

**A NEW FORM OF THE HERMIT'S SPITTOON,  
*SAPRIA HIMALAYANA* GRIFFITH F. *ALBOVINOSA*  
BÄNZIGER & HANSEN F. NOV. (RAFFLESACEAE),  
WITH NOTES ON ITS ECOLOGY**

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ABSTRACT

*Sapria himalayana* Griffith f. *albovinosa* Bänziger & Hansen f. nov. is described as an endemic plant of a restricted area in NE Thailand. It differs from the typical form in having white-dotted warts and wine-red perigone lobes, instead of yellow-dotted and blood-red ones, respectively. The differences between this and other white-dotted, wine-red species are pointed out. Notes on the ecology and conservation are added.

Key words: identification key, parasite, pollination, host, *Tetrastigma laoticum*, Vitaceae, Thailand

INTRODUCTION

Studies in ecology, taxonomy and conservation of various Rafflesiaceae in Southeast Asia (e.g. HANSEN, 1972; ELLIOTT, 1990; BÄNZIGER, 1995; MEIJER, 1997; Nais & Wilcock, 1998; BÄNZIGER & HANSEN, 2000) evince the need for more systematic work on these renowned but still relatively poorly understood and controversial parasitic plants. Recently a first study disentangled three species of *Sapria* Griffith, viz. *S. himalayana* Griffith, the misleadingly described *S. poilanei* Gagnepain emend. Bänziger & Hansen, and the new *S. ram* Bänziger & Hansen. Treatment of a slightly different taxon of probable infraspecific rank of *S. himalayana* from Northeast Thailand was postponed until more data became available. These are now reported below.

Recognition of taxa at infraspecific rank is desirable for several reasons in the present context. By properly describing and naming such taxa we clarify the systematics of the Rafflesiaceae, which is a 'highlight' family due to its biological and ecological interest, as well as due to the popularity it enjoys among the general public. Indeed, the repeated confusion of the taxon described below as a new form of *S. himalayana* with other species such as *S. poilanei* and *S. ram* requires clarification, not least in order to point out that it is an endemic restricted to a single area. Finally, we provide evidence for the diversity present in this family of mostly rare or threatened plants and thus give increased scope for improving their badly needed conservation.

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## METHODS

Sites of the Hermit's Spittoons in Phu Khiew Wildlife Sanctuary, western Northeast Thailand, were shown to HB by KK, marked and mapped. This is needed in order to assess the reliability of certain characters of the flower at different sites and through time. Colour, size, morphology of structures such as the ramenta, diaphragma, disk, etc., were studied in the field for five years (1996–2000) and compared with populations in N. Thailand. Colour persistence, especially the white, a major problem with *Rhizanthus* (cf. BÄNZIGER & HANSEN, 2000) was followed up during pollination studies throughout anthesis.

For improved preservation of the flower, the method of HEINRICHER (1905) was used: boiling freshly collected specimens in 60–70% ethyl, methyl or isopropyl alcohol for a few minutes. This takes out most of the colours, which would not preserve anyway, but avoids subsequent unwanted blackening of the specimen and preservation fluid. The specimen remains more or less pale and the alcohol, after replacing it a few times over several months or years, remains clear. One drawback of boiling is that the specimens tend to become too soft, especially if boiled longer than a few minutes to improve colour extraction. If so, preservation in 60–70% methyl alcohol reconstitutes some rigidity. Methanol has two further advantages: it shrinks specimens somewhat less (ethanol: about 5 to 12%), and is much cheaper. Shrinking and flaccidity *versus* swelling and rigidity are reversible processes, even after long-time preservation in ethyl or methyl alcohol, respectively. However, continuous inhaling of methanol vapours should be avoided.

The collected material is at present with the first author but will be deposited at the Herbarium, Royal Forest Department, Bangkok (BKF), when the ecological part of the study is concluded.

Morphological terms used have been explained in detail in Figs. 1–9 of BÄNZIGER & HANSEN (1997). By cluster we mean the buds and flowers of *Sapria* parasitizing a single host liana. All photographs are by HB.

## DESCRIPTION

*Sapria himalayana* Griffith f. *albovinosa* Bänziger et Hansen f. nov.

Figs. 1–5

*A Sapria himalayana* f. *himalayana* perigonii segmentis vinosis cum verrucis albis, non sanguineis cum verrucis flavis differt.

**Etymology.**—A compound name from Latin, *albus* (white) and *vinosus* (wine-red), referring to the white-dotted warts and wine-red lobes.

**Diagnosis.**—There is no apparent morphological difference with *S. himalayana* from North Thailand, only the colours being different: *S. himalayana* f. *albovinosa* has white-dotted warts on wine-red perigones instead of yellow-dotted warts on blood-red perigones.

The new form is superficially similar to *S. poilanei* and *S. ram* in having white-dotted warts and wine-red lobes but in the latter two the dots are distributed mainly basally, not evenly over the whole lobe as in the new form. There are other colour differences, but the



Figure. 1. Female *Sapria himalayana* f. *albovinosa* f. nov.; size 11x12 cm. Note the typically pale female disk.



Figure. 2. Male *Sapria himalayana* f. *albovinosa* f. nov.; size 10x11 cm. Note the typically red male disk.





Figure 3. Cross section of female *Sapria himalayana* f. *albovinosa* f. nov.

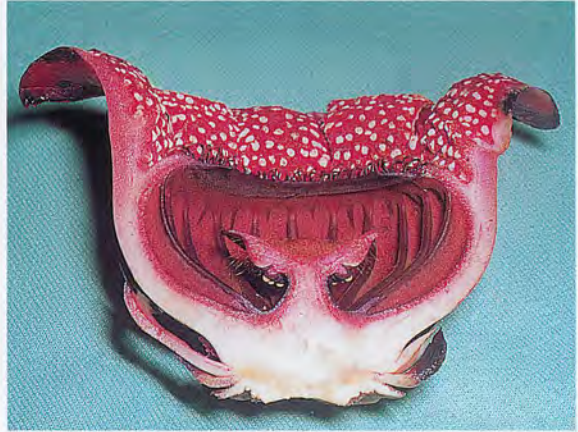


Figure 4. Cross section of male *Sapria himalayana* f. *albovinosa* f. nov.

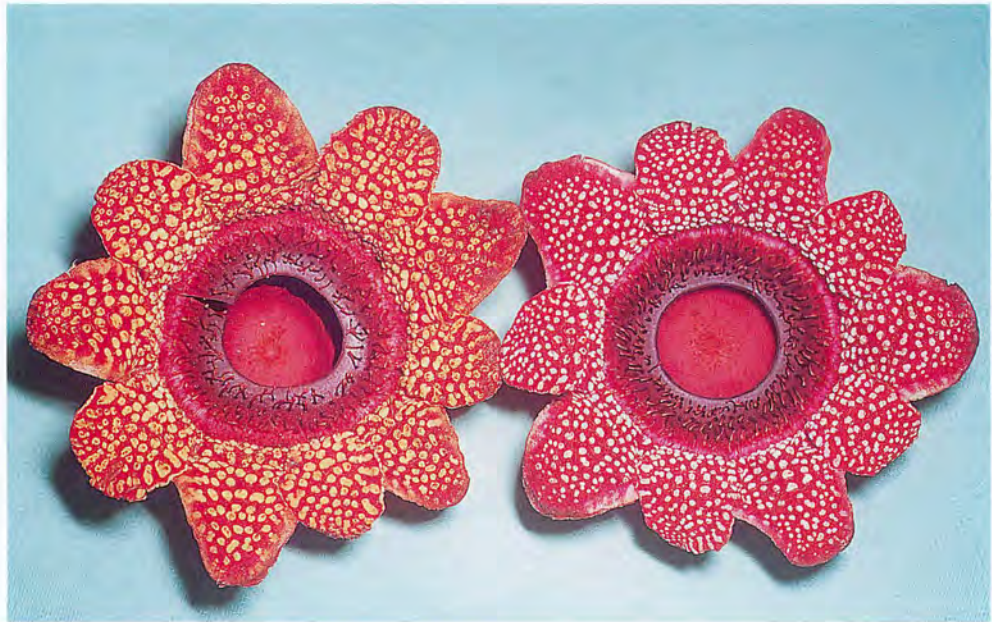


Figure 5. The typical form (left, Phu Khiew, Bänziger 1602) and the new form, *albovinosa* (right, Phu Khiew paratype Bänziger 1604), compared, both males. Note the yellow-dotted warts on blood-red lobes (left) and the white-dotted warts on wine-red lobes (right).

main distinction is morphological, especially in the structure of the column, as summarized in Appendix 1.

**Distribution.**—So far found only at 750–885 m a.s.l. in the Dong Phya Fai Range, Phu Khiew Wildlife Sanctuary, Chaiyaphum Province, western Northeast Thailand.

**Biology.**—See notes below.

**Taxonomic remarks.**—At the study site in NE Thailand both the typical and the new forms are present. The colour difference of *albovinosa* is not an aberration because it was consistently found in all flowers of the same clusters during each of the five years of study, while also the *himalayana* form in the same research area was consistently so in all clusters. No intermediates were noted. The colour did not change throughout the flowers' anthesis. Hence recognition at form rank appears appropriate. However, the flowers of both forms in NE Thailand were somewhat smaller than the typical form from N Thailand. This size difference is at present being investigated.

**Vernacular name.**—We are not aware of any local name for *S. himalayana* f. *albovinosa* other than that used for the typical form, viz. กระโดนฤๅษี (krathon ryssi, or Hermit's Spittoon), an allusion to the shape of the flower. Because of the need to differentiate between the two taxa, we suggest กระโดนฤๅษีจุดขาว (krathon ryssi jud khao, or White Dotted Hermit's Spittoon) for the new form.

**Material studied.**—Six clusters with one to several dozen flowers were studied *in situ* 1996–2000. Only 5 live specimens were collected for taxonomic research and documentation. Otherwise only reproductively dead or dried old specimens were taken.

Collected material. Holotype. Female, THAILAND, Chaiyaphum Prov., Phu Khiew Wildlife Sanctuary, cluster BM1, 860 m a.s.l., 31.12.1996, Bänziger 1605, to be deposited at BKF. Paratypes. 1 male, loc. cit. but cluster BM6, 860 m a.s.l., 31.12.1996, Bänziger 1604; 1 male, loc. cit. but cluster BM1, 22.11.1999, Bänziger 1673; 1 male, loc. cit. but cluster BM6, 22.11.1999, Bänziger 1674; 1 male, loc. cit. but cluster NP2, 870 m a.s.l., 24.11.1999, Bänziger 1679; 2 dead, black flowers, loc. cit. but cluster BM6, 23.11.1999, Bänziger 1675, 1678, all to be deposited at BKF.

## ECOLOGICAL NOTES AND CONSERVATION STATUS

The habitat of the Hermit's Spittoon at Phu Khiew is the upper moist evergreen forest (M. Kumsuk, pers. comm.). HB found only one species of liana there being host to all clusters, viz. *Tetrastigma laoticum* Gagnepain (Vitaceae) (e.g. BÄNZIGER 1456, 1741). In other areas three additional species were infected by *S. himalayana*, viz. *T. obovatum* Gagnepain, *T. cruciatum* Craib & Gagnepain, and a still unidentified species of *Tetrastigma* (HANSEN, 1972; ELLIOTT, 1990; BÄNZIGER, in prep.). None of these were found at the study sites in Phu Khiew, though species known to be parasitized by other Rafflesiaceae elsewhere were present: *T. quadrangulum* Craib & Gagnepain (a host of *Rafflesia kerrii* Meijer), *T. papillosum* (Blume) Planchon (a host of *Rhizanthes deceptor* Bänziger & Hansen), and *T. taeniatum* C.L. Li (closely related or conspecific with *T. hookeri* (Lawson) Planchon, a host of *Sapria ram*) (BÄNZIGER, 1991, and in prep.; BÄNZIGER & HANSEN, 2000).

Nineteen clusters were studied at six major sites separated by up to 8 km. At three sites only the typical form was present, at one only *albovinosa*, and at two both forms were present, with a total of 6 clusters of the *albovinosa* and 13 of the *himalayana* forms. The

clusters were 25–80 m from each other. The flowers of a single cluster all belonged to the same form, either *himalayana* or *albovinosa*, every month of the flowering season which was October to early March, every study year. There was, however, a dubious case: NT2 appeared to have flowers of both forms, less than 2 m from each other. But, at this site there was a second potential host liana of *T. laoticum* at only about 7 m distance, hence comfortably within its infectable root range which can extend to over a 10 m radius. It is not clear, therefore, whether the two forms grew on the same (double-infected) liana or on two different lianas, their *Sapria*-infected roots just being incidentally near each other, and closer to one of the lianas.

During a whole flowering season a few flowers up to many dozens of flowers may develop on a single large liana, and in an exceptional case a maximum of 16 flowers were seen blooming in the same cluster at the same time by HB. Anthesis lasts about 5–6 days. The pollination of *albovinosa* is similar to the typical form studied in N Thailand, but the main pollinator appears to be the carrion fly *Chrysomya pinguis* (Walker), not *Lucilia porphyrina* (Walker) (Calliphoridae) (BÄNZIGER, in prep.).

Although at present *S. himalayana* f. *albovinosa* must be considered as a strict endemic confined to a single area in Northeast Thailand, it is well possible that it is found elsewhere in the otherwise relatively wide *Sapria*-blank region of Thailand's Northeast. Nevertheless, it is important that the new form is given full protection for several reasons.

Like all rafflesias s.l. it is very vulnerable because it is dependent on its host liana, and natural infection of new hosts appears to be very rare. At present it cannot yet be cultivated. Pollination, study of which is not yet concluded, is not frequent. The flower's biological interest is self-evident. Finally, the plant is aesthetically attractive. Even though the new form differs taxonomically from the known form at a low rank, the difference even springs to the eye of the layman nature lover.

Thus at Phu Khiew Wildlife Sanctuary the White Dotted Hermit's Spittoon has good chances of survival because, unlike in national parks, it may be exposed less to "eco"-tourists who might damage or try to collect it. One cluster used for nature education has been fenced in - a reasonable provisional measure to reduce inadvertent trampling of buds. Finally, at this sanctuary there are competent and committed forestry officials.

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**Appendix 1.** Differences between *S. himalayana* f. *albovinosa*, and *S. poilanei* and *S. ram*.*S. himalayana* f. *albovinosa*

White-dotted warts distributed more or less evenly over the lobes. Most ramenta with conspicuously expanded apices (bi- or multilobed or crateriform), and distributed in a wide band (8–11 mm) over much of the diaphragma. Its aperture always quite smaller than the disk of 30–35 mm. Disk a more or less flat to somewhat concave, wall-less pan. Disk dorsally hairy around the bottom (female) to somewhat more densely and widely hairy (male), but hairless distally towards the margin. Known only from one site in NE Thailand.

*S. poilanei* and *S. ram* (see also Figs. 1–9, 11–21 in Bänziger & Hansen, 1997)

White-dotted warts distributed mainly basally on the lobes. Ramenta without or with only slightly expanded apices and found mainly in a narrow band (3–8 mm) at some distance (2–7.5 mm) from the aperture of the diaphragma. Its aperture always much to just wider than the male disk of 12–18 mm, or slightly wider to slightly smaller than the female disk of 17–28 mm. Disk clearly walled, in males cup-shaped, in females pan to bowl-shaped, dorsally with conspicuous hairs all over including margin, wall and its crest in both sexes. In Thailand only in the SE, and central NW to the S.

