Didymium vernum, a second Butterbur inhabiting myxomycete in the UK

Jurgen Nieuwkoop[1]

A search in May 2022 on the underside of *Petasites hybridus* (Common Butterbur) leaves in Northumberland not only revealed *Didymium tussilaginis*, but also *D. vernum*. The latter is a new record for England and the UK while the former is considered a rare species. Presumably both species occur on a wider scale and the scarcity is an expression of the fact that their habitat is rarely investigated for myxomycetes. This article aims to increase awareness and promote further searches in spring 2023.

History

Kuhnt *et al.* (2014) published an article on two *Didymium* species on the underside of Common Butterbur leaves. The most common of these was first found in Cheshire in England in 1870 and described under several names before Massee in 1892 gave it its current name: *Didymium tussilaginis*. In the following years the species was largely forgotten or synonymized with other taxa until the 2014 article drew attention to this clearly recognizable species. Ing mentions the species in the supplement to the enlarged edition of his handbook (Ing 2020). Besides *D. tussilaginis* Kuhnt *et al.* described another species on Butterbur leaves new to science: *D. vernum*.

Description

Description of both species follows Kuhnt, Baumann & Nowotny (2014).

Didymium tussilaginis (Berk. & Broome) Massee

Sporocarps irregularly rounded, rarely oblong plasmodiocarps, light grey, often conspicuously flat, sessile on a broad base, 0.2–0.4 mm tall, 0.4–1.5 (-2.5) mm wide, scattered or in loose groups, sometimes growing in groups of 5–25 sporocarps; **Stalk** absent; **Columella** inconspicuous, but mostly appearing as a clearly distinct, thin, chalky base, white, dirty white to beige, slightly shiny, sometimes with hump-like outgrowths or short ridge-like elevations (representing a pseudocolumella?); **Hypothallus** ± conspicuous, whitish to beige, common to a group of adjacent sporocarps, but aggregated hairs of lower leaf surface of the host plant appear like a larger extended hypothallus; **Peridium** simple, membranous, under the magnifying glass mostly with metallic, sometimes light blue iridescence, under transmitted light almost translucent, very pale brown or pale yellow, usually only sparsely covered with calcareous scales, these fine crystalline or mostly amorphous with irregular, angular shape, 5–20 (-32) µm in size; **Capillitium** whitish under the lens, almost colourless in transmitted light or pale brown, rarely darker brown, irregularly branched or sometimes reticulate, often with small inclusions of crystalline or amorphous calcium, 0.6–3 (-5) µm in diameter, somewhat elastic, mostly smooth, some threads with darker swellings; **Spores** free, in mass dark brown, by transmitted light pale brown to violaceous brown, with a wall of uniform thickness, without obviously lighter germination pore, densely and irregular spinulose, occasionally with ± conspicuous groups of slightly darker spines, spores spherical, (11-) 12–13 (-15) µm or slightly ovoid (11-) 12–14 (-16) x (10-) 11–13 (-14) µm; **Plasmodium** dark lilac to grey.

Didymium vernum Kuhnt, K. Baumann & Nowotny

Sporocarps irregularly rounded, more rarely short plasmodiocarps, light brown, to orange-brown, sessile, 0.3–0.8 mm tall, 0.8–2.3 mm wide, scattered or in loose groups, sometimes slightly gregarious; **Stalk** absent; **Columella** absent, but with a conspicuous calcareous base appearing as a thin crust with a rough surface, bright orange to orange-brown; **Hypothallus** conspicuous, common to a group of adjacent sporocarps, light orange-brown, partly with lime crystals; **Peridium** simple, membranous, under the lens brown or blue, shiny, irregularly opening, colourless in transmitted light or pale yellow, sometimes irregularly mottled with yellowish, rounded, large patches, covered with scattered,

large calcareous scales, these yellowish orange in transmitted light, showing a crystalline structure, or sometimes irregular angular in shape, (8-) 25–65 (-90) µm; **Capillitium** usually rather sparse, gray to whitish under the magnifying glass, almost colourless to light brown in transmitted light, occasionally with dark brown thickenings, irregularly branched, (0.5-) 0.8–1.8 (-2,5) µm in diameter, with swellings up to 4.5 µm thick, sometimes much wider ramifications, threads usually smooth; **Spores** free, dark brown in mass, ± light brown by transmitted light, with a wall of uniform thickness, without conspicuous germination pore, irregularly and delicately spinulose, sometimes with indistinct groups of darker spines, spores round or slightly ovoid, spherical spores (9-) 9,5–11 (-12) µm, ovoid ones (9,5-) 10–11 (-12) x (8-) 9–10 (-11) µm; **Plasmodium** unknown (just before fruiting dark yellowish orange).

Figure 1. *Didymium tussilaginis* (Berk. & Broome) Massee on the underside of a leaf of Common Butterbur.

Figure 2. *Didymium vernum* Kuhnt, K. Baumann & Nowotny on the underside of a leaf of Common Butterbur.

Pictures represent Dutch material and are made by Hans van Hooff. For more pictures of both species and many other Myxomycetes see: https://www.mycologen.nl/onderzoek/systematiek-taxonomie/myxomyceten/soortenoverzicht

Distribution

In the original publication, *D. vernum* is recorded at six sites in Germany and one in France. Targeted searches revealed the species at two sites in the Netherlands (Klunder & Van Hooff 2018) and one in Denmark (Danish Myxomycetes). *D. tussilaginis* is more common: known in seven vice counties in England (Ing 2020), 20 localities in Denmark (Danish Myxomycetes), 12 in The Netherlands (Verspreidingsatlas), many in Germany and one in Austria (Kuhnt *et al.* 2014). The map on the Global Biodiversity Information Facility also shows some dots in southern Norway (GBIF).

In Northumberland both species were found along a small stream some 10 km north of Alnwyck. Furthermore *D. tussilaginis* was found along the River Aln just north of Alnwyck and along the River Wharfe in Burnsall in the Yorkshire Dales.

Abundance

To find both myxomycetes it is necessary to turn over quite a lot of Butterbur leaves. The best spots seem to be alongside wherever water is nearby. In the Netherlands Common Butterbur also grows on road verges, but such sites were mostly unproductive. When it is present, turning of about 30–40 leaves on average is sufficient to find *D. tussilaginis*. It was found in 33% of searched populations of *Petasites hybridus* in Denmark. In a search by the author in April and May 2022 in The Netherlands the success-rate was 35% (5 out 14). And in England in May 2022 even 100% (3 out of 3). The English records of *D. tussilaginis* were made within 5 minutes of searching and in two out of three sites there were several leaves with the myxomycete present.

D. vernum takes more searching-time before it turns up. In The Netherlands in 2022 it was present in 7% of searched populations of *Petasites hybridus* (1 out of 14). In England the score in May 2022 was 33% (1 out of 3). Usually, the number of leaves with *D. vernum* is lower than with *D. tussilaginis*, so more turning is required.

Ecology

Both species are found on the underside of leaves of *Petasites hybridus*. They are present between the middle of April and early June. As stated, Butterbur plants near water on more or less moist soils provide the best chance. Common Butterbur flowers first (in separate male and female plants) and afterwards the leaves appear. Probably the plasmodium develops in the soil and creeps up the Butterbur leaf stems while the leaves are still inrolled. The inrolled leaves provide protection against dehydration and damage by rain. They are then lifted up by the growing leaf. When the leaves unfold the myxomycetes are already developed and remain protected against wash-off by rain.

As far as the experience of the author reaches, *D. vernum* is always accompanied by *D. tussilaginis*, albeit nearly always on separate leaves. The latter is often found as the single *Didymium* species present.

Records

Didymium tussilaginis

UK, Northumberland, Ellingham, along Charlton Burn S of Tinely Farm, riverside in wooded valley, on the underside of *Petasites hybridus* leaves, leg. J. Nieuwkoop 23-05-22, Herbarium Nieuwkoop M0464

UK, Northumberland, Alnwyck, along River Aln, riverside in wooded valley, on the underside of *Petasites hybridus* leaves, leg. J. Nieuwkoop 24-05-22, Herbarium Nieuwkoop M0466

UK, Yorkshire Dales, Wharfedale, Burnsall, along River Wharfe, riverbank near village green, on the underside of *Petasites hybridus* leaves, field record J. Nieuwkoop 29-05-22.

Didymium vernum

UK, Northumberland, Ellingham, along Charlton Burn S of Tinely Farm, riverside in wooded valley, on the underside of *Petasites hybridus* leaves, leg. J. Nieuwkoop 23-05-22, Herbarium Nieuwkoop M0465.

Figure 3. The site of *Didymium vernum* and *D. tussilaginis* along the Charlton Burn south of Tinely Farm in Northumberland: a slightly shaded small stream with Common Butterbur on its sloping banks.

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1. Jurgen Nieuwkoop, Vluchtheuvelstraat 6, 6621 BK Dreumel, The Netherlands

References

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Klunder, N. & Hooff, H. van. (2018). Help us find *Didymium tussilaginis* and *Didymium vernum* on *Petasites hybridus*. *Coolia* 61(2): 87–91.

Kuhnt, A., Baumann, K. & Nowotny, W. (2014): *Didymium tussilaginis* (Berk. & Broome) Massee, *Didymium vernum* spec. nov., and *Diacheopsis* spec. – three hitherto overlooked foliicolous myxomycete species on Common Butterbur (*Petasites hybridus*). *Zeitschrift fur Mykologie* 80(1): 137–167.

Further resources

Myxomycetenproject. https://www.mycologen.nl/onderzoek/systematiek-taxonomie/myxomyceten

Verspreidingsatlas. https://www.verspreidingsatlas.nl/padden-stoelen