

## Studies of the Family Celastraceae in Jharkhand

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**Abstract:** The paper deals with the documentation of species belonging to the family Celastraceae in Jharkhand. A total of 10 species belonging to seven genera are reported from Jharkhand. The genera are *Celastrus*, *Elaeodendron*, *Euonymus*, *Gymnosporia*, *Reissantia*, *Salacia* and *Siphonodon*. *Gymnosporia* is the most dominant genus with three species, followed by *Reissantia* with two species and remaining genera with one species each. Key to the genera and key to the species are also provided here for easy identification of the species found in Jharkhand.

**Keywords:** Celastraceae, Jharkhand, Key.

### 1. INTRODUCTION

The family Celastraceae is characterized by evergreen or deciduous trees, shrubs, lianas, or less frequently herbaceous annuals and perennials which have small, actinomorphic, 4–5-merous bisexual or unisexual flowers with nectary disks occurring on the same or different plants and wide diversity of fruit and aril types (Simmons, 2004). It comprises about 1300 species belonging to 96 genera that are mainly distributed in the tropics and temperate regions of the world (Mabberley, 2017). In India, it is represented by 12 genera and 82 species (Ramamurthy, 2000).

Haines (1910, 1921–1925) and Singh *et al.* (2001) had contributed to the flora of the erstwhile Bihar while Sarma and Sarkar (2002), Paria and Chattopadhyay (2000, 2005) and Ranjan (2014) have made significant contributions to the Flora of Palamau, Hazaribagh districts and Parasnath Wildlife Sanctuary of Jharkhand, respectively but no one has contributed particularly to the family Celastraceae of the state. Therefore, the present study is the first report to document all species belonging to the family Celastraceae in Jharkhand.

### 2. MATERIAL AND METHODS

#### 2.1. Study Area

Jharkhand was formed as a separate state after bifurcation of the erstwhile state of Bihar in the year 2000 and spreads in about 79,716 sq km. The state is rich in forest and mineral reserves. About 23,611 sq km is under forest cover that constitutes 29.62% of total geographical area (FSI, 2019). The state possesses many rivers and valleys with undulating tracts, hills and ridges and altitudes ranging from 300 to 900 m. Temperature vary from 4°C to 47°C and the important rivers are Son, South Koel, Baitarni, Ganga and Damodar. The state has one Tiger Reserve, one Elephant Reserve, one National Park and 11 Wildlife Sanctuaries (Singh and Singh, 2002; WII, 2019).

#### 2.2. Data Collection and Presentation

The present work was based on the study of literature (Haines, 1910, 1921–1925; Singh *et al.*, 2001; Sarma and Sarkar, 2002; Paria and Chattopadhyay, 2000, 2005; Ranjan, 2014) and herbarium specimens deposited at CAL and LWG. Key to the genera and key to the species are also provided. Genera and species are arranged alphabetically in the present enumeration. The nomenclature of plants was updated using Plants of the World Online (2019). Each species is provided with accepted name, followed by basionym, if any, synonyms, phenology and distribution. The name of author, book and periodicals cited here are accordance with Brummitt and Powell (1992), Stafleu and Cowan

(1976–1988), Stafleu and Mennega (1992–2000) and BPH online (<http://fmhibd.library.cmu.edu/HIBD-DB/bpho/findrecords.php?-link=Find>).

### 3. RESULTS AND DISCUSSION

A total of 10 species belonging to seven genera are reported from Jharkhand. The genera include *Celastrus* L., *Elaeodendron* Jacq., *Euonymus* L., *Gymnosporia* (Wight & Arn.) Hook.f, *Reissantia* N. Hallé, *Salacia* L. and *Siphonodon* Griff. *Gymnosporia* is the most dominant genus with three species, followed by *Reissantia* with two species and remaining genera with one species each. Life forms include climber with three genera (*Celastrus*, *Reissantia* and *Salacia*) and tree with four genera (*Elaeodendron*, *Euonymus*, *Gymnosporia* and *Siphonodon*). *Elaeodendron glaucum* (Rottb.) Pers. commonly known as *Khaura* or *Ratangarur* is used for medicinal purpose by local inhabitants of the state as its leaves and barks are used in limb swelling in the state.

Ramamurthy (2000) treated the genus *Siphonodon* under the family Celastraceae and Ramamurthy and Naithani (2000) treated Hippocrateaceae as distinct family while Singh *et al.* (2001) treated Celastraceae, Siphonodontaceae and Hippocrateaceae as independent family. But, phylogenetic study supports the taxonomic inclusion of Hippocrateaceae within paraphyletic Celastraceae (Simmons *et al.*, 2001). Jordaan and Van Wyk (1999) reinstated the genus *Gymnosporia* (Wight & Arn.) Hook.f. and included all its spiny members which were previously placed under *Maytenus* Molina *sensu lato*. Further, the genus *Elaeodendron* was treated as either distinct genus or synonym of *Cassine* but phylogenetic study (Islam *et al.*, 2006) supported that both genera should be recognized as distinct genera.

#### Key to the Genera

- 1a. Unarmed climbing shrubs.....2
- 1b. Armed or unarmed erect shrubs or trees.....3
- 2a. Stamens 5; filaments distinct, often incurved, inserted at or below the margin of the disk; seeds albuminous .....**1. Celastrus**
- 2b. Stamens 3; filaments connate at the base, recurved, inserted inside the disk; seeds exalbuminous .....4
- 3a. Plants armed .....**4. Gymnosporia**
- 3b. Plants unarmed .....5
- 4a. Flowers in paniced cymes; fruits capsular, flattened, dry, dehiscent; seeds winged.....**5. Reissantia**
- 4b. Flowers in fascicles; fruits berries, globose, fleshy, indehiscent; seeds not winged.....**6. Salacia**
- 5a. Fruits capsule.....**3. Euonymus**
- 5b. Fruits drupe.....6
- 6a. Inflorescences dichotomous cymes; ovary 2-loculed.....**2. Elaeodendron**
- 6b. Inflorescences not dichotomous cymes; ovary many loculed.....**7. Siphonodon**

#### 1. CELASTRUS L.

(7 species in India and 1 in Jharkhand)

**Celastrus paniculatus** Willd., Sp. Pl., ed. 4, 1: 1125. 1798; M.A. Lawson in Hook.f., Fl. Brit. India 1: 617. 1875; Haines, Forest Fl. Chota Nagpur: 265. 1910 & Bot. Bihar Orissa: 188. 1921; Ramam. in N.P. Singh *et al.*, Fl. India 5: 87, f. 18. 2000; Paria & S.P. Chattop., Fl. Hazaribagh 1: 448. 2000; N.P. Singh *et al.*, Fl. Bihar: 103. 2001; Ranjan, Fl. Parasnth WLS. Jharkhand: 58: 2014. **Figure 1a-c**

Flowering & fruiting: April–January.

Distribution: Deoghar, Dumka, East Singhbhum, Giridih, Godda, Gumla, Hazaribagh, Jamtara, Koderma, Palamau, Pakur, Ranchi and Sahibganj.



**Figure 1.** a-c. *Celastrus paniculatus* Willd: a. inflorescence, b. flower, c. fruits; d-e. *Elaeodendron glaucum* (Rottb.) Pers.: d. flowers, e. fruit; f-h. *Gymnosporia montana* (Roth) Benth.: f. flowers, g. fruits, h. seeds.

## 2. ELAEODENDRON Jacq.

(4 species in India and 1 in Jharkhand)

**Elaeodendron glaucum** (Rottb.) Pers., Syn. Pl. 1: 241. 1805; M.A. Lawson in Hook.f., Fl. Brit. India 1: 623. 1875, p.p.; Haines, Forest Fl. Chota Nagpur 266. 1910 & Bot. Bihar Orissa: 189. 1921. *Mangifera glauca* Rottb., Nye Saml. Kongel. Danske Vidensk. Selsk. Skr. 2: 534, t. 4, f. 1. 1783. *Cassine albens sensu* Ramam. in N.P. Singh et al., Fl. India 5: 80, f. 17. 2000 non(Retz.) Kosterm. (1986). *Cassine glauca* (Rottb.) Kuntze, Revis. Gen. Pl. 1: 114. 1891; Paria & S.P. Chattop., Fl. Hazaribagh 1: 447. 2000; N.P. Singh et al., Fl. Bihar: 102. 2001; T.K. Sarma & A.K. Sarkar in N.P. Singh & P.S.N. Rao, Fl. Palamau: 145. 2002. **Figure 1d-e**

Flowering & fruiting: August–December.

Distribution: Deoghar, Godda, Gumla, Hazaribag, Koderma, Pakur, Palamau, Ranchi and Singhbhum.

## 3. EUONYMUS L.

(32 species in India and 1 in Jharkhand)

**Euonymus glaber** Roxb., Fl. Ind. 2: 403. 1824; M.A. Lawson in Hook.f., Fl. Brit. India 1: 609. 1875; Haines, Bot. Bihar Orissa: 186. 1921; Paria & S.P. Chattop., Fl. Hazaribagh 1: 449. 2000; Ramam. in N.P. Singh et al., Fl. India 5: 100. 2000; N.P. Singh et al., Fl. Bihar: 103. 2001.

Flowering & fruiting: April–May.

Distribution: Hazaribagh.

#### 4. GYMNOSPORA (Wight & Arn.) Hook.f.

(18 species in India and 3 in Jharkhand)

##### Key to the species

- 1a. Capsules mainly 2-valved.....3. **G. senegalensis**  
1b. Capsules 2 to 3-valved.....2  
2a. Leaves crenulate; petioles distinct; cymes axillary or on spines, many times divided; capsules 2-valved, occasionally 3-valved.....2. **G. montana**  
2b. Leaves entire or remotely crenate in distal part; petioles sessile or very short; flowers fascicled, axillary or on spines; capsules 3-valved.....1. **G. emarginata**

**1. Gymnosporia emarginata** (Willd.) Thwaites, Enum. Pl. Zeyl.: 409. 1864; M.A. Lawson in Hook.f., Fl. Brit. India 1: 621. 1875; Haines, Bot. Bihar Orissa 187. 1921. *Celastrus emarginatus* Willd., Sp. Pl. ed. 4, 1: 1128. 1798. *Maytenus emarginata* (Willd.) Ding Hou in Fl. Males, ser. I, 6: 241. 1962; Ramam. in N.P. Singh et al., Fl. India 5: 120. 2000; N.P. Singh et al., Fl. Bihar: 103. 2001.

Flowering & fruiting: October – March.

Distribution: Singhbhum.

**2. Gymnosporia montana** (Roth) Benth., Fl. Austral. 1: 400. 1863; M.A. Lawson in Hook.f., Fl. Brit. India 1: 621. 1875; Haines, Bot. Bihar Orissa: 188. 1921. *Celastrus montanus* Roth, Syst. Veg. 5: 427. 1819. **Figure 1f-h**

Flowering & fruiting: March–January.

Distribution: Hazaribagh.

**3. Gymnosporia senegalensis** (Lam.) Loes., Bot. Jahrb. Syst. 17: 541 1893. *Celastrus senegalensis* Lam., Encycl. 1: 661. 1785. *Maytenus senegalensis* (Lam.) Exell., Bot. Soc. Brot., ser. 2, 26: 223. 1952; Ramam. in N.P. Singh et al., Fl. India 5: 126. 2000; N.P. Singh et al., Fl. Bihar: 104. 2001; Ranjan, Fl. Parasnth WLS. Jharkhand: 60: 2014.

Flowering & fruiting: October–December.

Distribution: Giridih and Hazaribagh.

#### 5. REISSANTIA N. Hallé

(3 species in India and 2 in Jharkhand)

##### Key to the species

- 1a. Leaves membranous; stipules subulate .....1. **R. arborea**  
1b. Leaves chartaceous; stipules 3-angled, 3-lobed.....2. **R. indica**

**1. Reissantia arborea** (Roxb.) H. Hara in J. Jap. Bot. 40: 327. 1965; Ramam. & B.D. Naithani in N.P. Singh et al., Fl. India 5: 147. 2000; N.P. Singh et al., Fl. Bihar: 104. 2001. *Hippocratea arborea* Roxb., Pl. Coromandel 3: 3. t. 205. 1811; M.A. Lawson in Hook.f., Fl. Brit. India 1: 625. 1875.

Flowering & fruiting: November–August.

Distribution: Bihar (Ramamurthy & Naithani, 2000).

**2. Reissantia indica** (Willd.) N. Hallé, Mém. Inst. Franç. Afrique Noire 64: 85. 1962. Ramam. & B.D. Naithani in N.P. Singh et al., Fl. India 5: 149. 2000; N.P. Singh et al., Fl. Bihar: 105. 2001. *Hippocratea indica* Willd., Sp. Pl., ed. 4, 1: 193. 1797; M.A. Lawson in Hook.f., Fl. Brit. India 1: 624. 1875.

Flowering & fruiting: March–April.

Distribution: Gumla.

#### 6. SALACIA L.

(22 species in India and 1 in Jharkhand)

**Salacia chinensis** L., Mant. Pl.: 293. 1771. Ramam. & B.D. Naithani in N.P. Singh et al., Fl. India 5: 152. 2000; N.P. Singh et al., Fl. Bihar: 105. 2001. *Tontelea prinoides* Willd., Neue Schriften Ges. Naturf. Freunde Berlin 4: 184. 1803. *S. prinoides* (Willd.) DC., Prodr. 1: 571. 1824; M.A. Lawson in Hook.f., Fl. Brit. India 1: 626. 1875.

Flowering & fruiting: January–April.

Distribution: Bihar (Ramamurthy & Naithani, 2000).

## 7. SIPHONODON Griff.

(1 species in India and Jharkhand)

**Siphonodon celastrineus** Griff. in Calcutta J. Nat. Hist. 4: 247. t. 14. 1844; M.A. Lawson in Hook.f., Fl. Brit. India 1: 629. 1875; Haines, Forest. Fl. Chota Nagpur: 267. 1910 & Bot. Bihar. Orissa: 190. 1921; Ramam. in N.P. Singh et al., Fl. India 5: 137. 2000; Paria & S.P. Chattop., Fl. Hazaribagh 1: 449. 2000; N.P. Singh et al., Fl. Bihar: 104. 2001.

Flowering & fruiting: April–June.

Distribution: Daltonganj, Hazaribagh and Sahibganj.

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