

***Kiefferia pericarpicola* (Bremi, 1847) (Diptera: Cecidomyiidae) causing galls in the flower-heads of *Torilis japonica* L.**

Harry Green [2019. Published in *Worcestershire Record* 47:60-62.

On the Worcestershire Recorders field recording day on 3<sup>rd</sup> August 2019 at the Wild Goose Reserve near Grimley several of us noticed occasional small reddish galls in the flower-heads of *Torilis japonica*, the Upright Hedge-parsley. We were unable to name the causer so we took pictures and collected small samples. Consulting the usually infallible *Plant Gall Key* (Redfern, Shirley & Bloxham 2011) did not help. The key is arranged under plant species and *Torilis* is not there. On an internet search Jean Young discovered that the gall was probably caused by a gall midge *Kiefferia pericarpicola* (Bremi, 1847, Diptera: Cecidomyiidae) and that it was seen most often on the flowers of Wild Carrot *Daucus carota*. A Dutch web site (see references list) notes that it occurs on many umbelliferous plants: "*Apiaceae, broadly oligophagous*" and lists 39 hosts many of which occur in Britain and Ireland. *Torilis japonica* is listed.

On returning to the *British Plant Galls Kiefferia pericarpicola* is of course in the key under *Daucus* with a note that it "*Occasionally occurs on other Apiaceae*" and is illustrated with a colour picture in Plate 4. Internet searching soon showed that it occurs widely throughout Europe. So have we been missing it? In 2019 it seemed to be uncommon in a few localities examined after 3<sup>rd</sup> August. Inspection of several hundred flower-heads of *Torilis japonica* near Tiddesley Wood in August revealed very occasional ones with galls. Interestingly Darlington (1968 revised 1975) notes "*When mature, the gall is attractive in a delicate, rather inconspicuous way and is easily overlooked.*"!

The gall develops in the ovary of a floret and is usually occupied by one orange larva (occasionally two or three). The galls collected on 3<sup>rd</sup> August did indeed each contain orange larvae. When fully developed the galls are about 5 mm diameter and roughly spherical and covered with a few prickles. Pupation usually occurs in September. Two versions of its life-cycle are given in the literature.

The Dutch web site states that the larva emerges from the gall, drops to the ground and enters soil and hibernates in a cocoon, presumably pupating later and the adult emerging when umbels flower in the following year. This description is also used in many other publications.

Darlington, referring to *Daucus* galls, states that the larva pupates in the gall and the adult midge emerges in September or will do so in captivity in autumn. What then? No flowers to lay eggs in or on at that time of year and it seems unlikely that an adult midge could survive until the next flowering season. Publications refer to one generation per year and there is no mention of a complex life-cycle. Possibly Darlington's contention might have arisen from observations made on material he collected and brought indoors. Another possible answer might be that one of the first guides to British galls (Connold's 1901 *British Vegetable Galls*) states "*The larva pupates in the gall. The imago emerges during October*" and that this was copied by Darlington. Connold's page is transcribed in the box.

Following Connold's books the next important British book on galls is Swanton (1912) and he writes: "*Daucus carota* Linn. 109. *Wild Carrot. Floral axis, peduncles and seeds swollen and deformed. The swollen seeds are often raised above the inflorescence and are either violet or brown. Sometimes there is atrophy, and the seed loses the normal longitudinal ridges and points. Larvae yellowish.* SCHIZOMYIA PIMPINELLAE F. Low 670 Syn. *Asphondylia pimpinellae* F. Low." He also notes the same gall on Burnet saxifrage *Pimpinella saxifraga* and Parsnip *Pastinaca sativa*.

Galls caused by the larvæ of *Asphondylia pimpinellæ* F. on the Flower-heads of *Daucus carota* Linn.

Synonymy of insect

HABITAT OF DAUCUS CAROTA - The degenerated or wild form of this plant may be found in some parts very abundantly in fields, pastures, waste places, etc., Commonly throughout Britain.

THE GALL IS FORMED - by the abnormal swelling of the seed POSITION - On the umbels.

MANNER OF GROWTH - Gregarious; pubescent; separate.

COLOUR - At first pale green, later dark green striped with purple.

AVERAGE DIMENSIONS OF MATURE SPECIMEN - Length, 5 mm.; breadth, 4 mm. ; girth, 12 mm.

MAY BE SOUGHT - during: the months of August, September, and October.

THE GROWTH - is complete by the end of September.

THE TYPICAL CONDITION - of the gall is unilocular and unilarval.

THE LARVA PUPATES - in the gall. The imago emerges during October.

These galls while growing are not conspicuous, and may often be overlooked, unless a careful search is made for them. They are extremely variable in size. Some are scarcely larger than a normal seed, while a large one will exceed 8 mm. in length. In shape they are mostly uniform; occasionally a few of a more or less globular shape may be found. They never coalesce, but several may be partially joined to each other. When mature they are very pretty.

From: Connold (1901) *British Vegetable Galls*.

Returning to Redfern *et al* (2011) again *Kiefferia pericarpicola* is not mentioned under Parsnip or Burnet Saxifrage. However both plants have Cecidomyiidae midge galls associated with flowers. Parsnip has a swollen fruit gall *Contarina pastinacea* and *Pimpinella* a flower stalk gall *Lasioptera carophila* and flower galls *Diodaulus trailii* and *Contarina umbellatarum*. The larvae of the last two are yellow and orange respectively and are called "jumping larvae". Presumably *Kiefferia pericarpicola* larvae don't jump? For those of us looking for these galls next summer it is also worth remembering that some of the small umbel flower head galls are placed at the base of a floret or the main umbel stalk while others are destroy the ovary or developing seed.

Since we noticed the gall the author has spent a long time foraging on the internet for information about the gall-maker *Kiefferia pericarpicola*. It is widespread and common throughout Europe and the accounts in English all state that the life cycle is simple, annual, and the larva pupates in the soil. Three useful references from The Netherlands, Germany and Poland respectively are Roskam & Carbonnelle 2015, Skuhrová *et al* 2014, and Skuhrová *et al* 2008. There are many more.

Synonyms for *Kiefferia pericarpicola* (Bremi, 1847) are *Cecidomyia pimpinellae* LOEW, 1850; *Asphondylia pimpinellae* F. LOW, 1874; *Asphondylia umbellatarum* F. LOW, 1877. *Schizomyia pimpinellae* F. Low.

The original description and naming of *Kiefferia pericarpicola* appears to be from Switzerland: Bremi J. J. 1847. *Beitraege zu einer Monographie der Gallmucken, Cecidomyia Meigen*. Neue Denkschrift der Allgemeinen Schweizerischen Gesellschaft fur die gesammten Naturwissenschaften, 9: 1-72.

To date neither the original paper nor a description of the life cycle based on direct observations has been found by the author. The information on the life cycle must be out there somewhere. From

references it is apparent that many 19thC papers on *Kiefferia pericarpicola* are in German and the information is probably therein.

One interesting aside is a recent hypothesis that the single dark-coloured floret usually seen near the centre of Wild Carrot *Daucus carota* flower-heads is a deterrent to gall flies searching for a flower on which to lay eggs: “Umbels with a dark central floret, however, were parasitized significantly less often by the gall midge *Kiefferia pericarpicola* than umbels without a dark central floret. We propose that the dark central floret may play a role in reducing parasite infestation by mimicking an already present gall or deterring oviposition of the gall midge by other means.” (Polte & Reinhold 2012).

#### Acknowledgements

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01. Flower-head of *Torilis japonica* showing *Kiefferia pericarpicola* galls. Harry Green.



02. Flower-head of *Torilis japonica* showing *Kiefferia pericarpicola* gall. Jean Young.



03. Flower-head of *Torilis japonica* showing *Kiefferia pericarpicola* galls and a larva that emerged in captivity. Rosemary Winnall.



04. Detached floret of *Torilis japonica* showing *Kiefferia pericarpicola* gall and a larva that emerged in captivity. Harry Green.

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**Web site.**

The useful Dutch website for *Kiefferia pericarpicola* (Bremi, 1847)  
is

<https://bladmineerders.nl/parasites/animalia/arthropoda/insecta/diptera/nematocera/cecidomyiidae/cecidomyiinae/cecidomyiidi/asphondyliini/schizomyiina/kiefferia/kiefferia-pericarpicola/>

Images

01. Flower-head of *Torilis japonica* showing *Kiefferia pericarpicola* galls. Harry Green
02. Flower-head of *Torilis japonica* showing *Kiefferia pericarpicola* gall. Jean Young.
03. Flower-head of *Torilis japonica* showing *Kiefferia pericarpicola* galls and a larva that emerged in captivity. Rosemary Winnall.
04. Detached floret of *Torilis japonica* showing *Kiefferia pericarpicola* gall and a larva that emerged in captivity. Harry Green.