

JUNIPER DWARF MISTLETOE AND STEEPNESS OF SLOPE

Zakaullah*

Summary. *The studies carried out in the Sasnamana forest of Baluchistan revealed that the incidence of dwarf mistletoe infection was the highest in trees growing on areas with gentle slopes. The incidence decreased as the steepness of slope increased.*

Objective. Following Zakaullah and Badshah (1977) and Zakaullah's (1977) work on mistletoe, this study was undertaken to determine if there existed a relationship between incidence of the parasite and steepness of slope in the Sasnamana forest of Baluchistan.

Methods. Three equidistant lines were drawn running north-south on the map of Sasnamana Forest (1:50,000). On each line, plots were marked at intervals of 377 m. The plots were located in the forest by pacing and hand compass. At each plot station, a circular plot of 0.05 ha was established. The slope for the plots was determined by Haga altimeter. All the trees in a plot were numbered. The data on mistletoe rating were recorded for each study tree.

The 6-class infection-rating system described by Hawksworth and Lusher (1956) was adopted to record the incidence of infection. The live crown of the tree was divided into three parts from top to bottom and each third rated as: (0) no visible infection; (1) light infection (1/2 or less of total number of branches in the third infected); (2) heavy infection (more than 1/2 of total number of branches in the third infected). The ratings of each third were added to obtain a total for the tree. Mistletoe ratings for all the infected trees in a plot were averaged.

Results. Out of 72 plots studied, 31 were infected (43.1%). The incidence of infection was highest in plots established on gentle slopes (64.2%), intermediate on moderate slopes (41%) and lowest on steep slopes (35.2%). The total number of trees was 479. Of these, 183 were infected (38.2%). The infected trees were studied and an average infection rating was determined as 3.1. The highest incidence of 54.9% was recorded in trees growing on gentle slopes, followed by 37.3 and 20.3 percent infection of moderate and steep slopes, respectively. The incidence of infection decreased with the steepness of slope, as would be indicated by the following data:

Steepness of slope	Number of plots	Plots with mistletoe		Number of trees		Trees with mistletoe		Infection* rating
		No.	%	No.	%	No.	%	
Gentle (under 10 percent)	14	9	64.2	77	50	54.9	4.2	
Moderate (10 to 30 percent)	39	16	41.0	300	112	37.3	3.5	
Steep (over 30 percent)	19	6	35.2	102	21	20.6	1.7	

*Based on 6-class system of Hawksworth and Lusher (1956).

*The author is Forest Pathologist at the Pakistan Forest Institute, Peshawar.

Discussion and Conclusion. The results indicate that the incidence of infection varies from 21 to 55% and the infection rating for the infected trees from 1.7 to 4.2, depending on the steepness of slope. This shows that steepness of slope is a factor that influences the incidence of dwarf mistletoe infection.

The incidence of dwarf mistletoe infection was found to be the highest on gentle slopes as reported by other workers (Hawksworth, 1959; Andrews and Daniels, 1960; Hawksworth, 1968).

Acknowledgements. The cooperation of the following is gratefully acknowledged:

- (1) Mr. A.S. Swathi, Chief Conservator of Forests Quetta, Baluchistan;
- (2) Mr. K.M. Shams, Conservator of Forests, Quetta Forest Circle, Quetta;
- (3) Mr. M.I. Sheikh, Director Forestry Research Division, Pakistan Forest Institute, Peshawar.
- (4) Dr. M.N. Malik, Director Biological Sciences Research Division, P.F.I. Peshawar.

References

1. ANDREWS, STUART R. and DANIELS, JOHN P. (1960). A survey of dwarf mistletoe in Arizona and New Mexico. U. S. For. Sev., Rocky Mountain Forest and Range Exp. Sta., Sta. Pap. 49, 17 pp.
2. HAWKSWORTH, F.G. (1959). Distribution of Dwarf Mistletoes in relation to Topography on the Mescalero-Apache Reservation, New Mexico. J. Forest. 57: 919-922.
3. HAWKSWORTH, F.G. (1968). Ponderosa Pine Dwarf Mistletoe in relation to Topography and soils on the Manitou Experimental Forest, Colorado. U.S. For. Serv., Rocky Mountain Forest and Range Exp. Sta., Sta. Pap. 107, 4 pp.
4. HAWKSWORTH, F.G. and ARTHUR A. LUSHER. (1956). Dwarf Mistletoe survey and control on the Mescalero-Apache Reservation—New Mexico. Jour. For. 54: 354-390, illus.
5. ZAKAULLAH. (1977). Survey of juniper dwarf mistletoe in the adjacent areas of Sasnamana state forest of Baluchistan. Pakistan J. For. 27(3): 143-146.
6. ZAKAULLAH and K. BADSHAH. (1977). Survey of juniper dwarf mistletoe in the Sasnamana state forest of Baluchistan. Pakistan J. For. 27(1): 39-50.

A REVIEW OF WATERSHED MANAGEMENT WORKS CARRIED OUT IN PAKISTAN TILL JUNE 1978

Abdul Aleem*

Pakistan can be divided into the following watershed regions, grouped to the north and the west around the vast alluvial plain of the Indus which forms the core of the country (Roitzsch, 1968).

- (1) The Northern Mountain Region comprising the inland Indus Basin above Attock with Swat-Chitral and Gilgit tributary catchments, and the inland Jhelum Basin upstream of Mangla
- (2) The Uplands of Northern Punjab with the catchments of Haro and Soan rivers
- (3) The Western Mountain Region including the catchments of Kohat Toi, Kurram, Zhob—Gomal, and small streams of Quetta district
- (4) The South-Western Baluchistan Plateau, not a water-producing area
- (5) The Coastal Zone with Hub, Porali-Kud, and Dasht river catchments
- (6) The Indus Plains

Of these, the most important are the mountainous areas which yield water after it is received in the form of snow or rain. It is the management of these areas which is posing problems

“These areas have so far been regarded at best, as areas producing water for use in the southern irrigated sections. At worst, these have become in the minds of many programme planners, a source of increasing loads of silt and sediment which clog the irrigation-power infrastructure. Seldom is it recognised as a region whose potentially productive soils could produce significant portions of needed foodstuff for the national welfare as well as higher quality water for plains irrigation.

But the area is important not only for the water and power it can export to southern areas of Pakistan. The land already supports over ten million people who depend on it for their livelihood, even though farming practices are crude and its land resources are

*The author is Watershed Management Specialist, Pakistan Forest Institute, Peshawar.