

## Rust on *Satyrium nepalense* Don Prodr. —a new orchid disease from India

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In this communication, new leaf rust was reported on a native terrestrial orchid, *Satyrium nepalense* from Sikkim. Urediospore and teleutospore have characterized on the natural host population and the disease usually appeared in the month of July to August when the plants come out with profuse green leaves and there are heavy rainfall in the area. The disease appeared to be caused by *Puccinia* sp. This seems to be a new disease on this orchid host.

**Key words:** Rust, orchid, *Satyrium nepalense*, *Puccinia*

### INTRODUCTION

*Satyrium nepalense* is a native terrestrial orchid flora of Sikkim. It is found in an altitude ranging from 6000–13000 ft. It is an annual and has under ground bulb and pseudo stem come out of the bulb with dark green thick leaves. The species is found in hilly slope with a large number of populations in natural habitats. During our survey and collection of orchid germplasms to East Sikkim in August 2005, we came across with a new leaf rust disease on *Satyrium nepalense* at an altitude of about 12000 ft. near Tsongu, East Sikkim.

### MATERIALS AND METHODS

Infected leaves of *Satyrium nepalense* were collected, dried and mounted in the herbarium pressboard. The herbarium specimen was kept in the Division of Plant Pathology, National Research Centre for Orchids (ICAR), Pakyong, Sikkim for detail studies of the rust fungus. One set of herbarium samples was sent to Global Plant Clinic, diagnostic and Advisory Service, CABI Bioscience, UK for identification. Development of symptoms and

its spread was studied and recorded periodically. Characterization of the pathogen was done with microscopic observation. Transverse sections were made from rust infected leaves at 15 days interval and observed under microscope for telia and teliospores. Pathogenicity was tested with artificial inoculation of healthy *Satyrium nepalense* plants with spore suspension ( $5 \times 10^6$  spores per ml solution of distilled water) under polyhouse condition.

### RESULTS AND DISCUSSION

#### Symptoms

The symptom first appeared as minute yellow dot, which gradually enlarged. The spots were mainly found on the lower surface of the leaves (Fig. 1). Teleutosori appeared as dark brown, measuring 0.5–1.0 × 1.0 – 1.5 mm. Several sori coalesced and cover larger areas of the leaves. Infected leaves puckered and wrinkled. Severely affected leaves gradually dry out and stayed hanging.

In disease-affected plants, flower spike are smaller than healthy plant. The frequency of the disease in

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Fig. 1. Uredio and teleutospores with spores on the underside of leaf

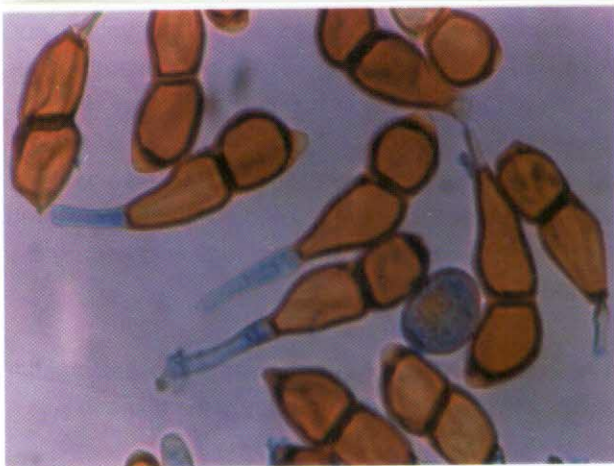
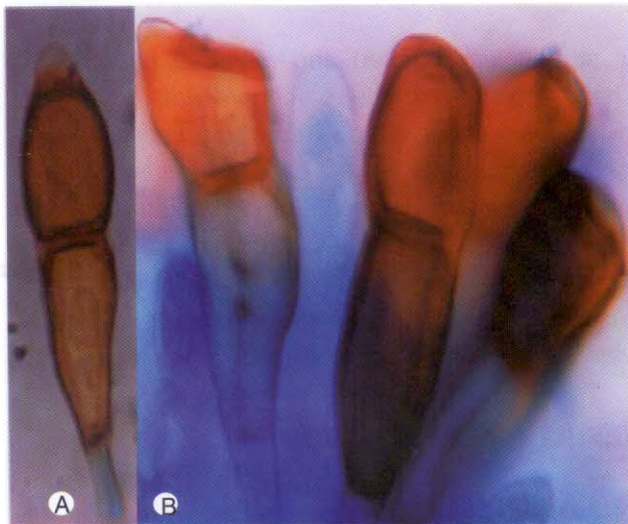


Fig. 2. A : Individual teleutospore. B : Bunch of teleutospore coming out together rupturing pastules. C : Urediospore and teleutospore.

the population is mild to moderate. The diseases usually appeared in the month of July to August when the plants come out with profuse green leaves and there are heavy rainfall in the area.

#### **Characterization and identification of the pathogen**

When transverse section of infected leaf was viewed under the microscope, teleutospores were distinctly found on the lower side of the leaf. Several teleutospores were observed to come out rupturing the lower epidermis. Teleutospores were cylindrical, elongated, deep brown in colour, two celled, thick walled with prominent single germ pore at the top or little side on the top, lower cell longer and larger, germ pore of the lower cell being obscured (Fig. 2). Teleutospores varied from 64.22 – 77.54  $\mu\text{m}$ , side wall thickness 3.2  $\mu\text{m}$ , top wall thickness 5.8  $\mu\text{m}$ . Teleutospores always pedicelate (stalked) and pedicel length varied from 24 – 35  $\mu\text{m}$ . Production of basidium and basidiospores were not observed. Urediospores were recorded to produce in the same pastules but at the peripheries. Urediospores appeared as light brown, spherical to oval or pear shaped, subglobose, echinulate, thick walled. Urediospores varied from 24.76 – 32.26  $\mu\text{m}$  in size and wall thickness 4.1  $\mu\text{m}$ . Germ pore obscure. Young pastules first produced urediospores abundantly. In the matured pastules, the frequency of

teleutospores production increased as compared to urediospores in the same pastules.

On the basis of the teleutospores characteristics, the rust has been identified as *Puccinia* sp. Rust on *Satyrium nepalense* was not reported earlier (Bilgrami *et al.* 1981, 1991; Mukherji and Juneja 1974; Sarbhoy *et al.* 1980, 1986; Sohi 1992; Simone and Burnett 2002). To the best of our knowledge, this seems to be a new disease on this orchid host.

## REFERENCES

- Bilgrami, K.S., Jamaluddin, S. and Rizwi, M.A. 1981. *Fungi of India*. Part II. Today and tomorrow's Printers and Publishers, New Delhi. 268 pp.
- Bilgrami, K.S., Jamaluddin, S. and Rizwi, M.A. 1991. *Fungi of India*. Today and tomorrow's Printers and Publishers, New Delhi. 798 pp.
- Mukherji, K.G. and Juneja, R. C. 1974. *Fungi of India* (1962-72). Emkay publications, New Delhi. 107 pp.
- Sarbhoy, A.K., Agarwal, D.K. 1980. *Fungi of India* (1977-81). Assoc. Pub. Com. New Delhi. 107 pp.
- Sarbhoy, A. K., Varshney, J. L. and Agarwal D. K. 1980. *Fungi of India* (1971-76). Navyug Traders, Book Sellers and publishers, New Delhi. 168 pp.
- Sarbhoy, A. K., Agarwal, D. K. and Varshney, J. L. 1986. *Fungi of India* (1977-81). Assoc. Pub. Com. New Delhi. 107 pp.
- Simone, G. W. and Burnett. H. C. 2002 Diseases caused by bacteria and fungi. In: *Orchid Pests and Diseases* JB Watson (Ed). American Orchid Society, Delray Beach, Florida. 124 pp.
- Sohi, H. S. 1992. *Diseases of Ornamental Plants in India*. New Delhi, India. Indian Council of Agricultural Research. 195 pp.

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