

## Hiratsukamyces, a new Genus of the Pucciniastreae

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### Summary

Two species of rusts on *Salacia*, obviously aecial stages, not cupulate or caeoma-like, but with pustulate sori developing long elater-like hyphae, were placed by the authors in a new Form Genus *Elateraecium*. A telial stage has now been found, and in one species a uredial stage. Knowing the perfect stage makes possible assignment of a permanent, but new, genus name for which the authors propose *Hiratsukamyces*.

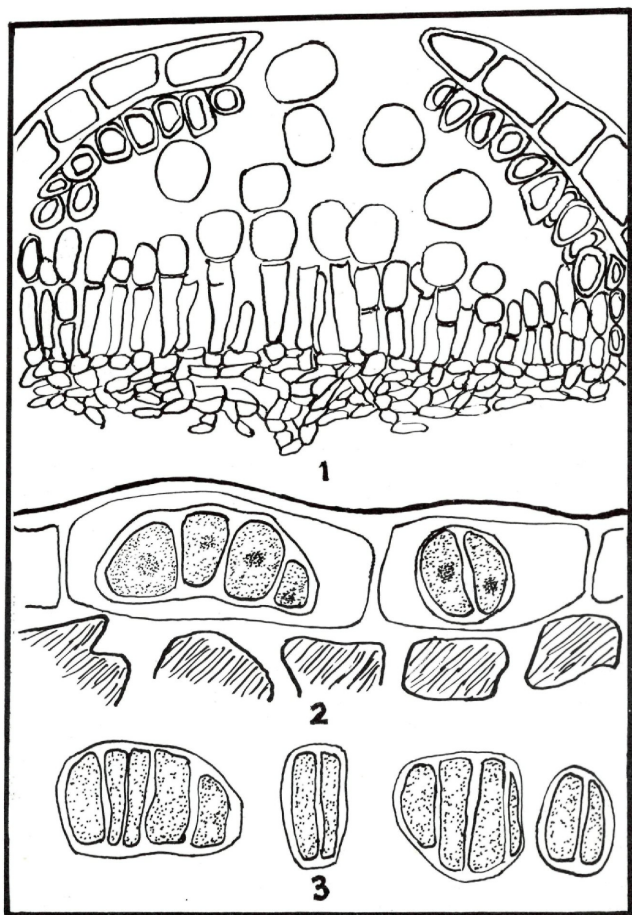
In 1966 we described a new Form Genus, *Elateraecium*, to accommodate two rusts on species of *Salacia* (Hippocrateaceae) that had an unusual type of sorus with elater-like hyphae forming a reticulum on which the aeciospores were exposed and dispersed. This aecial stage was associated with subepidermal paraphysate spermatogonia.

*Elateraecium salacicola* Thirum., Kern & Patil on *Salacia prinoidea* was the type species, and a new combination *Elateraecium divinum* (Syd.) Thirum., Kern & Patil was proposed by transferring *Caeoma divinum* Syd., described by Sydow and Petrak (1931) from the Philippines on *S. philippinensis*. This species has been collected in India on *S. macrocarpa* Wight and *S. oblonga* Wall.

*Caeoma indicum* Rajendran (1966) is synonymous with *Elateraecium salacicola*. Studies of this species have revealed that it is an autoecious eu-form. The urediospores develop following aeciospore infections and are followed by intraepidermal telia characteristic of the *Pucciniastreae*. There is an *Elateraecium*-type of aecium, a *Pucciniastreae*-type of telium, and an autoecious life-cycle restricted to an angiospermous host. Other species of the *Pucciniastreae* are heteroecious, with aecia on the *Abietaeae*. This combination of morphological and biological characters warrants the establishment of a new genus, for which the authors propose the name *Hiratsukamyces*, in honor of Professor Naohide Hiratsuka, renowned uredinologist of Japan, and a devoted student of the *Pucciniastreae*.

The uredia (Fig. 1) are formed from November to February on leaves of *Salacia prinoidea*. The uredia are minute, cinnamon-brown, subepidermal, and erumpent. Hyphae form the upper layer of the sorus and sterile

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*Hiratsukamyces salicicola*

Fig. 1: Section of the uredium showing dermatate nature. 400 ×

Fig. 2 and 3: Section of the telium showing intraepidermal teliospores. 1000 ×

Fig. 3: Teliospores. 1000 ×

outer spore layer constitute a dermatate layer, as previously described by Thirumalachar and Kern (1955). The mycelium that bears uredia is dicaryotic, and urediospores are also binucleate and borne on long hyaline pedicels which develop spores in succession, 2 to 3 in number, giving the sorus the appearance as in *Albugo*. Mature urediospores are cinnamon-yellow to brown, ovate, ellipsoid and minutely verrucose. The germ pores are indistinct, and become visible only at the time of germination, when a long germ tube is formed.

The telia are intra-epidermal, very sparsely formed from the mycelium that bears the uredia. There are no macroscopic symptoms and are found only in old uredial material. The teliospores are thin-walled, 3 to 5 in each cell, and appear similar to those of *Thekopsora* (*Pucciniastrum*) and *Melampsorella*. Because of the mutual compression they are angular to polygonal and are smooth. Their germination has not been observed.

The structure of the telia places the rust as a member of the *Pucciniastreae*. The pale yellowish brown colour of the teliospores and the relatively thicker walls places it nearer *Pucciniastrum* than the fern rusts *Mile-sina*, and *Hyalopsora*. The peridiate to dermatate uredium is a character bringing it closer to other genera of *Pucciniastreae*.

The spermatogonia in most of the *Pucciniastreae* are characteristic (Hunter 1936), and are chiefly conical. They are either subcuticular or subepidermal. In contrast, the spermatogonia of *Hiratsukamyces* are flask-shaped and subepidermal, similar to those in *Puccinia*.

The aecial stage affords a most distinguishing character in having a unique structure with a mass of reticulate hyphae, appearing as elators on which the aeciospores are dispersed. These structures, along with other features characterize the new genus.

#### **Hiratsukamyces** Thirum., Kern & Patil, **gen. nov.**

Pycniis subepidermalibus, ampulliformibus, paraphysibus ostiolaribus. Aeciis typi elateraecii, subepidermalibus, indefinitis, catenis, aeciosporum reticulatis in elateroformibus hyphis, plus minusve auctis. Urediis subepidermalibus, peridiatis sed dermatatis. Teliis intra-epidermalibus; teliosporis unicellularibus, pallide flavo-brunneis, membranis uniformibus. Germinatione ignota.

Spec. Type: **Hiratsukamyces salicicola** Thirum., Kern & Patil, sp. nov.

*Elateraecium salicicola*, Thirum., Kern & Patil (1966), the aecial stage. *Caeoma indicum* Rajendran (1966), a synonym.

Pycniis et aeciis ut habet *Elateraecium salicicola* (Mycologia **58**: 394. 1966). Urediis hypophyllis, rare amphigenis, sparsis, minutis, flavo-brunneis, subepidermalibus, erumpentibus; urediosporis ovato-ellipsoideis, pallide flavo-brunneis, pedicellatis,  $14-21 \times 8-18 \mu$ , minute verrucosis, membranis uniformibus,  $1-1.5 \mu$ , poris obscuris. Teliis hypophyllis, intra-epidermalibus, obscuris; teliosporis 3-5 in cellulis epidermalibus, uni-

cellularibus, angulatis vel polygonalibus sub compressione,  $8-15 \times 6-9 \mu$ ; membranis uniformibus, circa  $1 \mu$ , pallide flavo-brunneis. Germinatione ignota.

Typus: In foliis et ramis *Salacia prinoidea* DC. (Hippocrateaceae), Ramghat, Maharashtra, India, leg. B. V. Patil, 5th January, 1963 (Holotypus CMI; isotypi BPI et HC10).

*Caeoma divinum* Sydow (1931) has also been studied and a telial stage discovered associated with the aecia; no uredial stage is present. The teliospores are intraepidermal, 1-celled, 2-4 in an epidermal cell, pale yellowish-brown, subglobose to polygonal, wall smooth, uniform up to  $1 \mu$  thick. This species is now described in the new genus *Hiratsukamyces*.

### ***Hiratsukamyces divinum* Thirum., Kern & Patil, sp. nov.**

Pycniis et aeciis ut habet *Caeoma divinum* Syd. (1931) et *Elateraecium divinum* Thirum., Kern & Patil (1966).

Urediis ignotis. Teliis hypophyllis, obscuris, intraepidermalibus; teliosporis unicellularibus, 2-4 in cellulis epidermalibus; membranis pallide flavo-brunneis, levibus, ca.  $1 \mu$ ,  $8-10 \times 6-9 \mu$ .

Hab. in foliis *Salacia macrospermae* Wight, Ramghat, Maharashtra, India, December 27, 1963 leg B. V. Patil (typus HC 10); *Salacia philippinensis* Mer. (Sydow, 1931); etiam *Salacia oblongae* Wall, Ramghat, Maharashtra, India, December 27, 1963, B. V. Patil.

In the subfamily *Pucciniastreae* the primitive forms like species of *Uredinopsis* and *Milesina* have completely hyaline spores lacking the orange-yellow pigments characteristic of most rusts. Their aecial stages are on Gymnosperms, and the uredial and telial stages are on ferns. *Hyalopsora* has the same type of heteroecious cycle, but the spores are pigmented. Until now, the aecial stage has been discovered only on Gymnosperms. Hence it is most interesting that, in *Hiratsukamyces*, the aecial and spermatogonial stages occur on an angiospermous host, the rust being autoecious. If, in the evolution of the *Pucciniastreae*, *Uredinopsis* occupies the lowest place in the evolution ladder, *Hiratsukamyces* occupies the top place among the *Pucciniastreae* genera. The type of spermatogonia and the almost coloured teliospores approach the condition in *Pucciniaceae*.

### **Literature cited**

- Hunter, L. M. 1936. Morphology and ontogeny of the spermatogonia of the Melamporaceae. J. Arnold Arb. **47**: 115-152.  
 Rajendran, R. B. 1966. A new species of *Caeoma* from India. Bull. Torrey Bot. Club **93**: 237-240.  
 Sydow, H., and F. Petrak. 1931. Micromycetes philippinensis. Ann. Mycol. **29**: 145-279.  
 Thirumalachar, M. J., and Kern, F. D. 1955. The rust genera *Allotelia*, *Atelocauda*, *Coinostelia* and *Monosporidium*. Bull. Torrey Bot. Club **82**: 102-107.  
 Thirumalachar, M. J., Kern, F. D., and Patil, B. V. 1966. *Elateraecium*, a new form genus of the Uredinales. Mycologia **58**: 391-396.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Sydowia](#)

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