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Host diversity of phanerogamic parasite *Loranthus* (Loranthaceae) in Kurnool region of Andhra Pradesh

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Abstract
Loranthus species (family Loranthaceae) is a aerial hemi/semi/ partial stem parasitic flowering plants that establish vascular connections with woody hosts through specialized organs known as haustoria. Although capable of photosynthesis, they rely on host plants for water, mineral nutrients and a portion of their carbon requirements. One of the remarkable ecological characteristics of *Loranthus* is its extensive host diversity, with many species parasitizing numerous taxonomically unrelated trees and shrubs. However, host utilization varies considerably among species and geographical regions, reflecting differences in host compatibility, seed dispersal, environmental conditions and evolutionary history. The present study was done to know the host diversity of *Loranthus* and factors influencing host selection, ecological consequences of host parasitism and recent advances in host-parasite interaction studies. The understanding of the host diversity will helpful for developing sustainable management strategies in orchards, forestry plantations and natural ecosystems.

Keywords: *Loranthus*, Loranthaceae, host diversity, mistletoe, hemi parasite, haustorium, host specificity

Introduction
Members of the family *Loranthaceae* represent one of the largest groups of aerial parasitic angiosperms distributed throughout tropical and subtropical regions. *Loranthus* species are stem hemi-parasites that invade branches of woody hosts using haustoria, extracting water and dissolved minerals while maintaining photosynthetic capability. Their successful establishment depends on host compatibility, seed dispersal by birds, environmental suitability, and physiological interactions between parasite and host. Unlike highly specialized parasites, many *Loranthus* species exhibit broad host ranges and infect numerous economically and ecologically important trees. Their wide host diversity contributes to their persistence across heterogeneous landscapes and complicates management in orchards and forest ecosystems.

Loranthus is a woody, aerial hemi-parasite with an endophytic system that provides anchorage and nutrient acquisition, while its exophytic system performs photosynthesis and reproduction, forming a dense, globular crown up to 2 m in diameter (Krasylenko *et al*., 2019; Kubicek *et al*., 2018). It is characterized by sympodial dichasium branching, with dark-brown twigs that are circular in cross section, and brittle at the nodes. Leaves are opposite or subopposite, oblong to oblong-ovate (2.5–7 cm long), dark green, simple and pinnately veined, with short petioles (0.2–0.8 cm) (Shavvon *et al*., 2012) [12]. They are amphistomatic with paracytic stomata on both surfaces and have an undifferentiated mesophyll (Andronache *et al*., 2006; Shavvon *et al*., 2012) [1, 12]. The variation in leaf size and shrub architecture appears to be influenced by host species, light availability and elevation. It lacks functional roots and establishes simple cone-shaped haustoria without epicortical or cortical strands, corresponding to wood-rose types (*Dactylanthus*), which penetrate the host xylem and form longitudinal strands to facilitate water and nutrient uptake (Glatzel *et al*., 2017). It is a dioecious species, with male flowers arranged in racemes and female flowers in spikes. Each flower has two whorls of four to six free yellowish petals (<10 mm), with the outer whorl interpreted as a reduced calyx and the inner whorl as the corolla (Shavvon *et al*., 2012) [12]. Stamens are inserted on the inner whorl petals; pollen grains are tricolpate with a straight-triangular outline in polar view (Grimsson *et al*., 2017) [3]. Floral morphology suggests insect-mediated pollination, though specific pollinators remain undocumented. The presence of nectar is likely, but has not been reported. Fruit a sticky, golden-yellow berry, ovoid to subglobose, 0.9–1.0 × 0.5–0.6 cm, containing a single seed with a viscin layer that aids adhesion to host branches (Shavvon *et al*., 2012) [12]. The seeds are globose, dark-brown and deeply wrinkled (0.5 × 0.3 cm). Mature individuals can produce 100–4000 fruits annually, which serve as an important winter food source for frugivorous birds (Schropfer *et al*., 2010). *Loranthus europaeus* and *V. album* L. are the most widespread European hemi-parasitic plants, typically colonizing tree crowns and occasionally, even trunks.

Taxonomy and Distribution
The genus *Loranthus* belongs to:
- **Kingdom:** Plantae
- **Order:** Santalales
- **Family:** Loranthaceae
- **Genus:** *Loranthus*

Species occur throughout India, Southeast Asia, China, Sri Lanka, Africa, and Australia, where they parasitize diverse woody vegetation in forests, agroforestry systems, plantations, and urban landscapes.

Host Diversity of *Loranthus*

Host diversity refers to the range of plant species capable of supporting parasite establishment and growth. Studies indicate that *Loranthus* species parasitize hosts belonging to numerous botanical families, although infection frequency differs considerably among hosts. The frequently reported host families includes, *Fabaceae, Rutaceae, Myrtaceae, Moraceae, Anacardiaceae, Combretaceae, Sapindaceae, Bignoniace, Apocynaceae* (Norton and de Lange, 1999, Pamidimukkala and Inala, (2020), Kher *et al*. (2020) [9, 11] . Among the different families the *Fabaceae* often exhibits relatively high infection frequencies because many species possess large canopies that attract seed-dispersing birds.

Botanical name	Family	Economic importance
Mangifera indica	Anacardiaceae	Mango
Azadirachta indica	Meliaceae	Neem
Pongamia pinnata	Fabaceae	Biofuel tree
Albizia lebbeck	Fabaceae	Timber
Albizia saman	Fabaceae	Avenue tree
Ficus religiosa	Moraceae	Sacred tree
Ficus benghalensis	Moraceae	Avenue tree
Psidium guajava	Myrtaceae	Guava
Punica granatum	Lythraceae	Pomegranate
Terminalia arjuna	Combretaceae	Medicinal tree
Peltophorum pterocarpum	Fabaceae	Ornamental
Millingtonia hortensis	Bignoniaceae	Ornamental

Major Host Species Reported: The following are the various host species reported from the different families (Okubamichael *et al*., 2017) [10]. Regional surveys has to continue to identify additional hosts, indicating that host diversity of incompletely documented. Hence the present study was done to identify the diversity of different host species in the Kurnool and Nandyal region of Andhra Pradesh and its effect on the host etc.

Materials and Methods

A regional survey was conducted in different locations of the Kurnool and Nandyal locations to know the incidence and host diversity of *Loranthus* on different plants. The observations on the incidence of *Loranthus* on different hosts, symptoms and its effects on the hosts to be recorded. The morphology of the leaves, flowers and establishment of the infection with the hosts was recorded.

Results and Discussion

The regional survey was conducted in Kurnool and Nandyal regions of Andhra Pradesh and the incidence of the *Loranthus* was recorded in the different host species *viz.* Citrus, Mango, Guava, Sapota, and Neem etc. (Li, *et al*., 2023). The morphology of the phanerogamic parasite *viz*., the morphology of the leaves, flowers and establishment of the infection with the hosts (fluated stems) was recorded and observed (fig. a) the other important factors determine host utilization which influence the infection of the *Loranthus* to its hosts etc.

The other important factors for determination of the host includes as follows:

Bird-mediated Seed Dispersal: Birds consume mistletoe berries and deposit sticky seeds on branches of suitable hosts. Consequently, host abundance and bird behaviour strongly influence infection patterns.

Host Compatibility: Successful parasitism requires physiological compatibility between host tissues and parasite haustoria. Some potential hosts prevent haustorial penetration through structural or biochemical defences.

Host Architecture: Large crowns, rough bark, and stable branches enhance seed retention and germination, increasing infection probability.

Environmental Conditions: Temperature, rainfall, altitude, humidity, and host density influence parasite establishment and survival.

Evolutionary Relationships: Closely related parasite species often utilize related host groups, suggesting that host associations possess significant phylogenetic structure.

Broad Host Diversity: Broad host diversity provides several ecological advantages which includes,

- Increased survival under changing environmental conditions.
- Colonization of heterogeneous habitats.
- Maintenance of parasite populations through alternative hosts.
- Enhanced opportunities for gene flow and dispersal.
- Greater resilience following host decline.

Network analyses indicate that Loranthaceae generally exhibit greater host generality than several other mistletoe lineages, potentially contributing to their diversification (Muche *et al*., 2022) [8].

Agricultural Significance: Infestation on economically important fruit and plantation crops can lead to:

- Reduced water uptake
- Nutrient competition
- Branch dieback
- Reduced flowering and fruit yield
- Premature branch mortality
- Increased susceptibility to secondary pathogens.

Mango, citrus, guava, pomegranate, and ornamental trees are frequently affected in tropical regions.

Research Gaps

Current knowledge highlights several priorities:

- Comprehensive host inventories across agro-climatic zones.
- Molecular mechanisms underlying host recognition.
- Genomic basis of host specificity.
- Long-term monitoring of host shifts under climate change.
- Host resistance mechanisms.
- GIS- and remote sensing-based mapping of infestations.
- Conservation of native mistletoe-host interactions in natural ecosystems.

Future Perspectives

Future studies should integrate ecology, phylogenomics, metabolomics, and host–parasite physiology to better understand mechanisms governing host diversity. Comparative studies among *Loranthus*, *Taxillus*, and related genera will improve predictions of host shifts and support management strategies in forestry and horticulture.

a. *Loranthus* infection on the host plant formation of fluated stems, long broad elongated leaves. b. Long elongated flowers.

***Loranthus* infection on Citrus (fig. c) and Sapota (fig. d)**

Effects or symptoms of *Loranthus* infection on host plants as dieback (fig. e) and formation of fluated stems (fig. f)

Conclusion

Loranthus species exhibit remarkable host diversity, parasitizing numerous woody species across multiple plant families. Although many species function as generalists, host utilization is influenced by compatibility, bird-mediated seed dispersal, environmental conditions, and evolutionary history. Understanding host diversity provides valuable insights into parasite ecology and is fundamental for conserving biodiversity while minimizing economic losses in orchards and forestry systems. Continued multidisciplinary research is needed to unravel the mechanisms underlying host selection and adaptation.

References

1. Andronache A, Toma I, Toma C. The structure of vegetative organs in *Viscum album* and *Loranthus europaeus*. Analele Stiintifice ale Universitatii" Al. I. Cuza" din Iasi,2006:52:13.
2. Gebauer R. International Biological Flora: *Loranthus europaeus* No. 8. Journal of Ecology,2026:114(4):e70311.
3. Grimsson F, Zetter R, Labandeira CC, Engel MS, Wappler T. Taxonomic description of in situ bee pollen from the middle Eocene of Germany. Grana,2017:56(1):37-70.
4. Kher A, Dohere A, Barfa R. Host Preference and Report of Two New Host Plants of *Loranthus longiflorus* at Indore, Madhya Pradesh, India. Journal of the Bombay Natural History Society (JBNHS), 2011, 237-238.
5. Krasylenko Y, Sosnovsky Y, Atamas N, Popov G, Leonenko V, Janosikova K, *et al*. The European mistletoe (*Viscum album* L.): distribution, host range, biotic interactions, and management worldwide with special emphasis on Ukraine. Botany,2020:98(9):499-516.

6. Kubieek J, Spinlerova Z, Michalko R, Vrska T, Matula R. Temporal Dynamics and size effects of Mistletoe (*Loranthus europaeus* Jacq.) Infection in an Oak Forest. Austrian Journal of Forest Science/Centralblatt für das Gesamte Forstwesen, 2018, 135(2).
7. Li *et al*. Parasite–host network analysis provides insights into the evolution of two mistletoe lineages (*Loranthaceae* and *Santalaceae*). Plant Diversity,2023:45:702–711.
8. Muche M, Muasya AM, Tsegay BA. Biology and resource acquisition of mistletoes, and the defense responses of host plants. Ecological Processes,2022:11:24.
9. Norton DA, de Lange PJ. Host specificity in parasitic mistletoes (*Loranthaceae*). Functional Ecology,1999:13:552–559.
10. Okubamichael DY, Griffiths ME, Ward D. Host specificity in parasitic plants: Perspectives from mistletoes. AoB PLANTS,2017:8:plw069.
11. Pamidimukkala K, Inala MS. *Loranthus longiflorus*: A wide host range parasite harbored on a few new hosts and phytochemical comparison of host and parasite., 2020.
12. Shavvon RS, Mehrvarz SS, Golmohammadi N. Evidence from micromorphology and gross morphology of the genus *Loranthus* (*Loranthaceae*) in Iran. Turkish Journal of Botany,2012:36(6):655-666.