

Occurrence of *Canna* rust caused by *Puccinia thaliae* from Tripura

DURGA PRASAD AWASTHI¹, UTPAL DEY², SWAGATIKA MOHANTY³, AMAR BAHADUR¹, KUNAL DEBBARMA⁴ AND DEBASHISH SEN⁵

¹Department of Plant Pathology, College of Agriculture, Tripura, Lembucherra 799 210 Tripura

²Plant Protection, Krishi Vigyan Kendra, Sepahijala Central Agricultural University (Imphal), Latiacherra, Sepahijala 799103 Tripura

³Plant Pathology, Sugarcane Research Station, RRTSS (OUAT) Nayagarh, Odisha -752069

⁴Department of Horticulture College of Agriculture, Tripura, Lembucherra, 799 210 Tripura

⁵Department of Agronomy, College of Agriculture, Tripura, Lembucherra, 799 210, Tripura

Received : 27.11.2025

Accepted : 16.02.2026

Published : 30.03.2026

Canna indica is a perennial, beautiful flowering plant. The plant suffers from a number of plant diseases but not much work has been reported regarding incidence of different diseases occurring in *Canna indica* from Agro-climatic condition of Tripura. Thus, to know what are the different diseases which are affecting this ornamental plant a survey was conducted during the year 2022-23 and 2023-24. Predominant diseases under agro-climatic condition were found to be *Canna* rust. Characteristic symptom includes development of rust pustules which are found primarily on the lower surface of leaves, with corresponding 1-2 mm-diameter chlorotic lesions forms on the upper surface. In advanced stages of the disease, spots on the upper leaf surface coalesce and turn dark brown. Disease severity among four (4) districts surveyed was found to vary from 12.6 % to 22.8 %.

Keywords : *Canna*, *Puccinia thaliae*, rust, urediniospores

INTRODUCTION

Canna indica is a perennial, beautiful and hardy plant of 50 to 150 cm in height. Stems are green and smooth. Leaves are like of banana plant in appearance but smaller in size. A canna flower varies from white, cream, orange, yellow, pink, scarlet, deep red and various other shades. They are propagated by divisions of rhizomes. It is basically a bed plant and is suitable for growing in the bigger gardens in the midst of lawns. There are reports that it can be used for the purpose of food (especially the root), medicines and a range of other commodities. It has been utilized for the cure of malaria, stomach problem, dysentery, cuts, urine disorder, fever and dropsy (Odugbemi *et al.* 2006; Thepouyporn *et al.* 2012).

The crop is the excellent source of natural starch and various phytochemicals (Kessler, 2010). Major diseases of *Canna indica* include rust

caused by *Puccinia thaliae*, rhizome rot caused by *Sclerotium rolfsii* Sacc., and leaf blight caused by *Alternaria alternata*. In addition, viral infections such as *Canna* yellow mottle virus also significantly affect the crop. However, limited information is available regarding the incidence and distribution of these diseases in this region. Therefore, to identify and document the various diseases affecting this ornamental plant, a systemic survey was conducted.

MATERIALS AND METHODS

During 2022-23 and 2023-24, a survey on plants of *Canna indica* was conducted in the West Tripura, Dhalai, Unakoti and Sepahijala District of Tripura, India. Field observation for disease symptoms were carried out in different villages of above mentioned Districts following roving method. Per plant five number of leaves were observed and altogether twenty five numbers of plants were screened from an area. Time of occurrence of disease, plant part affected and development of disease starting from its initial

*Correspondence : pathodurga@gmail.com

stage to characteristic symptoms were recorded in a regular interval of fourteen days. Samples were brought to the laboratory and compared with standard disease atlas and books. Affected plant parts were brought into laboratory for studies and further confirmation of Koch Postulates where urediniospores collected from plant tissues were inoculated in healthy plants. Symptoms were reproduced in healthy plants. Leaf sample infected with the fungi were collected from plant and mounted in canada balsam, stained with cotton blue and microscopically examined. Estimation of disease severity was carried out for further confirmation and evaluation of disease.

Estimation of disease severity was carried out by using the formula-

Disease severity= {(all numerical ratings)/ (No of plant parts observed) × (Highest Disease Score)} × 100. The Disease rating scale used for estimation is presented in Table 1.

RESULTS AND DISCUSSION

Leaves of *Canna indica* were found to be infected with numerous small, yellow, irregularly shaped, rust pustules on leaves, petioles, and flowers. These pustules are found primarily on the lower surface of leaves, with corresponding 1-2 mm-diameter chlorotic lesions forms on the upper surface. In advanced stages of the disease, spots on the upper leaf surface coalesce and turn dark brown. Heavily diseased leaves eventually desiccate, collapse, and die. Orange rusty pustules mostly concentrated to underside side

of the leaves although the symptoms can occur in both sides of leaves (Fig.1). The disease symptoms observed were at par with observation made by Kessler (2007).

The pathogen *Puccinia thaliae* shows golden urediniospores which are formed in the uredinia. Urediniospores looks like egg or pear shape (Fig.2).Pycnia and aecia have not been observed for the pathogen *P. thaliae*. Similar results were obtained by several previous authors (Gopi *et al.* 2014). Occurrence of *Canna* rust was reported for first time in Malaysia by Khoo *et al.* (2022).The erumpent uredinia, exposes powdery golden, yellow, or orange color spores. Based on the symptoms of plant parts and urediniospores the pathogen is readily identified as *Puccinia thaliae*.

In the pathogenicity test, inoculated leaves developed rust pustules symptoms underside of the leaves 10 days after inoculation, where the control leaves remained healthy. The fungus present on the inoculated leaves was morphologically identical to that originally observed on disease plants. The estimation of disease severity was found to vary from 12.6 % to 22.8 % (Table 2).

DECLARATION

Conflict of Interest. Authors declare no conflict of interest.,

Table1 : Disease rating scale

0	No Symptoms
1	Small, scattered, yellow to tan spots appear on the upper surface of the leaves. Minute, powdery, orange -yellow pustules (uredinia) are present on the underside (abaxial surface) of the leaf.
2	Above mentioned symptoms and 1.0 to 12.0,% leaf area affected.
3	Above mentioned symptoms and significant portions of the leaves turn yellow or chlorotic and brown or black due to widespread tissue death. Small holes may develop in the older leaves. 12.1 to 25.0 % leaf area affected.
4	Above mentioned symptoms and 25.1 to 50.0 % leaf area affected.
5	Above mentioned symptoms and more than 50.0 % leaf area affected . The entire leaf may be covered with coalesced pustules, leading to premature drying and dropping of the leaves. The plant's ornamental quality is lost, and in severe cases, the entire plant may decline

Table 2 : Disease severity of *Canna* Rust caused by *Puccinia thaliae*

Plant Part affected	Time of visibility of Rust Pustules	Name of District	Disease severity
Leaves, Petioles etc.	December-February	West Tripura	20.4 %
		Dhalai	15.6 %
		Unakoti	22.8 %
		Sepahijala	12.6 %

**Fig 1**: Symptoms on abaxial and adaxial surface of leaf. A- Orange-yellow pustules on abaxial surface B- Symptom of leaf blight and orange-yellow pustules on adaxial surface**Fig 2** : Microscopic view of urediniospores

REFERENCES

- Gopi, R., Kapoor, C., Kalita, H., Babu, S., Sharma, B. 2014. A new record of rust caused by *Puccinia thaliae* on *Canna indica* in Sikkim. *J. Mycopathol. Res.* **52**: 55-56.
- Kessler, J.R.2007. *Canna lilies* for Alabama Gardens. Alabama Cooperative Extension System ANR-1315. 2007. http://www.aces.edu/pubs/docs/A/ANR-1315/ANR_1315.pdf (accessed 24 June 2012).
- Kessler, J.R. 2010.*Canna lilies* for Alabama Gardens. Alabama Cooperative Extension System. Auburn, Alabama: A&M University & Auburn University Press. 2010; 307-31.
- Khoo,Y.W., Tan, H.T., Khaw, Y.S., Li, S-F., Chong, K.P. 2022.First Report of *Puccinia thaliae* Causing Leaf Rust on *Canna indica* in Malaysia. *Plant Dis.* **106**: 1760
- Odugbemi, T.O., Akinsulire, O.R., Aibinu,I.E., Peter O Fabeku, P.O. 2006. Medicinal plant useful for malarial therapy in Okeigbo, Ondo State,South West, Nigeria. *Afr. J.Tradit.Compl. Alter. Med.* **2**:191-198.
- Thepouyporn, A., Yoosook, C., Chuakul, W., Thirapanmethee, K., Napaswad, C., Chanpen Wiwat, C. 2012. Purification and characterization of anti-HIV-1 protein from *Canna indica* leaves. *Southeast Asian J. Trop. Med Public Health* **43**: 1153-1160.