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## TAXONOMICAL NOTES ON THE GENUS *GYROMITRA*

### 1. Notes on two uncommon species of *Gyromitra*

Biguttulate smooth ellipsoid ascospores are the leading diagnostic character of the genus *Gyromitra* in difference from the genera *Helvella* (uniguttulate ellipsoid spores), *Helvellela* (globose spores), *Neogyromitra* and *Discina* (apiculate spores). The genus is usually known by its two common holarctic representatives *G. esculenta* (Fr.) Fr., the type species, and *G. infula* (Fr.) Quéf. Several other species have been described or transferred into the genus, but most of them have been afterwards removed into others or regarded as synonymi.

There are, however, some other good members of the genus which are poorly known or not transferred into the genus yet. A North American fungus, described by Phillips under the name *Helvella californica*, has biguttulate smooth ellipsoid ascospores and it is, in the other characteristics, too, a typical *Gyromitra*. The deeply lacunose stem of this fungus, besides the free margins of pileus, is probably the reason why it has been placed in *Helvella*. This species is discussed in details below, and a new combination is proposed for it.

### *Gyromitra californica* (Phill.) Raitv. comb. nova

*Helvella californica* Phill. in Trans. Linn. Soc. II 1: 423 (1880). Seaver, North American Cup Fungi (Operc.) 250 (1928)/sub *Elvela*/, 338 (1942). *Elvela umbracauliformis* Seaver, North American Cup Fungi 251 (1928).

Fruitbodies 6—20 cm high. Pileus 4—10 cm in diameter, subspherical or strongly inflated, widely expanded and reflexed, comparatively even or irregularly convoluted, light brown or tan to dark brown, with free or attached margins and white or yellowish underside. Stipe stout, 1.5—6 cm in diameter, deeply lacunose with high sharp ribs, usually not anastomosing, continuing on the underside of the pileus, white to yellowish, occasionally with a pinkish tint, rarely beautiful pink. Asci clavate or subcylindric, 175—225 × 9—12 μ. Spores uniseriate, ellipsoid, smooth, hyaline, with two small oil globules at each end, 14.1—16.2—(19.1) × 7.3—9.7 μ. Paraphyses cylindrical, clavately enlarged and light brown at their apices, 8—10 μ.

On soil in mountain forests, spring.

**Distribution:** Canada: British Columbia; U.S.A.: California, Idaho, Montana, Nevada, Washington.

**Specimens examined:** Phillips' type specimen at Kew; CUP: 47326, 37705, 43489.

**Exsiccati examined:** Ellis et Everh., North American Fungi 2737; Californian Fungi 315 and 317 (s. n. *Elvela umbracauliformis* Seaver).

The Phillips' type at Kew Herbarium consists of a single large fruit-body in good condition. A note indicates that the stipe had been beautiful pink when fresh. The asci contain spores typical for *Gyromitra*, ellipsoid, biguttulate,  $14.9-17.7 \times 8.1-9.7 \mu$  in my measurements.

It is a distinct and extremely beautiful species, differing from all other *Gyromitras* in its deeply lacunose stem. In hymenial characteristics it is a typical *Gyromitra* and it is interesting that no author has made a corresponding combination. Probably it is because the species has a small and compact area of distribution in the northwest of the United States and adjacent Canada. Therefore the material has not attracted the attention of a wide circle of investigators, whilst the leading American dicomycetologists in the first half of the century, Seaver and Kanouse, did not recognize the genus *Gyromitra*.

The variability in certain external characteristics, particularly in the length of stipe and shape of pileus is remarkable. It led Seaver to describe a short-stipitatae form as a new species *Elvela umbracauliformis*. Later he regarded it as a synonym of *E. californica*. This shows once more that the external characters, so variable in large *Pezizales*, are not reliable in their taxonomy, and we must not use them for a delimitation of taxa, even subspecifically.

The species is interesting in the mycogeographical aspect, too. It is evidently an arctotertiary relict which has retained its area in a small alpine region of North America. A very similar area has also a dacrymycetaceous fungus *Guepiniopsis alpinus*, but it is also found in Japan. A number of arctotertiary relicts in fungi are distributed both in North America and East Asia, belonging to the so-called Pacific geographical element (type of area), which should be better named Amphipacific. Mycologists should also make a search for *Gyromitra californica* in mycologically poorly investigated East Asia, particularly in the Soviet Far East.

There is also a good species of *Gyromitra* from the southern hemisphere. Examining collections of *Helvella*, loaned from the Herbarium, Royal Botanic Gardens Kew, my attention was called by a specimen labelled *Helvella monachella* from New Zealand. Macroscopically it already had the appearance of a *Gyromitra*, which was proved by microscopical analysis. In search for a name for this fungus, I made my decision in favour of *Gyromitra tasmanica* Cooke.

*Gyromitra tasmanica* Cooke, Mycographia 193, t. 90, f. 331 (1878).

Fruitbodies 4-6 cm high. Pileus 2-3 cm in diameter, irregularly hemispherical, undulate, with brown hymenium, free margins and whitish underside. Stipe stout, cylindrical,  $2-3 \times 0.3-1$  cm, smooth, whitish. Asci subcylindrical,  $200-250 \times 11-14 \mu$ . Spores uniseriate, ellipsoid or elongated ellipsoid, smooth, hyaline, with two small oil drops at each end,  $21-26 \times (9.7)-10-13 \mu$ . Paraphyses cylindrical, clavately enlarged and dark brown at apices.

**Distribution:** Tasmania; New Zealand.

**Specimens examined:** Cooke's type at Kew (only a slide); a specimen collected by Colenso from New Zealand, at Kew (labelled as *Helvella monachella*).

It is a good species of *Gyromitra* from the southern hemisphere, close to *G. esculenta*, but differing in poorly developed pileus with entirely

free margins and in larger and more elongated spores. The specimen from New Zealand agrees well with Cooke's figure in external characters, and there are no differences in spores of this collection and type, either. It must be noted that the spores of this species are figured in *Mycographia* incorrectly. They are typically ellipsoid or elongated ellipsoid, but never fusoid (fig. 1). Dr. Dennis described them as elliptic-fusoid (Dennis in litt.), but there seems to be a difference in the terminology.

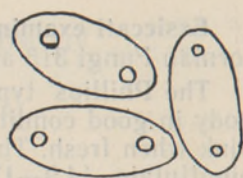


Fig. 1. Spores of *Gyromitra tasmanica* Cooke from the type collection. (Enlarged by 750 times.)

## 2. A new variety of *Gyromitra infula*

Among Dr. Korf's collections mentioned above I found a very curious fungus. Dr. Korf had labelled it as *Neogyromitra gigas*. Externally it resembled small fruitbodies of *G. infula* with poorly developed stipe. The ascospores were biguttulate as in *G. infula* but... distinctly apiculate. The fungus was more similar to *G. infula* than to any of *Neogyromitras*, but I could not solve the problem of apiculate spores.

Recently a helvellaceous fungus was brought to me from the subarctic Siberia by E. Parmasto. It had well-developed stout stipe, comparatively small pileus and biguttulate apiculate ascospores. The epispore membrane stained deeply in cotton blue. I examined the spores of *G. infula* for comparison and found in my great astonishment that they were also covered by clearly visible epispore membrane, slightly thickened at apices. This important feature has never been mentioned in the descriptions of *G. infula*.

As a rule we do not study our common and easily recognizable species carefully enough and therefore some of their features can be easily overlooked, particularly if we work with bad optics and low magnifications as myself in earlier studies.

But now all was clear. These two collections belong to hitherto undescribed variety of *G. infula*.

### *Gyromitra infula* (Fr.) Qué. var. *apiculatispora* Raitv. var. nova

Var. *typicae* similis, minoribus, 3—5 cm alt., sporis apiculatibus differt.

Typus: U.S.S.R., Regio Tjumen, distr. nation. Jamalo Neneticum, Azanel prope Salechardum, ad terram, 20. VIII 1964, TAA-17493, E. Parmasto legit. Paratypus U.S.A., Mont., Glacier Nat. Park, ad truncos putridos, 20. VIII 1948, CUP-37724 (=Korf-1430, TAA-15751), F. Korf et R. P. Korf legit.

Similar to the type variety, but smaller, 3—5 cm high and with respectively smaller pileus. Hymenium seems to have been dark brown with violaceous tint and stipe violaceous grey when fresh. Spores like those of the type variety, but distinctly apiculate; apiculae 2—3 mm thick.

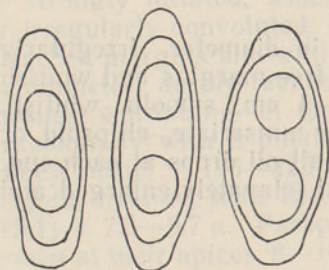


Fig. 2. Spores of *Gyromitra infula* var. *apiculatispora* Raitv. from the type collection. (Enlarged by 1200 times.)

On soil and rotten wood, autumn.

Distribution: U.S.S.R.: The Tyumen Region; U.S.A: Montana.

Specimens examined: TAA-17493 (type), CUP-37724 (=Korf-1430, TAA-15751, paratype).

The Siberian collection of this fungus was remarkably strongly pigmented. Not only the tips of the paraphyses, but the paraphyses in its total length and the subhymenium, too, stained very intensively dark purple in KOH.

Now let us discuss the relationship between *Gyromitra* and other helvellaceous genera. The spore morphology is an important characteristic in the taxonomy of large Discomycetes. The tribes *Morchelleae*, *Acetabuleae*, *Gyromitreae* and *Discineae* in Korf's system (Korf, 1958) are established on this basis. The genera *Gyromitra* and *Neogyromitra* are not closely related according to this system. But the relationship between these genera seems to be a fact, whilst in both genera similar epispore formations can be observed. This feature is presented in the genus *Gyromitra* in gradual progress. *G. esculenta* and other species have a very thin epispore membrane without thickened parts. The spores of *G. infula* var. *infula* are "potentially apiculate" or "semiapiculate". They have epispore membrane ca 0.5  $\mu$  thick with parts thickened to 1  $\mu$  at spore apices (fig. 3)\*. *G. infula* var. *apiculatispora* has already distinctly apiculate spores. We shall probably place the genera *Gyromitra* and *Neogyromitra* into the same tribe in the future.

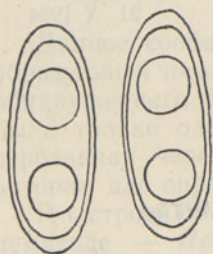


Fig. 3. Spores of *Gyromitra infula* var. *infula*. (Enlarged by 1200 times.)

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### LITERATURE

Korf R. P., 1958. Japanese Discomycete Notes I—VIII. Rep. Yokoh. Nat. Univ., II, 7: 1—35.

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\* Fig. 2 and 3 were made by camera lucida from mounts stained in cotton blue and using the phase-contrast system that makes the epispore membrane better visible.

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SUSTEMAATILISI MÄRKMEID PEREKOND *GYROMITRA* KOHTA

## Resüme

Artiklis antakse kahe vähetuntud kogriitsaliigi *Gyromitra californica* (Phill.) Raitv. comb. nova ja *G. tasmanica* Cooke kirjeldus. Mõlema puhul on uuritud tüüpkesemplare ja nende alusel täpsustatud liikide süstemaatiline kuuluvus. Põhja-Ameerika liigi *G. californica* jaoks esitatakse uus kombinatsioon. Oletatakse, et seda liiki võiks leida ka Kaug-Idast. Kirjeldatakse uus varieteed *G. infula* var. *apiculatispora* Raitv. var. nova, mille eostel, erinevalt tüüpvormi eostest, on jätked tippudes. Selle tunnuse järgi võib arvata, et perekonnad *Gyromitra* ja *Neogyromitra* on omavahel lähedasemalt sugulased, kui seda näitab nende asend praegustes süsteemides.

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СИСТЕМАТИЧЕСКИЕ ЗАМЕТКИ О РОДЕ *GYROMITRA*

## Резюме

В статье даются описания двух малоизвестных видов строчков *Gyromitra californica* (Phill.) Raitv. comb. nova и *G. tasmanica* Cooke. Изучены типовые коллекции обоих видов и на этой основе уточнены их систематические позиции. Для североамериканского вида *G. californica* приводится новая комбинация. Предполагают, что этот вид может быть найден и на Дальнем Востоке. Описывается новая разновидность *G. infula* var. *apiculatispora* Raitv. var. nova, которая отличается от типовой разновидности спорами с придатками на концах. На основе этого признака можно предположить, что роды *Gyromitra* и *Neogyromitra* являются более родственными, чем это определяет их положение в современных системах.

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