ASSESSMENT OF DAMAGE CAUSED BY HEART-ROT IN TEAK IN MADHYA PRADESH

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Introduction

The standing tree is exposed to the risk of injuries by biotic and abiotic agencies throughout its life which open wounds in the tree tissues to be invaded by extraneous parasitic and saprophytic micro-organisms which grow, multiply and ramify causing death of living tissues and in many cases fungal decay of wood substances. Fungal decay reduces both the quality and quantity of timber and thus hampers the basic purpose of forestry which aims to produce crops of healthy timber. When decay is established in the heartwood and becomes progressive with time, it is termed as "heart rot" (commonly known as hollowness of tree trunks). Heart-rot is established in trees through wounds in the bark and Sapwood such as thinning, pruning and lopping scars, dead branches, branch stubs and knots, fire or grazing injuries and also in coppiced stands from the stool or thinning of the companion shoots. Since heartwoods of trees are prized for their grain patterns, strength and durability, heart-rot is considered of significant economic importance. Nearly 80% of the total loss of forest plants due to diseases, is attributed to heart-rot as determined from an appraisal of resources in the United States (Hepting and Jemison, 1958). Only in the U.S.A. have comprehensive estimates been prepared of losses due to heart-rot in the principal tree species (Findlay, 1956). Foster *et al.* (1954) estimated losses caused by heart-rot in *Tsuga heterophylla* (Raf.) Sarg. in British Columbia. In an appraisal of heart-rot in sal (*Shorea robusta* Gaertn.), Bakshi *et al.* (1963) found that out of 704 trees studied, 513 (73%) were affected with heart-rot entailing a loss of about 10% of the timber. This is the only appraisal available from India about the heart-rot damage. However, Singh *et al.* (1973) while studying the management of dry coppice teak forests in Gujarat had predicted that the incidence of heart rot may be as high as 50% but no estimation of damage was done.

Teak (*Tectona grandis* L.f.) is the most important and valuable timber species which contributes a major share in the forest revenue of Madhya Pradesh. During surveys of depots and forest areas it was revealed that teak is affected by heart-rot in stands. In the present study an attempt has been made to evaluate the damage caused by heart-rot in the timber in teak in Madhya Pradesh.

Materials and Methods

Estimation of heart-rot was done in the felling coupes of teak during felling and logging operations in Madhya Pradesh. The

trees were then grouped in four girth classes. For the evaluation of loss in wood volume (decay cull), decay columns were measured in the depots in different grades (I, II, IIIA, IIIB and IV) following the method recommended by Bakshi (1977). To calculate the economics of losses, the production data for the year 1988 to 1991 and prevailing prices of Madhya Pradesh Govt. were taken into consideration.

Results and Discussion

The heart-rot damage assessment as measured in the felling coupes has been presented in Table 1.

It is evident from Table 1 that heart-rot infection increases with the increase in girth of the trees or with the age of the trees. Similar observations have also been made by Schmitz and Johnson (1927), McCallum (1928), Bier *et al.* (1948), Thomas and Podmore (1953), Boyce and Wagg (1953), Foster *et al.* (1954), Stillwell (1955), Thomas and Johnson (1958), Basham (1960) and Bakshi *et al.* (1963) in different tree species. The damage differs from locality to locality

Table 1

Heart-rot infection in felling coupes of Teak

Locality	Girth class (cm)	Heart-rot infected trees (%)	Total % of heart-rot infected trees
Kaladehi coupe IV	51 - 75	20.00	
Bargi Range	76- 120	43.24	60.00
Compt. No. 258	121 - 200	69.39	
Jabalpur Divn.	Above 200	76.92	
Padaria coupe IV	51 - 75	20.00	
Kundam Range	76 - 120	63.64	82.86
Compt. No. 236	121 - 200	86.36	
Jabalpur Divn.	Above 200	86.36	
Bedapar coupe VI	51 - 75	62.09	
Chawar Range	76 - 120	83.33	87.50
Sehore Divn.	121 - 200	98.97	
	Above 200	100.00	
Itarsi coupe IV	51 - 75	18.05	
Taku - Kesla Range	76 - 120	30.00	38.46
Hoshangabad Divn.	121 - 200	66.67	
	Above 200	69.23	
Rukhad 65 coupe	51- 75	32.43	
Rukhad Range	76 - 120	45.45	48.39
South Seoni Divn.	121 - 200	91.67	
	Above 200	100.00	
Multai coupe IV	51-75	22.47	
Multai Range	76-120	45.11	62.67
Betul Divn.	121 - 200	72.50	
	Above-200	76.15	

Table 2

Heart-rot damage assessment in stored Teak logs

Name of Depot	No. of logs sampled	Heart-rot % infected logs	Anticipated volume of all sampled logs (m^3)	Volume of infected logs (m^3)	Total volume of decay column (m^3)	Average % loss in wood volume in all logs	Average % less in wood volume in infected logs
Barghi Nagar Depot, Jabalpur	290	26.55	21.689	6.469	1.669	7.70	25.80
Kalpi Depot, Mandla	431	46.64	57.593	25.910	6.385	11.09	24.64
Hamlapur Depot, Betul	1281	45.75	104.944	54.962	14.563	13.88	26.50
Sehore Depot, Sehore	344	35.76	34.855	13.260	3.326	9.54	25.08
Ashapur Depot, Khandwa	184	48.37	11.544	6.583	1.931	16.73	29.33
Ralamandla Depot, Indore	138	38.41	6.112	2.947	0.832	13.61	28.23
Dhuma Depot, Seoni	241	27.39	16.735	4.109	1.132	6.76	27.55
Sironja Depot, Sagar	129	41.86	16.326	6.515	1.554	9.52	23.85
Pithora Depot, Raipur	171	42.69	21.998	8.990	2.877	13.08	32.00
Average of all Depots		39.27 %				11.32 %	27.00 %

and as observed ranges from 38.46% to 87.50% (Table 1). The localities in Chawar Range and Padaria Range were observed with clayey soils while the other localities were with murrumy soils. Peace (1938) reported that decay is greater on clay and less on sandy soils. Foster *et al.* (1954) also noticed similar variation with site conditions in *Tsuga heterophylla* and reported nearly 52% loss in wood volume due to heart-rot.

The results of evaluation of losses in wood volume (cull) have been depicted in Table 2. About 39% of stored teak logs were found affected by heart-rot in depots entailing a loss of about 11.32% in total log volume. However, in affected logs the loss in log volume was as much as 27%. According to Findlay (1956) by measuring the volume of decayed wood in sample logs after felling, reasonally accurate estimates can be made

of both present and future losses due to decay in a stand.

Nearly 2.0 lakh m^3 of teak is extracted annually from the forests in Madhya Pradesh. At an average market price (1992-93) of about Rs. 9000/- per m^3 (average of all grades I-IV), the loss in wood volume due to heart-rot can be estimated to the tune of Rs. 19.80 crore rupees. Thus the loss is enormous in terms of wood volume lost due to heart-rot as well as in terms of revenue.

SUMMARY

Damage caused by heart-rot in teak trees in natural forest has been estimated in Madhya Pradesh (Central India) where 38% to 88% trees were found affected by heart-rot. Loss assessment made in stored teak logs in the depots revealed that about 39% logs were having heart-rot entailing an average loss of about 11% in wood volume. This loss in wood volume has been calculated to the tune of nearly Rs. 200 million annually on the basis of market value of teak.

मध्य प्रदेश में सार अपक्षयण से होने वाली सागौन की हानि का आकलन

एन०एस०के० हर्ष व सी०के० तिवारी

सारांश

मध्य प्रदेश (मध्य भारत) के प्राकृतिक वनों में सागौन के वृक्षों को सार-अपक्षयण से पहुंचने वाली हानि का आकलन किया गया है जहाँ 38% से 88% तक वृक्ष सार-अपक्षयण से ग्रस्त हुए पाए गए । भंडारों में रखाए गए सागौन के लट्ठों की हानि का अनुमान 39% लगाया गया है जहाँ सार-अपक्षयित लट्ठों से काष्ठ आयतन को लगभग 11% औसत हानि उठानी पड़ी । काष्ठ आयतन को पहुँची इस हानि का आगणन सागौन के बाजार भाव के आधार पर 20 करोड़ रु० वार्षिक लगाया गया है ।

Acknowledgements

The authors are thankful to Dr. B.N. Gupta, Director of the Institute and Dr. Jamaluddin, Head of the Division for kindly providing necessary facilities and encouragements.

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