The genus *Elaeocarpus* L. (Elaeocarpaceae) represents 18 species in Northeast India out of 29 species in India. The paper provides the diversity and distribution of *Elaeocarpus* species in Northeast India. Brief description, habitat & ecology, flowering & fruiting, distribution, specimens studied and uses of each species are provided.

**KEYWORDS:** *Elaeocarpus*, Elaeocarpaceae, diversity, distribution, Northeast India.

**Introduction**

Elaeocarpaceae is an angiosperm family which comprises 615 species in 12 genera (Christenhusz and Byng 2016). It is a tropical and subtropical family with few genera extending into the temperate zone. It is found in all the continents except Africa and North America. The family consists of trees and shrubs. Most species of the family are evergreen and the flowers are small, clustered, drooping and fragrant. In India, 2 genera and 33 species of the family are distributed.

*Elaeocarpus* L., the largest of the 12 genera recognised in the Elaeocarpaceae family, comprises of about 350 species (Coode, 2004). *Elaeocarpus* is a genus of tropical and subtropical regions and consists of medium to large size trees. All the species of the genus are evergreen. The notable feature of the genus is attractive, fragrant, colourful and pearl-like fruits. Inflorescences of the plants in the genus are few to many flowered, axillary, white or whitish colour. Fruits of many species of *Elaeocarpus* are eaten fresh and used in making pickles. The seeds of *Elaeocarpus sphaericus* commonly called as "Rudraksh" are used as beads for bracelets, necklaces and rosaries and used in religious beliefs. In Northern India, *E. panitus* and *E. angustifolius* are also considered as *Rudraksh*. In India, 29 species belonging to the genus *Elaeocarpus* are reported and most of the species are confined mainly to North Eastern and Southern India and few species to Andaman & Nicobar Islands. The species of the genus occurs comfortably in warm moist climate and usually grows between 500m and 2200m altitudes. The fruits of *E. floribundus* are edible.

India has rich diversity of flora and fauna. There are four biodiversity hotspots in India viz., The Western Ghats, The Eastern Himalayas, Indo-Burma and Sundaland. More than 45,500 plant species have been recorded so far in India, viz., 17,527 angiosperms, 67 gymnosperms, 1,200 pteridophytes, 2,500 bryophytes, 2,223 lichens, 14,500 fungi, 7,175 algae and 850 virus/bacteria (Ghosh et al., 2017).

Northeast India comprises of eight states, viz., Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland,


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Sikkim and Tripura. It is one of the rich biodiversity regions of India. Northeast India occupies 7.7% of total geographical area of India, supports 50% of the flora (ca. 8000 species) and 31.58% (ca. 2526 species) are endemic (De and Medhi, 2014).

**Materials and Methods**

The present study of the genus *Elaeocarpus* in Northeast India is based on the extensive studies of herbarium specimens collected from the Northeast, housed in ASSAM and field observations carried out by the authors in the states of the region and consultation of relevant literatures and floras in Botanical Survey of India, Shillong, Assam University and Manipur University (Balakrishnan 1981, Deb 1981, Haridasan 1985, Mao and Gogoi 1996, Singh et al. 2000, Singh et al. 2002, Pal 2013). The objective of this study is to explore the diversity of *Elaeocarpus* in Northeast India and their uses. The recorded species are enumerated below alphabetically along with habitat & ecology, flowering & fruiting, distribution, specimen studied and available uses.

**ENUMERATION**


Trees up to 20 m tall, bark furrowed, greyish-brown; leaves lanceolate, elliptic-lanceolate, elliptic-oblong, base cuneate, apex acuminate; racemes axillary on fallen leaf ends, pubescent; flower buds fusiform; flowers ovoid, white; drupes oblong, green, smooth.

Habitat & ecology: Grows in moist evergreen forests between 800 and 1800 m altitudes. Flowering: July – September; Fruiting: October – December

Distribution: India (Assam, Arunachal Pradesh and Meghalaya) and Bangladesh.


Vernacular name: Assamese: Gera Sa, Nagini, Garo: Chham Nanga, Gangma Jachhang, Khasi: Dieng Thang Khapiah

Trees up to 40 m tall with conical crown; leaves obovate, elliptic or oblongate, base cuneate or acute, apex rounded or subacute; racemes axillary on fallen leaf ends, rusty; flower-buds lanceolate, ribbed; flowers pale-white, drooping, fragrant; drupes ellipsoid, green, smooth.

Habitat & ecology: Grows in moist evergreen forests between 1200 and 2000 m altitudes. Flowering: April – June; Fruiting: July – September

Distribution: India (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal), Bangladesh, Bhutan and Myanmar.

Specimens examined: Arunachal Pradesh, G.D. Pal 2068 (Itanagar); Assam, Jorhat, Gibbon WLS, R. Daimary 121583; Mizoram, Lungleh, Dutta 33440.


Trees up to 15 m tall; bark brown, smooth; branchlets rusty, tomentose; leaves elliptic or oblong, base obtuse, apex acuminate, veins prominent; racemes in axils of fallen leaves, tomentose; flowers white; drupes ellipsoid.

Habitat & ecology: Grows in moist evergreen forests between 800 and 1800 m altitudes. Flowering: September – November; Fruiting: December – February

Distribution: India (Arunachal Pradesh, Assam, Manipur, Meghalaya and Nagaland) and Myanmar.


Uses: Fruits are edible, eaten fresh, cooked and pickled.

**Elaeocarpus floribundus** Blume, Bijdr. 120. 1825; Masters in Fl. Brit. India 1: 401. 1874; Kanjilal et al., Fl. Assam 1(1): 173. 1934; Murti in Sharma et al., Fl. India 3: 536.1993.

Vernacular name: Assamese: Jalpai, Khasi: Soh byrkei, Manipuri: Chorphon

Trees up to 30 m tall with spreading crown; branchlets glabrous; leaves ovate or elliptic, base acute or cuneate, apex acute or acuminate; racemes axillary, drooping, flowers white, small; drupes oblong-ovoid, light green, smooth, rounded at both ends, fleshy.

Habitat & ecology: Grows in moist evergreen forests between 800 and 1800 m altitudes. Flowering: September – November; Fruiting: December – February

Distribution: India (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and West Bengal), Bangladesh, Bhutan, Indonesia, Malaysia and Myanmar.

Specimens examined: Tripura, R.S. Rao 8879; Assam, Sibsagar, Barpathar U Kanjilal 3060; Meghalaya, Khasi & Jaintia Hills, Umsaw, S.R. Sarma 12060; Mizoram, Murlen NP, R. Kumar & Party 128884.

Uses: Fruits edible, eaten fresh, cooked and pickled. Leaves and barks are used as tonic and mouthwash for inflamed gums. The wood is used for many purposes in boxes, match splints, planking, plywood and wooden pallets.

Note: *Elaeocarpus floribundus* is the most common species of *Elaeocarpus* found in India. It is planted in home gardens and parks in Northeast India for its edible fruits.

The genus *Elaeocarpus* (Elaeocarpaceae) in Northeast India

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**Figure 1.** Inflorescences of widely distributed *Elaeocarpus floribundus*. Photo: Joykumar Longjam.

Trees up to 25 m tall; branchlets glabrous; leaves obovate, oblanceolate, base cuneate, apiculate or rounded at apex; racemes puberulous; flower buds pyramidal; flowers white; drupes lanceolate, pointed at both ends.

Habitat & ecology: Grows moist evergreen forests between 800 and 1500 m altitudes.
Flowering: March – May; Fruiting: June – August
Distribution: India (Assam) and Myanmar.
Uses: Fruits are edible.

Vernacular name: Khasi: *Dieng-soh-khyllam*

Trees up to 20 m tall, crown dense; bark greyish-black; branchlets pubescent; leaves elliptic, lanceolate, elliptic-lanceolate or oblanceolate, base cuneate, apex acuminate; racemes axillary, long, pubescent; flower-buds ovate-lanceolate; flowers white; drupes ovoid-ellipsoid, green.

Habitat & ecology: Grows in moist evergreen forests between 1000 and 2600 m altitudes.
Flowering: April – June; Fruiting: July – September
Distribution: India (Andhra Pradesh, Arunachal Pradesh, Assam, Karnataka, Manipur, Meghalaya, Nagaland, Sikkim and West Bengal), Bhutan, China, Indonesia, Myanmar and Nepal.
Specimens examined: Arunachal Pradesh, Pange G.D. Pal 77747 (Itanagar); Manipur, Kozirii forest, Mao & Gago 115077; Meghalaya, Mawphlang, P.K.Hajra 52096; Mizoram, Murlen National Park, R. Kumar & Party 128126.
Uses: Fruits are edible and wood used in making houses and tea boxes. Nuts used for bracelets, necklace and rosaries.

*Elaeocarpus lucidus* Roxb., Fl. Ind. 2: 600. 1832; Masters in Fl. Brit. India 1: 403. 1874.

Trees up to 30 m tall; branchlets pubescent; leaves elliptic or ovate-lanceolate, base obtuse or rounded, apex acute to acuminate, veins prominent beneath; racemes axillary; flower-buds ovoid-conical; flowers white; drupes oblong-ovoid, unilocular.
Habitat & ecology: Grows in moist evergreen forests between 1000 and 1800 m altitudes.
Flowering: March – May; Fruiting: June – August
Distribution: India (Andhra Pradesh, Assam, Meghalaya and West Bengal) and Bangladesh.


Vernacular name: Assamese: *Soba sopa, Putkuli*.

Trees up to 25 m tall; branchlets pubescent or glabrescent; leaves obovate-oblong, oblongate or spathulate, base cuneate, apex obtuse or subacute; racemes axillary, corymbose; flowers buds lanceolate or ovoid; flowers dull white; drupe long, green-yellow.

Habitat & ecology: Grows in moist evergreen forests between 500 and 1000 m altitudes.
Flowering: February – April; Fruiting: May – July
Distribution: India (Andaman & Nicobar Islands and Assam), Indonesia and Myanmar.


Trees up to 30 m tall; branchlets glabrous, resinous; leaves elliptic-lanceolate or oblong-elliptic, base acute, apex acuminate or acute; racemes axillary, glabrous; flower buds ellipsoid or oblong-oblanccelolate; flowers white; drupe ellipsoid or oblong, greyish-blue, smooth.

Habitat & ecology: Grows in moist evergreen forests between 800 and 2000 m altitudes.
Flowering: January – March; Fruiting: April – June
Distribution: India (Andaman & Nicobar Islands and Assam), Bangladesh, Indonesia, Malaysia and Myanmar.


Trees up to 20 m tall; branchlets glabrous; leaves oblong-lanceolate to elliptic-lanceolate, base cuneate, apex acute to acuminate; racemes axillary, crowded at apex, pubescent; flower buds ovate or oblong-lanceolate, hairy; flowers white or pale yellow; drupes oblong-ovoid.

Habitat & ecology: Grows in moist evergreen forests between 800 and 2000 m altitudes.
Flowering: January – March; Fruiting: April – June
Distribution: India (Assam, Manipur, Meghalaya, Tripura and West Bengal) and Bangladesh.


Vernacular name: Assamese: *Gatronga, Phulchampa, Bor chopa, Garo: Ankhi-siphak*.

Trees up to 35 m tall; branchlets robust, hairy; Leaves at ends of branchlets, obovate, obovate-lanceolate, base cuneate, acute or subacute at apex; racemes axillary, pubescent, many-flowered; flowers large, white; drupes ellipsoid, greenish yellow.

Habitat & ecology: Grows in moist evergreen forests between 600 and 1800 m altitudes.
Flowering: February – March; Fruiting: April – June
Distribution: India (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Meghalaya and Tamil Nadu), Bangladesh, Malaysia and Myanmar.
Specimen examined: Arunachal Pradesh, Kameng *K. P. Singh* 102009.


Vernacular name: Garo: *Udrok, Khari: Dieng-sohlangskei*.

Trees up to 30 m tall; bark brown; branchlets hairy; leaves oblong, obovate or elliptic, base acute or obtuse, apex acute or acuminate, veins prominent beneath; racemes axillary, rusty, drooping; flowers creamy white, fragrant; drupes oblong or ellipsoid, greenish yellow.

Habitat & ecology: Grows in moist evergreen forests between 800 and 1800 m altitudes.
Flowering: February – April; Fruiting: May – July
Distribution: India (Maharashtra, Karnataka, Kerala, Tamil Nadu), Bhutan, China, Indonesia, Malaysia, Myanmar, Nepal and Sri Lanka.

Use: Fruits are edible.

Vernacular name: Assamese: *Rudrai*, Khadi: *Soh Langskai*

Trees up to 30 m tall, crown spreading; stem cylindrical; bark dull white; leaves oblong-lanceolate, ob lanceolate or elliptic, base cuneate or acute, apex acute or acuminate; racemes axillary, drooping; flower-buds ovoid-conical; flowers white, small; drupes purplish-blue when ripe.

Habitat & ecology: Grows in moist evergreen forests between 1000 and 2000 m altitudes.

Flowering: January – March; Fruiting: April – June

Distribution: India (Arunachal Pradesh, Assam, Bihar, Maharashtra, Manipur, Meghalaya, Nagaland, Sikkim and West Bengal), Bangladesh, Myanmar and Nepal.


Uses: The sour fruit pulps of *Elaeocarpus sphaericus* is edible and used as medicine in the treatment of asthma, diabetes, epilepsy and heart problems. The nuts of *E. sphaericus* are used as beads for rosaries, bracelets and necklaces.

Note: *Elaeocarpus sphaericus* is planted in home gardens and parks in Northeast India for it’s many uses and religious beliefs.


Vernacular name: *Seleng*

Trees up to 25 m tall; branchlets pubescent; leaves ovate-oblong or elliptic, base acute, apex acuminate; racemes axillary, short, pilose, peduncle yellow-brown; flowers white; drupe ellipsoid to oblongoid.

Habitat & ecology: Grows in moist evergreen forests between 800 and 2000 m altitudes.

Flowering: January – March; Fruiting: April – June

Distribution: India (Assam, Meghalaya, Sikkim and West Bengal) and Bhutan.


Vernacular name: Assamese: *Poreng*, *Seleng*, Garo: *Aogong*, Bolrogong, Khadi: *Dinglasw*, *Ding-sohkhyllam*

Trees, up to 30 m tall; bark lenticellate; branchlets rusty, pubescent; leaves elliptic-oblong to ovate-oblong, base cuneate to rounded, apex acute to acuminate, veins prominent beneath; racemes axillary, pubescent; flower buds oblong-ovoid; flowers white, fragrant; drupes oblong-ovoid, greenish-yellow.

Habitat & ecology: Grows in moist evergreen forests between 1000 and 2000 m altitudes.

Flowering: May – July; Fruiting: August – October

Distribution: India (Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Tamil Nadu, Tripura and West Bengal), Bangladesh, Cambodia, Malaysia, Myanmar and Thailand.


Use: The tree is harvested for its timber wood.


Trees up to 20 m tall; leaves oblong or oblong-ovate, base narrow, apex acuminate; racemes axillary, few-flowered; flower buds ovoid, glabrescent; flowers white; drupes oblate to oblong.

Flowering: March – May; Fruiting: June – August

Habitat & ecology: Grows in moist evergreen forests between 800 and 1400 m altitudes.

Distribution: India (Arunachal Pradesh).


Trees up to 25 m tall, crown large spreading; bark grey, smooth; branchlets grey, hairy; leaves elliptic to oblong, base rounded, apex acute; racemes axillary, dense, pubescent; flower-buds lanceolate or ovoid-lanceolate; flowers white; drupe ellipsoid, green, shining.

Habitat & ecology: Grows in moist evergreen forests between 1000 and 1800 m altitudes.

Flowering: February – April; Fruiting: May – July

Distribution: India (Arunachal Pradesh, Assam, Meghalaya, Nagaland, Sikkim, Uttar Pradesh and West Bengal), Bangladesh, Myanmar and Nepal.

Specimens examined: Assam, Goalpara, Bhr Block, *U. Kanjilal* 5091; Meghalaya, Mawkyrwater, *A.H. Mir* 024; Arunachal Pradesh (NEFA), Subansiri FD, *GVS Rao* 24829.

Use: Wood used for making tea boxes.

Trees up to 30 m tall; branchlets grey, hairy; leaves oblong to elliptic or obovate-oblong, base rounded, apex acuminate; racemes axillary, hairy; flower-buds ovoid; flowers white; drupes oblong-ovoid, 3-loculed.

Habitat & ecology: Grows in moist evergreen forests between 800 and 1200 m altitudes.
Flowering: March – May; Fruiting: June – August
Distribution: India (Assam and Orissa) and Myanmar
Specimen examined: Assam, Goalpara, Bhur Block, U. Kanjilal 5097.

Discussion
Based on the present study it has been found that out of 29 Elaeocarpus species reported in India, 18 species are reported from Northeast India. Northeast India has rich diversity of Elaeocarpus species. From phytogeographical point of view, the distribution of the genus Elaeocarpus Linnaeus in Northeast India is significant. The species of Elaeocarpus usually prefer to grow in moist evergreen forests between 500 and 2000 m altitudes. Most of the Elaeocarpus species fruits are edible. The wood of Elaeocarpus trees is used in making boxes, match splints, plank, plywood and wooden pallets. E. floribundus is the most common species of Elaeocarpus found in this region. It is planted in home gardens and parks for its edible fruits. E. sphaericus (Rudraksh) is also planted for its medicinal and religious uses. Different species of indigenous Elaeocarpus needs to be conserved. There is also need for more scientific research analysis of the medicinal properties and nutritional values of wild Elaeocarpus species.

References


http://www.ipni.org/
http://www.theplantlist.org/
http://www.tropicos.org/