



Enumeration of the host plants of *Dendrophthoe falcata* (L.f.) Ett. in and around Rajshahi city, Bangladesh

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Abstract

Dendrophthoe falcata (L.f) Ett. Belonging to the family Loranthaceae, comprising the most notorious hemiparasitic plant that has been occurred as a menace on ornamentals, fruits and timber yielding plants. An organized survey was carried out for the enumeration of host plant species in entire City of Rajshahi including township and its surrounding area for six consecutive months (September 2018 to February 2019). Fifty species belonging to twenty-one families of dicotyledons were found infested by this parasite in the study area. The major families of host species were Caesalpiniaceae, Combretaceae, Meliaceae, Mimosaceae and Moraceae. *Albizia*, *Ficus* and *Terminalia* were found as a major genus. Among the recorded plants, forty-two were tree species, seven species were shrubs and *Campsis radicans* was a climber. However, the present work will be helpful to the researcher for the identification of host plants for *Dendrophthoe falcata* (L.f) Ett. of study area.

Keywords: mistletoes, hemiparasite, loranthaceae, Rajshahi

1. Introduction

Dendrophthoe falcata (L.f) Ett. belonging to the family Loranthaceae is commonly known as “Dhyrra” in Rajshahi as well as the North-Western region of Bangladesh. It is a member of mistletoes which occurs as a menace on various plant species. This bushy shrub grows on as notorious hemiparasite and is capable of destroying our valuable fruits and timber plants as well as ornamental or industrial plants but they do not seem to have received much attention. We, both common people and botanists are very much aware of our staple food plants than fruits and timber yielding plants. The effects of *Dendrophthoe falcata* (L.f) Ett. on their hosts may include reduced vigor and growth rates, poor fruit yield or seed set, malformation of woody tissues, sparse foliage, top dying, predisposition to insect and other disease attack and premature death^[3]. Rajshahi is famous for its Mango and Litchi, besides that, Guava and Indian jujubes are also cultivated here on large scale. On the other hand, Mahogany is an important timber yielding plant which is planted every nook and cranny for the timber. So, we have to aware of this parasitic shrub to protect our plants from its undesirable effect. *D. falcata* is the most common parasitic angiosperm established in each and every geographical location and has been reported on 98 host species of 28 families in Karnataka, India. It has been widely recognized as a parasite containing a broad host range^[14]. According to Kuijt, it can infest a large number of taxonomically unrelated hosts and their attack has been proved to be fatal to various trees and shrubs^[8]. The tropical rain forest mistletoe, *Dendrophthoe falcata* has approaching 400 known host species^[6]. However, very little work has been done regarding the host range of *Dendrophthoe falcata* (L.f) Ett. in Rajshahi as well

as Bangladesh. Therefore, an enumeration of hosts attacked by *Dendrophthoe falcata* occurring in Rajshahi as well as Bangladesh is much wanting. Definitely, such a list would help us to distinguish the ranges of host and distribution of *Dendrophthoe falcata* (L.f) Ett.

2. Materials and Methods

2.1. *Dendrophthoe falcata* (L.f.) Ett.

Plants shrubby, shoots of *Dendrophthoe falcata* are mostly erect; glabrous except young shoots. The stem may be more than 1 m long depending on host species and place of infection on the host branch. Leaves opposite, sub-opposite, scatter or solitary, lamina narrowly to broadly ovate, obovate, ovate-oblong or elliptic, sometimes oblique; attenuate at the base obtuse or slightly rounded at the apex, lather like thick but soft, glabrous, light green, margin of young leaves are reddish; venation pinnate with distinct and reddish brown midrib, lateral vein obscure, petioles short but distinct. Inflorescence raceme grows at the nodes of the branch; initially, the flowers buds are green but finally the buds color changes to reddish with greenish yellow tips. The number of flower per inflorescence was found to vary from 10 to 30 (Fig.1). Flower pedicellate with short pedicel, corolla 5-merous, uniformly winded upwards, slightly narrowed to a neck and usually weakly clavate and acute at the apex. Flower buds are slightly curved. Petals in mature flowers are gamopetalous for three-quarters of their length; deep red in color with free tips, the free tips are yellow and spiral and dropping. Petal length ranges 3.0-4.5cm. The gynoecium consists of one ovary, one style and one stigma, upper parts of style and stigma of the mature flower are red (Fig. 2).



Fig 1: *Dendrophthoe falcata* inflorescence **Fig 2:** *Dendrophthoe falcata* flower buds

Study Area

Rajshahi City area 95.56 sq km, located in between 24°20' and 24°24' north latitudes and in between 88°32' and 88°40'

east longitudes. It is bounded by Paba upazila on all sides [5] (Fig. 3). Under Koppen climate classification, Rajshahi has a tropical wet and dry climate [4].



(Source: <http://en.banglapedia.org/images/thumb/4/45/RajshahiCityCorporation.jpg/800px-RajshahiCityCorporation.jpg>)

Fig 3: The map of study area

Once in Rajshahi were many orchards in this city area, but nowadays, the numbers of orchard are decreasing. Most of the tree species in this city area are planted at various institutions premises, park, graveyard, embankment side, railway side, and roadside. Some of the species grow up around the house also. However, the area comprises various types of vegetation such as the evergreen, semi-evergreen and also deciduas.

An organized survey was carried out for the enumeration of host plant species in entire City and its surrounding area for six consecutive months from September 2018 to February 2019. During winter, when *D. falcata* is blooming and this is the high time for observation. This hemiparasite is shrubby and bushy in nature and it has a brilliant color flower. Therefore, an incidence of the parasite on the host tree is visible from long distance besides that; departed corolla tube or other parts of the flower are found under the canopy of an infested host tree. So, it is not difficult to recognize. The host and parasites were identified up to species with the help of Ahmed *et al.* [1], and Alam [2] respectively and the up-to-date nomenclature has been cited based on Pasha and Uddin [11].

3. Results and Discussion

A total of 50 plant species belonging to 21 families were observed infested by *Dendrophthoe falcata* in the study area. Earlier Mahal *et al.* has reported 16 plants as the host of Loranthaceae spp. from Rajshahi [10] but they were not specified that how many plants were infested by *Dendrophthoe falcata*. The family Loranthaceae comprises 60-70 genus and about 15 species under 7 genera are found in Bangladesh [1]. However, Sikder and Khair have reported 19 host species for *D. falcata* from Jahangirnagar University campus, Savar, Dhaka, Bangladesh [13]. *D. falcata* is the most common parasitic angiosperm established in each and every geographical location. The number of hosts differ one location to another depending upon the presence or absence of susceptible plants and dispersal agent. Vijayan *et al.* has reported 40 roadside trees as hosts in Tiruchirappalli City Corporation, Tamilnadu, India [15]. Thriveni *et al.* stated that it has been widely recognized as a parasite containing a broad host range and has been reported on 98 host species of 28 families in Karnataka, India [14]. Selvi and Kadamban, also listed 26 host species from Pondicherry Engineering College Campus, Pondyicherry, India [12]. Joshi has reported

24 plants from their study area [7]. Most of the infested plant species were found in their aging condition. However, most of the observed host plants in this study were reported earlier by the above researchers. The growth of *Dendrophthoe falcata* on *Annona reticulata*, *Spondias dulcis*, *Campsis redicans*, *Terminalia citrine*, *Murraya paniculata*, *Mimosops elengi*, *Calliandra haematocephala*, *Acacia catechu* and *Aphanamixis polystachya* were not reported in the cited article. Moreover, these hemiparasite plants were found to prefer trees rather than shrubs. Perusal Table 1, it revealed that 42 species were tree, 7 species were shrub and only one *Campsis redicans* (L.) Seem. belonging to Bignoniaceae family was woody climber. However, the result indicates that 84% of the host plants were tree species and only 14% of the observed plant belongs to Shrub in this study. Similar result was reported by Selvi *et. al.* [12]. This variation may be due to the result of preference of dispersal agent. The birds are act as a dispersal agent for mistletoes and they may feel secured on tree than shrub. All the recorded host plants were dicotyledonous angiosperms. No herbaceous species were found. This observation is conformity with the findings of earlier workers [14]. The luxuriant growth of this parasite was found on some trees, such as *Mangifera indica*, *Swietenia mahagoni*, *Melia azederach*, *Albizia saman*, *Ficus religiosa* and *Bombax ceiba*. In the present investigation, Mimosaceae was found as a major family consisting seven genera followed by Caesalpiniaceae, Combretaceae, Meliaceae, and Moraceae consist of four genera each. On the other hand, *Terminalia* consisting four species was found as a major genus followed by *Albizia* and *Ficus* consisting three species each. These results were very close to findings of Thriveni *et. al.* [14]. On the other hand, Fig. 4 showed that the highest infestation was recorded for ornamental plant with a value of 36%, followed by fruits 22% and timber yielding plant 20%. The city dweller likes ornamental plant that gives flowers, beautification or shadow in the road, garden or in front of residence. So it is very much natural that the city greenery comprises many ornamental species.

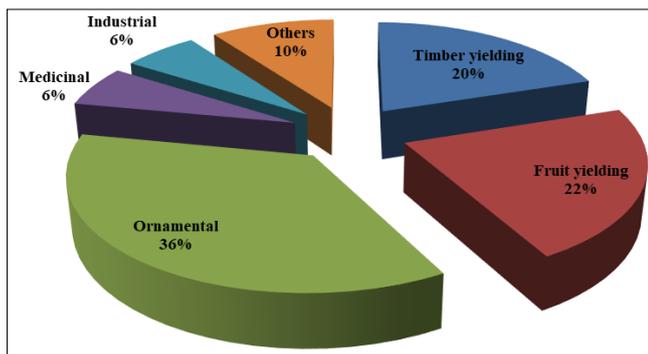


Fig 4: Infestation on different type of plant

This study has been observed that the attack on the roadside or the scattered growing plants was relatively high than the plants in orchard or garden, perhaps due to regular care or pruning. Not a single *Moringa oleifera* plant which had already been reported as a host was found infested because of regular cutting after harvest. This is a normal practice of the people of the Rajshahi. This indicated plant-parasitic infestations can be controlled by pruning infested branches if it is possible. The current list of the host species indicates a great diversity of plant species which is not able to escape

the infection of *Dendrophthoe falcata* arising hazard for ornamental, silviculture and horticulture plant.



Fig 5: *D. Falcata* on *Morus alba*



Fig 6: *D falcata* on *M. paniculata*



Fig 7: *D. falcata* on *C. pentandra*



Fig 8: *D. falcata* on *Mimosops elengi*



Fig 9: *D. falcata* on *Cassia fistula*



Fig 10: *D. falcata* on *Senna siamea*

Table 1: List of the host species of *Dendrophthoe falcata* (L.f) Ett.

Sl.	Family Name	Scientific Name	Local Name	Habit	Usage
1	Anacardiaceae	<i>Lannea coromandelica</i> (Houtt.) Merr.	Jiga	Tree	Others
2	Anacardiaceae	<i>Mangifera indica</i> L.	Amm	Tree	Fruit
3	Anacardiaceae	<i>Spondias dulcis</i> Parkinson	Bilatiamra	Tree	Fruit
4	Annonaceae	<i>Annona reticulata</i> L.	Nona	Tree	Fruit
5	Annonaceae	<i>Annona squamosa</i> L.	Ata	Tree	Fruit
6	Apocynaceae	<i>Nerium oleander</i> L.	Karobi	Shrub	Ornamental
7	Apocynaceae	<i>Thevetia peruviana</i> (Pers.) K. Schum.	Kolkeful	Shrub	Ornamental
8	Bignoniaceae	<i>Campsis radicans</i> (L.) Seem. ex Bureau	Trumpet vine	Climber	Ornamental
9	Bombacaceae	<i>Bombax ceiba</i> L.	Simul	Tree	Industrial
10	Bombacaceae	<i>Ceiba pentandra</i> (L.) Gaertn.	Kapuk	Tree	Ornamental
11	Caesalpiniaceae	<i>Bauhinia purpurea</i> L.	Debkanchon	Tree	Ornamental
12	Caesalpiniaceae	<i>Cassia fistula</i> L.	Bandarlathi	Tree	Ornamental
13	Caesalpiniaceae	<i>Cassia javanica</i> L. subsp. <i>javanica</i>	Java sonalu	Tree	Ornamental
14	Caesalpiniaceae	<i>Senna siamea</i> (Lam.) H.S. Irwin & Barneby	Minjiri	Tree	Timber
15	Casuarinaceae	<i>Casuarina equisetifolia</i> L.	Jhau	Tree	Ornamental
16	Combretaceae	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn	Arjun	Tree	Medicinal
17	Combretaceae	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Bohera	Tree	Medicinal
18	Combretaceae	<i>Terminalia catappa</i> L.	Katbadam	Tree	Ornamental
19	Combretaceae	<i>Terminalia citrina</i> (Gaertn.) Roxb. ex Fleming	Hatiyal	Tree	Medicinal
20	Fabaceae	<i>Dalbergia sissoo</i> DC.	Sishookat	Tree	Timber
21	Lythraceae	<i>Lagerstroemia indica</i> L.	Purus	Shrub	Ornamental
22	Lythraceae	<i>Lagerstroemia speciosa</i> (L.) Pers.	Jarul	Tree	Ornamental
23	Malvaceae	<i>Hibiscus rosa-sinensis</i> L.	Joba	Shrub	Ornamental
24	Meliaceae	<i>Aphanamixis polystachya</i> (Wall.) R. Parker	Royna	Tree	Timber
25	Meliaceae	<i>Melia azederach</i> L.	Ghoranim	Tree	Timber
26	Meliaceae	<i>Swietenia mahagoni</i> (L.) Jacq.	Mahagoni	Tree	Timber
27	Meliaceae	<i>Toona ciliata</i> Roemer	Toon	Tree	Other
28	Mimosaceae	<i>Acacia auriculiformis</i> Benth.	Akashmoni	Tree	Timber
29	Mimosaceae	<i>Acacia catechu</i> (L.f.) Willd.	Khair	Tree	Industrial
30	Mimosaceae	<i>Albizia lebeck</i> (L.) Benth.	Sirish	Tree	Timber
31	Mimosaceae	<i>Albizia procera</i> (Roxb.) Benth.	Koroi	Tree	Timber
32	Mimosaceae	<i>Albizia saman</i> (Jacq.) Merr.	Koroi	Tree	Timber
33	Mimosaceae	<i>Calliandra haematocephala</i> Hassk.	Powderpuf	Shrub	Ornamental
34	Mimosaceae	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Jilapi	Tree	Other
35	Moraceae	<i>Ficus benghalensis</i> L.	Bot	Tree	Other
36	Moraceae	<i>Ficus racemosa</i> L.	Jogadumur	Tree	Fruit
37	Moraceae	<i>Ficus religiosa</i> L.	Pakur	Tree	Other
38	Moraceae	<i>Morus alba</i> L.	Tunt	Tree	Industrial
39	Myrtaceae	<i>Callistemon citrinus</i> (Curtis) Skeels	Bottle brush	Tree	Ornamental
40	Myrtaceae	<i>Psidium guajava</i> L.	Piyara	Tree	Fruit
41	Proteaceae	<i>Grevillea robusta</i> A. Cunningham ex. R.Br.	Silky oak	Tree	Ornamental
42	Punicaceae	<i>Punica granatum</i> L.	Dalim	Shrub	Fruit
43	Rhamnaceae	<i>Ziziphus mauritiana</i> Lam.	Boroi	Tree	Fruit
44	Rutaceae	<i>Aegle marmelos</i> (L.) Corr. Serr.	Bel	Tree	Fruit
45	Rutaceae	<i>Citrus maxima</i> (Burm.f.) Merr.	Jambura	Tree	Fruit
46	Rutaceae	<i>Murraya paniculata</i> (L.) Jack	Kamini	Shrub	Ornamental
Sl	Family Name	Scientific Name	Local Name	Habit	Usage
47	Sapotaceae	<i>Madhuca longifolia</i> (J.Konig ex L.) J.F. Macbr.	Mohua	Tree	Ornamental
48	Sapotaceae	<i>Manilkara zapota</i> (L.) P. Royen.	Sofeda	Tree	Fruit
49	Sapotaceae	<i>Mimusops elengi</i> L.	Bokul	Tree	Ornamental
50	Verbenaceae	<i>Tectona grandis</i> L.f.	Segun	Tree	Timber

4. Conclusion

The result indicates that numerous plant species which can be infested by *Dendrophthoe falcata* in the Rajshahi as well as this region of Bangladesh. This study has established a baseline for the study of host range for *Dendrophthoe falcata* of given area. Comprehensive work should be required to identify why and how the plants are parasitized. Further studies should address the relationship between *Dendrophthoe falcata* distributions, their dispersal agents; so that we can safeguard our valuable plants from the adverse effects of this hemiparasitic plant.

5. Acknowledgment

The author Hasan MT is grateful to Dr. Mahabuba Sultana, Senior Scientific Officer, Bangladesh National Herbarium, Dhaka, Mr. S.M. Azizul Alom and Mr. Mozharul Islam for their cooperation to carry out this work.

6. Reference

1. Ahmed ZU, Begum ZNT, Hassan MA, Khondker M, Kabir SMH, Ahmad M, *et al.* Encyclopedia of Flora and Fauna of Bangladesh. Asiatic Society Bangladesh, Dhaka, 2008-2009, 6-10.

2. Alam MK. Loranthaceae. In: Khan MS. (Ed.). Flora of Bangladesh, No.33. Bangladesh National Herbarium, Dhaka, 1986.
3. Gill LS, Hawksworth FG. The Mistletoes. A literature review. Technical bulletin No.1242. United States. Department of Agriculture, Washington DC, 1961.
4. <https://en.wikipedia.org/wiki/Rajshahi>. 25 February, 2019
5. http://en.banglapedia.org/index.php?title=Rajshahi_City_Corporation. 25 February, 2019
6. Joshi GCPCP, Kothyari BP. New host of *Dendrophthoe falcata* (Linn. f.) Etting. Indian Journal of Forest. 1985; 8:235.
7. Joshi PN, Soni HB. Host plants of *Dendrophthoe falcata* (L.f) Ettingsh.–A parasite plant in GSFC Township, Vadodara, Gujarat, India. Life Sciences Leaflets. 2013; 5:50-59.
8. Kuijt J. A revision of the Loranthaceae of Costa Rica. Bot. Jahrb. 1964; 83:250-326.
9. Leeuwen DV. On the biology of some Javanese Loranthaceae and the role of birds play in their life-history. Beaufortia. 1954; 4(41):105-207.
10. Mahal F, Sinha SN, Neela FA. Incidence and distribution of *Loranthus* spp. in Rajshahi, Bangladesh. International Journal of Botany Studies, 2018; 3(2):146-148.
11. Pasha MK, Uddin SB. Dictionary of Plant Names of Bangladesh (Vascular Plants). Janokalyan Prokashani. Chittagong, Bangladesh, 2013.
12. Selvi B, Kadamban D. Studied on the parasitic plants of Pondicherry Engineering College Campus, Puducherry. International Journal of Plant Sciences. 2009; 4(2):547-550
13. Sikder M, Khair A. Prevalence of plant parasitic infestation, Jahangirnagar University Campus. Bangladesh Journal of Life Sciences. 2011; 23(2):25-31.
14. Thriveni MC, Shivamurthy GR, Amruthesh KN, Vijay, Kavitha GR. Mistletoes and their hosts in Karnataka, Journal of American Science. 2010; 6(10):827-835.
15. Vijayan A, Vivekraj P, Kalavathy S. A report of the stem parasitic plant *Dendrophthoe falcata* (L.f.) Ettingsh. (Loranthaceae) from the associates with trees along roadsides in Tiruchirappalli, Tamilnadu, India. International Journal of Institutional Pharmacy and Life Sciences. 2015; 5(2):92-100.