LORANTHUS PARASITISM - A CHALLENGE TO THE DEVELOPMENT OF ECONOMIC TREE RESOURCE IN THE RAWALPINDI EAST REGION

Zakaullah, Mohammad Irfanul Haque and Khial Badshah*

Abstract

During the investigations on *Loranthus longiflorus* and *L.pulverulentus* it was observed that both the parasites were found growing between 500–1050m above sea level. *L. pulverulentus* was parasitizing the plants in the higher range and *L. longiflorus* in the lower range. They were found attacking 32 timber and fruit plant species some of which had been reported earlier *L. longiflorus* was more prevalent particularly on old trees of *Acacia modesta*, while *L. pulverulentus* had comparatively low incidence. Only four host species were found commonly attacked by both parasites. For the rest of 28 species they were host specific. *L. pulverulentus* is a new record in the scrub forests of Rawalpindi.

Introduction

Loranthus longiflorus Desr (Syn. *Dendrophthoe falcata* (L.f) Etting) is known to occur in the scrub forests of Rawalpindi District (Abdullah, 1973). The parasite attacks a number of angiosperms but Parker (1921), stated that it did not cause appreciable damage in the area. This study was, therefore, undertaken to find out the host range and incidence of the parasite in these forests.

Rawalpindi District is located in the north-west corner of the Punjab, between 33° and 34° N latitude and 72° and 74° E longitude. It is a country of broken plains and denuded hills with an altitude of 457m at Gujjar Khan, 503m at Rawalpindi and rising upto 2286m at Murree. The dominant tree species are *Olea ferruginea* and *Acacia modesta* growing alongwith a large number of shrubs.

Review of Literature

Champion *et al.* 1965 classified the scrub forests of Rawalpindi as dry subtropical broadleaved forests. These have been reported to occupy the lower slopes from 457m to 1524m and cover an area of 20235 ha. in the district (Muhammad, 1972). No systematic studies have been made on *Loranthus* spp. growing and parasitizing different hosts in the scrub forests of Rawalpindi. However some workers (Brandis, 1874; Parker, 1921; Stewart, 1972; Abdulla, 1973) have described recorded and their occurrence on a number of tree species in the area (Stewart, 1952; Ahmad, 1959; Jamal and Beg, 1974).

Materials and Methods

Information about locations of *Loranthus parasitism* was collected through enquiries

*The authors are the Forest Pathologist and Investigators respectively at the Pakistan Forest Institute, Peshawar.

from the local inhabitants as well as the forest staff by showing them the *Loranthus* plant samples.

Localities were subsequently visited and infested compartments surveyed by taking 0.5% area of each compartment along the inspection and bridal paths. Where no paths were available plots measuring 60.96 x 15.24m were laid along the compartment boundary or along a line-transect, running through the centre of the compartment at regular intervals. Data on elevation, tree species and dbh (diameter at breast height) were recorded in respect of each sample tree. The important symptoms caused by the parasites were also noted.

Results

Host range: The study revealed that two species *L. longiflorus* and *L. pulverulentus* grow in the scrub forests of Rawalpindi District. *L. pulverulentus* was a new record for the area. They were both found to attack a total of 32 tree species of 22 families, including both indigenous and exotic types. *L. longiflorus* occupied a wider altitude belt of 500–1050m. However, it was found more prevalent in a narrow strip of 850–1050m. It had a wide host range, attacking 23 host species with 13 new records, whereas *L. pulverulentus* was found parasitizing 9 hosts. Although both have four common hosts i.e. *Acacia modesta, Olea ferruginea, Dalbergia sissoo* and *Morus alba* they were in general host-specific. Of the various host species, *A. modesta* with its higher density was badly attacked by *L. longiflorus* with an incidence of 33%. *L. longiflorus* was found to be more virulent on older trees in the lower altitude limits from 500–900m, while *L. pulverulentus* was present in higher altitudes with low incidence. The host range of the two parasites is given in table 1.

Table 1

Host range of *L. longiflorus* and *L. pulverulentus*

Parasite		Host	Locality	Occurrence
Loranthus longiflorus				
	1.	Leguminosae *Acacia modesta*	Lehtrar, Jandala; Karor; Tret; Kallar forests	recorded/most common.
		Dalbergia sissoo	Tret; Ghoon forests	recorded/rare
		Albizzia labbek	Foot-hill zone	recorded
	2.	Anacardiaceae *Lannea coromendelica**	Karor forests	rare

Parasite	Host	Locality	Occurence
	*Pistacia integerrima**	Lehtrar; Karor Forests	rare
3.	Salicaceae *Populus x euramericana**	Lehtrar; Kahuta	rare
	*Salix acmophylla**	Lehtrar; Jandala	rare
4.	Oleaceae *Olea ferruginea**	*Karor* forests	common
5.	Bombacaceae *Salmalia malabarica*	Jandala; Karor; Ghoon; Panjar	common
6.	Apocynaceae *Carissa opaca*	Karor; Ghoon forests	recorded
7.	Moraceae *Ficus palmata*	Ghoon forests	recorded
	*Ficus racemosa**	Ghoon forests	rare
	*Morus alba**	Kathar Kahuta	rare
8.	Boraginaceae *Ehretia laevis**	Ghoon forests	rare
9.	Rosaceae *Prunus armeniaca**	Rehan Kallar forests	rare
10.	Euphorbiaceae *Mallotus philippinensis**	Tret; Ghoon forests	rare
11.	Rubiaceae *Wendlandia exserta**	Panjar; Ghoon forests	rare
12.	Lythraceae *Woodfordia fruticosa**	Ghoon forests	rare
13.	Rhamnaceae *Zizyphus nummularia**	Salgran	rare

Table 4

Compartmentwise infestation of *L. longiflorus* & *L. pulverulentus* in Rawalpindi District

Sl. No.	Compartment No. and Forest.	Forest Range	Total area (ha.)	Infestation (%)
	Rawalpindi North Forest Division			
1.	91, Salgran Reserved Forest	Tret	183	30.5
2.	86/iv, Nand Kot Protection Forest	Tret	148	26.9
3.	47, Salanga R. F.	Lehtrar	201	28.6
4.	44, Dhamnuta P. F.	Karor	122	48.2
5.	19, Boga R.F.	Karor	168	15.2
6.	20, Boga R. F.	Karor	35	20.0
7.	101, Amban, P. F.	Karor	377	20.0
	Rawalpindi South Forest Division			
8.	90, Nalasehr R. F.	Kallar	299	41.2
9.	75/iii, Kanand P. F.	Kallar	83	42.1
10.	88, Plakhar P. F.	Kallar	171	48.6
11.	95/ii, Balimah, R.F.	Kallar	59	28.1

Symptoms and effects of mistletoe: Both the parasites caused excessive growth and abnormal swellings on the host. The infested branch has atrophied above the point of infestation. This was characterised by a swelling or a graft so perfect that mistletoe appears to emerge as a normal branch. Top dying and sparse foliage were the other visible effects of the parasite on *A. modesta*.

Discussion:

In Pakistan, *Loranthus* species attack a large number of economically important broad-leaved timber, fuelwood, fodder and fruit species. In India, they were found on tea (Delacroix, 1902; Kumar, 1939; Narasimhan, 1920; Singh, 1954; Troup, 1921), citrus and mango (Sarma, 1952) and in Australia on *Pinus muricata* and *P. radiata* (Pescott, 1946; Rawlings, 1950) and Eucalyptus spp. (Anonymous, 1954), thus extending host range of the parasites. Among the hosts involved are tropical timber species as well as subtropical and temperate fruit and other species.

According to Beg (1982), keep a check on the deeper penetration of high storey elements of one zone into the other. Accordingly, in the overlapping zone whenever a tree attempts to extend its range beyond a certain limit, that of the lower zone into the upper and likewise that of the higher into the lower, it is attacked. The same is true for an introduced temperate tree in the ecotonal belt.

The study, therefore, suggests that when grown out of their optimal range, a large number of economic trees are subject to attack of *Loranthus* parasites in the area.

Recommendations:

The situation urges that either protection of the trees against the parasites should form a part of the management programmes or planting of susceptible species be avoided in the region.

Acknowledgements:

We are grateful to Dr. G. M. Khattak, the then Director Gerneral and Dr. M. N. Malik. The then Director General, Pakistan Forest Instt. Peshawar for their kind support and guidance throughout the course of the study. We acknowledge the help of Mr. Sayeed Ahmad Khan, Research Assistant, P.F.I., Peshwar for help in the identification of specimens.

Grateful thanks are due to Dr. A.R. Beg, Forest Botanist for useful criticism, interpretation of the results and giving the present shape to the article.

This research has been financed in part by USDA, under PL-480 programme "Survey and control of mistletoes in Pakistan"(PK-55/FG-Pa-327).

REFERENCES:

1. Abdulla, P. (1973). Loranthaceae No. 35, Stewart Herbarium, Gordon College, Rawalpindi. *Printed* at *Ferozsons* Ltd. Rawalpindi.

2. Anonymous (1954). Mistletoe Control. Rep. For. Timb. Bur. Aust. 1953. (For. Abst. No. 1884, Vol.. 16. (1955).

3. Ahmad, M.B. (1959). Revised Working Plan for the Murree Kahuta Forests of Rawalpindi District (1953-54 to 1982-83). Printed by the Superintendent, Government Printing, Punjab, Lahore.

4. Beg, A.R. (1982). Personal communication. Pakistan Forest Institute, Peshawar.

5. Brandis, D. (1874). The Forest Flora of North-west and Central India. Publishers Wm. H. Allen and Co.,13 Waterloo Place, S.W. London.

6. Brooks, F.T. (1914). Species of *Loranthus* on rubber trees. Fed. Malay States Agri. Bul. 3:7–9). (The mistletoes. A literature review. Tech. Bul. No. 1242, U.S.D.A. For.Ser. P.43.).