Universal Impact Factor0.9285:2012; 1.2210:2013

Index Copernicus
ICV 2011: 5.09
ICV 2012: 6.42
ICV 2013: 15.8
ICV 2014:89.16

NAAS Rating
2012 : 1.3;
2013-2014-2015:2.69

Received on:
15th March 2016

Revised on:
19th May 2016

Accepted on:
20th May 2016

Published on:
1st June 2016

Volume No.
Online & Print
76 (2016)

Page No.
34 to 41

Life Sciences Leaflets is an international open access print & e journal, peer reviewed, worldwide abstract listed, published every month with ISSN, RNI Free- membership, downloads and access.

FLORISTICAL STUDY ON VARIOUS HOSTS OF TWO PARASITIC SPECIES BELONGS TO *CUSCUTA* GENUS AROUND THE PATAN DISTRICT FROM GUJARAT STATE, (WESTERN INDIA)

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ABSTRACT:

The dodder plant *Cuscuta reflexa* Roxb. is an angiosperm leafless parasitic plant belonging to the family Cuscutaceae is abundantly found colonizing certain plant species in the premises of Patan Dist., Gujarat, INDIA. The host range, the economic damage and for these dodders are briefly discussed in this paper. Here 67plant species have been listed of which 42 species belonging to enumerated 42 plant for *Cuscuta chinensis* and 25 species to *Cuscuta reflexa*.

KEY WORD: *Host, Cuscuta, Patan, North Gujarat.*

INTRODUCTION:

The family Convolvulaceae has been studied by several authors, including Muschler divided this family into parasitic (*Cuscuta*) and non-parasitic (the remaining taxa of Convolvulaceae) (Muschler, 1912), Tiagi and Johri & Tiagi, who compared the embryological features of *Cuscuta* with other genera of the Convolvulaceae and suggested the placement of *Cuscuta* into a distinct family Cuscutaceae. (Johri & Tiagi, 1952 and Tiagi, 1951). Sampathkumar and Ayangar studied the seed coat anatomy and morphology of the family Convolvulaceae and they also separated the genus *Cuscuta* from the other members of the family (Sampathkumar and

Agyangar, 1978). Takhtajan placed the genus *Cuscuta* in a separate family based on embryology and floral anatomy (Takhtajan, 1980). Based on floral characteristics of the family Convolvulaceae, found that the genus *Cuscuta* has a close affinity to the other members of Convolvulaceae (Hassan ,1989). Stefanovic, *et al*. also put the genus *Cuscuta* within the family Convolvulaceae (Stefanovic, *et al*., 2002).

As distinctive ecological taxa, angiosperm parasitic plants are carefully considered as the icon being the influential factor in determining the fate of the quality and quantity of economically valuable timber plant species. They are the serious pest in natural forests, plantation, orchards and ornamental trees in many parts of the world (Calder and Bernhard, 1983). The parasite plants have a specialized structure called haustoria, rather than root, which penetrate the branches and stem of the host plants water and mineral nutrients (Agrios, 2000). *Cuscuta* contain special glandular cells facilitating adhesion of the parasite to the host (Abubacker et al., 2005). Many studies have already indicated the host parasite relationship of *Cuscuta* (Fer, 1976; Ihl and Jacob, 1990; Nagar and Sanwal, 1984; Quick, 1998; Shaw and Hennon, 1991).

STUDY AREA:

Gujarat state geographically is divided into five regions i.e. North Gujarat, Central Gujarat, South Gujarat, Saushtra and Kutch. Patan District 7 Talukas viz Patan, Siddhpur, Chanasma, Harij, Sami, Radhanpur and Sakul have been included in Patan District is situated between 20° 41' to 23° 55' north latitudes and east longitude of 71° 31' to 72° 20'. The area of Patan District is 5600 sq. k.m. In the north and north-west borders there is Banaskantha District and in the west there is the border of Kutch district. In the south and south-east there is Desert of Kutch and some part of Surendranagar District. Besides this, there is Mahesana District situated in the east part of Patan. The region is having the minimum temperature as low as 5°C to 10°C and maximum temperature as high as 40°C to 48°C. The average rain fall in the region is 701 mm.

MATERIAL AND METHODS:

The present study was carried out during 2009-2011. Data on taxon distribution within the Patan District- Gujarat were collected mainly from two sources: field observations, -collection of specimens preserved in Herbarium - and literature. Accordingly, information we have note the which vegetative organ parasitized by *Cuscuta* species. Collection of plant specimens was carried out in both dry and wet seasons. The identification of specimens was carried out by consulting the relevant literature and regional floras (Cooke, 1958; Hooker, 1897; Patel, 2004; Saxton and Sedgwick, 1918; Saxton and

Sedgwick, 1922; Shah, 1978) before they were deposited in the herbarium of Department of Botany, SPT Arts & Science College, Godhra, Gujarat, India.

RESULTS AND DISCUSSION:

With the help of haustoria *Cuscuta* plants will take water and nutrients from the host plant. During our observations, around the Patan District, we have collected the various hosts of *Cuscuta chinensis* (Table-1) and *Cuscuta reflexa* (Table-2). Thus, during our field trips, we observed that these two species of *Cuscuta* have parasitised 67 taxa from 60 genera and 34 families and furthermore, from our observations, there is only one species, *Holoptelea integrifolia* Roxb., that is a host plant for both species of *Cuscuta*. I have enumerated 42 host plants for *Cuscuta chinensis* Lam which are presented in Table 1, and 25 for *Cuscuta reflexa* Roxb which are presented in Table 2. Figures 2–5 show photographs of the two species on a variety of host plants.

CONCLUSIONS:

Host plants for *C. chinensis* and *C. reflexa* (Table 1 and 2) include a wide range of trees, shrubs, grasses and herbaceous species. In the present study attempts were made to explore more about the parasitism of *C. chinensis* and *C. reflexa* on other useful plant species occurring in Patan District, Gujarat, India. We found that the host plants for *C. chinensis* and *C. reflexa* are mainly agricultural plants, economically valuable or useful plants and medicinal plants. The residents of Patan District use *Cuscuta* sp. for their health care and ethno-veterinary practices. The host range of *C. chinensis* and *C. reflexa* plants are estimated to be 67 species spread over 60 genera belonging to 34 families.

ACKNOWLEDGEMENTS:

I am very much thankful to Dr.D.C.Bhatt, Head, Dept. of Marine Science, Bhavnagar University, Bhavnagar for giving valuable information and for all his help.

REFERENCES:

Abubacker M.N., Prince M. and Hariharan, Y. (2005). Histochemical and biochemical studies of parasite host interaction of *Cassytha filiformis* Linn. and *Zizyphus jujuba* Lamk. *Current Science* 89, pp. 2156-2158.

Agrios G.N. (2000). Plant Pathology. Harcouvt Asia Pvt. Ltd, Academic Press, California, USA.

Calder M. and Bernhard P. (1983). The Biology of Mistletoes. Academic Press, New York.

Cooke T. (1958). Flora of the Presidency of Bombay, *Botanical Survey of India*, Calcutta. Vol. I-VII.

Fer A. (1976). Photosynthesis and respiration in *Cuscuta lupuliformis* Krock. Seedlings during their preparasitic stage. *Physiol. Veg*. 14, pp. 357-365.

Fisher C.E.C. (1926). Loranthaceae of Southern India and their host plant. *Rec-Bot-Surv-India*. 11, pp. 159-195.

Hassan Soad A., 1989, Morphological studies on some Convolvulaceae. – *Ain Shams Univ*., M. Sc. Thesis.

Hooker J.D., 1897, Flora of British India, L. Reeve and Co., London. Vol. I-VII.

Ihl B. and Jacob F., 1990, Functioning of Cuscuta haustoria by benzylaminopurine. *Haustorium.* 24, pp. 4-5.

Johri B.M. and Tiagi B. (1952). Floral morphology and seed formation in *Cuscuta reflexa* ROXB. – *Phytomorphology* 2, pp. 126.

Kadavul K., Pragasam A., Dixit A.K., Joseph Diane R. and Prasena J. (2006). Biodiversity of host species of mistletoes of Pondicherry, Coromondol Cost, South India. *Nat. Env. Poll. Tech.* 5, pp. 309-313.

Mathur A.K. (1949). Angiospermic parasite of our forest. *Indian Forester*. 75, pp. 449-456.

Muschler R., (1912). Annual flora of Egypt, Berlin. Vol. 2, pp. 758–775.

Nagar N., Sanwal G.C. (1984). Biochemical aspects of parasitism in *Cuscuta reflexa:* Inhibition of cell wall degrading enzymes of *Cuscuta* by non-susceptible plants. In: Proceedings of 3rd International Symposium on Parasitic Weeds, Aleppo, CIMMYT.

Patil S.H. (2001). Host parasite relationship in tree of Dhule forest. *Geobios.* 28, pp. 33-36.

Patel P.K. (2004). Studies on Flora along the Riverbank of the Saraswati River from Mukteshwar to Patan District with Ethnobotanical Aspect. Ph.D. thesis, submitted to H.N.G. University, Patan. (Un published).

Quick W.P., 1998, Localization of photosynthetic metabolism in the parasitic angiosperm *Cuscuta reflexa*. *Planta.* 205, pp. 506-513.

Sampathkumar R. and Ayangar K.R. (1978). Seed morphology of Convolvulaceae – *J. Indian Bot. Soc*. 57, pp. 28.

Shaw C.G. and Hennon P.E.S. (1991). Intensification and upward advance of dwarf mistletoe in thinned, young strands of Western hemlock in Southeast Alaska. *Plant Dis*. 75, pp. 363-367.

Stefanovic S., Krueger, L. and Olmstead, R.G. (2002). Monophyly of the Convolvulaceae and circumscription of their major lineages based on DNA sequences of multiple chloroplast loci. – *Amer. J. Bot.* 89(9), pp. 1510–1522.

Saxton W.T. and Sedgwick L.J. (1918). Plants of Northern Gujarat. *Botanical Survey of India, Calcutta* 6, pp. 209-323.

Saxton W.T. and Sedgwick L.J.(1922). Plants of Northern Gujarat. *Botanical Survey of India, Calcutta* 9, pp. 251-262.

Shah G.L. (1978). Flora of Gujarat. S P University, Vallabh Vidhyanagar.

Srivastava G. D. (2006). Two new hosts of *Loranthus* at Allahabad. *Current Science* 4, pp. 106-107.

Takhtajan A.L. (1980). Outline of the classification of the flowering plants (Magnoliophyta). – *Bot. Rev.* 46(3), pp. 226.

Tiagi B. (1951). A contribution to the morphology and embryology of *Cuscuta hyaline* Roth. and C. *planiflora* TENORE. – *Phytomorphology* 1, pp. 9.

Table: 1: List Host of *Cuscuta chinensis* from field observations

Sr. No.	Species	Family	Habit	Vegetative organ parasitized		
1	*Abrus precatorius*	Fabaceae	Cl	Stem		
2	*Abutilon indicum*	Malvaceae	S	Stem	Leaf	
3	*Achyranthes aspera*	Amaranthaceae	H	Stem	Leaf	
4	*Aerva javanica*	Amaranthaceae	H	Stem		
5	*Alysicarpus monilifer*	Fabaceae	H	Stem		
6	*Blepharis repens*	Acanthaceae	H	Stem	Leaf	
7	*Cardiospermum halicocabum*	Sapindaceae	Cl	Stem		
8	*Cassia italica*	Caesalpiniaceae	H	Stem		
9	*Cassia siamea*	Caesalpiniaceae	T	Stem		
10	*Cassia tora*	Caesalpiniaceae	H	Stem	Leaf	
11	*Chenopodium album*	Chenopodiaceae	H	Stem	Leaf	
12	*Commelina benghalensis*	Commelinaceae	H	Stem	Leaf	Flower
13	*Corchorus aestuans*	Tiliaceae	H	Stem	Leaf	Flower
14	*Crotalaria medicaginea*	Fabaceae	H	Stem		
15	*Cynodon dactylon*	Poaceae	H	Stem		
16	*Cyperus rotundus*	Cyperaceae	H	Stem		
17	*Digera muricata*	Amaranthaceae	H	Stem	Leaf	
18	*Eclipta prostrata*	Asteraceae	H	Stem	Leaf	
19	*Glinus lotoides*	Molluginaceae	H	Stem	Leaf	
20	*Holoptelia integrifolia*	Urticaceae	T	Stem	Leaf	
21	*Indigofera tinctoria*	Fabaceae	H	Stem		
22	*Lepidagathis trinervis*	Acanthaceae	H	Stem		
23	*Leptadenia spartium*	Asclepiadaceae	S	Stem		
24	*Medicago sativa*	Fabaceae	H	Stem	Leaf	
25	*Melothria maderaspatana*	Cucurbitaceae	Cl	Stem		
26	*Momordica balsamina*	Cucurbitaceae	Cl	Stem	Leaf	Flower
27	*Moschosma polystychyum*	Lamiaceae	H	Stem		
28	*Parthenium hysterophorus*	Asteraceae	H	Stem		

Sr. No.	Species	Family	Habit	Vegetative organ parasitized		
29	*Phyllanthus fraternus*	Euphorbiaceae	H	Stem	Leaf	Flower
30	*Physalis minima*	Solanaceae	H	Stem	Leaf	Flower
31	*Polygonum glabrum*	Polygonaceae	H	Stem		
32	*Salvadora oleoides*	Salvadoraceae	S	Stem		
33	*Sida rhombifolia*	Malvaceae	H	Stem	Leaf	
34	*Solanum nigrum*	Solanaceae	H	Stem	Leaf	
35	*Spermacoce hispida*	Rubiaceae	H	Stem		
36	*Tephrosia villosa*	Fabaceae	H	Stem	Leaf	
37	*Tribulus terrestris*	Zygophyliaceae	H	Stem		
38	*Trichodesma indicum*	Boraginaceae	H	Stem		
39	*Tridax procumbens*	Asteraceae	H	Stem		
40	*Withania somnifera*	Solanaceae	H	Stem	Leaf	
41	*Xanthium strumarium*	Asteraceae	S	Stem	Leaf	Flower
42	*Zornia diphylla*	Fabaceae	H	Stem		

Abbreviations: H - Herb, S - Shrub, Cl - Climber, T – Tree

Table: 2: List Host of *Cuscuta reflexa* from field observations

Sr. No.	Botanical Name	Family	Habit	Vegetative organ parasitized		
1	*Acacia nilotica*	Mimosaceae	T	Stem		
2	*Azadirachta indica*	Meliaceae	T	Stem	Leaf	
3	*Bougainvillea spectabilis*	Nyctaginaceae	Cl	Stem	Leaf	
4	*Butea monosperma*	Fabaceae	T	Stem		
5	*Calotropis procera*	Asclepiadaceae	S	Stem		
6	*Capparis decidua*	Capparaceae	S	Stem		
7	*Capparis sepiaria*	Capparaceae	S	Stem		
8	*Clerodendron multiflorum*	Verbenaceae	S	Stem	Leaf	
9	*Clerodendrum inerme*	Verbenaceae	S	Stem		
10	*Datura metal*	Solanaceae	H	Stem		
11	*Euphorbia neriifolia*	Euphorbiaceae	S	Stem		
12	*Ficus religiosa*	Moraceae	T	Stem	Leaf	
13	*Holoptelea integrifolia*	Urticaceae	T	Stem	Leaf	
14	*Ipomoea aquatica*	Convolvulaceae	Cl	Stem		
15	*Ipomoea pes-tigridis*	Convolvulaceae	Cl	Stem		
16	*Jatropha gossypifolia*	Euphorbiaceae	S	Stem		
17	*Kiranganelia reticulata*	Euphorbiaceae	S	Stem		

Sr. No.	Botanical Name	Family	Habit	Vegetative organ parasitized		
18	*Lantana camara*	Verbenaceae	S	Stem		
19	*Maytenus emarginata*	Celastraceae	S	Stem	Leaf	
20	*Polyathia longifolia*	Annonaceae	T	Stem		
21	*Prosopis chilensis*	Mimosaceae	T	Stem		
22	*Prosopis cineraria*	Mimosaceae	T	Stem		
23	*Rhynchosia minima*	Fabaceae	Cl	Stem		
24	*Salvadora persica*	Salvadoraceae	T	Stem		
25	*Tecoma stans*	Bignoniaceae	S	Stem		

Abbreviations: H - Herb, S - Shrub, Cl - Climber, T – Tree

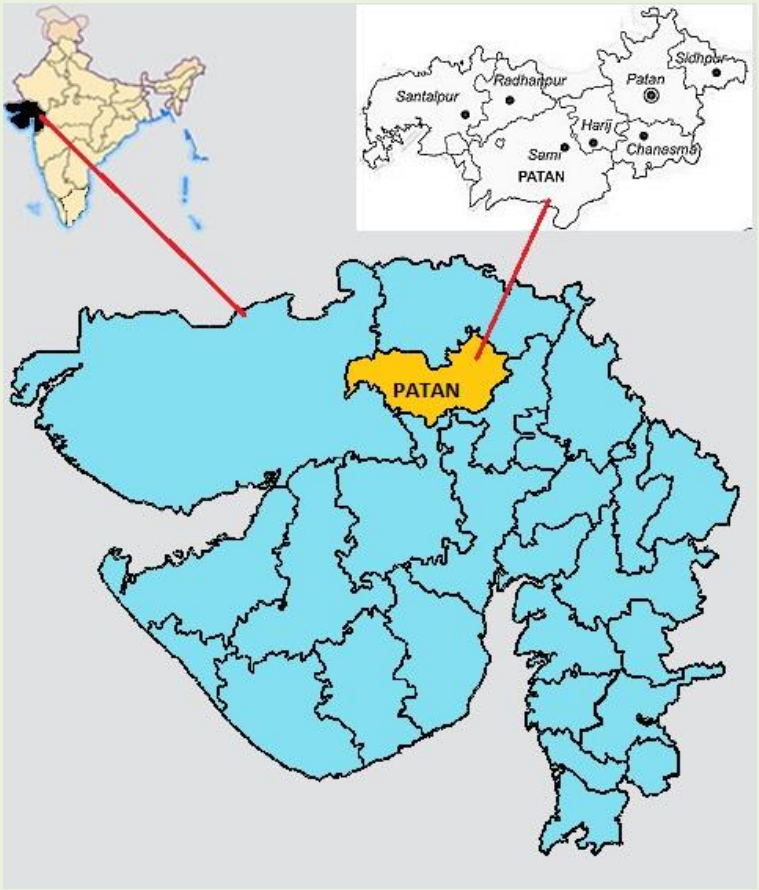

Figure 1. Map of Study area

Figure 2. ***Cuscuta chinensis*** **Lam. on** ***Duranta plumeri*** **Jacq.**

Figure 3. ***Cuscuta chinensis*** **Lam. on** ***Solanum xanthocarpum*** **Schrad. & H. Wendl.**

Figure 4. ***Cuscuta chinensis*** **Lam. On** ***Cassia tora*** **L.**

Figure 5. ***Cuscuta reflexa*** **Roxb. on** ***Bougainvillea spectabilis*** **Willd.**