cylindracea* Wall. (1829).

**Local name(s):** *Sarpagnadha, Chandra, Choto Chand.*

**Habit:** Herb to small shrub.

**Habitat:** Mixed forests, plains and foot hills.

**Potential value:** Medicinal.

**Botanical identification:** A perennial herb to small shrub. Leaves whorled, elliptic-lanceolate or obovate-lanceolate to acuminate, base tapering. Cymes compact, axillary or terminal. Flowers white. Drupes crimson to black when ripen. *Flowering and Fruiting:* April-October.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction and over exploitation.

**Conservation status:** It is located to a number of localities in several forested areas with one or two individuals in each site. This species is facing threats to high risk of extinction due to habitat destruction and over exploitation.

**Occurrence in Bangladesh:** Chittagong (*Faiz Lake, Mireswari, Sitakund*), Cox's Bazar (*Gorak Ghata, Inani*), Bandarban (*Dudpukoria reserve forest*), Rangamati (*Gagra*) & Khagrachari (*Manikchari*), Dinajpur (*Singra*), Mymensingh (*Gazni*), Moulavibazar (*Lawachara*).

**Global distributions:** Bangladesh and India.

**Conservation measures taken:** *Ex-situ* conservation has been made in various gardens.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimens:** Chittagong: Hazarikhil, 21.06.1979, *Mia & Rahman* M 63 (DACB); Faiz Lake, 29.09.1989, *Mostafiz* 71 (HCU); Sitakund, Chandranath Hill, 13.09.1993, *Rahman et al.* 151(HCU, DACB); Cox's Bazar: Gorak Ghata, 10.09.1992, *Rahman et al.* 19 (HCU, DACB); Inani Range, Boro Inani Block, 04.06.2000, *Khan et al.* K 10597 (DACB). Bandarban: *loc. non cit.*, 22.08.1987, *M. K. Alam* 5421 (BFRIH); Dudpukoria reserve forest, 17.09.1993, *Rashid & Yusuf* 161 (HCU, DACB). Rangamati: Gagra, 25.04.1994, *Rashid* 195 (HCU, DACB). Khagrachari: Manikchari, 07.04.1994, *Rashid et al.* 170 (HCU, DACB). Mymensingh: Gazni, 19.04.1964, *D. K. Das* s. n. (BFRIH). Dinajpur: Singra, 14.05.1965, *D. K. Das* s. n. (BFRIH). Moulavibazar: Lawachara, 06.04.1988, *Mahfuz et al.* MZ 86 (DACB). Sylhet: Jaintapur, near Rajbari, *Khan & Mia* K5668 (DACB). Netrokona: Banagra, 25.04.1974, *Yusuf* 126 (DACB). Kurigram: Bhuringamari, 23.05.1990, *Huq et al.* H 9585 (DACB). Kushtia: Munshiganj, Alamdanga, 10.06.1974, *Khan & Huq* K3895 (DACB). Chuadanga: Darshana, 13.12.1988, *Huq et al.* H 8920 (DACB).

**Note:** This species, *Rauvolfia serpentina* Benth. *ex* Kurz, of the family Apocyanaceae has already been included in the Red Data Book of Bangladesh (*Khan et al.* 2001) as LR (cd).

**10. *Urceola micrantha*** (Wall. *ex* G. Don) Middleton in *Novon* 4: 151 (1994). **Fig. 9**

**Basionym:** *Echites micrantha* Wall. *ex* G. Don (1837).

**Synonyms:** *Ecdysanthera micrantha* (Wall. *ex* G. Don) A. DC. (1844);

*Parabarium micranthum* (Wall. *ex* G. Don) Pierre (1905).

**Local name:** Not available.

**Habit:** Woody climber.

**Habitat:** Hilly evergreen forests.

**Potential value:** Wildlife supporting plant.

**Botanical identification:** A large woody climber with milky latex. Leaves ovate-oblong or oblong-lanceolate, apex acuminate, base acute or cuneate. Cymes trichotomously branched, paniculate. Flowers small, yellow; calyx pubescent, corolla urceolate, glabrous. Follicles 2, divaricate. *Flowering and Fruiting:* April-December.

**Status of occurrence:** Possibly Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** Wallich collected it from Sylhet in 1830. Since then it has not been reported from elsewhere in Bangladesh.

**Occurrence in Bangladesh:** Sylhet (*lnk*).

**Global distributions:** Bangladesh, Bhutan, Nepal, India, Myanmar, Thailand, Laos, Vietnam, Indonesia, Malaysia, China and Japan.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken as appropriate.

**Herbarium Specimens:** Sylhet: *loc. Non cit.*, Wall. Cat. 1667 (K-W). No specimen is available at DACB, BFRIH, and BCSIRH.

**11. *Vallaris solanacea*** (Roth) O. Kuntze, *Rev. Gen. Pl.* 2: 417 (1891). **Fig. 14**

**Basionym:** *Peltanthera solanacea* Roth (1821).

**Synonym:** *Echites dichotoma* Roxb. (1832).

**Local name(s):** *Hadpur, Mali, Hapormali, Agarmoni.*

**Habit:** Scandent shrub.

**Habitat:** Scrubs or secondary forests.

**Potential value:** Medicinal.

**Botanical identification:** A large, scandent shrub with milky latex. Leaves opposite, glabrous, elliptic, oblong-lanceolate, acute or acuminate, base cuneate. Cymes axillary. Flowers white, pubescent, calyx tube short, acuminate or acute, corolla-tube narrow, cylindrical. Fruits 10-15 cm long, beaked. *Flowering and Fruiting:* December-April.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Deforestation and habitat destruction.

**Conservation status:** It has been collected from only Hazarikhil forest of Chittagong in 1995 and Sasupahar area of Khulna in 2006. Since then no locality of its occurrence could be traced yet.

**Occurrence in Bangladesh:** Chittagong (*Hazarikhil*) and Khulna (*Sasupahar*).

**Global distributions:** Bangladesh, India, Myanmar, Pakistan and Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of this species is to be traced for taking conservation management immediately.

**Herbarium specimens:** Chittagong: Hazarikhil, 03.05.1995, *Rahman* 173 (HCU); Khulna: Sasupahar, 09.04.2006, *Amina khatun, s.n.* (DACB).

**12. Willoughbeia edulis** Roxb., Pl. Corom. 3:77. t. 280 (1820). **Fig. 8**

**Synonym:** *Willoughbeia martabanica* Wall. (1832).

**Local name(s):** *Lata Aam, Lati Aam.*

**Habit:** Climbing shrub.

**Habitat:** Evergreen forests.

**Potential value:** Fruits edible and medicinal.

**Botanical identification:** A large climbing shrub. Leaves coriaceous, glabrous, oblong or ovate-oblong, acuminate, reddish brown beneath. Cymes axillary. Flowers fragrant, yellowish. Fruits pyriform. *Flowering and Fruiting:* May-December.

**Status of occurrence:** Vulnerable (VU).

**Threats to species:** Habitat destruction.

**Conservation status:** It occurs sporadically in some forests of Chittagong, Cox's Bazar, Rangamati and Greater Sylhet. Its population is decreasing rapidly due to destruction of habitat.

**Occurrence in Bangladesh:** Chittagong (*Bariadhala, Hazarikhil*); Cox's Bazar (*Ramu Upper Rezu reserve forest, Ukhia Madhur Chara*), Rangamati (*Rampahar, Sitapahar*) and Habigonj (*Satchari*).

**Global distributions:** Bangladesh, Cambodia, India, Laos, Malaysia, Myanmar and Thailand.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management required.

**Herbarium specimens:** Chittagong: Bariadhala, 16.10.1997, *Rahman et al.* 1980 (HCU), Chunati, *Huq & Mia* 10324 (DACB). Cox's Bazar: Ukhia Madhur Chara, 23.12.1996, *Rahman* 614 (HCU); Ramu Upper Rezu, *Huq & Mia* 10576 (DACB) and 08.10.1997, *Rahman et al. s.n.* (HCU). Habigonj: Satchari, 02.04.2009, *Arefin et al.* KA.76 (DUSH). Rangamati: Kaptai Rampahar/Sitapahar, May-August, 1999, *Rahman et al.* 4893 & 5566 (HCU). Dhaka: Balda Garden, *Rezia* RK.248 (DACB).

**13. *Wrightia arborea* (Dennst.) Mabb., in Taxon 26:533 (1977). Fig. 10**

**Basionym:** *Periploca arborea* Dennst. (1818).

**Synonyms:** *Wrightia tomentosa* Roem. & Schult. (1819); *W. pubescens* Roth (1821).

**Local name:** Not available.

**Habit:** Medium sized tree.

**Habitat:** Evergreen forests.

**Potential value:** Leaves are cooked as vegetable and medicinal.

**Botanical identification:** A medium sized deciduous tree with profound milky latex. Leaves tomentose on both surfaces, elliptic or ovate, elliptic-lanceolate, acuminate, base cuneate, margins thickly undulate. Cymes terminal, corymbose, tomentose. Flowers white turning yellow with unpleasant odour. Fruits cylindrical, pendulous. *Flowering and Fruiting:* May-January.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Deforestation and habitat destruction.

**Conservation status:** It occurs sporadically in some forested areas of Bandarban, Chittagong, Khagrachari, Mymensingh, Rangamati and Sherpur with a fewer number of individuals.

**Occurrence in Bangladesh:** Bandarban (near *Boga Lake, Ruma*), Chittagong (*Hazarikhil*), Khagrachari (*Ramghar*), Mymensingh (*Modupur National Park*) and Sherpur (*Gajni forest*).

**Global distributions:** Bangladesh, China, India, Myanmar, Sri Lanka and Thailand.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management required immediately.

**Herbarium specimens:** Bandarban: Ruma, near Boga Lake, 28.02.2011, *Rahman et al.* 8020 (HCU). Chittagong: Hazarikhil, 06.10.1997, *Rahman et al.* 1980 (HCU). Mymensingh: Modupur National Park, *Huq et al.* H.5727 (DACB). Sherpur: Gajni forest, *Khan et al.* K.7056 (DACB), *Huq* H.7676 (DACB).

**14. *Wrightia coccinea* Sims. in Bot. Mag. 53. t. 2696 (1826). Fig. 13**

**Synonym:** *Nerium coccineum* Roxb. (1832).

**Local name(s):** *Dudhi, Pallam.*

**Habit:** Medium sized tree.

**Habitat:** Evergreen forests.

**Potential value:** Ornamental plant.

**Botanical identification:** A medium sized tree, bark whitish grey outside. Leaves opposite, superposed; elliptic to ovate-obovate, apex caudate-acuminate, base obtuse to acute. Cymes terminal, few flowered. Flowers showy, orange red. Follicles linear with silky coma at the base. *Flowering and Fruiting:* May-January.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction.

**Conservation status:** It has been located to some forests of Chittagong, Moulvi Bazar, Rangamati and Sylhet, Its occurrence is decreasing rapidly due to habitat destruction.

**Occurrence in Bangladesh:** Chittagong (*Keochia*), Dhaka (*Ramna Park*), Moulvi Bazar (*Biyani Bazar*), Rangamati (*Sitapahar, Belai Chari*) and Sylhet (*Jaintapur, Jafflong, Patherkandi, Loobah lake*).

**Global distributions:** Bangladesh, China, India, Myanmar, Pakistan and Thailand.

**Conservation measures taken:** None.

**Conservation measures proposed:** *In-situ* conservation management to be taken immediately.

**Herbarium specimens:** Chittagong: Keochia, *Das* 6245 (BFRIH); Dhaka: Ramna park, *Momtaz Begum* 212 (DACB); Moulvi Bazar: Biani Bazar, *Mujibur Rahman* 6614 (BFRIH) and *Alam* 5808 (BFRIH); Rangamati: Belai Chari, *Rahman et al.* 4547 (HCU); Sylhet: Jaintapur, *Huq et al.* H.6203, H.7858 (DACB); Jafflong, *Huq & Mia* H.6297 (DACB); Patherkandi, *Gupta* 7835 (ASSAM); Loobah lake, *Kanjilal* 4680 (ASSAM).

#### FAMILY: VITACEAE

**15. Ampelopsis glandulosa** (Wall. *ex* Roxb.) Momiy. in Bull. Univ. Mus. Univ. Tokyo 2: 78 (1971). **Fig. 17**

**Basionym:** *Vitis glandulosa* Wall. *ex* Roxb. (1824).

**Synonym:** *Cissus glandulosa* Roxb. (1814 *num. nud.*).

**Local names:** *Jangli Boroi*.

**Habit:** Climber.

**Habitat:** On the hill slopes.

**Potential value:** Wildlife supporting plant, fruits edible.

**Botanical identification:** A slender branched climber. Tendril 2-3 branched. Leaves simple, pentagular, cordate-ovate, crenate, often 3-5 lobed. Flowers in small dichotomous corymbose cymes, shorter than the leaves. Fruit a berry, small, globose, dark purple. Seed narrowly elliptic. *Flowering and Fruiting:* May-September.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction.

**Conservation status:** Only one specimen was collected from Sherpur (*Runctia Sal forest*) in 2009 by Mr. Ershad Tutul of Dhaka University after Roxburgh from Chittagong in 1832. No other location of its occurrence is traced yet.

**Occurrence in Bangladesh:** Chittagong (*lnk*) and Sherpur (*Runctia Sal Forest*).

**Global distributions:** Bangladesh, China, India, Myanmar, Nepal, Taiwan and the Philippines.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of its occurrence is to be traced and then *in-situ* and *ex-situ* conservation measures are to be taken as appropriate.

**Herbarium Specimen:** Sherpur: Runctia Sal Forest, Gazni, 31. 10. 2009, *Tutul* 444 (DUSH).

**16. Ampelopsis rubifolia** (Wall.) Planch. in DC., Monogr. Phan. 5(2): 463 (1887). **Fig. 15**

**Basionym:** *Vitis rubifolia* Wall. (1824).

**Local name:** Not available.

**Habit:** Climbing shrub.

**Habitat:** Over bushes and scrub jungles of the foot hills.

**Potential value:** Wildlife supporting plant.

**Botanical identification:** A large climbing shrub with 4-angled slender stem and branches. Leaves 1 or 2 pinnate, usually 3-foliolate, leaflets ovate-elliptic or ovate. Inflorescences umbellate cymes. Flowers small, greenish, anthers elliptic, styles conical. Fruits berry, globose red, turning black when fully ripen. *Flowering and Fruiting:* August-December.

**Status of occurrence:** Possibly Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** No report since Hook.f. (1875) recorded from Sylhet without citing any locality.

**Occurrence in Bangladesh:** Sylhet (*Ink*).

**Global distributions:** Bangladesh, China, India and Japan.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of occurrence is to be traced and both *in-situ* and *ex-situ* conservation management to be taken as appropriate.

**Herbarium Specimens:** No specimen is available at any herbaria consulted.

**17. Cayratia pedata** (Lam.) Juss. *ex* Gagnep., Notul. Syst. (Paris) 1: 346 (1911). **Fig. 16**

**Basionym:** *Cissus pedata* Lam. (1783).

**Synonym:** *Vitis pedata* Wall. *ex* Wight & Arn. (1834).

**Local names:** *Gwali-lata*, *Goali-Kata*.

**Habit:** Woody climber.

**Habitat:** Rainy forest areas.

**Potential value:** Medicinal and wildlife supporting plant.

**Botanical identification:** A woody climber. Leaves pedately 5 foliolate, ovate-elliptic, base rounded, subcordate. Inflorescences corymbose. Flowers hermaphrodite, usually 4-merous, very small, greenish. Fruit a berry, depressed globular. *Flowering and Fruiting:* April-October.

**Status of occurrence:** Near Threatened (nt).

**Threats to species:** Habitat destruction.

**Conservation status:** Although it occurs in few localities but with a very poor number of individuals and likely to be decreasing.

**Occurrence in Bangladesh:** Chittagong (*Sitakunda*, *Bariadhala*), Cox's Bazar (*Himchari National Park*), Dhaka (*Mirpur*) and Sylhet (*Ink*).

**Global distributions:** Bangladesh, Cambodia, India, Indonesia, Sri Lanka, Malaysia, Myanmar, Thailand and Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium Specimens:** Chittagong: Sitakunda, Bariadhala, 15.11.1998, *Rahman & Rashid* 3945 (HCU); Sitakunda, 24.06.1979, *Mia & Rahman* M.142 (DACB). Cox's Bazar: Teknaf,

Himchari National Park, 29.06.1997, *Rahman & Uddin* 1432 (HCU); Dhaka: Mirpur, 15.07.1961, *Zaman* D.83 (DUSH).

**18. *Cayratia tenuifolia*** (Wight & Arn.) Gagnep., Notul. Syst. (Paris) 1: 349 (1911). **Fig. 18**

**Basionym:** *Vitis tenuifolia* Wight & Arn. (1834).

**Synonyms:** *Cissus japonica* Willd. (1824) (later homonym); *C. tenuifolia* (Wight & Arn.) Planch. (1887); *C. cymosa* Steud. (1841).

**Local name:** Not available.

**Habit:** Climber.

**Habitat:** Rain forests.

**Potential value:** Medicinal and wildlife supporting plant.

**Botanical identification:** Herbaceous climber. Leaves pedate, ovate to elliptic or oblong, base acute to cuneate, apex acute. Disc of flower yellow at anthesis, becoming white after anthesis. Fruit depressed, obpyriform. *Flowering and Fruiting:* May-October.

**Status of occurrence:** Near Threatened (nt).

**Threats to species:** Habitat destruction.

**Conservation status:** Although it occurs in few localities with a very poor number of individuals and likely to be decreasing.

**Occurrence in Bangladesh:** Bandarban (*Alikadam*), Chittagong (*Garjania*), Cox's Bazar (*Teknaf*) and Rangamati (*Kaptai*, *Sitapahar*).

**Global distributions:** Bangladesh, India, Indonesia, Japan, Malaysia, Nepal and Taiwan.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimens:** Bandarban: Alikadam, Guishapjiri, 03.05.1998, *Rahman et al.* 2881 (HCU); Chittagong division: Garjania, 06.1920, *Cowan* 717 (E); Cox's Bazar: Teknaf, 23.10.1963, *Khan* 710 (DUSH); Rangamati: Kaptai, 03.10.1982, *Das & Alam* 4487 (BFRIH); Sitapahar, 08.10.1998, *Rahman et al.* 3552 (HCU).

**19. *Cissus pentagona*** Roxb., Fl. Ind. 1: 408 (1820). **Fig. 23**

**Synonym:** *Vitis pentagona* Buch.-Ham. *ex* Wall. (1831-1832).

**Local name:** *Sona-tola*.

**Habit:** Woody climber.

**Habitat:** Climbing over bushes and small trees in the hilly forest areas only.

**Potential value:** Medicinal.

**Botanical identification:** A large woody climber with 5-angled stem. Leaves simple, cordate or cordate-ovate or ovate, Inflorescences cymes, peduncle long. Flowers yellowish-red. *Flowering and Fruiting:* September-March.

**Status of occurrence:** Near Threatened (nt).

**Threats to species:** Habitat destruction.

**Conservation status:** It occurs sporadically with a fewer number of individuals in degraded forests of Chittagong, Cox's Bazar and Moulvi Bazar districts.

**Occurrence in Bangladesh:** Chittagong (*Sitakunda*, *Hazarikhil*), Cox's Bazar (*Whykong*, *Himchari National Park*, *Chakaria Sundarban*, *Shilkhali*), Moulvi Bazar (*Lowachara*), (*Kengal Chari*, *Rampahar*, *Sitapahar*).

**Global distributions:** Bangladesh, India and Myanmar.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium specimens:** Chittagong: Sitakunda, Chandranath hill, 11.10.1998, *Rahamn et al.* 3684 (HCU); Hazarikhil, 8.11.1998, *Rahman et al.* 513 (HCU). Cox's Bazar: Teknaf, Whykong, 15.10.1998, *Rahman et al.* 2130 (HCU); Himchari National Park, 15.10.1998, *Rahman & Uddin* 3863 (HCU); Chakaria Sundarban, 25.02.1997, *Rahman & Uddin* 802 (HCU); Shilkhali, 26.12.1996, *M. A. Rahman* 644 (HCU); Panerchara, 12.09.1999, *Rahman et al.* 5944 (HCU). Rangamati: Kengal Chari, 30.05.1998, *Rahman et al.* 2960 (HCU); Kaptai, Rampahar, 29.10.2011, *Rahman et al.* 7586a (HCU); Sitapahar, 20.10.2003, *Uddin* N.2155 (DACB). Moulvi Bazar: Srimongal, Lowachara, 17.03.1984, *Alam* 4873 (BFRIH).

**20. *Cissus verticillata* (L.) Nicolson & C. E. Jarvis, Taxon 33(4): 727 (1984). Fig. 19**

**Basionym:** *Viscum verticillatum* L. (1753).

**Synonyms:** *Cissus sicyoides* L. (1759); *C. glauca* Thw. (1858); *Vitis sicyoides* (L.) Miq. (1857).

**Local name:** Not available.

**Habit:** Climber.

**Habitat:** Primary forests.

**Potential value:** Medicinal, wildlife supporting plant, fruits edible.

**Botanical identification:** Evergreen perennial vine. Leaves typically large, simple, alternate, glabrous, and succulent. Inflorescences densely flowered cymes, extended from the leaf axils. Flowers yellow-green, calyx light green, cup-shaped and forms a rim around the ovary. Fruit a berry, black or purple which is similar to a small grape. *Flowering and Fruiting:* July-December.

**Status of occurrence:** Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** No report after Roxb. (1832) from Chittagong citing without any locality.

**Occurrence in Bangladesh:** Chittagong (*lnk*).

**Global distributions:** Argentina, Bangladesh, Bolivia, Brazil, Caribbean, Central America, Chile, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala Honduras, Guyana, India, Mexico, Nicaragua, Panama, Peru, Suriname, U. S. A. and Venezuela.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of occurrence is to be traced and both *in-situ* and *ex-situ* conservation management to be taken as appropriate.

**Herbarium Specimens:** No specimen is available at any herbaria consulted.

**21. *Cissus vitiginea* L., Sp. Pl.: 117 (1753). Fig. 24**

**Synonyms:** *Cissus latifolia* Lam. (1783); *C. glauca* Roxb. (1820); *Vitis glauca* (Roxb.) Wight & Arn. (1834).

**Local name:** *Guali-lata*.

**Habit:** Climber.

**Habitat:** Primary rain forests.

**Potential value:** Not known.

**Botanical identification:** A large climber. Leaves 5-angled or lobed, cordate-ovate on main shoots. Inflorescences umbellate cyme, leaf-opposed. Flowers whitish-green, copular. Fruit a berry, ovoid. *Flowering and Fruiting:* July-December.

**Status of occurrence:** Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** No report after Roxb. (1832) from Chittagong without citing any locality.

**Occurrence in Bangladesh:** Chittagong (*lnk*).

**Global distributions:** Bangladesh, India, Myanmar, Sri Lanka and Thailand.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of occurrence is to be traced, if exists, appropriate conservation management to be taken.

**Herbarium Specimens:** No specimen is available at any herbaria consulted.

## **22. *Cyphostemma auriculatum* (Roxb.) Singh & Shetty, Taxon 35 (3): 596 (1986). Fig. 20**

**Basionym:** *Cissus auriculata* Roxb. (1824).

**Synonym:** *Vitis auriculata* (Roxb.) Wall. (1831).

**Local name:** Not available.

**Habit:** Climber.

**Habitat:** Evergreen forests.

**Potential value:** Fruits edible, wildlife supporting plant.

**Botanical identification:** A large climber with succulent stem. Leaves palmately 5-foliolate, ovate-elliptic, acuminate, base rounded. Inflorescences pseudo-axillary or terminal cyme, corolla constricted in bud, pubescent. Fruit a globose berry. *Flowering and Fruiting:* April-June.

**Status of occurrence:** Possibly Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** No report after Heinig (1925) from Chittagong is available. No locality in Chittagong and Sylhet could be traced yet.

**Occurrence in Bangladesh:** Chittagong (*lnk*) and Sylhet (*lnk*).

**Global distributions:** Africa, Bangladesh, India, Madagascar and Myanmar.

**Conservation measures taken:** None.

**Conservation measures proposed:** Intensive search is to be made to locate this plant, if exists, appropriate conservation management to be taken.

**Herbarium Specimens:** No specimen is available at any herbaria consulted.

## **23. *Parthenocissus semicordata* (Wall. ex Roxb.) Planch. in DC., Monogr. Phan. 5: 451 (1887). Fig. 25**

**Basionym:** *Vitis semicordata* Wall. ex Roxb. (1824).

**Synonyms:** *Ampelopsis himalayana* Royle (1835); *Cissus himalayana* Walp. (1842);

*Parthenocissus himalayana* (Royle) Planch. (1887).

**Local name:** Not available.

**Habit:** Climber.

**Habitat:** Hill slopes over bushes.

**Potential value:** Not known.

**Botanical identification:** A large climber with terete branchlets, sparsely pilose when young, becoming glabrescent; Leaves 3-foliolate, usually nearly sessile, apex mucronate. Cymes up to 3 cm long, compact. Flowers 4-merous. Fruits berry. *Flowering and Fruiting:* January-June

**Status of occurrence:** Near Threatened (nt).

**Threats to species:** Habitat destruction.

**Conservation status:** It occurs sporadically with a fewer number of individuals in degraded forests of Chittagong, Cox's Bazar, Moulvi Bazar and Rangamati districts.

**Occurrence in Bangladesh:** Chittagong (*Deyang Hill*), Cox's Bazar (*Himchari National Park*), Moulvi Bazar (*Samanbagh beat*), Rangamati, Kaptai (*Rampahar, Sitapahar*).

**Global distributions:** Bangladesh, Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, North America, Pakistan, Thailand, Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management to be taken immediately.

**Herbarium Specimens:** Chittagong: Deyang hill, 07.06.1996, *Rahman et al.* 254A (HCU). Cox's Bazar: Bhangamura, Himchari National Park, 21.03.1997, *Rahman & Uddin* 336 (HCU); 30.03.1997, *Uddin & Rashid* 2717 (HCU). Moulvi Bazar: Samanbagh beat, 25.04.1987, *Das & Alam* 5799 (BFRIH). Rangamati: Kaptai, Rampahar, 12.06.2010, *Rahman et al.* 6399 (HCU); Sitapahar, 26.02.1965, *Khan* 1198 (DUSH); 12.05.1996, *Alam* 7622 (BFRIH).

**24. Tetrastigma dubium** (Laws.) Planch. in DC., Monogr. Phan. 5(2): 437 (1887). **Fig. 26**

**Basionym:** *Vitis dubia* Laws. (1875).

**Synonym:** *Vitis oxyphylla* Wall. ex Prain (1903).

**Local name(s):** *Kuanria*.

**Habit:** Climber.

**Habitat:** Hilly forests.

**Potential value:** Medicinal, Fruits edible.

**Botanical identification:** A large sub-woody climber. Leaves 5-foliolate, ovate or elliptic or lanceolate, acuminate, base rounded. Inflorescences axillary cymes, compact, corymbose. Flowers 4 mm across. Fruits berry, oblong. *Flowering and Fruiting:* March-August.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction.

**Conservation status:** The last collection of this species has been made from Chunati of Chittagong by MS Khan in 1997 after Deke from Chhatak of Sylhet district in 1941. The first collection of it was made from Kaptai of Rangamati by Lace in 1880. No locality could be traced yet.

**Occurrence in Bangladesh:** Chittagong (*Chunati*), Rangamati (*Kaptai*) and Sylhet (*Chhatak*).

**Global distributions:** Bangladesh, Bhutan, China, India and Nepal.

**Conservation measures taken:** None.

**Conservation measures proposed:** It is to be located to its collection sites for taking *ex-situ* conservation management immediately.

**Herbarium Specimens:** Chittagong: Chunati, 25.09.1997, *Khan et al. s.n.* (DACB); Rangamati: Kaptai, 11.03.1880, *Lace* 2179 (E). Sylhet: Chhatak, 09.02.1941, *Deka* 20542 (ASSAM).

**25. *Tetrastigma rumicispermum*** (Laws.) Planch. in DC., Monogr. Phan. 5(2): 429 (1887).  
**Fig. 27**

**Basionym:** *Vitis rumicisperma* Laws. (1875).

**Synonym:** *Vitis tuberculata* Wall. (1831).

**Local name:** Not available.

**Habit:** Climber.

**Habitat:** Evergreen forests.

**Potential value:** Not known.

**Botanical identification:** woody Lianas. Branchlets terete. Leaves pedately 5-foliolate, leaflet complex, central leaflet obovate-elliptic, Inflorescences axillary or leaf-opposed on lateral branches, umbelliform; Calyx shallow, saucer-shaped, glabrous, anthers yellow. Fruits berry, globose. *Flowering and Fruiting:* April-November.

**Status of occurrence:** Possibly Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** It was collected once from Patharia forest of Sylhet by G. Mann in 1828. Since then no other location of occurrence could be traced yet.

**Occurrence in Bangladesh:** Sylhet (*Patharia forest*).

**Global distributions:** Bangladesh, Bhutan, China, India, Laos, Nepal, Thailand and Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of occurrence is to be traced, if exists, *ex-situ* or as appropriate conservation management to be taken.

**Herbarium Specimens:** Sylhet: Patharia forest, 07.1828, *Mann* 1073 (ASSAM).

**26. *Tetrastigma serrulatum*** (Roxb.) Planch. in DC., Monogr. Phan. 5(2):432 (1887).

**Fig. 28**

**Basionym:** *Cissus serrulatum* Roxb. (1820).

**Synonyms:** *C. nepalensis* DC. (1824); *Vitis capriolata* D. Don (1826); *V. serrulata* (Roxb.) Wall. (1831).

**Local name:** Not available.

**Habit:** Climbing shrub.

**Habitat:** Rain forests.

**Potential value:** Fruits edible.

**Botanical identification:** An evergreen climbing shrub. Plant dioecious. Leaves pedately 5-foliolate, obovate or elliptic or lanceolate, cuspidate-acuminate, Inflorescences umbellate cymes. Flowers 4-merous, yellow-green. Fruit a berry, globose, reddish-brown when ripen. *Flowering and Fruiting:* May-November.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction.

**Conservation status:** It has been collected from Teknaf of Cox's Bazar in 1997 after Sinclair from Signal Hill in 1943. It was also collected from Dhaka city area in 1970.

**Occurrence in Bangladesh:** Cox's Bazar (*Teknaf, Signal hill*) and Dhaka (*Second capital area*).

**Global distributions:** Bangladesh, Bhutan, China, India, Myanmar, Nepal and Thailand.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation management required immediately.

**Herbarium specimens:** Cox's Bazar: Teknaf, 24.10.1997, *Rahman et al.* 2124 (HCU); Signal Hill, 14.08.1943, *Sinclair* 3142 (E); Dhaka: Second capital area, 17.05.1970, *Rahman* 100 (DUSH).

**27. *Vitis flexuosa*** Thunb. in Trans. Linn. Soc. London 2: 103, 332 (1794). **Fig. 21**

**Synonyms:** *Vitis parvifolia* Roxb. (1820); *V. purani* Buch.-Ham. ex D. Don (1825);  
*V. wallichii* Kurz (1872).

**Local name:** Not available.

**Habit:** Climbing shrub.

**Habitat:** Evergreen forests.

**Potential value:** Not known.

**Botanical identification:** A large climbing glabrous shrub. Leaves simple, cordate, sometimes 3-lobed, crenate-serrate, apex somewhat alternate. Flowers minute, green, calyx obscurely 5-lobed, corolla lobes 5, cohering. *Flowering and Fruiting:* February-May.

**Status of occurrence:** Possibly Extinct (EX).

**Threats to species:** Habitat loss; specimens not collected.

**Conservation status:** Hook. f. (1875) reported this plant from Eastern part of Bengal without citing any locality. Since then no report of collection of it from elsewhere in Bangladesh is available.

**Occurrence in Bangladesh:** Eastern Bengal (*Ink*).

**Global distribution:** Bangladesh, China, India, Japan, Korea, Laos, Malaysia, North-West Himalayas, Nepal, Pakistan, Taiwan, Thailand, the Philippines and Vietnam.

**Conservation measures taken:** None.

**Conservation measures proposed:** Location of occurrence is to be traced, if exists, conservation management to be taken as appropriate.

**Herbarium Specimens:** No specimen is available at any herbaria consulted.

**28. *Vitis heyneana*** Roem. & Schult., Syst. Veg., ed. 15 bis 5: 318 (1819). **Fig. 22**

**Synonym(s):** *Vitis lanata* Roxb. (1814, 1824); *Cissus vitiginea* Roxb. (1832); *C. heyneana* (Wall. ex Wight & Arn.) Planch. (1887); *Vitis heyneana* Wall. ex Wight & Arn. (1834); *V. indica* Hook. & Arn. (1838).

**Local name:** *Gode lata*.

**Habit:** Climbing shrub.

**Habitat:** Thickets of foot hills.

**Potential value:** Fruits edible.

**Botanical identification:** A large climbing shrub with corky bark. Leaves simple, cordate-ovate or broadly ovate, apex shortly acuminate, base cordate. Inflorescences paniculate

cymes. Flowers small, green, unisexual, calyx minute, corolla lobes cohering at the apex. Fruits berry, globose, blackish. *Flowering and Fruiting*: May-October.

**Status of occurrence:** Endangered (EN).

**Threats to species:** Habitat destruction.

**Conservation status:** It was collected by Das in 1964 from Gazni of Mymensingh and again in 1995 from Kaptai Sitapahar of Rangamati by Das & Akram. Since then no other collection from any locality could be found.

**Occurrence in Bangladesh:** Chittagong (*lnk*), Mymensingh (*Gazni*), Rangamati (*Sitapahar*).

**Global distributions:** Bangladesh, China to the Himalayas and Myanmar.

**Conservation measures taken:** None.

**Conservation measures proposed:** Both *in-situ* and *ex-situ* conservation measures to be taken immediately.

**Herbarium specimens:** Mymensingh: Gazni, 10.04.1964, *Das s.n.* (BFRIH). Rangamati: Kaptai Sitapahar, 17.07.1981, *Das & Akram* 4150 and 18.06.1995, *Alam & Basak* 7432 (BFRIH).

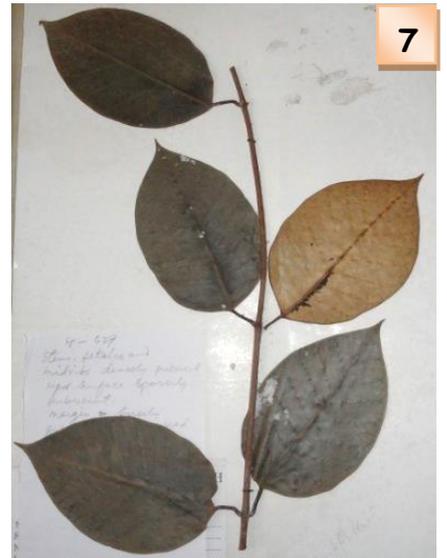
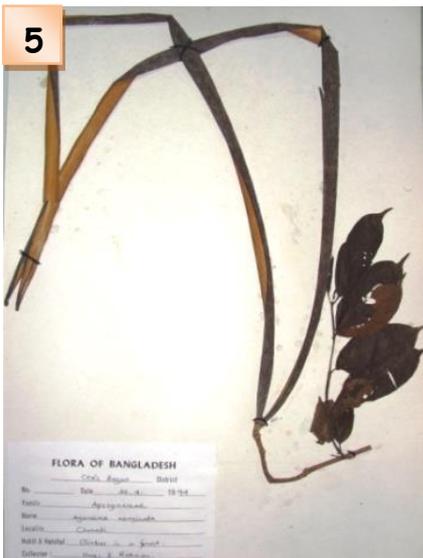
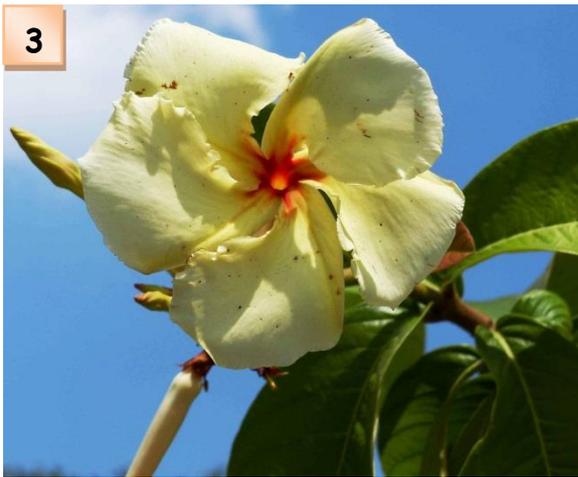
**Note:** No species of the family Vitaceae has been included in the Red Data Book of Bangladesh (Khan *et al.*, 2001).

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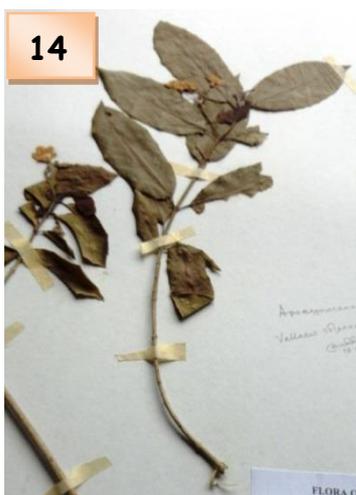
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**Figures 1-7. Threatened species of the flora of Bangladesh. 1. *Alstonia nerifolia* D. Don.; 2. *Beaumontia grandiflora* Wall.; 3. *Chonemorpha verrucosa* (Blume) Middleton; 4. *Rauwolfia serpentina* (L.) Benth. ex Kurz; 5. *Aganosma marginata* (Roxb.) G. Don.; 6. *Chonemorpha assamensis* Furtado; 7. *Chonemorpha griffithii* Hook. f.**



**Figures 8-16. Threatened species of the flora of Bangladesh (contd.). 8. *Willoughbeia edulis* Roxb.; 9. *Urceola micrantha* (Wall. ex G. Don) Middleton; 10. *Wrightia arborea* (Dennst.) Mabb.; 11. *Melodinus khasianus* Hook. f.; 12. *Melodinus monogynus* Roxb.; 13. *Wrightia coccinea* Sims.; 14. *Vallaris solanacea* (Roth) O. Kuntze; 15. *Ampelopsis rubifolia* (Wall.) Planch.; 16. *Cayratia pedata* (Lam.) Juss. ex Gagnep.**



Figures 17-22. Threatened species of the flora of Bangladesh (contd.). 17. *Ampelopsis glandulosa* (Wall. ex Roxb.) Momiyama; 18. *Cayratia tenuifolia* (Wight & Arn.) Gagnep.; 19. *Cissus verticillata* (L.) Nicolson & C.E. Jarvis; 20. *Cyphostemma auriculatum* (Roxb.) Singh & Shetty; 21. *Vitis flexuosa* Thunb.; 22. *Vitis heyneana* Roem. & Schult.



Figures 23-28. Threatened species of the flora of Bangladesh (contd.). 23. *Cissus pentagona* Roxb.; 24. *Cissus vitiginea* L.; 25. *Parthenocissus semicordata* (Wall. ex Roxb.) Planch.; 26. *Tetrastigma dubium* (Laws.) Planch.; 27. *T. rumicispermum* (Laws.) Planch.; 28. *T. serrulatum* (Roxb.) Planch