Detective in the herbarium: *Omphalia luteolilacina*

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In the course of studies of the genus *Lichenomphalia*, we came across the taxon *Omphalia luteolilacina*.[1] The epithet (lutus = yellow, lila = lilac) immediately brought to mind the great mimic, *Lichenomphalia umbellifera*, with its cap of various yellowish shades and stem with slight purplish tinges (title banner). Therefore, we were surprised to learn that the species had been synonymized with *L. hudsoniana*,[2, 3] a species with a more pure yellow cap, but whose stem, in our recollection, was invariably white, with no hint of lilac. Time to put on the deerstalker cap of Sherlock Holmes, for another episode of the Detective in the herbarium series.[4] Since there is no manual for herbarial detection, as there is for the private kind (Clovis Anderson: The principles of private detection, used to great effect by Mma Precious Ramotswe, founder of the No 1 Ladies' Detective Agency), we set down the seven steps for successful resolution of this case, as a guide for budding herbarial detectives.

Step 1: Review the original description to get an idea of what is meant by "lilac". **Result**: Stems described "lilacin pâle hyaline quand imbu, blanc pur par le sec". If your French is rusty, a version in German is available, but language is rendered immaterial by a delightful aquarelle by Favre's wife that shows the delicate lilac hues very clearly (Figure 1). Unfortunately, no mention or image of an associated lichen thallus (vide infra).

Step 2: Review our collections of *L. hudsoniana* for comparison. **Result**: Stems white; the faintest hint of lilac hue may be construed for two of 26 visible stems if your imagination runs on rocket fuel (Figure 2).

Step 3: Review our collections of the much more common *L. umbellifera*. **Result**: Most collections have stems with lilac tones, very obvious in many (Figure 2).

Step 4: Review reports of the original synonymization of *Omphalia luteolilacina* with *Botrydina viridis* The current *L. hudsoniana*).[2] **Result**: Authors state that North American fruit bodies have white stems, while European ones are often lilac. Sounds good, but, same authors do not list Favre's type specimens of *O. luteolilacina* among collections studied.

Step 5: Review Internet images of *L. hudsoniana*.

Figure 1. Aquarelle of Omphalia luteolilacina *by Mme Favre. Note the orange-yellow cap, white when dry (right), and the light lilac hues of the stem when moist, also drying white. Lichen thallus not illustrated.*

Figure 2. All our 15 photographed collections of Lichenomphalia hudsoniana, *above, and selected photographs from our much more numerous* L. umbellifera *collections, below. The* Coriscium *type of leafy thallus of* L. hudsoniana *is readily apparent on every image. The small green granules of* L. umbellifera *lichen thallus are not seen at this magnification, better evident as a green mat on the title banner photo. Photos: Roger Smith, Aare Voitk, Maria Voitk, AV.*

Result: None found with convincingly lilac stems.

Step 6: Review descriptions and photos in European books. **Result**: Fungi of Switzerland[5] mentions lilac stems; photo shows only white stems. Arctic and Alpine Fungi[6] mentions lilac stems; photo shows stem with a faint suggestion of lilac.

Up to this point, no incontrovertible conclusions can be drawn. An impression that the epithet might fit better with *L. umbellifera* is only that—an impression, and quite remote from certainty. However, there is one step that might resolve the question without room for doubt. *L. hudsoniana* is the only *Lichenomphalia* species with a leafy, or *Coriscium*, type lichen thallus. The thallus (fungus-alga structure) of all other *Lichenomphalia* species consists of green *Botrydina* type granules on the ground around the base of the stem, as seen in the title banner. Therefore, examination of the type specimen may settle the issue completely. If there is no substrate with the specimen, no lichen thallus will be seen, and our present state of uncertainty remains unaltered. If there is substrate but no *Coriscium* is seen, it suggests rather strongly, but does not prove, that the type is likely not *L. hudsoniana*. But if there is substrate with visible *Coriscium*, then the type species must be *L. hudsoniana*, settling the matter.

Step 7: Review type specimens. **Result**: There were three specimens labeled TYPUS in l'Herbier du Conservatoire et Jardin Botaniques de Genève (G). Two of these were mentioned in Favre's protologue (first description). Because he did not declare either a holotype, taxonomically both are syntypes. However, there is a note on the 1943 collection that Heinz Clémençon declared it the lectotype for the species in 1981. A lectotype is the official name-bearing collection to which all scientists may turn as the representative for the species. Clémençon's choice was likely made on the grounds that this was the first collection of the two, had the most fruit bodies, and also was the one from which Mme Favre had made her charming aquarelle, showing the delicate lilac of the stem. Examination of the substrate at the base of the fruit bodies of this type collection revealed the presence of leafy lichen thallus of the *Coriscium* type—also seen on the other two collections labelled TYPUS.

Case closed.

Because *L. hudsoniana* is the only species of *Lichenomphalia* with a *Coriscium* type thallus, *Omphalia luteolilacina* must be the same species as *Lichenomphalia hudsoniana*. The synonymization was made correctly on the basis of available evidence. Clearly, the white stem of this species has a lilac tint at times, more evident in Europe than North America. There is no other possibility.

Or is there? Well, yes. *L. hudsoniana* could represent a complex of two or more cryptic species, for the moment known by the one name. How likely is this? Probably not very, because molecular analysis has already shown that the species is monophyletic.[7] But is it possible? Theoretically, yes, because the number of specimens analyzed is small, most from Alaska, and none from the Swiss Alps, toporegion for *O. luteolilacina*. Conceivably, sequencing of Favre's type specimens, or fresh collections from the toporegion might uncover some unsuspected relationships. Although possible, such investigations seem to us more characteristic of literary characters like Don Quixote, maybe even the good soldier Švejk. Both admirable idealists, but neither as a good a role model for us detectives, as our idols Sherlock Holmes or Mma Precious Ramotswe. Parenthetically, if you have not read of the exploits of the latter, your life is unfulfilled.

Acknowledgments

We thank Philippe Clerc, curator at G, for examining and reporting on the status of *Coriscium* of the type specimens.

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