

The carnivorous shelled slug family Testacellidae in Essex

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Introduction

The family Testacellidae Cuvier, 1800 is a very characteristic yet relatively rarely encountered family of slugs, with a rather unusual biology. The slug form, that of a land snail which has lost the shell, has evolved independently several times amongst the terrestrial gastropods, the principal benefit of which is considered to be the resultant ability to access very restricted spaces. In the Testacellidae a rather flat, vestigial external shell remains covering the mantle which, again somewhat unusually against the conventional slug body plan, is found at the hind end of the animal. The body, up to 120mm long when fully extended, varies in colour from white to shades of grey, orange and brown, with two prominent dorsal grooves running the length of the body, converging in the vicinity of the shell. The foot colour can be pale cream through yellow/orange to salmon pink. There are four head tentacles.

Most terrestrial gastropods are herbivorous or detritivores but the Testacellidae are carnivorous, thought to prey mostly on earthworms and other molluscs (Quick 1960), the usual rasping radular teeth having evolved to become long and sharp. The feeding behaviour was particularly well described and figured by Essex Field Club Member Wilfred Mark Webb in 1893, based on specimens found in Buckhurst Hill by Mr H.C. Snell and published in the *Essex Naturalist* (Cole 1893). Consequent to their feeding habits, the slugs often inhabit gardens and allotments where a plentiful food supply exists, although they are rarely seen as they are primarily nocturnal, subterranean creatures and, like many predators of large prey items, short bursts of activity are followed by long periods of rest, particularly if conditions are cold or dry (Kerney & Cameron 1979).

Recent genetic studies have suggested there are four rather than the traditionally quoted three species present in Britain. Two of the species are very similar in exterior morphology and were previously considered a single taxon, but were found to differ genetically with subsequent studies of the internal anatomy confirming distinguishing characteristics available through dissection (Rowson *et al.* 2014). All species are in the single genus *Testacella* Cuvier, 1800 (table 1). With the recent discovery that what was formerly *T. scutulium* is effectively an aggregate of two species, all old records of that species unsupported by preserved specimens must be considered "*T. scutulium* agg." but this still has value in separating them from the remaining two species.

Table 1. British species of *Testacella* and their primary diagnostic characteristics.

Species	Primary diagnostic characteristics
<i>Testacella maugei</i> Férussac, 1819	Relatively large (>10mm) shell. Body colour dark. Dorsal grooves widely separated where they meet the shell.
<i>Testacella scutulium</i> Sowerby, 1821	Relatively small (<8mm) shell. Pale body colour speckled with dark pigment. Dorsal grooves merge at or just anterior to the shell.
<i>Testacella</i> sp. " <i>tenuipenis</i> "	Outward morphology almost identical to <i>T. scutulium</i> . Only distinguishable with confidence by dissection.
<i>Testacella haliotidea</i> Draparnaud, 1801	Relatively small (<9mm) shell. Pale body colour with few if any dark speckles. Dorsal grooves close together but still separate where they meet the shell.

Given their elusive habits, all species are considered to be significantly under-recorded in Britain - the NBN Gateway has fewer than 2,000 records for the whole of Great Britain and Ireland (NBN 2015) - and the issue of whether or not they are native is also the subject of some dispute as the shells are small and fragile and hence not easily preserved naturally. The distribution of *T. maugeri* is focussed on the southwest and it is not recorded from Essex; some supposedly Holocene shells are cited as evidence for the species being native (Quick 1960) although many authorities suggest this may be doubtful (Kerney 1999). There is greater consensus that the remaining species are introduced from southern Europe.

Little is known of the reproductive behaviour of the slugs, although their anatomy reveals the usual terrestrial gastropod hermaphrodite condition. There are reports of prolonged (4-5 hours) matings but also of self-fertilisation, and studies of established UK populations have indicated that hatchling numbers are observed to peak in November (Rowson *et al.* 2014).

Interestingly, individuals of all species other than *T. haliotidea* have been observed to hiss when disturbed while active. This is achieved by rapid contraction with expulsion of air through the breathing pore under the shell, and may be accompanied by the simultaneous blowing of slime bubbles. There have even been reports of attempts to bite fingers (Rowson *et al.* 2014), although there are no known occasions of injury being sustained and the animals are non-venomous.

Historic Essex records

Given the absence of any Essex county records of *T. maugeri* and the very recent discovery of *T.* sp. “*tenuipenis*”, this study focusses on *T. haliotidea* and *T. scutulium* agg. (henceforth referred as just *T. scutulium*).

The group are mentioned very early in the archive of the Field Club, with a note in the minutes of the meeting on 28 April 1888 that Walter Couch had recently found specimens of *T. haliotidea*, although J. W. Taylor later suggests the species involved was actually *T. scutulium* (Crouch 1890), in an old garden in Wanstead (indeed he took specimens to the Club AGM in January of the following year (Cole 1889)), prompting William Cole to recall finding “*Testacella* in great abundance in an old garden in Stoke Newington”, though the latter is just outside of VC18 (Cole 1888). This seems to have raised awareness of the group at that time, as there followed a steady stream of records throughout the 1890s and into the early 20th century:

- Mr. Snell exhibited specimens of *T. scutulium* from his garden in Buckhurst Hill at the Field Club meeting on 21 March 1891 (Cole 1891). The species was evidently still in his garden two years later when further specimens were exhibited and went on to form the basis of Webb’s study of the feeding mechanism (Cole 1893).
- Webb reports purportedly genuine records of *T. haliotidea* from Stisted (discovered by F. May in 1895) and Widford (Webb 1896).
- A further *T. haliotidea* is reported from the garden of Dr. Chichester in Crouch Street, Colchester on 21 March 1904 (Laver 1904).
- Although again just west of VC18, there are rather intriguing 1913 records in the Conchological Society dataset for both *T. haliotidea* and *T. scutulium* in the churchyard of St. Paul’s Cathedral (NBN 2015).

After this the record goes silent until the latter part of the 20th century, when *T. haliotidea* is reported from allotments in Colchester in 1989 and 1992 (Bowdrey 2008) and from a site just over the county border in Bishops Stortford in 1994 (NBN 2015).

21st century Essex records

Since the turn of the millennium there has been a further flurry of Essex records, these being well documented and in most cases supported by good quality photographic evidence. Principal among those to encounter these enigmatic slugs has been Mark Hanson of Boreham, who has

found them on several occasions in different localities, the first being in the formal gardens at Hylands Park in 2002. Mark describes the find very well himself: “I found just two specimens of *scutulum* and one of *haliotidea* at Hylands but the interesting thing was I found one specimen of *scutulum* actually feeding on an earthworm, it was still attached to the worm but the worm was just a flaccid empty skin by the time I came across them. All three specimens were found in the circular flower beds in the formal gardens all of which had very friable, moist, crumbly compost which were regularly dug over for various planting schemes throughout the year – notably for winter, spring and summer bedding schemes. I assume that the regular turning over of the soil makes it that much easier for the slugs to penetrate the soil when they are hunting earthworms” (Hanson, pers. comm. 2015).

Mark was then fortunate enough to make a further find some years later in December 2014 when he encountered a specimen of *T. haliotidea*, again in a garden setting, this time a well dug over herbaceous border in a private garden in Danbury (Plates 1 & 2). Mark has also found specimens in his own garden, although these were *T. scutulum* and not in dug beds but under a pile of decaying logs (Hanson, pers. comm. 2015).



Plate 1. *Testacella haliotidea* found in Danbury by Mark Hanson
© Graham Ekins



Plate 2. Close up of the vestigial shell at the hind end of the animal
© Graham Ekins

Colchester has provided the remainder of the Essex *Testacella* records since the millennium. Along with the allotment records from the late 20th century, this suggests very healthy populations in the area and possibly also raised awareness of the group amongst some gardeners there. A find of *T. haliotidea* by Mr. E. Craven on May 2007 in Lexden brought to three the number of allotment sites in the borough to have *Testacella* records since 1989. One specimen was held in captivity for three months and fed a diet of earthworms, though little is recorded of its behaviour (Bowdrey 2008).

A further source of very interesting records of *T. haliotidea* in Colchester has been local naturalist Maria Fremlin. Maria has an allotment and, again, has found *Testacella* there but the more interesting records are from her garden. Maria recycles a lot of woody organic matter and has participated in the scheme “Bury Buckets for Beetles” to provide habitat for beetle larvae, particularly those of Stag Beetles. In one of the buckets she has encountered specimens of *T. haliotidea* several times across a period of years from 2008. Given the nature of the buckets and the confirmed presence of beetle larvae, Maria was naturally concerned to find carnivorous slugs present (Plate 3). The beetle larvae are worm-like and, as noted previously, the slugs have been recorded feeding on animals other than earthworms, so there is every possibility that the slugs were drawn to the buckets to prey on the beetle larvae although, on the other hand, their presence could simply be coincidental as the buckets would provide very suitable habitat for the slugs even in the absence of the beetle larvae. It is perhaps worth noting that Maria has also found a specimen of *T. haliotidea* under a log elsewhere in her garden, not connected to the beetle larvae work (Fremlin, pers. comm. 2015).



Plate 3. *Testacella haliotidea* found in garden, with a beetle larva in view © Maria Fremlin

Future recording

It is hoped that this paper may increase awareness of this unusual group of molluscs and reports of all records of finds are encouraged to be made to the author, be they old records which have lain unreported or even unidentified for some time, or new finds. Many readers are almost certainly also active gardeners or allotment holders and are therefore urged to keep an eye open for these animals when moving old wood or digging the soil.

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