



Parasitic Flowering Plants: An Overview of Phanerogamic Parasites

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Phanerogamic parasites are flowering plants that depend partially or completely on other plants for their nutrition and survival. Unlike fungi or bacteria, these parasites are higher plants with well-developed reproductive organs such as flowers and seeds. They attach themselves to host plants through specialized structures called *haustoria*, which penetrate the tissues of the host and absorb water, minerals, and organic nutrients. Parasitic flowering plants are found in different ecosystems across the world and play important ecological as well as economic roles. Some species damage agricultural crops and forest trees, while others contribute to biodiversity and ecological balance.

Characteristics of Phanerogamic Parasites

Phanerogamic parasites possess several unique features that distinguish them from normal green plants:

- Presence of flowers and seeds.
- Development of haustoria for attachment and nutrient absorption.
- Reduced or absent chlorophyll in some species.
- Dependence on host plants for water and food.
- Specialized adaptations for parasitic life.
- All phanerogamic plant parasites are obligate parasites.

Classification of Phanerogamic Parasites

Phanerogamic parasites are mainly classified into two categories:

❖ Level of dependency

1. Total Parasites (Holoparasites)

These plants completely depend on the host for nutrition because they lack chlorophyll and cannot perform photosynthesis.

Examples:

- *Cuscuta* (Dodder)
- *Rafflesia*
- *Orobancha*.

2. Partial Parasites (Hemiparasites)

Partial parasites contain chlorophyll and can manufacture their own food through photosynthesis, but they depend on the host for water and minerals.

Examples:

- *Loranthus*
- *Viscum* (Mistletoe)
- *Santalum album* (Sandalwood)

❖ **Site of attachment****1. Stem Parasites**

These parasites attach to the stems of host plants.

Examples:

- *Cuscuta*
- *Loranthus*

2. Root Parasites

These parasites attack the roots of host plants.

Examples:

- *Orobanche*
- *Striga*

Major phanerogamic plant parasite and their management**1. Cuscuta:-****Systematic position**

Family: Convolvulaceae

Order: Solanales

Genus: Cuscuta

Species: *C. campestris*, *C. trifoli*, *C. planiflora*, *C. indecora*, and *C. gronovii*

Synonyms: Dodder, Amarbel, Gold thread, Golden vein, Hell vine, Hair Weed, Devil's Hair and Love Vine

Target crops: Alfalfa, Clover, Onion, Flax, Sugar beet, Potato, Chillies, Ornamentals, etc.

Morphology:

- It is a dicot plant.
- It is a yellow, sometimes orange vine strands which grow and coil around the plant.
- These phanerogams do not have leaves instead have minute scale leaves.
- It produces white, pink or yellow colour flowers which later produce seeds.
- It does not have roots.

Management:

- Use clean and certified seed free from dodder contamination.
- Avoid using contaminated fodder, manure, or irrigation water.
- Clean farm machinery and tools to prevent spread of seeds.
- Uproot and burn infected host plants before dodder flowers and sets seed.
- Deep summer ploughing helps bury seeds deeper in soil.
- Practice crop rotation with non-host crops.
- Pre-emergence herbicides can suppress dodder seed germination in some crops like Pendimethalin, Fluchloralin, and Glyphosate.

2. Loranthus (Dendrophthoe sp):-**Systematic position**

Family: Loranthaceae

Order: Santalales

Genus: Dendrophthoe

Species: *D. falcata*, *D. longiflorus*, *D. parasiticus* and *D. ampullaceus*

Synonyms: Giant mistletoe, Vrikshabhaksha

Target crops: Mango, Citrus, Apple, Guava, Rubber, etc.

Morphology:

- It is a dicot plant.
- It lacks roots.
- The phanerogamic parasite has brown coloured stem, which is generally thick and flattened at the node and it appears in clusters.
- Fleshy fruits with single seed are formed.
- The parasite produce wedge shaped houstonia and continuously suck the nutrients from the host.

Management:

- Prune infected branches about 20–30 cm below the point of attachment.
- Burn or destroy removed parasite material to prevent spread
- Regularly inspect orchard and shade trees.
- Remove heavily infected branches and alternate host plants nearby.
- Hand picking of parasite at early stages of its growth or cutting and removing of the infected trees.
- Injection of copper sulphate and 2, 4-D into the affected branches have been found effective.
- Foliar spray of diesel oil emulsion (30-40%) in soap water has been found effective in eradication of parasite from mango trees.

3. Orobanche:-**Systematic position****Family:** Orobanchaceae**Order:** Orchidales**Genus:** Orobanche**Species:** *O. ramose*, *O. minor*, *O. crenata* and *O. cernua***Synonyms:** Tokra / Broom rape**Target crops:** Tobacco, Sunflower, Cabbage, Cauliflower, Tobacco, Tomato, Brinjal, Fava bean, and broad bean etc.**Morphology:**

- It is an annual and monocot plant.
- It has a pale cylindrical stem which is thickened at the base and covered with brown scaly leaves that ends in spikes.
- Plants usually lack chlorophyll.
- Flowers arise from axills if the scale leaves, have a well-developed lobed calyx, tubular corolla, superior ovary, numerous ovules and large four lobed stigmas.
- Fruits are capsules containing small black reticulate and ovoid seed.
- It produces white, yellow white, purple, snapdragon like flowers with cup like appressoria.

Management:

- Use clean, certified seed free from *Orobanche* seeds.
- Avoid movement of contaminated soil, irrigation water, and farm tools.
- Remove and destroy infected plants before flowering and seed formation.
- Deep ploughing exposes seeds to sunlight and desiccation.
- Soil solarization using transparent polythene sheets in summer can also reduce viability.
- Uproot parasite shoots before seed setting.
- Repeated removal helps prevent spread because one plant produces thousands of seeds.
- Commonly used herbicides include: glyphosate, pendimethalin etc.
- Biocontrol agents reported against *Orobanche* include: *Fusarium oxysporum* , *Pseudomonas* spp.

4. Witch Weed (Striga sp):**Systematic position****Family:** Scrophulariaceae**Order:** Scrophulariales**Genus:** Striga Species: *S. asiatica*, *S. densiflora*, *S. hermonthic*, *S. lutea*,**Synonyms:** Witch weed**Target crops:** Sorghum, Maize, sugarcane, etc**Morphology:**

- It is a small plant with bright green leaves.
- Height of the plant is around 15-30 cm.
- The plant can be observed in cluster of 10-20 plants / host plant.
- It lacks root hairs and root cap.

- It is dicot plant.
- Flowers of white and pink colour are produced based on the species. *S. asiatica* produces pink flower while *S. densiflora* produces white flowers.
- A single plant produces 90,000-500,000 seeds, which in the soil for over 10 years.

Management:

- Grow *Striga*-resistant or tolerant crop varieties.
- Practice crop rotation with non-host crops such as legumes.
- Uproot and destroy *Striga* plants before they produce flowers.
- Apply generous amounts of organic manure or nitrogen fertilizers, which naturally inhibit *Striga* attachment and growth.
- Use trap crops like cotton, soybean, and lentil etc. to reduce the *Striga* seed bank in the soil.
- Sow crops at the recommended time for vigorous early growth.
- Use clean seed and prevent the spread of contaminated soil and crop residues.
- Pre-emergence application of atrazine 1.0 kg/ha on 3rd DAP + hand weeding on 45 DAP with an earthing up on 60 DAP combined with post-emergence spraying of 2,4-D at 6 g (0.6%) + urea 20 g (2%) / litre of water on 90 DAP + trash mulching 5 t/ha on 120 DAP.
- Use imidazolinone-resistant maize seeds coated with low-dose imazapyr, which kills the parasite as it attaches to the roots.

Conclusion

Phanerogamic parasites are remarkable flowering plants that have evolved specialized mechanisms to survive on host plants. Although many species are harmful to crops and forests, they also hold ecological significance and scientific value. Understanding their biology, classification, and impact helps in managing their harmful effects while appreciating their role in nature.