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Incidence of *Cuscuta* Species on Angiosperm Dicotyledons in Nirmal District in Telangana State, India

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***Abstract*:** The incidence of parasitic *Cuscuta* spp. was observed on 4 angiosperm dicotyledonous host plants species belonging to 30 genera of 22 families were observed with infection of parasitic *Cuscuta* spp. from in the Nirmal district of Telangana State, India. Dominant infection was to Fabaceae family (07 species) followed by Rhamnaceae (03 species) and families Moraceae, Euphorbiaceae, Rutaceae and Verbenaceae, (02 species each). Dominant infected plants belonging to tree categories with 50% (17 species), shrubs infected with 44% (15 species) and least attack on herbs with 6% (02 species).

Keywords: Parasite, *Cuscuta*, Dicotyledonous, Angiosperm, Host plant

Cuscuta L. species commonly parasitic plants known as dodder and this a genus contains over 201 species of yellow, orange, green or red colour. Dodders are holoparasitic plants that enwind stems of host plants and penetrate those by haustoria to connect to the vascular bundles. Having a broad host plant spectrum., *Cuscuta* spp infect nearly all dicot plants, formerly treated as the only genus in the family Cuscutaceae and now is accepted as genus of family Convolvulaceae on the basis of the work of the phylogeny group of angiosperms. The genus is found throughout the world, with the greatest species diversity in tropical and subtropical regions, the genus becomes rare in cool temperate climates. The life cycle of *Cuscuta* parasite include, seed germination, early development of the seedling, and search for a host plant, haustorium induction and invasion of the host, haustorium maturation and interaction with the host plant (Yoder 1999). Parasite plants have diversified, and the evolution of *Cuscuta* appears to be completely different from other root parasite plants (Heide-Jørgensen 2008). Epiparasitic myco-heterotrophic plants appear to be evolved from mutualistic myco-heterotrophic plants (Merckx et al., 2009). Sakshi et al. (2024) provided detailed review on *Cuscuta reflexa* Roxb. In India, *Cuscuta* spp. poses a serious problem in oilseed niger (*Guizotia abyssinica*), linseed (*Linum usitatissimum*) and blackgram (*Vigna mungo*), greengram (*Vigna radiata*), chickpea (*Cicer arietinum*) and fodder crops lucerne (*Medicago sativa*)and berseem (*Trifolium* spp.) under rainfed as well as in irrigated conditions. Legislation in 25 countries lists the dodder as "declared noxious weed" with seeds and plant material denied entrance. In the, *Cuscuta* spp is the only weed seed whose movement in prohibited in United States. The wide geographical distribution of dodder species and wide host range, listed among the most damaging parasites. In present study the incidence of *Cuscuta* L. on angiosperm dicotyledons in Nirmal District in Telangana State, India was recorded.

MATERIAL AND METHODS

The Nirmal district situated in at latitude 19.096413° N and longitude 78.342972° E, on east Manchiryal district north by Adilabad. and Utnoor divisions on the south by Jagithyal and Nizamabad districts and on the west by Nanded district of Maharashtra State (Fig. 1). The most important river that drains the divisions is Godavari, which is the largest river in peninsular India. The Kadam vagu is tributary of the Godavari. Besides these Swarna vagu, and Sudda vagu drain the division. The average annual normal rain fall of the Nirmal district is 1107.2 mm and average number of rainy days in the year is 55 – 63 days. The forest of this district falls under tropical dry deciduous and tropical thorn forest type's consisting of mixed teak. From June 2022 to March 2025, a comprehensive survey was conducted throughout the Nirmal district, covering locations such as Timmapur, Dehagam, Bhainsa, Valegam, Ranapur, Mamada, Pichara, Thandra, Jam, Kadama, and the surrounding forest region. The study explores a list of 34 plants belong to 22 different families of dicot plants and include trees, shrubs and herbs. The identification was done according to Bentham & Hooker (1862-1883) classification.

RESULTS AND DISCUSSION

The incidence of *Cuscuta* spp. was observed on 34 angiospermic dicotyledonous host plants belonging to 30 genera of 22 families (Table 1). The incidence of *Cuscuta* spp. was more on Fabaceae family (affecting seven species

belonging to six genera), followed by Rhamnaceae (03 species belonging to single genus *Zizyphus*) and Moraceae, Euphorbiaceae, Rutaceae and Verbenaceae, (02 species each). Remaining 16 families viz. Acanthaceae, Apocynaceae, Asclepiadaceae, Bignoniaceae, Capparidaceae, Combretacae, Lythraceae, Malvaceae, Meliaceae, Moringaceae, Myrtaceae, Nyctaginaceae, Oleaceae, Plumbaginaceae, Sapindaceae and Tiliaceae infested with single plant species each (Fig. 2). Predominantly, incidence was severe on the genus *Ziziphus* (Family Rhamnaceae*)* with three species namely *Z. mauritiana* Lam., *Z. oenoplia* (L.) Mill. *Z. xylopyrus* (Retz.) Willd. and genera *Ficus* (Moraceae) and *Vachellia* (Fabaceae) with two species each namely *F. benghalensis* L., *F. virens* L. *V. nilotica* (L.) P.J.H.Hurter & Mabb. and *V. leucophloea* (Roxb.) Maslin, Seigler & Ebinger respectively. Seven species of Fabaceae family infected with *Cuscuta* are *Albizia lebbeck* (L.) Willd, *Butea monosperma* (Lam.) Taub.,

Table 1. Angiosperm dicotyledonous plant species infected with parasitic *Cuscuta* plant

Scientific name	Family	Local name	Categories of plants
Albizia lebbeck (L.) Willd	Fabaceae	Dirisena	Tree
Aegle marmelos (L) Corr.	Rutaceae	Maredu	Tree
Azadirachta indica Juss.	Meliaceae	Vepa	Tree
Bougainvillea spectabilis Willd.	Nyctaginaceae	Kagithampulu	Climbing Shrub
Butea monosperma (Lam.) Taub.	Fabaceae	Modugu	Tree
Calotropis procera (Ait.) R.Br.	Asclepiadaceae	Jilledu	Shrub
Capparis zeylanica L.	Capparidaceae	Uppi teega	Climbing Shrub
Corchorus trilocularis L.	Tiliaceae	Parinta Koora	Herb
Dalbergia sissoo Rxob.	Fabaceae	Shisham	Tree
Ficus benghalensis L.	Moraceae	Marri Chettu	Tree
Ficus virens L.	Moraceae	Juvvi Chettu	Tree
Hibiscus rosa-sinensis L.	Malvaceae	Mandara	Shrub
Lantana camara L.	Verbenaceae	Parasu Kampa	Shrub
Millingtonia hortensis L.	Bignoniaceae	Sadac malle	Tree
Moringa olifera Lam.	Moringaceae	Munaga Chettu	Tree
Murraya paniculata (L.) Jack.	Rutaceae	Nagagolungu	Perennial shrub
Nerium oleander (L.)	Apocynaceae	Ganneru	Shrub
Nyctanthes arbor-tristis L.	Oleaceae	Parijatham	Shrub
Phyllanthus reticulatus Poir.	Euphorbiaceae	Puli Chettu	Shrub
Pithecellobium dulce (Roxb.) Benth.	Fabaceae	Seema Chintha	Tree
Plumbago zeylanica L	Plumbaginaceae	Chitra Mooolam	Shrub
Punica granatum L.	Lythraceae	Danimma	Shrub
Ricinus communis L.	Euphorbiaceae	Amudamu	Shrub
Ruellia tuberosa L.	Acanthaceae	Chitapata Kayala chettu	Herb
Sapindus emarginatus Vahl	Sapindaceae	Kunkudu Kayalu	Tree
Syzygium cumini (L.) Skeels	Myrtaceae	Alla neredu	Tree
Tamarindus indica L.	Fabaceae	Chinta	Tree
Terminalia tomentosa Wight & Arn.	Combretacae	Nallamaddi	Tree
Vachellia nilotica (L.) P.J.H.Hurter & Mabb.	Fabaceae	NallaTumma	Tree
Vachellia leucophloea (Roxb.) Maslin, Seigler & Ebinger	Fabaceae	Tella tumma	Tree
Vitex negundo L.	Verbenaceae	Vavili	Shrub
Ziziphus mauritiana Lam.-	Rhamnaceae	Jitti Nerachettu	Evergreen Shrub
Ziziphus oenoplia (L.) Mill.	Rhamnaceae	Pariki	Shrub
Ziziphus xylopyrus (Retz.) Willd.	Rhamnaceae	Gotti Chettu	Tree

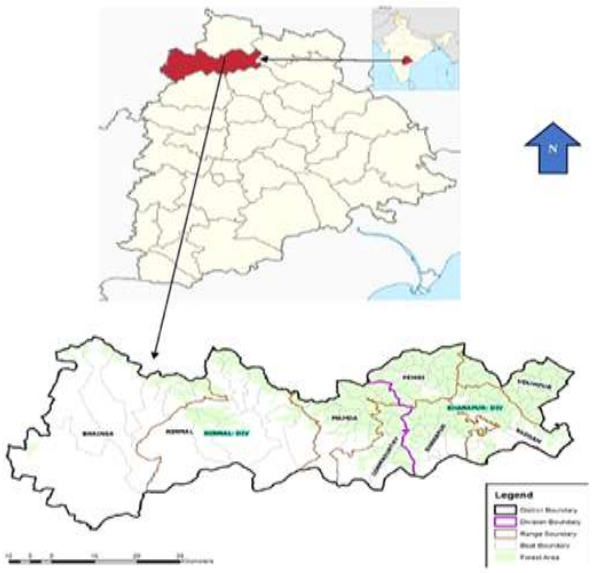

Fig. 1. Location of study area map

Dalbergia sissoo Rxob., *Pithecellobium dulce* (Roxb.) Benth., *Tamarindus indica* L., *Vachellia nilotica* (L.) P.J.H.Hurter & Mabb. and *V. leucophloea* (Roxb.) Maslin, Seigler & Ebinger (Fig. 2). Dominant infected plants belonging to tree categories (50%) followed by shrubs (44%) and herbs (6%).

Abubacker et al. (2005) observed that *Cuscuta* spp. have unique glandular cells that help the parasite adhere to the host and this explains why primarily observed on *Z. mauritiana* Lamk's rough bark. After dividing and spreading outward like a collar around the host plant, these cells pierce the phloem. Sarma et. al. (2008) also observed the same trend. *The* invasion is facilitated by habitat disturbance and climate change, which produce favorable conditions in new locations. In many regions of the world, at least a few species of *Cuscuta* are regarded as a major invasive danger due to their aggressive behavior, ability to disturb local ecosystems, and potential to reduce agricultural production (Parker 2012)

Fig. 2. Host plant attacked by *Cuscuta* spp. (A) *Vitex negundo* L.,(B) *Ziziphus mauritiana* Lam.

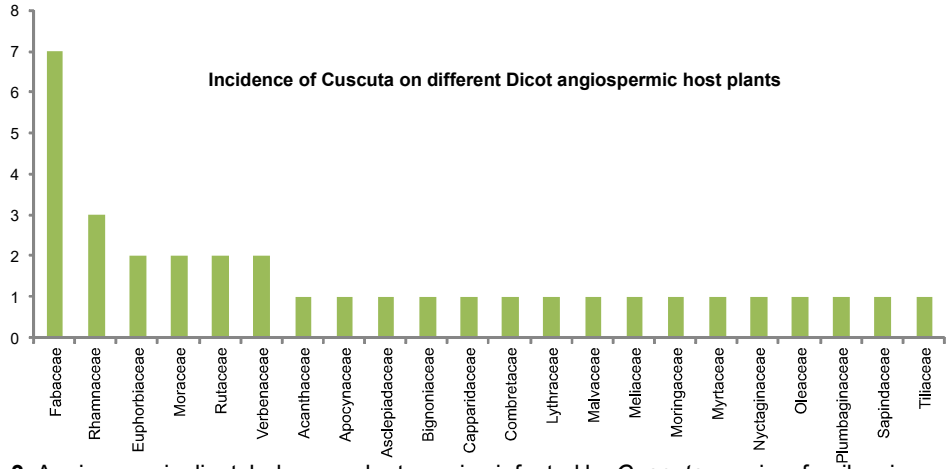

Fig. 3. Angiospermic dicotyledonous plant species infected by *Cuscuta* spp. in a family-wise manner in Nirmal district

CONCLUSION

Cuscuta species do not have a specific host and can even flourish by consuming the least quantity of nutrients and water from the host. It impairs or hinders the host's ability to grow and develop normally. The Fabaceae host plants ensured a very quick attachment and short lag phase of the parasite, likely because of the family's presumably higher nitrogen content and the high nitrogen requirements of *Cuscuta* genus members. *Cuscuta* spp. management is challenging in agriculture and the environment because of their parasitic nature. Phytosanitary management and prevention appears to be the most crucial step in preventing future infestations.

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