

**Finding the larvae of hoverfly *Parasyrphus nigratarsis* in association with the Green Dock Beetle *Gastrophysa viridula* larvae.**

Jean Young.

In early May 2020 Rosemary Winnall found a single white egg that had been laid on the underside of a dock leaf amongst a clutch of approximately 50 yellow eggs (01). It seemed likely that the yellow eggs had been laid by a Green Dock Beetle *Gastrophysa viridula* (02) but the origin of the white egg was unknown. Rosemary shared a photo of the eggs with some fellow recorders and fortunately Brett Westwood was able to help resolve the mystery of what had laid the white egg. Brett pointed us to an update on Flies in the Wildlife reports section of the of *British Wildlife Magazine* (Freeman 2020).

The report noted that the hoverfly *Parasyrphus nigratarsis* used to be rarely recorded as the adults (03) but are easily missed due to their similarity to some of the more common yellow and black hoverflies. However the hoverfly is now being found more frequently thanks to a better understanding of how to find their larvae, which feed on the larvae of leaf-beetles. The report suggests that a good technique is to look for the eggs of *G. viridula* on Broad-leaved dock, *Rumex obtusifolius* as *P. nigratarsis* lay a single white egg in the midst of the yellow eggs of the beetle.



01. *Parasyrphus nigratarsis* eggs within *Gastrophysa viridula* egg clutch Besford, Worcestershire 22.05.2020. Jean Young.



02. Mating *Gastrophysa viridula* Besford, Worcestershire 30.06.2016. Jean Young.

Intrigued and inspired by this the hunt was on! Although 'other known host species include some moderate sized leaf-beetles on

alder *Alnus* and willow *Salix*, as my local patch at Besford has a large area of *R. obtusifolia* and I am fairly familiar with *G. viridula* that seemed the ideal place to start.



03. *Parasyrphus nigratarsis* on dock, Ribbesford, near Bewdley, May 2021. Brett Westwood.

Green dock beetle adults are fairly easy to find where they are present. They are 4-6mm in length, convex shaped and bright metallic green. The pregnant females are particularly easy to spot as their abdomens are so distended with eggs that the wing cases are displaced, and they are often accompanied by a male. The significant leaf damage caused by the feeding larvae (04) makes them easily detectable, whereas being on the underside of the leaves the eggs are less obvious, but can be found by persistent leaf turning. I discovered that my dock patch had an abundant population of *G. viridula* eggs, larvae and adults. On 17/05/20 I turned over many leaves finding numerous clutches of eggs and lots of larvae munching the leaves. Eventually I came across a clutch of yellow eggs with four white eggs amongst them and also found what looked like a hoverfly larvae with the newly hatched beetle larvae (05).



04. *Gastrophysa viridula* larvae feeding signs on Dock leaf Besford, Worcestershire 22.05.2020. Jean Young.



05. *Gastrophysa viridula* larvae and *Parasyrphus nigratarsis* larva Besford, Worcestershire 22.05.2020. Jean Young.



Over the next week I checked the docks regularly and found several clutches of eggs with *P. nigratarsis* eggs amongst them, but rather than one egg as mentioned in the *British Wildlife* report I was finding 3 or 4 eggs per clutch. As there were many groups of dock beetle eggs spread over numerous dock plants, I was surprised that just a few were selected for depositing multiple eggs, as the policy of laying just one egg per clutch would reduce competition amongst the larvae. Over the period of my observations I found three or four larvae actively feeding on the *G. viridula* eggs and larvae.

The UK Beetle Recording website mentions that the early instars of the beetle larvae drop to the ground while feeding if disturbed and the older instars secrete a substance that repels competitors from eating the leaves (06). The larvae I observed being attacked by the hoverfly larvae appeared to be early instars and seemed quite helpless and unable to escape the hoverfly larvae (07 to 09). It would be interesting to know if the secretion produced by the older instars is only used to deter competitors for food or if it is also effective in deterring predators? I came across one *P. nigratarsis* larvae with several yellow eggs attached to its rear end (10) moving from an area of eggs that had been eaten towards a group of beetle larvae. I only saw this on one occasion so it is not clear whether it is just that the eggs are sticky or an attempt at some form of camouflage. As the prey appear to be so helpless camouflage would seem unnecessary, but something to keep a look out for next year!



08. *Parasyrphus nigratarsis* larva amongst *Gastrophysa viridula* larvae Besford, Worcestershire 17.05.2020. Jean Young.



09. *Parasyrphus nigratarsis* larva feeding on *Gastrophysa viridula* larva Besford, Worcestershire 20.05.2020. Jean Young.



06. *Gastrophysa viridula* larva secreting fluid Avon Meadows, Pershore, Worcestershire 14.06.2018. Jean Young.



10. *Parasyrphus nigratarsis* larva with attached *Gastrophysa viridula* eggs Besford, Worcestershire 20.05.2020. Jean Young.



07. *Parasyrphus nigratarsis* larvae with newly hatched *Gastrophysa viridula* larvae Besford, Worcestershire 20.05.2020. Jean Young.

Harry Green kindly provided a copy of the relevant pages from *The Colour Guide to Hoverfly larvae* (Rotherhay 1993), to help me identify my larvae, however the photograph of the *P. nigratarsis* larva featured looked a little different to mine as it was an overwintering specimen. Geoff Wilkinson, who has reared *P. nigratarsis* eggs and larvae in captivity on *G. viridula* eggs, larvae and pupa produced a 'crib sheet' to help with identification of the hoverfly larvae. He has kindly allowed me to include this aid to identification in this article and he has also produced an excellent annotated five minute video on YouTube showing the larvae feeding on Dock beetle eggs, larvae and pupae.

The identification of the egg Rosemary found and the eggs and larvae I came across were confirmed as *P. nigratarsis* on iRecord by Roger Morris. The only other Worcestershire record for *P. nigratarsis* was an adult from Harry Green at Beckford Gravel Pit Beckford Nature Reserve SO977361 on 24/06/2010. I did not spot any adults, something else to look out for next year!

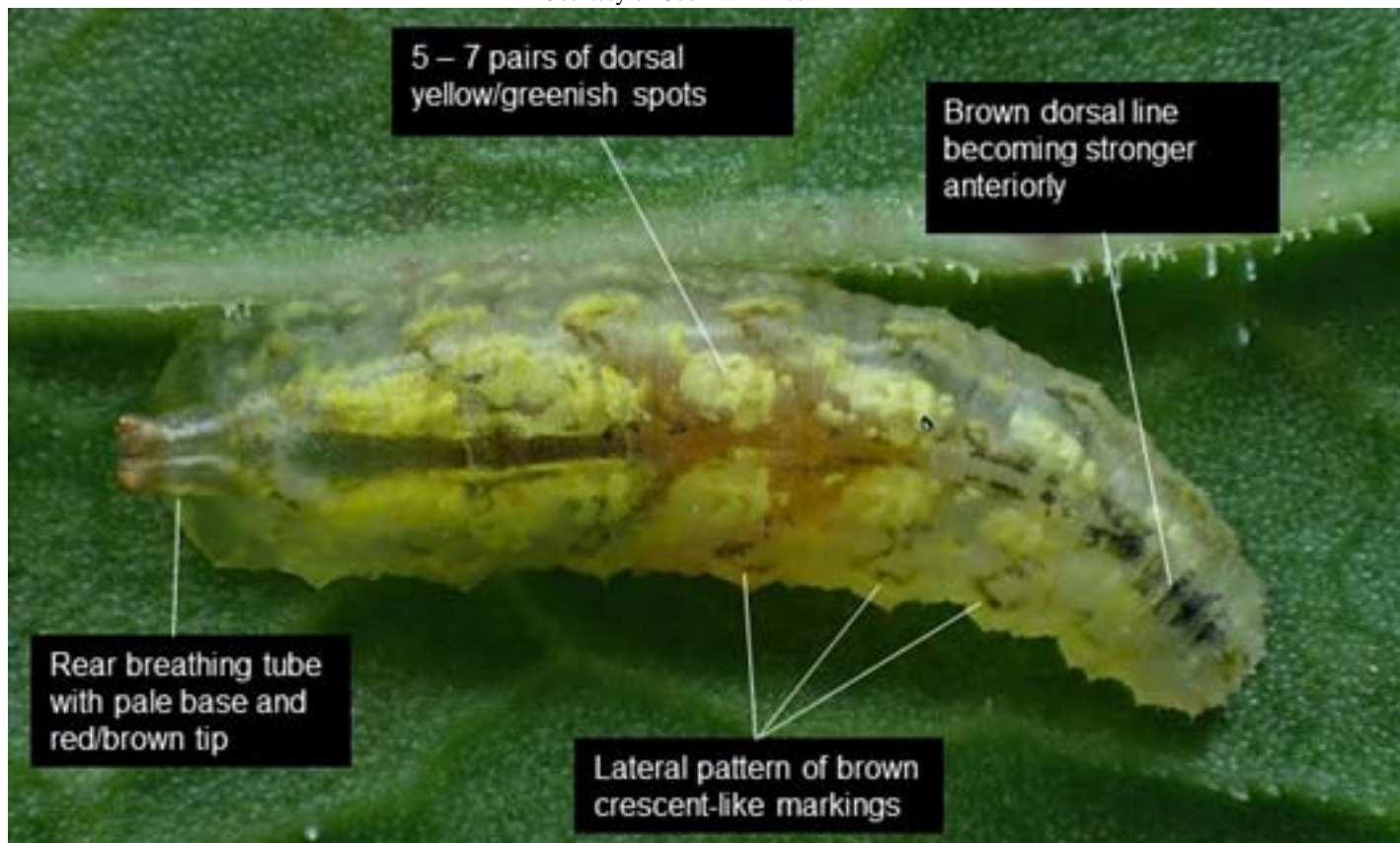
#### Acknowledgements

I would like to thank Rosemary Winnall and Brett Westwood for the photo and information which inspired me to look for this species; Harry Green for providing the Rotheray reference and Simon Wood of the Worcestershire Biological Records Centre for checking the records of *P. nigratarsis*. Also thanks to Geoff Wilkinson for allowing inclusion of his identification resources and to Roger Morris for confirming the identity.



Identification of *P. nigratarsis* larvae

Courtesy of Geoff Wilkinson



10. *Parasyrphus nigratarsis* larva photo, annotated. Geoff Wilkinson.

**Parasyrphus nigratarsis**

**Identification:** Around 14mm in length when mature. Species-specific colouration: 5 – 7 dorsal pairs of yellow spots (often turning brown when matured), repeated pattern of brown crescent-like marks linking to a dorsal brown line most prominent anteriorly. Rear breathing tube in 3<sup>rd</sup> stage larva twice as long as wide, pale at base, reddening at tip. Only British hoverfly that routinely feeds on leaf beetle eggs, larvae and pupae.

Can be identified in the field and from a good photograph

**Life-cycle:** One generation per season; active from May to late July; mature larva overwinters in litter, adult emerges following spring.

**Habits:** Predator of leaf beetle eggs, larvae and pupae of alder, willow and dock. Eggs and larvae readily found among leaf beetle colonies.

11. *Parasyrphus nigratarsis* identification notes. Geoff Wilkinson.

**References**

Freeman, G. 2020. Wildlife Reports, Flies. *British Wildlife* 31.4:293  
 UK Beetle recording website at  
<https://www.coleoptera.org.uk/species/gastrophysa-viridula>,  
 [Accessed 24/10/20]  
 Rotheray, G.E. 1993. Colour Guide to Hoverfly Larvae (Diptera, Syrphidae) in Britain and Europe. *Dipterists Digest* No.9  
 1993:83,136-137  
 Download available at :-  
[https://diptera.info/downloads/df\\_1\\_9\\_Colour\\_Guide\\_to%20Hoverfly\\_Larvae.pdf](https://diptera.info/downloads/df_1_9_Colour_Guide_to%20Hoverfly_Larvae.pdf) [Accessed 07/11/21]

**Useful Resources**

Facebook - UK Hoverflies Larval group  
 Geoff Wilkinson's Hoverfly Larvae Id. Sheets and larvae photos:-  
<https://www.flickr.com/photos/entangledentomology/albums/with/72157691946670244> [Accessed 07/11/21]  
 GeoffWilkinson's annotated video of *P. nigratarsis* larvae feeding on *G. viridula* eggs, larvae, pupa. Available at:-  
<https://www.youtube.com/watch?v=Ssi2jxDVrk8> [Accessed 07/11/21]

**Images**

01 *Parasyrphus nigratarsis* eggs within *Gastrophysa viridula* egg clutch Besford 22.05.2020. Jean Young.  
 02 Mating *Gastrophysa viridula* Besford 30.06.2016. Jean Young.  
 03. *Parasyrphus nigratarsis* on dock, Ribbesford Wood May 2021 Brett Westwood.  
 04. *Gastrophysa viridula* larvae feeding signs on Dock leaf Besford 22.05.2020. Jean Young.  
 05. *Gastrophysa viridula* larvae and *Parasyrphus nigratarsis* larva Besford 22.05.2020. Jean Young  
 06. *Gastrophysa viridula* larva secreting fluid Avon Meadows, Pershore 14.06.2018. Jean Young  
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 08. *Parasyrphus nigratarsis* larva amongst *Gastrophysa viridula* larvae Besford 17.05.2020. Jean Young.  
 08 *Parasyrphus nigratarsis* larva feeding on *Gastrophysa viridula* larva Besford 20.05.2020. Jean Young.  
 09. *Parasyrphus nigratarsis* larva with attached *Gastrophysa viridula* eggs Besford 20.05.2020. Jean Young.  
 10. *Parasyrphus nigratarsis* hoverfly larva photo annotated. Geoff Wilkinson.  
 11. *Parasyrphus nigratarsis* identification notes. Geoff Wilkinson.