

The smut-fungus *Microbotryum tragopogonis-pratensis* (Persoon) Bauer & Oberwinkler, 1997 infecting Goat's-beard *Tragopogon pratensis* in two Worcestershire grasslands.

Harry Green, Gary Farmer & Sue Chandler

On 25th May 2024 Harry Green and Sue Chandler were wading through rain-wet tall grassland full of buttercups at Tiddesley Orchard near Pershore (01) and noticed occasional dark, roughly spherical structures about 1cm in diameter, topping tall thin plants. Closer examination revealed them to be damaged, possibly galled flower heads of Goat's-beard *Tragopogon pratensis* (02).



01. Tiddesley Orchard grassland full of buttercups and Goat's-beard. 25.05.24. Harry Green.

By chance, the next day HG picked up a copy of the new gall key (Redfern & Shirley 2023) which revealed that the black spheres were remnant Goat's-beard flower-heads full of smut fungal spores of *Microbotryum tragopogonis-pratensis*. The fungus infects both Goat's-beard and Salsify *T. porrifolius*, destroying the flowers, leaving a dark powdery mass of spores in place of the flower (NatureSpot website).



02. Galled flower heads of Goat's-beard. Approximately 1 cm diameter. Tiddesley Orchard 25.05.24. Harry Green.

On 16th June 2024 less-damaged flower heads partly filled with black powder were found at the same site (03, 04).



03. Goat's-beard flower head attacked and galled by *Microbotryum tragopogonis-pratensis* 18.06.24, with healthy flower head for comparison. Harry Green.



04. Goat's-beard flower head attacked and galled by *Microbotryum tragopogonis-pratensis* vertical cut 18.06.24, with healthy flower head cut for comparison. Harry Green.

On 13th July 2024 galled flower heads were found at a more advanced stage and were photographed in situ by Sue Chandler (05, 06).



05. Goat's-beard flower head attacked and galled by *Microbotryum tragopogonis-pratensis* 13.07.24. Sue Chandler.



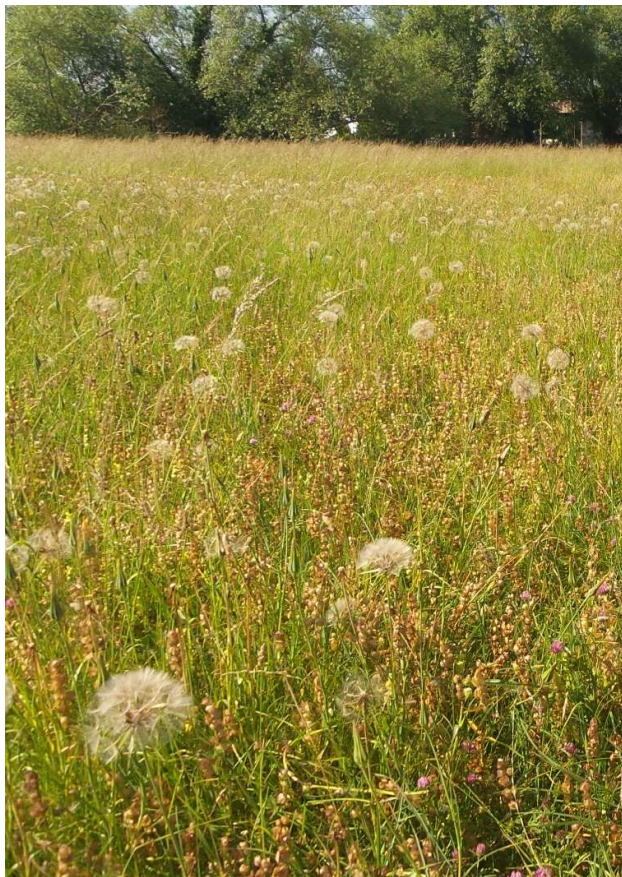
06. Goat's-beard flower head attacked by and galled by *Microbotryum tragopogonis-pratensis* 13.07.24. Sue Chandler.

Alerted by these findings, Gary Farmer noted the same gall on Goat's-beard while walking through grassland at Littleton Pastures, Middle Littleton on 25th June 2024. Most of the Goats-beard was in seed (07) but a few still had closed heads. When one of these was picked it 'exploded', issuing black dust. A second one was picked more carefully and when it was tapped on top of a fence post, black spores spilled from the galled head (08).

Microbotryum tragopogonis-pratensis appears to have a northern distribution with most records being north of a line from the Severn estuary to the Wash.

Interestingly, there are no records showing for Worcestershire on the NBN Atlas (accessed 06.07.24). Is this really so rare in the county,

has the mild, wet winter favoured the fungus, or is it simply under-recorded?



07. Seed heads of Goat's-beard in Littleton Pastures 25.06.24. Gary Farmer.



08. Smut fungus spores spilling from Goat's-beard head. Littleton Pastures 25.06.24. Gary Farmer.

Discussion

A similar smut fungus *Microbotryum violaceum* is common on champions *Silene* in Britain. The following account by Margaret Redfern (2011) outlines part of its life history.

"There are few symptoms until black telia appear instead of anthers, replacing the pollen with a mass of powdery black teliospores and sterilising the flower. Dispersal of the spores is by foraging insects

collecting pollen and becoming covered with teliospores and transporting them to the next flower they visit. The smut also transforms the flower ovaries into more stamens so inducing the flower to produce extra pollen with more spores. Infection in *Microbotryum* species is systemic and causes lifetime sterility in the plant.”

Presumably similar changes occur in the structure of the flower head in Goat's-beard leading to classification as a gall caused by a smut-fungus.

Ingram (2019) provides a very useful account of smuts including a picture entitled “A holobiotroph, *Ustilago violacea*, an Anther-smut of Red Campion *Silene dioica*. Note the pustules of black ustilospores (syn. teliospores) on the anthers of the otherwise intact flowers.” This looks similar to the Goat's-beard flower shown above (06) but at an earlier stage.

References

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Images

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