

Host Range of *Cuscuta reflexa* Roxb. in Jammu Province of Jammu and Kashmir State, India

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The holoparasite, *Cuscuta reflexa* Roxb., has emerged as an obnoxious trailing and climber weed adversely affecting the plant diversity in various regions of India. It is known to be extensively distributed throughout India ascending the Himalayas upto an altitude of 8000 feet to the plains of West Bengal, Uttar Pradesh, Andhra Pradesh and Punjab extending upto Uttarakhand and Kashmir that expand species distribution to the farthest limit of the Himalayas in the west (Vaid and Naithani, 1971).

Significant losses of crop plants, oil seed crops, the fruit plants, woody trees, ornamentals, shrubs etc. have been reported in many Indian states due to infection by *C. reflexa*. Although a few researchers have reported the occurrence of *C. reflexa* from Kashmir region of Jammu and Kashmir (Sharma and Kachroo, 1981; Dhar and Kachroo, 1983), the information on its host range and damage caused to host vegetation in Jammu region is wanting. Therefore, the present investigation was carried out to survey the occurrence and distribution of *C. reflexa* in Jammu region, record its host range, severity, and intensity of infection.

Periodic surveys were carried out to assess the presence of *C. reflexa* and its association with the host species in several sites in Udhampur, Jammu and Rajouri districts of Jammu Province. Collection and collation of parasitic *C. reflexa* alongwith its hosts was made in their vegetative and reproductive phases. For each host plant species, 4-5 specimens were collected from a particular study-site and their detailed field information was noted under a specific collection number. A number of parasitized plants were photographed on the spot to aid in identification. The infested plants were initially recorded based on visual observation of the attachment of vegetative parts of *C. reflexa* to the host plant by following the method of Qasem (2006). In this method, an arbitrary visual rating of low (L), moderate (M) or high (H) infection was assigned to describe the intensity of parasite infection on different host species and in the total area surveyed. Another scale of 1 to 5 was used for the severity of damage that the parasite inflicted on

its host; 1 denoting that the host was least affected and 5 denoting that the damage to the host plant was severe. The severity and intensity of infection was evaluated by observing the damage incurred on the vegetative parts of the host plant and the bulk of the vegetative mass of parasite shoots on host plant, respectively.

The present survey revealed the incidence of *C. reflexa* on 34 host plants species of angiosperms belonging to 21 plant families (Table 1). These host plants were categorized as fruit plants, forest plants, medicinal plants, weeds and other plants of ecological significance. All these diverse host species excepting for *Ziziphus mauritiana* Lamk., *Lantana camara* L., *Cannabis sativa* L. and *Parthenium hysterophorus* L. are the first record of new hosts of *C. reflexa* from India.

The number of host plants infested by *C. reflexa* and the intensity of infection varied with the place of occurrence. The parasite was found on 11 host species in Udhampur district, while in Kalakote area of Rajouri district, *C. reflexa* was found parasitizing only three host species which include *Carissa opaca* Stapf., *Mallotus philippensis* Muell-Arg. and *Morus alba* L. In Jammu; however, it was prominently growing in different locations of Akhnoor, Bajalta, Jammu, Jhajarkotli and Nagrota parasitizing maximum number of host species. The incidence of the parasite on broad range of hosts in various localities of three districts confirms the cosmopolitan nature and the generalist behaviour of the parasite and its adaptation to varied agro-climatic conditions of the state. However, parasitization of maximum number of hosts in Jammu region may be due to its preference for semi-humid, tropical and sub-tropical conditions. These results substantiate the reports of occurrence of *C. reflexa* in such climate in several other regions of India (Misra and Prasad, 1988 ; Kondap and Kumar, 1993).

The severity of infection also varied for different host species (Table 1). The parasitized host plants showed a plethora of symptoms including yellowing of leaves, suppression of new foliage emergence,

Table 1. Host plant species parasitized by *Cuscuta reflexa* Roxb.

Botanical name	Family	Growth form	Status	Intensity of infection†	Severity of infection‡	Location	Number of infested locations (out of 7)
Fruit trees							
<i>Citrus medica</i> L.	Rutaceae	ST	C	L	I	Udhampur	1
<i>Citrus sinensis</i> (L.) Osbeck	Rutaceae	ST	C	L	1	Udhampur	1
<i>Ficus carica</i> L.	Moraceae	T	C,W	L	1	Udhampur, Nagrota	2
<i>Mangifera indica</i> L.	Anacardiaceae	T	C	L	1	Udhampur	1
<i>Morus alba</i> L.	Moraceae	T	C,W	M	2	Kalakot, Nagrota, Akhnoor	3
<i>Morus nigra</i> L.	Moraceae	T	C,W	M	3	Akhnoor, Nagrota, Jammu	4
<i>Phoenix sylvestris</i> Roxb.	Palmae	T	C,W	L	1	Udhampur	1
<i>Pyrus pashia</i> Buch. Ham.	Rosaceae	T	C,W	M	2	Jhajjarkotli	1
<i>Vitis vinifera</i> L.	Verbenaceae	CL	C	L	1	Udhampur	1
<i>Ziziphus mauritiana</i> Lamk.	Rhamnaceae	T	C,W	M	2	Udhampur, Nagrota, Akhnoor	3
Forest trees							
<i>Acacia modesta</i> Wall.	Mimosaceae	T	W	L	1	Jammu	1
<i>Acacia nilotica</i> Del.	Mimosaceae	T	W	L	1	Jammu	1
<i>Albizia lebbek</i> (L.) Benth.	Mimosaceae	T	W	L	1	Jammu	1
<i>Butea monosperma</i> (Lamk.) Taub.	Papilionaceae	T	W	L	1	Bajalta	1
<i>Melia azedarach</i> L.	Meliaceae	T	W	L	1	Akhnoor	1
<i>Wendlandia henyei</i> Sant. & Merch.	Menispermaceae	T	W	L	1	Bajalta	1
Medicinal plants							
<i>Abutilon indicum</i> (L.) Sweet		Sh	W	M	2	Jammu	1
<i>Adhatoda vasica</i> (L.) Nees	Acanthaceae	Sh	W	H	5	Udhampur, Akhnoor, Jammu	3
<i>Amaranthus viridis</i> L.	Amaranthaceae	H	W	L	1	Jammu	1
<i>Carissa opaca</i> Stapf.	Apocynaceae	Sh	W	M	3	Kalakot, Jammu	2
<i>Mallotus philippensis</i> Muell-Arg.	Euphorbiaceae	ST	W	M	3	Nagrota, Kalakot, Jammu, Bajalta	4
<i>Murraya koenigii</i> Spreng.	Rutaceae	Sh	C,W	L	1	Bajalta	1
<i>Ricinus communis</i> L.	Euphorbiaceae	Sh	W	M	2	Jammu, Udhampur	2
<i>Tylophora indica</i>	Asclepiadaceae	Cl	W	L	1	Jammu	1
Weeds							
<i>Cannabis sativa</i> L.	Cannabinaceae	H	W	M	2	Jammu	1
<i>Lantana camara</i> L.	Verbenaceae	Sh	W	L	1	Bajalta, Jammu	2
<i>Parthenium hysterophorus</i> L.	Asteraceae	H	W	M	2	Jammu	1
Other plants							
<i>Barleria cristata</i> L.	Acanthaceae	Sh	W	M	2	Jammu	1
<i>Cassia occidentalis</i> L.	Caesalpinaceae	Sh	W	L	1	Jammu	1
<i>Ipomoea carnea</i> (Mart. ex Choisy) Austin	Convolvulaceae	Sh	W	L	1	Udhampur	1
<i>Pisum sativum</i> L.	Papilionaceae	H	C,W	M	2	Udhampur	1
<i>Sonchus oleraceus</i> L.	Asteraceae	H	W	M	2	Jammu	1
<i>Thysanolaena maxima</i> Ktze.	Poaceae	H	W	L	1	Jammu	1
<i>Tylophora hirsute</i> Wt & Arn.	Asclepiadaceae	Cl	W	L	1	Jammu	1

†Intensity of infection relates to the extent of parasite development : L–Low, M–Moderate or H–High. ‡Severity of infection : 1–Least affected host, 5– Severely affected and damaged host plant, H– Herb, Cl– Climber, Sh–Shrub, ST– Small tree, T– Tree, C– Cultivated, W –Wild.

weakening and subsequent drying up of tender shoots, reduced flowering and fruiting. In general, the medicinal plants were amongst the worst affected group followed by fruit trees, weeds and other plants whilst the forest vegetation was comparatively less affected.

Two monocots viz., *Phoenix sylvestris* and *Thysanolaena maxima* were also recorded as the potential hosts of this parasite, though with least intensity and severity of infection. It may be due to the failure of this parasite to attack most monocots due to the low

efficacy of its enzymes involved in the breakdown of monocotyledonous tissues during penetration by the parasite as advocated by Dawson *et al.* (1994).

The survey, thus, provides some vital information on the potential threat that this parasite might exert on the economically important vegetation in Jammu and Kashmir and other regions of India. Besides, its capability to establish, invade and outcompete various hosts has also threatened the availability of fodder to the herbivores in the region. Therefore, it is imperative to have an effective strategy for the management and prevention of its proliferation to newer areas of vegetation.

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