BRINDALUS PORCICOLLIS (ILLIGER) (COLEOPTERA: SCARABAEIDAE: PSAMMODIINAE) IN BRITAIN

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Abstract. *Brindalus porcicollis* (Illiger), believed extinct in Britain has been rediscovered. The occurrence, biology, ecology and conservation of this species in Britain are discussed.

INTRODUCTION

The British psammodiines are psammophilous in habitat choice, restricted in their distribution and difficult to collect. All the native species are given a rarity status in Hyman (1992), but due to lack of specific research on the species, their true distribution and conservation status is somewhat unclear. *Brindalus porcicollis* (Illiger) is one such species, which until recently was thought to be extinct in the UK. However, the recent work by the authors has clarified the known distribution and confirmed that the species is still breeding within our shores. We have summarised the known records, including both those published and those from museum collections, and report on the biology, ecology and conservation of this species.

THE HISTORY OF *BRINDALUS PORCICOLLIS* IN BRITAIN

Brindalus porcicollis was added to the British list based on a single specimen without data that was exhibited by G.R. Waterhouse at the Entomological Society of London's February meeting of 1864 (Waterhouse, 1864; Anon, 1864; Rye, 1865). The specimen was found amongst a series of *Psammodius sulcicollis* (Illiger) [= *P. asper* (Fab.)] in Kirby's British collection housed in the Entomological Society of London. The species was listed as British by Morris (1865: 18) in his catalogue and later by both Rye (1866: 256) and Crotch (1866: 6) as a doubtfully indigenous species. The species was omitted from the later list of Sharp (1871) and the *Handbook of Coleoptera* by Cox (1874).

In 1875, James J. Walker reported that a single specimen of *porcicollis* was captured in June and that some elytral fragments were found in July at Whitsand Bay, Cornwall (Walker, 1875a). Walker (1875b) tried repeatedly throughout that year to obtain further specimens, but without success until August, when he took it in small numbers. The next capture was not until 1879, when Walker returned from postings abroad and had the opportunity to visit Whitsand Bay again. His diary (J. J. Walker archive, Hope Entomological Library) of that period goes into detail of the capture: 19th May 1879 "...but owing to my having missed my way when near Fort Tregantle, it was full 3.30 pm before we descended the 'chine' before the above mentioned fort, and stood on the sandy beach of Whitsand Bay—drenched to the skin. . . . I grubbed and turned over stones (getting smothered in wet sand during the operation) and had the satisfaction of ascertaining that *Psammobius* [sic] *porcicollis* still existed in its old haunt, where I had discovered it in 1875, by capturing one specimen, and seeing the remains of another." Although Walker's captures proved *porcicollis* was present in the British Isles it was still omitted by Pascoe (1882). However, all subsequent catalogues of British Coleoptera have accepted its place in

our lists e.g. Matthews and Fowler (1883: 28); Sharp (1883: 24); Sharp and Fowler (1893: 24) and Bennett (1893: 20).

Walker's next successful excursion to Whitsand Bay was not until 4.v.1886 when he found the remains of a single specimen. However, the next published record of *porcicollis* was not until 1892 in a paper by James H. Keys, a friend of Walker, who lived in Plymouth and frequently accompanied Walker on local collecting trips. Keys visited Whitsand on two occasions during September 1891 securing some 21 specimens in total; his diary (Plymouth City Museum) gives an account of its capture: "They were all taken in a small space about a foot square, and they were 4 or 5 inches down in the sand." These finds were noted by Walker (1895: 266) as a new 'station' on the site for the species, this find was also the first instance of the species being taken from grass tussocks at the top of the cliffs as opposed to being found under stones and plants in sand at the beach head.

Walker and Keys made a further four successful trips to the site between August 1894 and August 1895 finding approximately 50 individuals. A trip made by Keys alone in March 1895 is of particular interest as his diary states "I took 4 specimens in burrows in the soil under stones fitting closely to the earth—not sand as first capture". This observation is interesting as this is the first account (in Britain at least) of this species occurring in a non-sand substrate. This fact along with the earlier observations of Keys (in Walker, *l.c.*), where the species had been noted hibernating in grass tussocks at the top of the cliff, shows the beetle's ability to survive outside the normal psammophilous niche it occupies elsewhere in Europe (e.g. Kim & Lumaret, 1981).

In Walker's (1895) summary paper on the species he states that: "At present *Psammobius* [sic] *porcicollis* appears to be restricted to a space of a few yards square in extent, about half way up the cliffs, and 30 or 40 feet above the high-water mark, where the clean sand of the beach passes into a sort of loam, the debris of the schistose rock of which the cliffs are composed." Although Walker believed the species to be "obtainable during the whole of Spring and Summer", it is clear from his own observations that the species is a Spring breeder, with emerging adults beginning to appear towards the end of July into August, as Walker noted himself the August specimens appeared mostly teneral. The closing paragraph shows an undertone of concern for the beetle's future, "so it is hoped that *Psammobius* [sic] will continue to hold its own there for many years to come".

The last historic record for *porcicollis* from this site appears to be that of April 1897; the only other published references appear to be those in the species accounts in the *British Red Data Books: 2: Insect* (Shirt, 1987: 177) and in *A Review of the Scarce and Threatened Coleoptera* (Hyman, 1992: 389). Their source for this record is not given, and neither the notebooks nor diaries of Walker or Keys bear this date of capture for *porcicollis*. Examination of most major collections that contain this species revealed a single specimen in the Dale Collection (Hope Entomological Collections, Oxford) that bears the data "Plymouth 04-97 JHK"; the locality is certainly incorrect and probably assumed from the home address of Keys. This would appear to be the only known source for this date, although the date may in fact refer to the date at which time the specimen was donated to Dale and not that of its capture. Other dubious dates include 1896, which is reported on a number of specimens in museum collections; again, this may in fact refer to the date of donation rather than that of a collection date.

It would appear as though only two people have collected *porcicollis*, as of the material so far examined in museum collections and the published papers all references have been to either J. J. Walker or J. H. Keys. The total number of

specimens of this species collected is just over 70, and these are distributed amongst various museum collections around Britain. A list of the known capture dates and number of specimens collected is given in Table 1. There are also a number of misleading localities both on data labels and in the literature (e.g. Britton, 1956: 23), these include: Plymouth; Plymouth District; Devon and Devonport, however, all authentic records of this species are from Whitsand Bay.

Fowler & Donisthorpe (1913: 271), in their *Additional Localities, Notes etc.* for Scarabaeidae, list *porcicollis* as occurring at Pyle, Glamorgan (VC 41) giving Tomlin as the author of this record. This spurious record has been perpetuated throughout the subsequent literature e.g. Joy, 1932: 246; Britton, 1956: 23; Shirt, 1986; Jessop, 1986: 18; Shirt, 1987: 177; Hyman, 1992: 389 and Fowles, 1995. However, Tomlin in his *Coleoptera of Glamorgan* (1914) does not list *porcicollis*, and in the additions to his list (Tomlin, 1933), published some nineteen years after Fowler & Donisthorpe, no mention is made of *porcicollis*. In a copy of *The Coleoptera of Glamorgan* owned by H. M. Hallett (a friend of Tomlin's and an avid Glamorgan recorder) that is annotated in his own hand, there is no indication of a record for this species for Glamorgan. Further to this, in a paper on coastal beetles, Keys (1918: 510) states: "*P. porcicollis* Tregantle, apparently the only British locality"; again, this ignores the record of Fowler & Donisthorpe (*l.c.*). In both the Tomlin and the Hallett collections housed in the National Museums and Galleries of Wales, Cardiff, the only material of *porcicollis* is that which was collected by J.J. Walker and J.H. Keys from Whitsand Bay.

The only indication as to the basis of this erroneous record, other than being first reported by Fowler & Donisthorpe (*l.c.*), is given by Hyman (1992: 389) where it is stated: "Pyle, Glamorganshire, where it was last recorded, in numbers in 1899" although the source for these data is not given. If it can be assumed that this is also the same source as that of the Fowler & Donisthorpe (*l.c.*) citation then this record can be deleted. Tomlin (1900) published an account of *Psammobius* [sic] *sulcicollis* occurring in large quantities in 1899 on the dunes at Pyle, near Candleston (= Kenfig Warren NNR) after a rainstorm saying that "They came up out of the sand by myriads, and one could have supplied all the collections in England off a few square yards". This may well be the origin of the Pyle *porcicollis* record, and may be due to some misinterpretation of the name or it may just have been copied incorrectly from this source. It is therefore our opinion that the Pyle record of *porcicollis* be deleted due to lack of voucher material or other evidence.

In the more recent literature that cover the British Scarabaeidae *porcicollis* is reported as being: "rare" Britton (1956); "not recorded for over 70 years" (Shirt, 1986; Jessop, 1986; Shirt, 1987); "possibly extinct" (Shirt, 1987; 1991: 102) and finally proclaimed "extinct" (Hyman, 1992). However, a recent and unnoticed record was published in the Military of Defence magazine; *Sanctuary* (Piercy, 1990), unfortunately, neither the locality nor the collector/determiner were cited. The record was under the heading "Some new discoveries on MOD sites in 1989: Cornwall-Entomology" and understates: "(*Psammodius porcicollis*). This beetle has not been recorded since the turn of the century." The current location of the voucher specimen is unknown, as is the source of the record, and until either is forthcoming, this record is considered by the authors as doubtful.

Recent captures of *Brindalus porcicollis*

While on a family holiday in the eastern part of Cornwall in August 1999, one of us (RGB) attempted to look for *Brindalus porcicollis*, because as far as he was aware,

Table 1. Summary of the known capture dates for *Brindalus porcicollis* in Britain

Locality cited	Date	Collector	Number of specimens	Source: HEC = Hope Entomological Collections. HEL = Hope Entomological Library. PCM = Plymouth City Museum.
Unknown	?.1865	?	1	*Journal and Proceedings of the Entomological Society London*, Feb 1 1865 pp 3–4.
Tregantle Fort, Whitsand Bay, Cornwall	?.vi.1875	J. J. Walker	1	*Entomologist's Monthly Magazine* **12**: 62
Tregantle Fort, Whitsand Bay, Cornwall	?.vii.1875	J. J. Walker	Elytral fragments	*Entomologist's Monthly Magazine* **12**: 62
Tregantle Fort, Whitsand Bay, Cornwall	?.viii.1875	J. J. Walker	A small series	*Entomologist's Monthly Magazine* **12**: 108
Tregantle Fort, Whitsand Bay, Cornwall	19.v.1879	J. J. Walker	1	J. J. Walker Notebook no: 4, HEL J. J. Walker Diary April–Oct. 1879, HEL
Whitsand Bay	04.v.1886	J. J. Walker	1 (remains)	J. J. Walker Notebook no: 4, HEL
Tregantle	13.ix.1891	J. H. Keys	20	J. H. Keys Catalogue of British Coleoptera, PCM *Entomologist's Monthly Magazine* **28**: 23-24
Tregantle Fort, Whitsand Bay, Cornwall	16.ix.1891	J. H. Keys	1	J. H. Keys Catalogue of British Coleoptera, PCM *Entomologist's Monthly Magazine* **28**: 23–24
Tregantle Fort, Whitsand Bay, Cornwall	07.viii.1894	J. J. Walker J. H. Keys	15 JJW 1JHK	J. J. Walker Notebook no: 21, HEL J. H. Keys Catalogue of British Coleoptera, PCM
Tregantle Fort, Whitsand Bay, Cornwall	14.03.1895	J. H. Keys	4	J. H. Keys Catalogue of British Coleoptera, PCM
Tregantle Fort, Whitsand Bay, Cornwall	25.03.1895	J. J. Walker J. H. Keys	15 JJW 13 JHK	J. J. Walker Notebook no: 21, HEL J. H. Keys Catalogue of British Coleoptera, PCM
Tregantle Fort, Whitsand Bay, Cornwall	?.viii.1895	J. J. Walker	?	*Entomologist's Monthly Magazine* **31**: 266
Tregantle Fort, Whitsand Bay, Cornwall	?.iv.1897	J. H. Keys	1	Locality listed in error on label as "Plymouth" HEC, Dale Collection. Date dubious.
Cornwall	1989	?	?	No voucher is known. Record remains dubious until voucher or collector is forthcoming
Tregantle Fort, Whitsand Bay, Cornwall (SX3852)	25.viii.1999	R. G. Booth	1	Field data
Tregantle Fort, Whitsand Bay, Cornwall (SX3852)	26.viii.1999	R. G. Booth	2	Field data
Tregantle Fort, Whitsand Bay, Cornwall (SX3852)	22.ix.1999	D. J. Mann	1	Field data
Tregantle Fort, Whitsand Bay, Cornwall (SX3753)	23.ix.1999	D. J. Mann	2	Field data

the species had not been found in Britain since the end of the 19th century. A week or so before leaving for Cornwall, RGB had indicated his intentions to DJM, who, having previously captured the species in Portugal, advised that it was necessary to search for this species by digging into the damp sand around the roots of plants. Armed with this information and having noted the comments in Fowler (1890), RGB visited Whitsand Bay on 25.viii.1999. The day had started with drizzle and low cloud, but brightened for a while later. Following the track down to the beach below Fort Tregantle (National Grid Reference, SX3852), a search for suitable sites was made. At one place, a bank of sand against the base of the cliff was noted in particular, and especially a large clump of restharrow (*Ononis repens* L., Fabaceae) growing there. By digging into the sand at the base of this plant, a few beetles were found, including two *Aegialia arenaria* (Fab.) (Scarabaeidae: Aegialiinae) and several *Falagria thoracica* Stephens (Staphylinidae). After 30 minutes or so of searching, a single, rather teneral *Brindalus porcicollis* was found, soon after which the search had to be curtailed.

Returning the following day, 26.viii.1999 the search was continued at the same site. Another *Brindalus* was found close to the roots of the restharrow, and a second specimen for the day found 2–3 feet away at the roots of one of the sand-dune grasses, whereupon the search for any further specimens was discontinued. All the sand was returned to the bases of the plants in order to avoid any lasting disturbance to the rather limited available habitat.

The site was visited again on the 22–23 of September by one of us (DJM) in an attempt to ascertain the extent of available habitat for the species. Knowing the location of the finds from the previous visits by RGB, an attempt was made to locate the beetle in other areas. On arriving on the evening of the 22nd the coast to the east of the known site was surveyed for suitable habitat, this proved fruitless with some 1 km of the coast considered to be unsuitable in terms of lack of available banks of sand above the high tide mark. However, the Ordnance Survey Explorer Map (108: 1:25,000) indicates that the beach to the west of Freathy (SX396520), which was not surveyed, appears to have at least some sand above the high tide mark. It is hoped to be able to return to this area in the future to complete the survey. Returning that night to the beach below Tregantle Fort (SX384527), a search by torchlight for the species was conducted along Long Sands beach to Trethill Cliffs (SX372533). After about three hours searching, no surface-active specimens were seen, with only a small number of *Aegialia arenaria* and *Broscus cephalotes* (Linnaeus) (Carabidae) present. However, previous experience of this species in Portugal (D. J. Mann *pers. obs.*) has shown that even when present in large numbers the species is rarely seen above ground. It was estimated that approximately a 1 km stretch of beach contained a number of small patches of suitable habitat, that is, banked sand above the high tide mark with some vegetation cover.

At one of these areas with banked sand (SX384528), a single specimen was found after 30 minutes of sifting sand from under a sprawling sea rocket plant (*Cakile maritima* Scopoli, Apiaceae). A further search in this area for another 30 minutes provided no more material. On the second day, the area to the west of the capture by RGB was surveyed at Trethill Cliffs (SX379531), where sand was dug and sieved from that which was banked against the cliff, a single specimen was discovered. Time was cut short by the incoming tide so a small bag of the roughly sieved sand was then taken back for further examination. This was then placed into a tray and a single specimen was extracted by 'flotation'. A further specimen was lost due to a wave washing over the tray.

There are several areas of sand above the high tide line to the West of Trethill Cliffs that are shown on the Ordnance Survey Map (Explorer 108); these areas need

to be surveyed at suitable times in the future to ascertain the extent of the distribution of this species along this stretch of coastline.

The ecology and biology of *Brindalus porcicollis*

The biology of the Psammodiinae as a whole is poorly known and with the exception of a few species, the larvae are undescribed. However, *Brindalus porcicollis* is one of these exceptions, with larval and pupal descriptions in Kim (1978) and an ecological study based in southern France published by Kim & Lumaret (1981). Throughout its range (Europe and North Africa) *porcicollis* appears to be restricted to sandy habitats, most often coastal sand dune systems. Kim & Lumaret (*l.c.*) suggest that sand particle size and presence of suitable vegetation cover play a major role in the distribution of this species within sand dune systems, and this therefore presumably excludes areas outside the suitable parameters. In the Cornish populations specimens have been found in a soil substrate (see above), however, we presume these to have been hibernating specimens and that these microhabitats do not form part of the true breeding 'area' of the species.

British data suggest that this species is a spring breeder with adults becoming active in March, occurring through to May. The larvae pass the summer in the sand feeding on detritus, pupating *in situ*, then the adults emerge from July to August. The adults probably start hibernating from September onwards, depending on local environmental conditions. This is supported by the studies of Kim & Lumaret (*l.c.*); however, unlike the populations studied by these authors it is thought that the British population has an annual life cycle.

Kim & Lumaret (*l.c.*) in their laboratory studies state that this species is biannual, with a spring and autumn activity period. In the spring period, oviposition takes place in March and April with a maximum of twelve eggs laid per female per annum. Each stage of the life cycle is very temperature dependent with increased instar lengths at the lower end of the scale (i.e. below 20 °C). The eggs take up to fourteen days to hatch, the first two instars may take up to 50 days, with the final instar being the most variable depending on the temperature and may take up to 30 days to complete. The pre-pupal stage may also last for an extensive length of time (up to 80 days); however, the pupation period is very short and emergence occurs up to 18 days later. Adults emerging in autumn will also reproduce (depending on latitude), the length of each instar of the resulting offspring being similar to that of the spring brood; however, the larvae will pass the winter in a pre-pupal stage, which may last up to four months. Pupation occurs the following spring and adults emerge after a similar pupation period as the spring brood.

Conservation status of *Brindalus porcicollis*

Although *Brindalus porcicollis* was considered extinct by Hyman (1992: 389) with no 20th century records (the reference in Piercy, 1990, presumably being overlooked), this is now no longer the case. The status of *Brindalus porcicollis* is uncertain, but it almost certainly warrants a status of *Red Data Book* category 1, Endangered, as it would appear that it is restricted to a single locality. The locality itself, although not directly under threat, may suffer from visitor pressure to the beach area and winter storms, although since it has survived for over one hundred years at this site, it seems unlikely that this will have a major detrimental effect. However, over-zealous collecting by coleopterists may well have a detrimental effect on this beetle's future. The habitat that this beetle occupies, as far as known, is small

in area and readily accessible. While the removal of a small number of individuals for collections may not pose a direct threat (although with a very low fecundity, i.e. 12 eggs produced per individual, the loss of females from the population may have an effect), the disturbance caused through invasive–destructive searching/collecting techniques will have a severe detrimental effect on the microhabitat.

THE GENERIC STATUS OF *BRINDALUS PORCICOLLIS*

Brindalus Landin, 1960, was established as a subgenus of *Phycochus* Broun, 1886, for a single species: *azoricus* Landin, 1960. However, this species was later synonymised by Pittino (1980) with *porcicollis* (Illiger, 1803), who then established *Brindalus* as a subgenus of *Psammodius* Fallèn, 1807, to include: *porcicollis*; *rotundipennis* Reitter, 1892; *granulicollis* Pittino, 1980 and *schatzmayri* Pittino, 1980. A further species was added to the subgenus by Pittino (1983), namely *Psammodius* (*Brindalus*) *maderae* Pittino, 1983, and all five species were keyed by Rakovič (1986: 16–17). This subgeneric placement is followed by a number of current European works such as Rakovič (1981; 1986), Baraud (1992) and Krell & Fery (1992).

However, Pittino & Mariani (1986) point out that the subgenera of *Psammodius* (namely: *Psammodius s.str*; *Brindalus*; *Leiopsammodius* Rakovič, 1981; *Granulopsammodius* Rakovič, 1981) are as distinct from each other as *Psammodius* is from the other genera of the Psammodiinae, and thus should be given generic status. This is followed in the world catalogue of Dellacasa (1988) and here.

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SHORT COMMUNICATION

***Micropygus vagans* Parent (Diptera: Dolichopodidae) still resident in Ireland.**—In my recent paper (1999, *British Journal of Entomology and Natural History*, **12**: 215–220) on the occurrence of this New Zealand dolichopodid in the British Isles, I cited several Irish records from the period 1971 to 1987. In September 1999, I revisited Ireland and took the opportunity to investigate the Slade of Saggart area of County Dublin where Jim O'Connor had found this fly in 1981. My visit was on 26 September and I was not expecting to find this species, as the record from here on 7 August was the latest date on which *M. vagans* had been recorded in the British Isles. The previous record of *M. vagans* from this area was from the vicinity of the stream in the valley, so I was surprised to find a single male in my catch from a track through conifer plantations on Lugg Hill (O0324), which rises above the valley to the west and is situated on the northern edge of the Dublin Mountains, providing an extensive view of the city. Unfortunately the fly was not recognised in the field so the precise location of the find was not recorded.

The main purpose of my visit was to determine accessions of Diptera in the collections of the National Museum, Dublin and I can also report a further Irish record of *M. vagans*. This was of a single female from Malahide Castle, County Dublin (O0220453) taken on the even later date of 13 October 1985 by J. P. and M. A. O'Connor. This locality is on the coast to the north of Dublin, not far from my earlier finds at Howth and provides confirmation that *M. vagans* is well established in the Dublin area.—PETER J. CHANDLER, 43 Eastfield Road, Burnham, Slough, Berks SL1 7EL

BOOK NOTICE

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