



ORIGINAL RESEARCH ARTICLE

Morphology of Teliospores of *ravenelia* spp. on forest trees

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Abstract: The study was conducted to show the morphology of teliospores of *Ravenelia* sp. in Jabalpur. This rust infects three different forest trees. These all three trees, *Albizia procera*, *Albizia lebbbeck*, and *Pongamia pinnata* belong to family Fabaceae. Rust fungus, *Ravenelia clemensae* Syd. infects the leaves of *Albizia procera* and *Albizia lebbbeck*, and the host tree *Pongamia pinnata* was infected by another species of *Ravenelia*, which was *Ravenelia hobsoni*. The rust infection starts in the month of September under favorable environmental conditions, when the new foliage is produced on the host plants. The present study showed that telial stage of *Ravenelia* sp. was found on all three host trees while pycnial, aecial and uredial stages were not recorded. The morphology of these spores, is described in the present communication. The morphological characters of these teliospores were found to be nearly similar to each other with slight changes.

Key Words: Environmental; Favorable; Infection; Morphology; Teliospores

INTRODUCTION

Rusts are diseases caused by fungal pathogens of the order Uredinales. It is estimated to have 168 genera of rust fungi with approximately 7000 species, more than half of which belong to the genus *Puccinia*, are currently accepted. This group is considered as one of the most dangerous pathogen for the forest plants. All rusts are obligate parasites; they require living hosts to complete their life cycle. They generally do not kill the host plant but severely reduce their growth and yield. Although, the fungal flora of India has been explored by several workers in the past (Bakshi and Singh, 1967; Bilgrami et al., 1991; Dubey, 1991; Jamaluddin et al., 2004) but this very important group of fungi has largely been neglected resulting in the paucity of literature and very fragmentary knowledge of these fungi.

MATERIAL AND METHODS

Field survey

The rust infected leaves of *Albizia procera*, *Pongamia pinnata* and *Albizia lebbbeck* were collected from selected forest areas of Jabalpur region. These infected materials were brought to laboratory in brown paper bags as in polythene bags there were chances to develop moisture which can destroy these infected leaves. The infected materials were collected in the month of December, when the infections occurred severely to the plant part. These materials were pressed amongst blotting papers for further work.

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These blotting papers were periodically changed to preserve the materials.

Experimental work

The specimens were also preserved in formalin, absolute ethanol, acetic acid and water in the ratio of 10:49:2:39 (Soni et al., 2011) for further study. Thin micro-sections were cut with the help of razor blade and stained with lactophenol cotton blue reagent (Pagvi and Singh, 1969). By using light microscope the morphology of spores were examined. Permanent slides were made using DPX mounting medium and identified with the help of published literature and confirmed by consulting several experts, working on the rust fungi.

RESULTS AND DISCUSSION

Generally, the rust species causes infection on leaves, twigs, flowers and fruits. In this study, the severe infection occurs on upper surface of leaves, but sometimes few infection patches have also been seen on the lower leaf surface. The telia of *Ravenelia clemensae* Syd. on *Albizia procera* were produced in large amount on upper leaf surface. They were present as irregular patches with orange to brown in colour. The teliospores were round in shape, thick-walled, orange-brown and measured 12.5-17.3 × 21.8-22.5 µm. In *Albizia lebbbeck* (Roxb.) telia of *Ravenelia clemensae* Syd. were produced. They were found on upper leaf



surface as irregular orange-brown patches. The telia were orange-brown erumpt and hypophyllous. They contain around 15-20 teliospores. Teliospores heads were $14.1\text{-}18.3 \times 23.6\text{-}24.9\mu\text{m}$ in size, thick walled, dark brown and round in shape. In *Pongamia pinnata*, the telia of *R. hobsoni*, were produced in irregular patches. Telia of *R. hobsoni* were round, scattered, pustulate, erumpt and usually develop hypophyllously. They develop sub epidermally. A telium in a cross section shows dark brown teliospore heads. They contain approximately 10-20 teliospores. The teliospore were, orange-red, thick-walled and measure $16.2\text{-}19.0 \times 23.2\text{-}25.1\mu\text{m}$. with some outgrowths on the wall. *Ravenelia hobsoni* reported from other parts of this country (Butler and Bisby 1960).

Ravenelia hobsoni has also been reported from other part of the country (Butler & Bisby, 1960). *Ravenelia clemensae* Syd. is found exclusively on *Albizia procera* (Roxb.) Benth. (Cummins 1941; Bilgrami et al., 1991), characterized by the smooth teliospore-heads. The rust *Ravenelia hobsoni* was originally described by Cooke from East India and Ceylon (Dietel, 1906).

CONCLUSION

The morphological study of spores of *Ravenelia* species showed that only teliospores were present on the specific host. They were orange to darkbrown in colour. The other stages of spores i.e. basidial, pycnial, aecial and uredial were not found in this study. Although Singh (1976) found pycnial, uredial, aecial, and telial stages on *Pongamia pinnata* host plant. The telial stage was more common in post-monsoon season and mostly infections occurred on upper leaf surface. The morphological features of these spores on three different host trees were also varied. The teliospore of *Ravenelia hobsoni* was quite different in structure as compared to teliospores of *Ravenelia clemensae* Syd., as *Ravenelia hobsoni* has some hair like structure on the wall of the spores. Generally, the teliospores of rust fungi are spindle shaped and two to three celled but sometimes they are four to five celled (Kapooria, 1973), but in *Ravenelia* sp. the spores were round shaped and many celled.

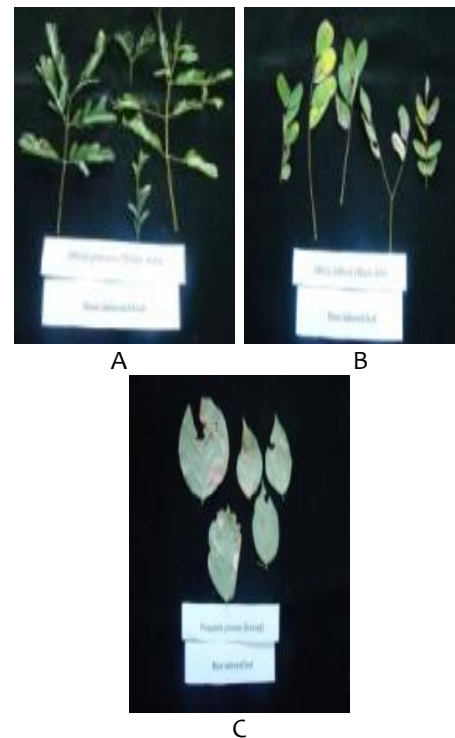


Figure 1: A. Leaves of *Albizia procera* infected with *Ravenelia clemensae* Syd.; B. Leaves of *Albizia lebbeck* infected with *R. clemensae* Syd.; C. Leaves of *Pongamia pinnata* infected with *R. hobsoni*.

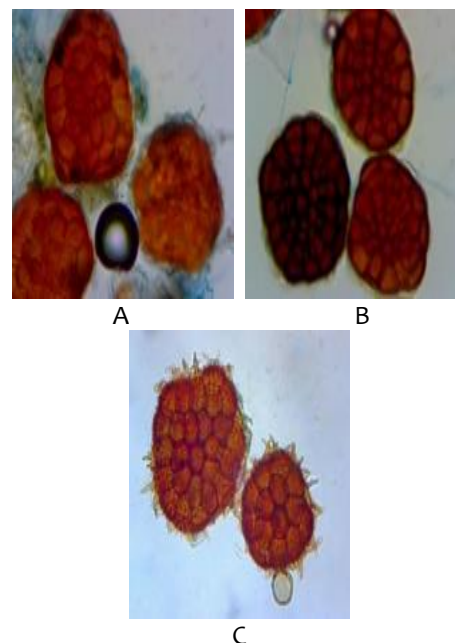


Figure 2: A. Teliospores of *R. clemensae* Syd. on *Albizia procera*; B. Teliospores of *R. clemensae* Syd. on *Albizia lebbeck*; C. Teliospores of *R. hobsoni* on *Pongamia pinnata*

Table 1: Microscopic observation of teliospores

Spore Count	<i>R. clemensae</i> on <i>A. procera</i>			<i>R. clemensae</i> on <i>A. lebbeck</i>			<i>R. hobsoni</i> on <i>P. pinnata</i>					
	shape	l × b (in μm)	color	texture	shape	l × b (in μm)	color	texture	shape	l × b (in μm)	color	texture
1		12.5×21.8				14.1×23.6				16.2×23.6		
2		12.7×21.9				14.3×23.8				16.7×23.4		
3		13.0×21.9	All	All spores		15.0×23.6	All	All spores		16.9×25.0	All	All spores
4	All	14.8×21.3	spores	were smooth,	All	15.9×24.0	spores	were thick-	All	17.0×24.8	spores	were hairy,
5	spores	14.2×22.1	were	multicellular,	spores	15.2×24.2	were	walled,	spores	17.9×25.1	were	smooth,
6	were	15.1×22.4	found	sessile, thick-	were	16.1×24.7	found	smooth,	were	17.4×24.4	found	thick-walled
7	round.	15.2×22.2	orange	walled	round.	16.6×23.9	orange	sessile, and	round.	18.9×23.1	red-	multicellular
8		16.4×22.9	brown			17.5×24.3	brown	multicellular		18.3×24.7	orange	, and sessile
9		16.8×21.8				18.6×24.9				19.0×25.1		
10		17.3×21.5				18.3×24.5				19.0×23.9		

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