

P. tiliacea, Fr. in Tuckerm., Lich. Amer. Septentr. exsic. no. 70.

var. rugosa (Hue) Asahina comb. nov.
P. subquercifolia Hue var. rugosa Hue, Nouv. Asch. Mus. ser. 4, 1: 175. 1899.


var. subradiata (Asahina) Asahina comb. nov.

Formerly all specimens of Parmelia galbina Ach. collected in Japan were called either Parmelia subquercifolia Hue or Parmelia sublaevigata Nyl. On the basis of Vega collection Nylander mentioned in his Lichenes Japoniae p. 27 Parmelia sublaevigata Nyl. In 1960 by the courtesy of Dr. Ahti (Helsinki) the author had an opportunity to examine the Vega specimen in question: 35116 Parmelia sub-Japonia Rokkosan E. Almquist. 1879. As this specimen is only a fragment (2.5x2.0 cm), it is difficult to know its natural habit. But the presence of soralia on the apical part of lobes excludes the identity either with Parmelia galbina Ach. or with real Parmelia sublaevigata Nyl. The original specimen of P. sublaevigata Nyl. was collected in Guiana (South America) and shows a different chemism. The author is of opinion that the Vega specimen no. 35116 is probably Parmelia metarevoluta Asahina (Journ. Japan. Bot. 35: 97. 1960), which is proved to show the same chemism as Parmelia galbina Ach. Long since Hue gave a new name P. subquercifolia to Tuckermans exsic. no. 70 (sub P. tiliacea Fr.) and reported a variety rugosa Hue from Japan. At last in 1961 Culberson has shown the identity of Parmelia galbina from North America with the so called Parmelia sublaevigata auct. (non Nyl.) as well as

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Chemism of Parmelia galbina Ach.: 20 g thalline fragments sent by Guberson were extracted 6 hours with ether at room temperature, the filtered ethereal solution evaporated almost to dryness and the residue was dissolved in possibly small amount of warm benzene, filtered and laid aside. The separated substance was washed with warm benzene to remove a trace of contaminated atranorin and recrystallized from 50% aceton. This substance appears under microscope thin quadrate lamellae and is discolored between 160-220° and decomposes at about 260°. On account of shortage of material any analysis to determine molecular composition was not carried out. This substance, to which the name "galbinic acid" was given, seems to be a depsidone. It is also characterized by the following reactions and differentiated from salacinic as well as from norstictic acids:

<table>
<thead>
<tr>
<th>salacinic acid</th>
<th>norstictic acid</th>
<th>galbinic acid</th>
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<tr>
<td>Under cover glass: blood red solution, giving gradually stout crossing prisms or curved thin trichites radiating from a center.</td>
<td>Blood red solution, giving slender, straight needles irregularly crossing with each other.</td>
<td>At first a yellow solution ensues and after standing over night irregular red spots under microscope are seen.</td>
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By the thin layer chromatography the galbinic acid is well characterized. As the substratum slide glasses coated with "Kieselgel G nach Stahl" (Merck) was used. As a solvent it was found convenient to use mixtures of benzene, chloroform and glacial acetic acid. According to the different proportion of components Rf values vary to some extent, so that it is indispensable in each case to compare the spots with those of the standard substance applied on the same plate in parallel. For spraying agents to visualize the spots either dilute sulfuric acid or dilute PD solution is employed.

Example: As standard substance the purified galbinic acid obtained from Parmelia galbina Ach. from U.S.A. (s. above) was employed. Test materials
were prepared by extracting the lichen fragments to be tested first with hot benzene (to remove atranorin, zeorin etc.), then with hot acetone, which dissolves the expected depsidone. A trace of the acetone solution was applied at the starting point of chromatography.

I. Solvent. Benzene: Chloroform: Acetic acid (glacial) = 3:3:0.3  
   a. Starting point of standard substance (galbinic acid).  
   b. Starting point of the acetone extract of *P. sublaevigata* (non Nyl.) Asahina.

II. Solvent. Benzene: Chloroform: Acetic acid (glacial) = 3:3:0.5  
   c. Starting point of standard substance (galbinic acid)  
   d. Starting point of the acetone extract of *P. metarevoluta* Asahina.

III. Solvent. Benzene: Chloroform: Acetic acid (glacial) = 2:4:0.3  
   e. Starting point of standard substance (galbinic acid)  
   f. Starting point of the acetone extract of *P. obsessa* Ach.

In this way the presence of galbinic acid was proved not only in *Parmelia galbina* but also in *P. metarevoluta* Asahina and in *P. obsessa* Ach. (collected by Kurokawa in Virginia, U.S.A. no. 62049). The author highly appreciate
Miss M. Nuno's excellent assistance in finding effective solvents of the thin layer chromatography.

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