

nomenclature of this rust was undertaken and the results are presented in this note.

The soybean rust was originally reported by P. Hennings under *Uredo sojae* P. Henn. Butler collected the rust from Poona, India, on a host was wrongly identified as *Glacine hispida* and the rust was accordingly assigned to *Uromyces sojae* by Sydow et al.<sup>7</sup> Butler<sup>1</sup>, however, subsequently pointed out that the host was wrongly identified as *Glacine hispida* which in reality belonged to a species of *Mucuna* and that no rust had been reported on *Glycine* spp. from India. Ramakrishnan<sup>5</sup> reported soybean rust from Madras under *Uromyces sojae*. Sawada<sup>6</sup> named it as *Phakopsora sojae* (P. Henn.) Sawada. Hiratsuka<sup>2,3</sup> placed it under *Phakopsora pachyrhizi* Syd. and thought that all previous names of soybean rust should be placed as synonyms of *Phakopsora pachyrhizi*. This view point was further confirmed by Lin<sup>4</sup>.

The material of soybean rust obtained from Pantanagar (M.A.C.S. Herb. No. 1215) was then compared with the holotype of *Uredo sojae*, *Uromyces sojae* and of *Phakopsora pachyrhizi*, and other authentic materials of the above rusts, obtained from Museum of Natural History, Stockholm, Sweden. On the basis of these observations it was confirmed that:

1. The holotype material of *Uromyces sojae*, as determined by Sydow was in fact *Uromyces mucunae* on *Mucuna* sp., the host of which was wrongly identified as *Glycine hispida* by Sydow et al.
2. The nomenclatures *Uromyces sojae* (P. Henn.) Sydow and *Phakopsora sojae* (P. Henn.) Sawada are invalidated according to the article number 58 of the International Code of Botanical Nomenclature.
3. So far, there is no report of valid species of *Uromyces* on *Glycine* spp.
4. The rust collected on soybean, i.e., *Glycine max* var. Bragg from Pantanagar together with the previous collections from Stockholm, were similar to each other and belonged to *phakopsora pachyrhizi* as suggested by Hiratsuka<sup>3</sup>.

The accepted nomenclature of soybean rust therefore, is as follows:

Accepted name:

**PHAKOPSORA PACHYRHIZI** Sydow  
(*Ann. Mycol.*, 1914, 12, 108).

Synonyms:

= *Uredo sojae* P. Henn.

- = *Uromyces sojae* (P. Henn.) Sydow nom. nud.  
= *Phakopsora sojae* (P. Henn.) Sawada nom. nud.  
= *Uromyces sojae* Miura non Sydow.  
= *Phakopsora vignae* Arthur.

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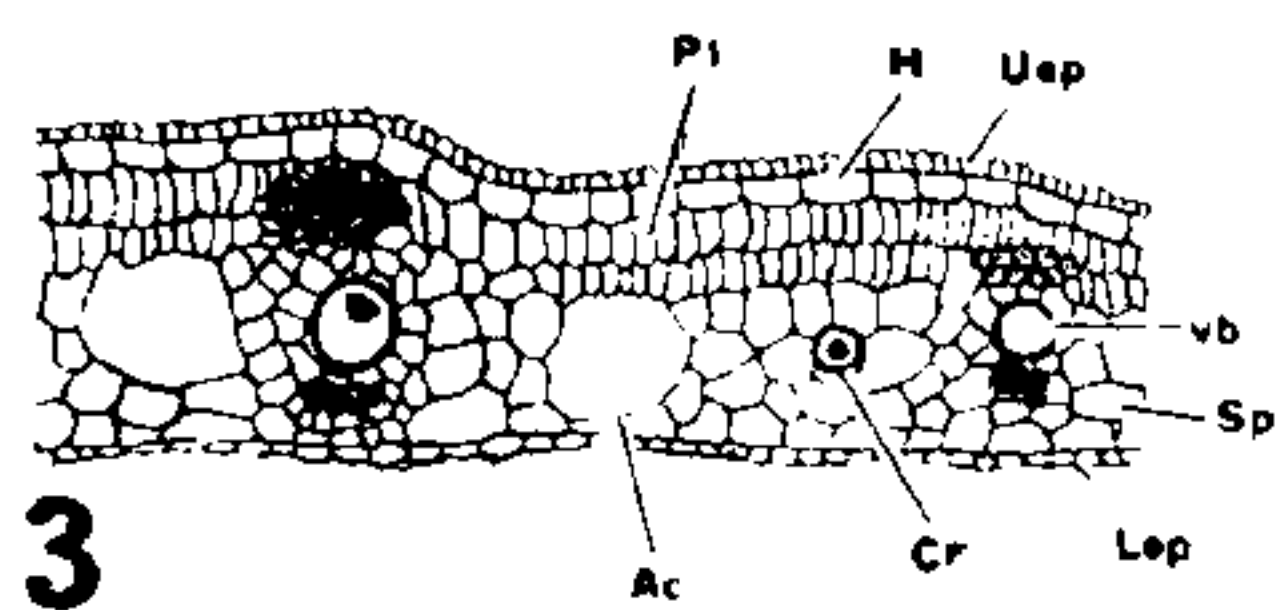
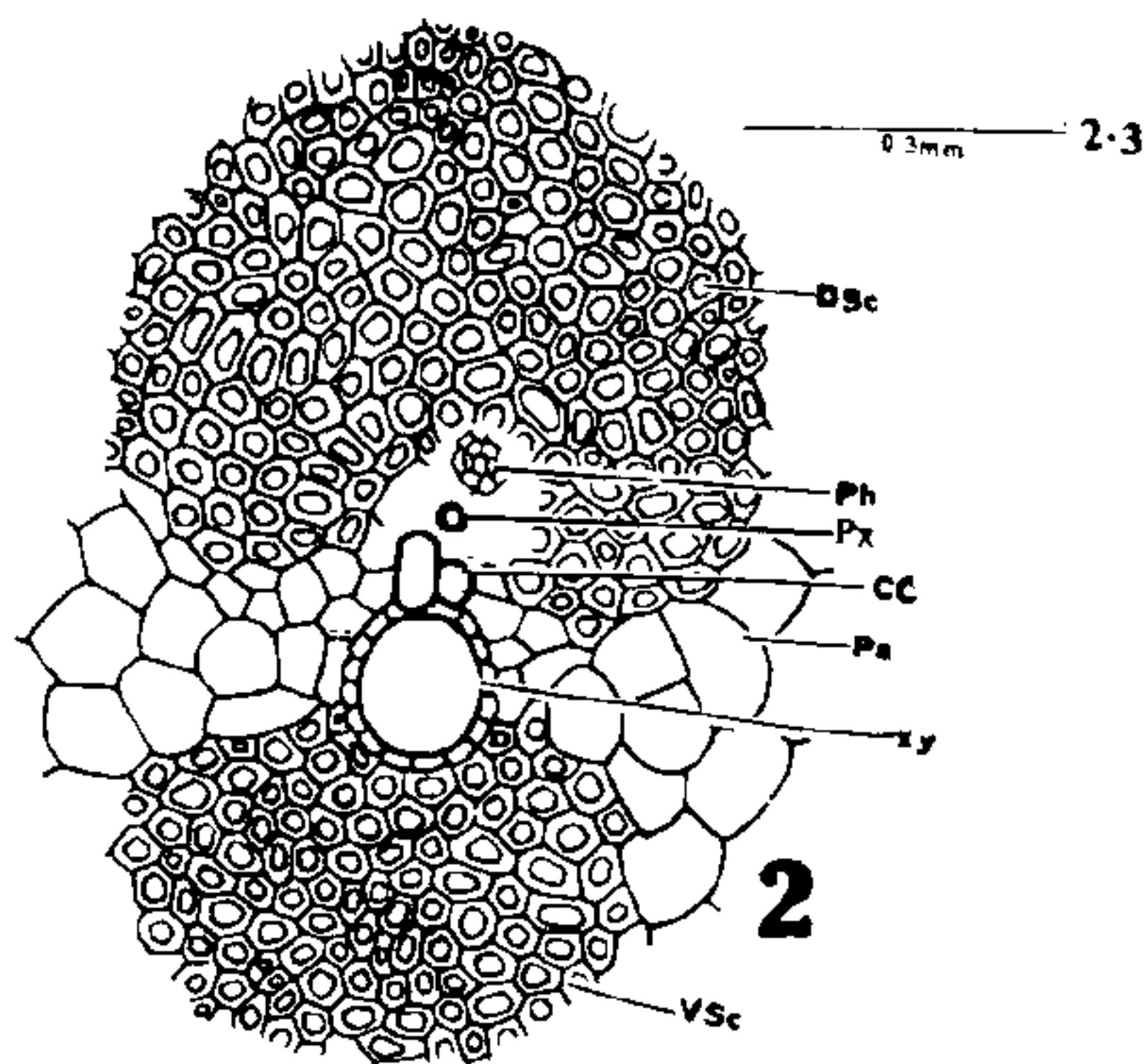
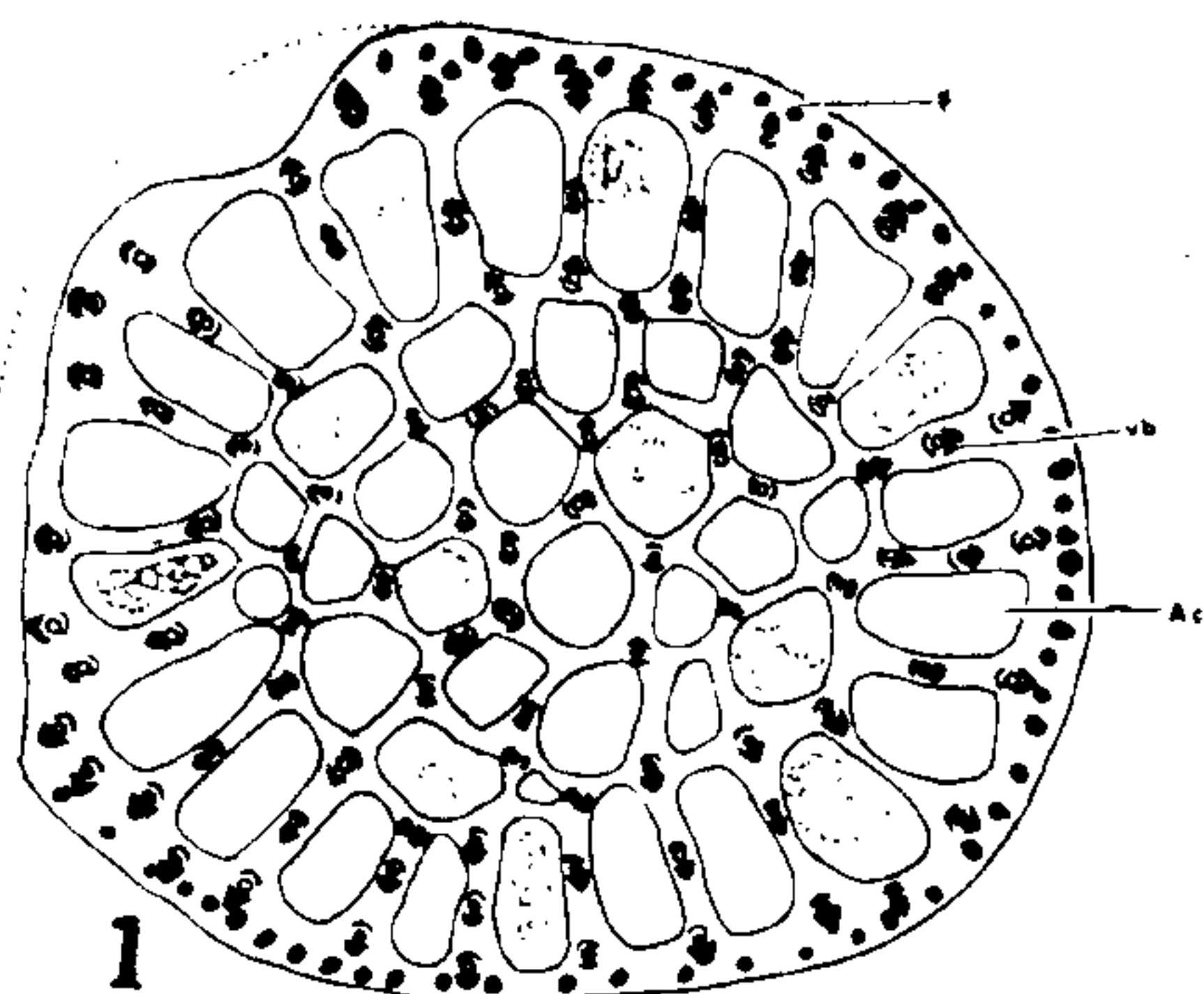
#### FOSSIL MEMBER OF MUSACEAE IN THE DECCAN INTERTRAPPEAN BEDS OF MADHYA PRADESH, INDIA

MUSACEOUS remains in fossil state are rather rare. A carbonised seed of banana was reported from the Tertiary of Columbia, (S. America)<sup>1</sup> while seeds, a fruit and a pseudostem have been described from the Deccan Intertrappean series, M.P., India<sup>2,3</sup>.

Two petrified pieces of chert collected by us from the Deccan Intertrappean beds of Mohgaon Kalan (22° 1' N; 79° 11' E) in Chhindwara District, Madhya Pradesh, India, revealed an axis which on sectioning yielded a petiole, midrib and leaf lamina. After detailed comparison and investigations it was found that the structure of the petiole, midrib and lamina closely resemble the corresponding structures of the genus *Heliconia* sp. (Musaceae)



As seen in cross-section, the fossil petiole is circular in outline, the midrib is wider in the middle but gradually narrows towards the margins, the leaf lamina is uniform in thickness.



FIGS. 1-3. Fig. 1. Cross-sections of fossil petiole showing fibrous and vascular bundles and numerous air canals,  $\times Ca 3$ . Fig. 2. Vascular bundle of the petiole showing both dorsal and ventral sclerenchymatous sheath and a single metaxylem vessel. Fig. 3. Cross section of fossil leaf lamina showing single layered hypodermis. (Ac, air canal; CC, commissural connective; Cr, crystal; Dsc, dorsal sclerenchyma; F, fibrous bundle; H, hypodermis; Lep, lower epidermis; Pa, parenchyma cells; Pi, palisade tissue; Ph, phloem elements; Px, protoxylem vessel; Sp, spongy tissue; Uep, upper epidermis; Vb, vascular bundles; VSc, ventral sclerenchyma; Xy, large metaxylem vessel.)

The petiole and midrib are characterised by the presence of numerous air canal which are provided with aerenchymatous tissue (Fig. 1) and vascular bundles which are arranged in 4 distinct arcs as in the petiole of living *Heliconia* (Musaceae)<sup>6</sup>. The 1st arc of the vascular bundles is adaxial or central in position, the vascular bundles of the 2nd and 3rd arcs are situated towards the abaxial side while those of the IV arc, i.e., the fibrous bundles lie close to abaxial side below the epidermis.

The vascular bundles are characterised by the presence of a single metaxylem vessel surrounded by xylem parenchyma, it is bounded by the dorsal and ventral sclerenchymatous sheaths. There is greater development of sclerenchymatous tissue towards the phloem pole. Few thick-walled cells representing the commissural connective have also been noticed; these lie between the xylem and phloem elements (Fig. 2).

Lamina in cross-section shows upper and lower epidermal cells, hypodermis is single layered both on abaxial and adaxial side. The palisade cells are in two rows, the spongy tissue is loosely arranged and is parenchymatous. Vascular bundle has both the dorsal as well as ventral sclerenchymatous sheaths, air spaces are conspicuous (Fig. 3).

Numerous air canals in petiole and midrib, definite arrangement of fibrous and vascular bundles, single layered hypodermis and mesophyll differentiated in palisade and spongy tissue in the leaf lamina are the characters of the fossil specimen which closely resemble the corresponding structures in living *Heliconia* sp. (Musaceae).<sup>6</sup>

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