

Original Research Article

Dasturella Rust of Bamboo in India

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A B S T R A C T

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The bamboo plant in India has economically very important. It has wide variety of importance as this plant is very useful in paper industry. It's culm and leaves are important part for mankind. The plant is used for building materials, crafts, and high-quality paper, as well as for landscaping and soil conservation. The poor people in this region get employment due to this plant. They earn money to run their family from the work done by them on bamboo plant. But due to climatic changes this plant is suffering from different diseases, one of the most severe diseases is rust disease caused by *Dasturella divina*, which affect the leaves of this plant and affect photosynthetic activity of plant. The production as well as growth ability of this plant also affected due to this disease. This is not good for plant and human beings.

Introduction

Bamboos are non-timber forest products which have gained considerable importance in the recent past. Bamboos, encompassing 75 genera and about 1250 species, are versatile group of plants of multiple end uses; they play an important role in the rural economy in this country. It is estimated that about 21million hectares of the earth surface is covered by bamboo forests. They are widely distributed in the tropical to temperate zones, from sea level to alpine elevation (3000–4000 m). In India, there are about 128 species of bamboos belonging to 23 genera covering an area of 10.03 million hectares, which constitute around 128 % of

the total area of forest cover in the country (Tiwari, 1991). More than 50% of the recorded bamboos occur in eastern India. Other areas rich in bamboo resources are the Western Ghats, Andaman and Nicobar Islands, Bastar region of Madhya Pradesh and Siwalik hills of Uttar Pradesh. In addition to the natural occurrence of bamboos in forests, they have been planted on a large scale in many states. *Bambusa bambos* (L.) Voss (= *B. arundinacea* (Retz.) Willd.), *B. nutans* Wall., *B. vulgaris* Schrad. *Dendrocalamus hamiltonii* Nees and *D. strictus* Nees are the common species raised in plantations.

Bamboos have a wide range of social and industrial uses as foods, building materials, crafts, and high-quality paper, as well as for landscaping and soil conservation. The India bamboo market includes local sales of potted bamboos, with some types priced at several hundred rupees per pot, and a burgeoning bamboo timber industry for furniture and housing construction. Bamboo plants normally require little maintenance and can live for decades without much care. In some cases, however, insect pests and plant diseases significantly diminish the growth and quality of bamboo.

About 17 bamboo species belonging to five genera have been recorded in Kerala (Gamble, 1896; Muktesh kumar, 1990). Of these, *B. bambos*, *D. strictus*, *Pseudoxytenanthera bourdillonii* (Gam.) Naithani, *P. ritcheyi* (Mum) Naithani (= *Oxytenanthera monostigma* Bedd.), *Schizostachyum beddomei* (Fisch.) Majumdar (= *Teniosstachyum wightii* Bedd.), *Ochlandra travancorica* (Bedd.) Benth. ex Gam., *O. scriptoria* (Dennst.) Fisch., *O. beddomei* Gam., *O. ebracteata* Raizada & Chatterji and *O. wightii* Fisch. occur naturally. Bamboos have also been raised in pure or mixed plantations. So far, an area of 3,400 ha has been brought under bamboo cultivation (Anon., 1990). Apart from this, bamboos are grown traditionally in homesteads and farmlands, accounting for a total of 310 ha in homesteads (Krishnankutty, 1991) alone. As 'poor man's timber' bamboos play an important role in the rural economy of the State. They are used in traditional cottage industries for making mats and baskets and about 30,000 people are directly or indirectly dependent on this for their livelihood (Nair, 1986; Muraleedharan and Rugmini, 1990). At least 29 rust fungi belonging to six genera (*Dasturella* or *Kweilingia*, *Puccinia*, *Uredo*, *Phakospora*, *Stereostratum*, and

Tunicopsora) cause bamboo rust diseases globally. *Dasturella divina* infects many genera of bamboos in India. Globally, *Dasturella* or *Kweilingia* rust is relatively widespread within bamboo plantations and in natural stands. The rust can be an economically important disease on some species and in some locations depending on environmental conditions.

From India, so far, two species of *Dasturella* viz., *D. divina* (= *D. oxytenantherae* Sathe) and *D. bambusina* have been recorded on different bamboos (Mundkur and Kheswala, 1943; Sathe, 1965; Bakshi and Singh, 1967; Rangaswami *et al.*, 1970). *D. bambusina* differs from *D. divina* mainly in the number of teliospores per chain and depth of telial column.

Disease symptoms

Infection usually appeared during the month of August on the mature leaves in the form of greyish brown minute flecks; usually, the juvenile leaves did not get any infection. The small flecks coalesced and formed spindle shaped dark brown pustules with pale halo around. Mature leaves were found more susceptible to infection than younger ones; higher density of uredinia was observed on the former than the latter. Uredinia, yellowish brown in colour, developed in the fleckson the adaxial surface of leaves. Development of uredinial sori was observed rarely on the abaxial surface. In severe cases, the adaxial surface of the entire leaf lamina became completely covered with uredinia imparting yellowish brown colour. The rust infection continued till late May. Dark brown teliosori developed either in mature uredinial sori or separately on the adaxial surface in linear rows during January. Necrosis and withering of mature leaves occurred due to severe rust infection.

Fig.1 Shows the bamboo leaves infected with *Dasturell divina*

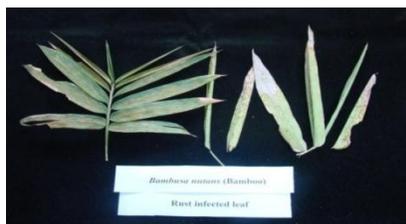
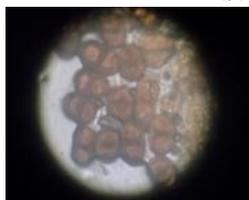


Fig.2 Teliospores of *D.divina* are brown, thick walled, two celled and spindle shaped.

Fig.3 Uredospores of *D. divina* are brown thick walled, round to oval in shape.

Scale- 1cm=10µm



Damage

Although *Dasturella* rust is an important rust disease for bamboo plantations as well as naturally grown bamboo plants. This rust is mainly found on upper surface of bamboo leaf, so this is obvious that it severely affects the photosynthesis activity of the plant. As the photosynthetic activity affected by this fungus the plant will not get proper food made by leaves. For this reason the growth and production ability of plant affected (Mohanani, 1887). The bamboo plant in India is economically very important as this is the source of bamboo shoots and pulp. Epidemics of *Dasturella* rust in bamboo nurseries can show production problems by defoliating young plants.

Management

An effective management of *Dasturella* rust is quite difficult, the reason for this is that the infected leaves of bamboo continuously produce enormous rust spores, which spread through wind and spread disease from plant

to plant. By adequate plant nutrition, increased plant spacing, removal and disposal of dead plant leaves and other plant debris, good aeration in area, and application of fungicides may be the solution to remove these fungi from the bamboo field.

From this study it has been concluded that the rust *Dasturella divina* is found to be a severe disease. It destroys the life of bamboo plant. This fungi grow very fast after infecting the host plant. As the poor people of this country depend on this plant for their survival, it is very necessary to save bamboo tree from rust infection and give proper treatments to prevent from this disease.

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