Tormentil mining bee *Andrena tarsata*

and nomad *Nomada roberjeotiana*

Surveys and update report 2021

In 2021 SRT's continued survey work has confirmed the ongoing presence of the Tormentil mining bee is at Allerthorpe Common and Pampledale Moor. It was recorded on Jugger Howe in 2020 but not in 2021. The bee still hasn't been re-found at Strensall Military Training Ground and the Hole of Horcum. However, 2021 appeared to be a poor year for species and further surveys are needed to provide further understanding.

Edge habitats appear to be particularly important for this species in terms of tall flower-rich grassy edges providing forage and sandy edge/cliffs providing nesting sites. These characteristic edge habitats are particularly important for a wider range of moor/hearth specialist invertebrates. Ongoing survey work and management is needed to continue to understand this species, as well as its ecology and distribution in Yorkshire. Also, continuing to work closely with land managers and key volunteers to highlight the importance of this bee-rich habitat, particularly 'flower-rich and sandy edges' and further improve sites for the Tormentil miming bee and its nomad.

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Background

This project is in its second full year, as maternity leave plus COVID meant no proper surveys were done in 2020. The project continues to examine the state of *Andrena tarsata*, a recognised UK threatened species and conservation priority, and its associated nomad bee *Nomada roberjeotiana* a nest parasite ('cuckoo bee') in its Yorkshire stronghold.

Project objectives remain the same to work with key volunteers and site users to explore the York heathlands and the North Yorkshire moors to better understand the distribution of the two bees

Tormentil mining bee
@ Allerthorpe Common 2021

- Mapping of nest sites and its foodplant Tormentil to better understand the bees' requirements in Yorkshire, as well as assess wider habitat opportunities
- Define next steps for habitat improvements by identifying potential areas to create new habitat and restore existing sites
- Engage landowners, managers and wider volunteers in discussions around the species and opportunities to embed habitat improvements within existing management practice.

Species' status and description

At a national level the species remains a Section 41 species. Andrena tarsata is a small dark solitary bee (6-10mm). A combination of the distinctive translucent orange hind tibiae and tarsi in contrast to the dark femur and a partially black-haired thorax with a fringe of grey hairs in the females; and a combination of a pale clypeus, partly orange tarsi and black hairs on the thorax in male bees. For a full description of both species please see the 'SRT Yorkshire Andrena tarsata and nomad progress report 2019'.

Survey update

Survey work is still focused on 5 core sites in Yorkshire where the species is (or was) known to occur, to better understand its needs and status on these sites. Surveying for the Tormentil mining bee in 2021 was difficult to weather conditions, during the peak survey month of July the weather was highly changeable. However, every site was surveyed in good weather conditions but with mixed results. Early and late surveys were in both June and August, but these failed to produce records.

Unfortunately, the species hasn't been re-found at the Hole of Horecum and Strensall Military Training Ground but survey efforts will still continue on these sites next year. A brief visit in 2020 did again record a single female at Jugger Howe. However, despite extensive searches on a day with good weather this species was not recorded at Jugger Howe in 2021. The species is thriving at Allerthorpe Common, which seems to be a critical site for this species, and a small number of individuals were still recorded at the Cod Reservoir site. Overall, 2021 seemed to be a poor year for the species, with low numbers recorded on most sites.

Ecology update

Andrena tarsata can be found on the wing for 4-6 weeks between mid-June to late August, although despite extensive surveying it wasn't found in either June or early August; and so, it seems that July is the peak time for surveying.

Allerthorpe Common on left a lowland heath site and Cod Beck on the right an upland moor site

This bee is a species of acid habitats such as moorland, heath, acid grasslands and open wood (but more rarely). This year's survey started to give more understanding of this species needs on Yorkshire sites. In sites surveyed the importance of 'edge' grassland habitat appears to be key. Particularly as these areas are more likely to be open areas allowing herbaceous plant growth. With Tormentil being lost in the central parts of moorland sites where heather dominates, or scrub/woodland on other sites (e.g.: Allerthorpe Common). On all sites edges of paths and tracks are providing open sandy areas where tormentil can colonise plus the opportunity for raised sandy areas and cliffs provide nesting habitat. Either lower small sandy 'cliffs' on the very edges of a wider track at Allerthorpe or bigger banks as found at Jugger Howe and Cod Reservoir. Scrub clearance is providing a lot of benefit at the 'bee mound' at Jugger Howe and needs to be applied on other sites. An extremely low grazing level is also key (particularly by sheep), as the species has completely disappeared on the sites where grazing is considered to be low. This is because sheep focus on the more palatable grassy areas, this has resulted in very low growing and unsuitable Tormentil.

Note that the conditions for this species are key attributes of heath/moorland sites and are beneficial to a range of pollinators (bumblebees and solitary bees) as well other invertebrates that also need flower-rich margins, as well as open sandy habitats for foraging and nesting. Habitat management for this species will have a lot of additional benefits.

Threats update

The threats to this species are loss, fragmentation and deterioration of Tormentil-rich habitats through loss of habitat, through scrubbing up and overgrazing (even very low levels in the summer months). Taller bushy stands of Tormentil have been lost in moorland/heathland areas to summer grazing. Grazing does not need to be heavy to impact the Tormentil, as sites with apparently low grazing sheep still shows impacts, as sheep focus their grazing on grassy margins causing them to become close mown. Loss of tormentil to scrubbing up of areas is an issue, with gorse, bracken and young trees all leading to the loss of grassy areas.

In addition, the loss and limitation of nesting habitats also seems to be key, if open sandy cliffs/path edges are not being created or maintained then this species loses an important part of its life cycle. These can be lost through changes in management and scrubbing up of areas.

Management

Maintain food sources through achieving tall and bushy Tormentil plants covering 30% of key areas in July by:

- Maximise the abundance of tall and flowering Tormentil between 1st June and end of August by avoiding cutting and only minimal grazing
- Type of stock needs to be considered as sheep, ponies and cattle graze differently. In this case sheep's close and targeted edge grazing can lose the tormentil and its associated-rich herbaceous grassland. Ponies and cattle should generally be preferred, but winter sheep are also quite good for this bee (Saunders *pers comms* 2019).
- On heathland and other habitats, keep a varied vegetation structure (for example heather on heathland) so that Tormentil can grow in grassy clearings and maintain Tormentil-rich verges and along tracks and manage scrub when encroaching on key bit of grassland; and rotational management to avoid tussocky grass and other competitors
- Controlled burning (swaling) of heathlands with heavy scrub or Purple moor grass may benefit Tormentil growth. If this is applied, burn plots in a rotation of 3 years or more.

- In Tormentil-rich acid grassland, avoid applying fertilisers or pesticides and remove arisings that result from any cutting

Bushy tormentil on Jugger Howe bee mounds

Retain open bare-ground nesting sites by:

- Known or potential nesting areas should be kept free of encroaching vegetation such as scrub (gorse, heather, young trees) and coarse grasses
- Artificial bee banks can be created, both areas were roughly south facing. With areas of both sloping and vertical bare ground. Small parabolic 'dips' can be created to boost diversity of micro-climate and niches. In addition, a trench about 4-5m long with spoil banked above. height about 2.5m. Can be created using a natural slope feature, and a range of loamy and peat soils were exposed (Saunders 2016). These new areas will be quickly colonised by a range of invertebrates including solitary bees, plus the target species (in about 2 years).

Possible nesting site at Allerthorpe Common

Yorkshire fieldwork 2021

For this second full year of survey work, as the numbers for the species being recorded are still so low no set survey methods were utilised. Also, the main aim for most sites is still to understand if the species are still present or not. However, with Allerthorpe Common where the species has a strong and prominent population, a timed transect was conducted.

Jugger Howe, Flyingdales, North Yorkshire

At Jugger Howe the great news is that the Tormentil mining bee is still at the site and over the last 3 years it was recorded in both 2019 and 2020; it wasn't recorded in 2021 but only one survey day was possible in July 2021 due to unsuitable weather. See table 1 for more information. It is also thought that generally 2021 wasn't a very good year for the species, as it was in low numbers at other sites.

The area that the bee is using I have termed the 'bee mounds', which is the raised areas in the car park. These bee mounds have suitable tall bushy tormentil and nesting cliffs. In 2010 the bee was first discovered at the site when tall bushy tormentil was growing on the main site. However, since 2010 a slight increase in grazing on the site has meant that the tormentil is now low growing on the main site, and it seems to be no longer suitable for this species on other solitary bees, despite nesting sites still being present. Therefore, the species is only found outside the main site.

Table 1 Jugger Howe records

Historic Records	Record 2019	Record 2020 and 2021
First recorded from this site in 2010, it is possible that this site was previously overlooked	1 female *Andrena tarsata* found on tall tomentil on outside of main site next to carpark on a heathy bank, 1 female again found	I did manage to survey this site in 2020 and 2021. In both years I did not manage find the species on the main site. In 2020 I again found a single female on the mound in the car park, but unfortunately not in 2021

Bee habitat management at Jugger Howe

The main focus of management at Jugger Howe to protect and grow the Tormentil mining bee and other bees is to protect and increase areas of tall bushy tormentil and other herbaceous plants on the site. Through scrub control and management on the bee mounds in the car park, plus management of grazing on the main site; as well as looking for opportunities for creating new nesting habitat.

Pampledale Moor

This site was surveyed in 2019 and 2021 and both times the species was recorded but the numbers were slightly lower in 2021, 2 individuals compared to 5, but weather was more changeable and although I was on site in good weather it was not as good as in 2019.

The Pampledale Moor site has good bee-rich habitat running up the side of the 'bee track', with grassy areas of tall growing tormentil and other flowery species, complemented by sandy nesting cliffs along the bee track. This crucial bee habitat is focused in a small area and some simple management tweaks could make a big difference to securing this habitat for the long-term benefit of this species and many other pollinators.

Table 2 Cod Reservoir records

Historic Records	Records 2019	Records 2021
First recorded in 2011, possible that the site was overlooked previously	5 females recorded on taller tormentil found further into the site	2 females were recorded plus 1 male, the numbers weren't high on the site this year

Management

On the bee track, the grazing levels currently seem to be optimal and so do not change. If it is increased, then there is a risk the sheep grazing will focus on the grassy areas reducing the Tormentil and so the bees will be lost.

On the bee track there is dredging of the ditches to manage run off. The dredging management can be useful as it reopens up sandy cliff areas to allow nesting, however the dredging spoils are being left on the sides and are smothering Tormentil and allowing growth of Creeping thistle – a weed which spreads very easily to take over and suppress other plants. It would be better if the spoils could be removed elsewhere (e.g.: off site or further up the track) or at least placed on heather, rather than the herbaceous and grassy areas.

There is also an area of managed conifer near the bee track and some cut conifer had been placed in a grassy hollow, which is usually used by the species. Again, if these could be placed away from the grassy area or further up the track.

Allerthorpe Common

Allerthorpe Common is by a long way the most important site for the species that I have surveyed in Yorkshire. There is a lot of opportunity to sustain and enhance this really important site. The bees are specifically focused on the bee track that runs under the pylons from one side of site towards the Yorkshire Wildlife Trust reserve. This open area has created the grassy flower-rich areas with lots of tall bushy tormentil, plus it has open sandy path edges that are being used for nesting. This area is absolutely buzzing with insects and particularly pollinators. This was my highest recorded area for both 2019 and 2021. In 2019 I only surveyed a very small area, but the species was very abundant, compared to other sites. In 2021 I surveyed the track and looked around the wider site and got a much higher record. However, I think this year wasn't a good year for this species, despite good records on this site. The habitat on the reserve section of the common is not really suitable, however there is some Tormentil growing on the very edge of the reserve near the track and the species is using this Tormentil and so it is in the reserve. There is huge opportunity to improve the habitat to allow this species, others bees and wider invertebrates to thrive.

Table 3 Allerthrope Common records

Historic Records	**Records 2019**	**Record 2021**
Extensive historic records for Andrena tarsata in 1925, 1927, 1928, 1929, 1932, 1973, 1974, 1976, 1979, 1980, 1981, 1983, 1984, 2004, 2005, 2006, 2007, 2008	About 10 individuals recorded mainly females	28 individuals recorded in 1 hour spending 30mins each side of the track
Extensive historic records for Nomada roberjeotiana in 1927, 1928, 1929, 1935, 1973, 1975, 1976, 1983	None found	None found

Management of the bee track and opportunities in the reserve

This bee track is an absolute joy in terms of invertebrate conservation on lowland heaths. However, you can see the encroachment of gorse, willow and other scrub starting to take over the bee track

edges. There is a need to control this to stop this important bee track being lost. Also, any opportunity to open-up nesting habitat, recreating small sandy cliffs, should be taken. The edge of nature reserve that runs next to the bee track could also be opened-up to create suitable forage and nesting habitat.

Hole of Horecum

Despite the species not being found on the site in 2019 and 2021 (only visited once during reasonable weather) there is still a chance that the species is still present, due to recent historic records and some suitable habitat still being present. There is still a need to improve and protect bee track and nesting habitat on site (rich herbaceous grassy areas and sandy cliffs) and this will encourage a range of moor/heath specialists, including the targets species.

Historic Records	**Records 2019**	**Record 2021**
Two records in 1937 and then 2005, again in 2011	None found	None found

Strensall Military Training Site

Despite the species not being found in 2019 and 2021 (only visited once during reasonable weather) there is still a chance that the species is still present due to a lot of recent historic records for the species and its nomad, plus some suitable habitat still being present and a need to further explore the site particularly the danger area. There is still a need to improve and protect bee track and nesting habitat on site (rich herbaceous grassy areas and sandy track edges) and this will encourage a range of moor/heath specialists, including the targets species.

Historic Records	**Records 2019**	**Habitat comments 2019**
Extensive historic records for *Andrena tarsata* in 1971,1981, 2005, 2006, 2008	None found searched once in good weather	Some taller growing Tormentil in specific areas, such as next to small watercourses
Extensive historic records for Nomada roberjeotiana in 1971, 2004, 2006, 2009	None found	

Discussion

The project in 2021 has provided 'second look' to understand the Tormentil mining bee and its nomad on the heath and moorland sites of Yorkshire. The work this year continued to confirm the presence of the species Allerthorpe Common and Pampledale Moor it was recorded on Jugger Howe in 2020 but not in 2021. It still hasn't been found at Strensall Military Training Ground and the Hole of Horcum. 2021 survey allowed further exploration of the habitat needs of this species in Yorkshire.

Tall flower-rich grassy areas - The importance of tall flower-rich grassy areas are key for this species and many other invertebrates. These are very strongly impacted by sheep grazing, even low grazing can impact as the sheep focus on these palatable areas and this was particularly highlighted at Jugger Howe where a slight increase in sheep grazing caused the tall growing tormentil to be lost and so the species is restricted to the bee mounds in the car park. In those sites not grazed, such as Allerthorpe Common scrubbing up can occur and so this habitat can be lost. It is the right type of grazing at the right time is key. The other option is some other type of opening-up management or disturbance.

Open sandy areas and cliff – These areas are key nesting sites for the species as well as many other mining bees and hunting areas for tiger beetles etc. Track edges allow open sandy areas that can be important nesting habitat and any sandy cliffs on site are also important. Maintaining, increasing and improving sandy areas is a key part of this species conservation management.

Both sandy nesting areas and flower-rich tall grassy 'edge' areas are important on heath and moorland sites for a wide range of bees and other invertebrates, where these areas exist they are noisy and vibrating with the buzzy-ness of hundreds of invertebrates.

Conclusion

Ongoing survey work and management is needed to continue to understand this species, its populations, ecology and distribution in Yorkshire. Working closely with land managers and key volunteers to highlight the importance of this bee-rich habitat particularly 'flower-rich and sandy edges' and improve site the Tormentil miming bee and its nomad.

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