

Urnula hiemalis – a rare and interesting species of the Pezizales from Estonia

Irma Zettur & Bellis Kullman

Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences,
181 Riia St., 51014, Tartu, Estonia.
E-mail: bellis.kullman@emu.ee

Abstract: *Urnula hiemalis* of the Pezizales is reported for the first time from Estonia.

Kokkuvõte: Liidikulaadsete seente haruldane ja huvitav liik tali-urnseen *Urnula hiemalis*.

INTRODUCTION

In early spring 2011, after an extremely snowy winter, we found a 5 cm large black fruit-body in a spruce forest (*Picea abies*) on mossy ground among needle litter. The fruit-body appeared immature but after growing for some days in a humidity box it developed mature spores, allowing for the first time to identify *Urnula hiemalis* Nannf. from Estonia.

MATERIALS AND METHODS

Freshly collected living material was mounted in tap water and examined using the Zeiss Axioskop 40 FL microscope, AxioCam MRc camera and the Axio Vison 1.6 program.

The specimens are deposited in the mycological collection (TAAM 203117) and in the collection of fungal living cultures (TFC 2011-1) of the Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences and in database eBiodiversity (2011).

TAXONOMY

Urnula hiemalis Nannf., Svensk bot. Tidskr. 43: 471 (1949).

Põlva County, Mooste (South-East Estonia, 58° 9.9' N, 27°9.1' E), under *Picea abies*, on mossy ground among needle litter, about 25 m from birches (*Betula pendula*); collecting place the edge of a meadow about 100 m from a spruce forest, 30 April 2011 leg. I. Zettur, det. I. Zettur and B. Kullman (TAAM 203117) (Fig. 1).

Apothecia infundibuliform, the apical diameter reaching about 5 cm, basally tapering into a

short, hardly noticeable stipe emerging from the soil. Flesh 1 mm thick, white. Outer surface felty, brownish black. Hymenium black, surface velvety. Spores ellipsoid, (20.6–) 23.3 (–27.6) × (9.3–) 12.0 (–14.5) μm (n = 25), rather thick-walled, smooth, with several smaller droplets towards each end (which disappear in lactic acid). Spores developing very slowly, towards the ascus tip often obliquely arranged, slightly overlapping. Asci very long, (507–)549(–586) × (11–)12(–13) μm (n = 10), 8-spored, narrowly cylindrical above, ascus apex opening by an operculum, gradually tapering towards the base. Paraphyses long and hyaline, upwards slightly enlarged and branched, septate, upper part clavate, with dark content.

Medullary excipulum of textura intricata consisting of loosely interlaced brown hyphae. Ectoexcipulum of textura globularis covered with a fine layer of hyaline hairs encrusted with brownish black dots.

DISCUSSION

Urnula is a genus of the cup-fungi in the family Sarcosomataceae characterized by dark-colored (brown to black), shallow to deep infundibuliform apothecia with or without a stipe, growing in spring. The type species of the genus is *Urnula craterium*, commonly known as the devil's urn or the gray urn. Members of this genus can grow as saprobes or parasites having an anamorphic state. *U. craterium*, the sister species of *U. hiemalis*, is thought to cause a plant disease, Strumella canker, on oak (Davidson,



Fig 1. *Urnula hiemalis* (Photo B. Kullman; TAAM 203117.)

1950; anamorphic state *Conoplea globosa*). The anamorphic state of *U. hiemalis* is yet unknown or not recorded. *U. craterium* has been known in Estonia since 28.05.1955 when Erast Parmasto collected it from Tartumaa, Järvelja. At present it is known to grow in coniferous and mixed forests, especially *Corylus* meso-eutrophic boreo-nemoral hillock spruce forests and *Hepatica* eutrophic boreo-nemoral spruce forests, attached to twigs of broad-leaved trees, buried in the ground, in May, everywhere in Estonia, with the exception of Saaremaa, Hiiumaa and Läänemaa.

U. hiemalis was first described in 1949 by Nannfeldt from Sweden. *U. hiemalis* is distinct from *U. craterium* in lack of fruit-body stipe and smaller spores (25–30 × 11–13 µm and 29–35 × 13–14 µm respectively) (Hansen & Knudsen, 2000). The species differ also in their growth rhythm and substrate. Fruit-bodies of *U. craterium* develop rapidly, forming mature asci and spores whereas fruit-bodies of *U. hiemalis* remain immature, decaying often without having ripened spores. Describing this species Nannfeldt (1949) noted that the fungus can be immature even late in the season being already in a state of decomposition. *U. craterium* growing

on decaying branches forms a late-autumn and wintertime stromata which will rapidly transform into apothecia with the advent of warm weather in spring (Wolf, 1958). *U. hiemalis* grows on the ground and its connection with wood as well as forming of stroma are not known. Our finds of *U. hiemalis* were growing without a visible substrate of hardwood.

This winter (2010/2011) snow fell on the unfrozen ground and did not melt until spring, which obviously favored the development of fruit-bodies of *U. hiemalis*. Something like that happened to *Sarcosoma globosum*, belonging to the same family, in 2005. After a winter during which the ground was not frozen deep and was covered with a thick layer of snow, there appeared hundreds and hundreds (altogether ca 3,300 in Estonia) of fruit-bodies of *S. globosum*, a species that seemed to be disappearing in Estonia earlier (Kullman, 2005; 2011). They appeared mostly in the same places where they had been found decades earlier. In the following years we found many new localities of *S. globosum* (Kullman, 2011).

Persisting in the same place for years seems to be typical also of the genus *Urnula*. *U. craterium* shares the habitat with *S. globosum*

in *Corylus* meso-eutrophic boreo-nemoral hill-ock spruce forests, and in *Hepatica* eutrophic boreo-nemoral spruce forests in Põlva County (Taevaskoja and Kiidjärve). These fungi have occurred in the locality for several decades or even longer. We have found *U. craterium* exactly in the same place, attached to twigs of *Corylus avellana*, buried in the ground since 1994 in Taevaskoja. The same seems to be valid for *U. hiemalis*. According to Esteri Ohenoja's personal communication, *U. hiemalis* has been found almost every spring in the same locality since 1968 at Muhos in Finland.

Distribution and habitat. *U. hiemalis* has sparse and scattered distribution throughout Scandinavia and now in one locality in Estonia. According to Hansen and Knudsen (2000), *U. hiemalis* occurred in the northern part of Norway, Sør-Trøndelag (rare), in the southern part of Sweden, Västergötland, Östergötland (rare) and in the northern part of Finland, Inarin Lappi (rare). Using the databases at the Swedish Museum of Natural History – S (Krypto-S, 2011.), the Natural History Museum, University of Oslo – O (Soppherbariet, 2011) and personal data we found altogether ca 90 records of *U. hiemalis*.

Sweden: Northernmost Sweden (1 collection), southern Sweden (4), eastern coast of Sweden (1), Central Sweden (4), and southwestern part of Sweden (2). Habitat: Rich habitats on riversides and forest meadows, in mossy lawn, in groves with *Betula pendula*, *Populus tremula*, *Picea abies* and *Pinus sylvestris*, but also singly on sparse lawn (Nannfeldt, 1949; Krypto-S, 2011).

Norway: Southern Norway (16), western Norway (6), southeastern Norway (10) and Central Norway (5). Habitat: Rich habitats (calcareous soil) on riversides and in mossy lawn, in groves with *Populus tremula*, *Betula pendula*, *Corylus avellana*, *Quercus robur* and *Alnus glutinosa*, also under *Picea abies* and *Pinus sylvestris* (Soppherbariet, 2011).

Finland (Herb: H, OULU, TUR): Southern Finland (ca 20), Central Finland (ca 10), northern Finland (ca 10 northward up to the Oulu region and one collection from Utsjoki). Habitat: Rich habitats on riversides and forest meadows, often under junipers (growing on decaying junipers?) (personal communication of Martti Ohenoja).

U. hiemalis was red-listed as near-threatened (NT) in Finland according to the third evalua-

tion (2001), but in the last evaluation (Huhtinen et al. 2010) it is nationally considered as least concern (LC), but is locally threatened in some areas of the country, and also in Norway it is in the least concerned class (LC) (Rødliste, 2010). The taxon is proposed to the European Red List (Ing, 1993). It occurs also in Alaska (Kempton & Wells, 1974).

ACKNOWLEDGEMENTS

We are grateful to Kuulo Kalamees, Kadri Pärtel (Estonia) and Esteri Ohenoja (Finland) for useful consultations and all-round help. Our sincere thanks are due to Mrs. E. Jaigma for revising the English text of the manuscript.

REFERENCES

- Davidson, R.W. 1950. *Urnula craterium* is possibly the perfect state of *Strumella oryneoidea*. *Mycologia* 42: 735–742.
- eBiodiversity. 2011. – http://elurikkus.ut.ee/kirjeldus.php?lang=est&id=158960&rank=70&id_puu=170170&rank_puu=60
- Hansen, L. & Knudsen, H. (eds.) 2000. *Nordic Macromycetes Vol. 1. Ascomycetes*. Nordsvamp, Copenhagen 309 pp.
- Huhtinen, S., Salo, P., Haikonen, V. & von Bonsdorff, T. 2010. Kotelosenet Ascomycota. In: Rassi, P., Hyvärinen, E., Juslén, A. & Mannerkoski, I. (eds.). *The 2010 Red List of Finnish Species*, pp. 272–277. Ympäristöministeriö & Suomen ympäristökeskus, Helsinki. www.environment.fi/redlist
- Ing, B. 1993. Towards a red list of endangered European macrofungi. In: Pegler, D.N., Boddy, L., Ing, B. & Kirk, P.M. (eds.) *Fungi of Europe: Investigation, Recording and Conservation*, pp. 231–237. Royal Botanic Gardens, Kew.
- Kempton, P.E. & Wells, V.L. 1974. Studies on the fleshy fungi of Alaska. VII. *Urnula* in Alaska. *Norw. J. Bot.* 21: 217–221.
- Krypto-S. 2011. – http://andor.nrm.se/fmi/xsl/kryptos/kbo/publFindspecies.xsl?view&db=kbo_svamregister&token.languagecode=en-GB
- Kullman, B. 2005. Kagu-Eesti – limatünniku varju-paik. In: I. Puura ja S. Pihu (toim.). *XXVIII Eesti Looduseuurijate Päev. Setomaa loodus: 77–79*. Tartu. 94 pp.
- Kullmann, B. 2011. Limatünnik Eestis. In: Kull, T., Liira, J., Sammul, M. (toim.). *Haruldused Eesti looduses. Eesti Looduseuurijate Seltsi aastaraamat* 86: 9–17.
- Nannfeldt, J.A. 1949. Contributions to the mycoflora of Sweden. 7. A new winter discomycete, *Urnula hiemalis* Nannf. n. sp., and a short account of the Swedish species of Sarcoscyphaceae. *Svensk botanisk Tidskrift* 43: 468–484.

- Rassi, P. Alanen, A., Kanerva, T. & Mannerkoski, I. 2001. *The 2000 Red List of Finnish species*, pp. 305–311. Ympäristöministeriö & Suomen ympäristökeskus, Helsinki. <http://www.ymparisto.fi/default.asp?contentid=262117&lan=EN>
- Rødliste. 2010. – <http://www.artsportalen.artsdatabanken.no/#/Rodliste2010/Vurderinger/Urnulla%2Bhiemalis/79524>
- Soppherbariet. 2011. – <http://www.nhm.uio.no/botanisk/sopp/index.html>
- Wolf, F.A. 1958. Mechanism of apothecial opening and ascospore expulsion by the cup-fungus *Urnulla craterium*. *Mycologia* 50: 837–843.