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Menace of die-back in shisham plantations of District Jhang

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Abstract

Shisham (*Dalbergia sissoo* Roxb.) die-back on state owned forests and farmlands in district Jhang was studied during 2003. An area of 120 acres of Shorkot plantation, 50 acres of Sajhowl bela , 11 avenue Km of Jhang - Sargodha road side, 18 avenue Km of Rangpur canal side and 16 different land holdings of 4 rural union councils of tehsil Jhang were randomly selected. The results indicated that maximum tree mortality of 34% was observed along roadside followed by 25% on canal side, 23.12% in irrigated plantation and 20 % in Bela (Riverian) forest. The age classes of these forest categories varied from 7-11 (Farmlands), 5-25 (riverian forest), 20-35 (road sides), 30-35(irrigated plantations) and 35-60(canal sides) years. None of these forest categories was water logged and saline except Shorkot plantation. The results of 16 different landholdings encompassing an area of 496 acres with an average of 13 trees per acre varying in age from 3-35 years depicted a significant increase in infection with the age of trees. Although the average infection percentage/ landholding was low (16.16%) but a maximum of 40.0% with a varying number of completely dead trees were recorded.

Key words: Shisham, *Dalbergia sissoo*, die-back, Jhang.

Introduction

Shisham occupies more than 80% of forest area of Punjab. Besides, it is also successfully growing in some parts of NWFP, Sindh and Azad Jammu & Kashmir. This tree is naturally growing along foot hills of Himalaya and extends in the Indus Valley up to Attock and is raised as irrigated plantations, chack plantations, linear plantations and as shelter belts on farmlands throughout the Province since the middle of 19th century (Anon. 2001). Farmer are claiming to grow this tree for generations due to their elders advice that this "magic" will always provide a relief during severe financial constraints, besides providing dowry for the marriage of their daughters.

The term die-back used to describe the stress conditions is characterized by the reduced growth, shortened internodes, root necrosis, premature fall coloring, sprouting from adventitious buds and (or) increased prevalence and pathogenecity of root decay fungi, nematodes, insects etc. (William and Edwin, 1994). Generally it is considered that these abnormalities resulted from deterioration of eco-edaphic conditions, debarking and heavy lopping, intensive cultivation of agricultural crops & extensive use of chemicals and changed pattern of agricultural practices which eventually inviting insect/pest attack as a natural sequence of events (Anon, 2001). This disease came to limelight since mid 1998, after which different Institutions like Ayub Agricultural Research Institute (AARI), University of Agriculture Faisalabad (UAF), Nuclear Institute of Biological and Genetic Engineering (NIBGE), Pakistan Forest Institute (PFI) Peshawar are under- taking diagnostic studies to work out the remedial measures. This study is designed to evaluate the extant of die-back in state owned plantations and on farmlands of district Jhang.

Materials and Methods

Jhang lies from 30^0,38` to $32^0$,00` north latitudes and 71^0,37` to $73^0$,13` east longitudes. Its total area is 8808.59 sq. km, comprising of three tehsils, namely Jhang, Chiniot and Shorkot. The surface of the district presents three well-marked topographic features i.e. sand dunes of Thal desert, a fertile plain and curious out crop of rocks. The climate of the area is arid to semi-arid. The irrigation system comprises of two river (Chenab and Jhelum), Trimu headwork, two link canals and an extensive conveyance system (measuring 723.23 km).

1. State Owned Forests

Jhang Forest Division is managing all kinds of public and private forests spreading over an area of 18636.00 Acres of Block Forests and 782.00 kilometers of Linear Plantations. The details of the demarcated area/category at the rate of 1% sampling intensity include 120 acre of Shorkot plantations, 50 Acres of riverian (Bela) forests, 11

km of roadside and 18 km of canal side plantations (Table I).

Three plots each of 40 acres were selected at random places in three compartments caring numbers 45, 46 and 47 of Shorkot plantation with the help of Sub Divisional Forest Officer (SDFO) and Range Forest Officer (RFO) for the collection of data. Similarly 5 plots each of 10 acres were randomly selected at the rate of one plot per compartment bearing Nos. 1, 2, 3, 4, and 5 with the help of SDFO.

Eleven km on both sides of the Jhang – Sargodha Road starting from Adhiwal Chowk to 13th km and 18 km of Rangpur canal side plantation starting from Burgi # 1 to Burgi # 26 near Trimu Head works were selected to collect the designed data.

2. Farmlands

A questionnaire dealing with farmer's land status, incidence and extent of die-back, agricultural inputs and local wisdom about the spread of the disease was developed.

Based on 10% sampling intensity, 4 rural union councils out of 41 and two villages per union council & two farmers per village were selected to compile the data. The details of the selected union councils, villages and farmers are in Table-II below.

Data regarding age of trees and infection % was analyzed by applying regression equation while data for area of agricultural crops, number of irrigation, use of fertilizers and other chemicals was analyzed by applying T-Test.

Results And Discussion

1. State Owned Forest/Plantations

(a) Shorkot irrigated plantation

Data with regard to the extent of Shisham die back is given in Table-I. There were a total of 1650 standard trees on 120 acres growing at the rate of 13 trees/acre varying in age from 30-35, along with eucalyptus and wild mesquite. Amongst these standard trees 12.4% were infected and 23.12% completely dead. The remaining 64.48% of the Shisham trees were apparently lush green. Similar results were also reported by Sharma *et al*. (2000). Water logging and salinity was the common problem throughout the plantation.

Table-I: Incidence/intensity of die-back on state owned forests of district Jhang

Category of plantation	Area surveyed	Total number of shisham trees	Die-back%			Age (years)	Type of soil	Water logging/ Salinity	Type of Industry
			Healthy	Infected	Dead				
Irrigated	120 Acres	1650	64.47	12.36	23.12	30-35	Sandy loam	Yes	No
Riverian	50 Acres	20600	65	15	20	5-25	Sandy loam	No	No
Canal side	11 miles	4282	55.45	20	24.54	35-60	Sandy + Clay	No	No
Road side	7 miles	1043	43	23	34	20-35	Sandy	No	No

Table-II: Description of union councils, villages and farmers

S.No	Name of Union council	Name of Village	Name of Farmers
1	Pakkey Wala	1. Pakkey wala	(1) Allah Ditta (2) M. Nawaz
		2. Habib	(1) M.Allah Ditta (2) Babar
2	18 Hazzari	1. Mansoor Sial	(1) N. Nawaz (2) M.Bux
		2. 18 Hazzari	(1) M.Arif (2) Haji Mumtaz
3	Pir Kot Sadhana	1. Chack Said Behram	(1) IqbalKhokhar (2)SarfarazKhan
		2. Massan	(1) M Sattar (2) M.Riaz
4	Kot Sai Singh	1. Kot Sai Singh	(1) Ali Nawaz (2).M.Afzal
		2. Chack Ghumnana	(1) M. Ramzan (2) M. Arfan

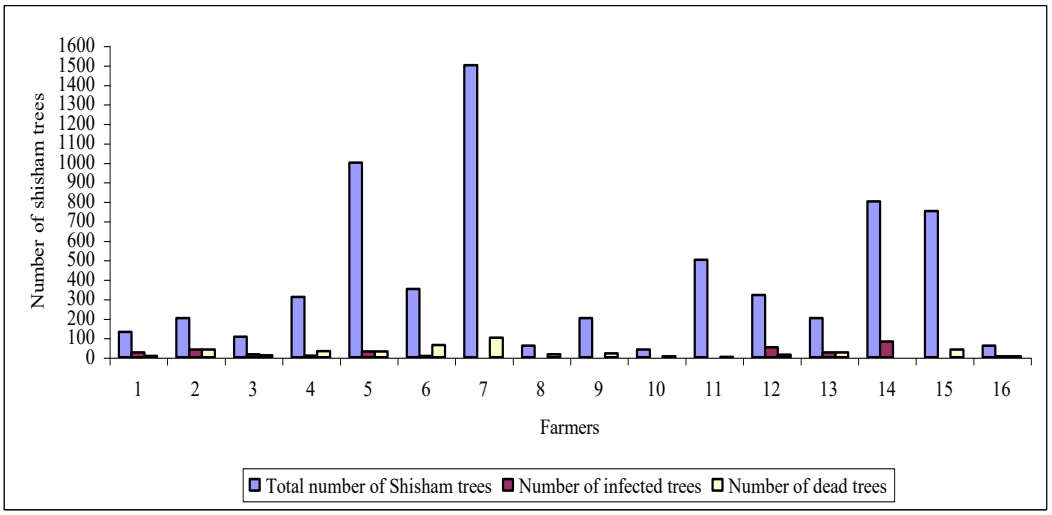

Fig. 1. Presentation of health status of Shisham trees growing on farmlands

(b) Riverian (bela) plantation

The results pertaining to the Sajhowal Bela plantation presented in Table-I above depicted that there were a total of 20,600 Shisham trees/50 acre which varied in age from of 5-35 years. 35% of the total trees were infected with die back, of which 20 % were completely dead. While remaining 65% were in good health and showed no sign of die-back. The soil of Bela was sandy loam, no water logging & salinity and no industry was observed nearby the plantation.

(c) Canal side Plantation

Canal side data shown in the Table-I above indicated that a total of 4,282 trees enumerated on 18 km were in the age class of 35–60 years. More than 20% were infected and 24% were died. Similar results had also been reported by Sharma *et al*. (2000) in India and Bajwa *et al*. (2003) in Pakistan. The remaining 55% did not show any problem of die-back

(d) Road Side Plantation

Data given in Table-I above indicated that 1,043 Shisham trees of 20-35 years age growing on 11 Avenue km of Jhang- Sargodha Road showing no symptoms of water logging/salinity and no industrial waste was recorded in the area. Of the 57% of the total Shisham trees found diseased or dead, 34% were completely dead and remaining 23% showed sign of die-back. Such survey results were also reported from Bangladesh (Baksha and Basak, 2002) and from Punjab (Anon, 2003). The soil of the area was sandy in nature.

2. Farmlands

Data regarding the health status, growing pattern and total number of trees/holding on 16 different land holdings recorded and given in Fig.1.

Data of 496 acres belonging to 16 different farmers indicated that on the average 408 trees per land holding varied in age from 7-11 years showed an average infection percentage of 16.16 %. Although the average infection percentage per land holding was low but individually it was up to a maximum limit of 40.0% per land holding with varying number of completely dead trees.

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