

Tiree's Great Yellow Bumblebee Project



END OF PROJECT REPORT 2017-2021

Janet Bowler, Project Coordinator

Isle of Tiree, March 2022



Tiree Community
Windfall Fund



A community partnership project aimed at
protecting the great yellow bumblebee.

www.friendsoftiree.org.uk/bees

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End of Project Report - EXECUTIVE SUMMARY

The great yellow bumblebee *Bombus distinguendus* (GYBB) is the 2nd rarest bumblebee in the UK. Tiree is one of the Scottish islands currently home to the species, and an important refuge. Tiree's Great Yellow Bumblebee Project (2017-2021) was a community conservation initiative involving over 110 residents, visitors and RSPB staff. Its aims and key achievements were to:

1. **Enhance suitable forage for queen GYBBs emerging from hibernation in spring through sowing locally sourced kidney vetch seeds.**

Kidney vetch seeds were collected from a derelict industrial site on Tiree in autumn 2016, 2017 and 2018, and either sown directly into denuded soil at appropriate wild sites, or transplanted as seedlings the following summer. Plants at six out of the 13 sites successfully flowered (in their second year), with the best results at sites with the poorest and barest soils.

2. **Enhance forage provision in summer through planting other suitable flowers.**

Packets of a bespoke mix of seeds of wild flowers favoured by Tiree's GYBBs, and seeds of bumblebee 'super-foods', were distributed to 50 gardens across the island. The most successful sowings were those with the poorest and barest soils. The 'mini-machair' at the Care Home flowered spectacularly in summer 2021, and was probably the most successful of all the gardens involved.

3. **Monitor the numbers of bumblebees seen throughout the summer.**

Bumblebee surveys carried out in 2017-2021 by 18 local volunteers and five RSPB personnel, discovered healthy numbers of GYBBs at 16 key monitoring sites. Total counts for each year were 105, 370, 220, 213, 288, respectively. When the data were corrected for observer effort and phase of breeding cycle, there appeared to be a large increase in GYBB activity in 2021. The variation in activity between years is attributed to variations in temperature, rainfall and windspeed, and their consequent effects on flower abundance and foraging opportunities for GYBBs.

4. **Raise awareness and understanding of the species' conservation needs.**

Public events, talks, newsletters, blogs and activities with local groups, individuals and pupils at the Tiree School increased the understanding of Tiree's bees generally, and the GYBB in particular, amongst resident adults and children of all ages, plus visitors to the island. In addition, a children's story book about a queen GYBB and her struggle to find enough food for her family is being distributed to primary schools throughout the GYBB's Scottish range.

5. **Involve local adults and children throughout.**

Over 90 adults and children resident on the island participated in the project, from harvesting kidney vetch seeds, to sowing Tiree wildflowers and bumblebee 'super-food' plants, conducting bumblebee surveys, and producing a children's story book.

INTRODUCTION

The great yellow bumblebee *Bombus distinguendus* (GYBB) is the 2nd rarest bumblebee in the UK. One hundred years ago, it inhabited wildflower meadows throughout the UK, but due to agricultural intensification, now occurs only in some Scottish islands and the very north of the Scottish mainland. The Isle of Tiree in the Inner Hebrides is one of the islands currently home to the species, and an important refuge.

Tiree's Great Yellow Bumblebee Project (2017-2021) was a community conservation initiative run in partnership with RSPB Scotland. It set out to discover more about the island's GYBB population and habitat, and enhance its habitat through involving the local community. Around 110 resident adults and children, second-home owners, tourists and personnel at RSPB Scotland were involved in carrying out the project under the direction of a local ecologist who designed, fundraised and coordinated the project.

This report is a brief round-up of what we, as a community, achieved over the past five years. For greater detail, photographs and further information, please refer to the weblinks listed throughout and at the end of this report.

Tiree's Great Yellow Bumblebee Project set out to:

1. Enhance suitable forage for queen GYBBs emerging from hibernation in spring, through sowing locally sourced kidney vetch seeds
2. Enhance forage provision in summer through planting other suitable flowers
3. Monitor the numbers of GYBBs seen throughout the summer
4. Raise awareness and understanding of the species' conservation needs
5. Involve local adults and children throughout

ACHIEVEMENTS

1. Enhance suitable forage in spring

1.1 Harvesting local kidney vetch

In late autumn 2016, 2017 and 2018, wild kidney vetch seeds were collected by hand from a derelict site at The Camp at Crossapol, Tiree (grid ref NL 9950 4460). They were sorted, rolled and sieved so that only the seeds remained. One heaped teaspoon contained about 240 seeds, suggesting that each harvest was roughly 7,000 seeds. The seeds were stored in cold, dry, dark conditions and sown in late winter-early spring in subsequent years.

1.2 Sowing and planting locally-harvested kidney vetch at wild sites

In Feb-Mar 2017, kidney vetch seeds were sown at 10 sites around the island (Figure 1). The sites were selected on the following basis: GYBBs were recorded foraging there during 2005-2015, the sites were floristically poor, and there was little grazing by livestock in summer. Each site was monitored for kidney vetch growth in subsequent years - four of the 10 sites were successful, with rosettes of leaves evident in the first summer. The kidney vetch grew best in areas of stable, bare sand and/or gravel with very little organic matter, and where there was very little competition from other plants.

In summer 2018, project volunteers planted out around 190 kidney vetch seedlings at three sites of denuded and eroding machair at Caoles, Salum and Crossapol. The seedlings had been grown in pots in a variety of soil types, from locally-harvested seeds collected the previous autumn. The kidney vetch seeds germinated well in compost but needed very poor soil to grow on and, again, the most successful were those transplanted to the poorest, barest and most stable substrates. In all cases, flowering did not occur until the 2nd year of growth, then continued annually.

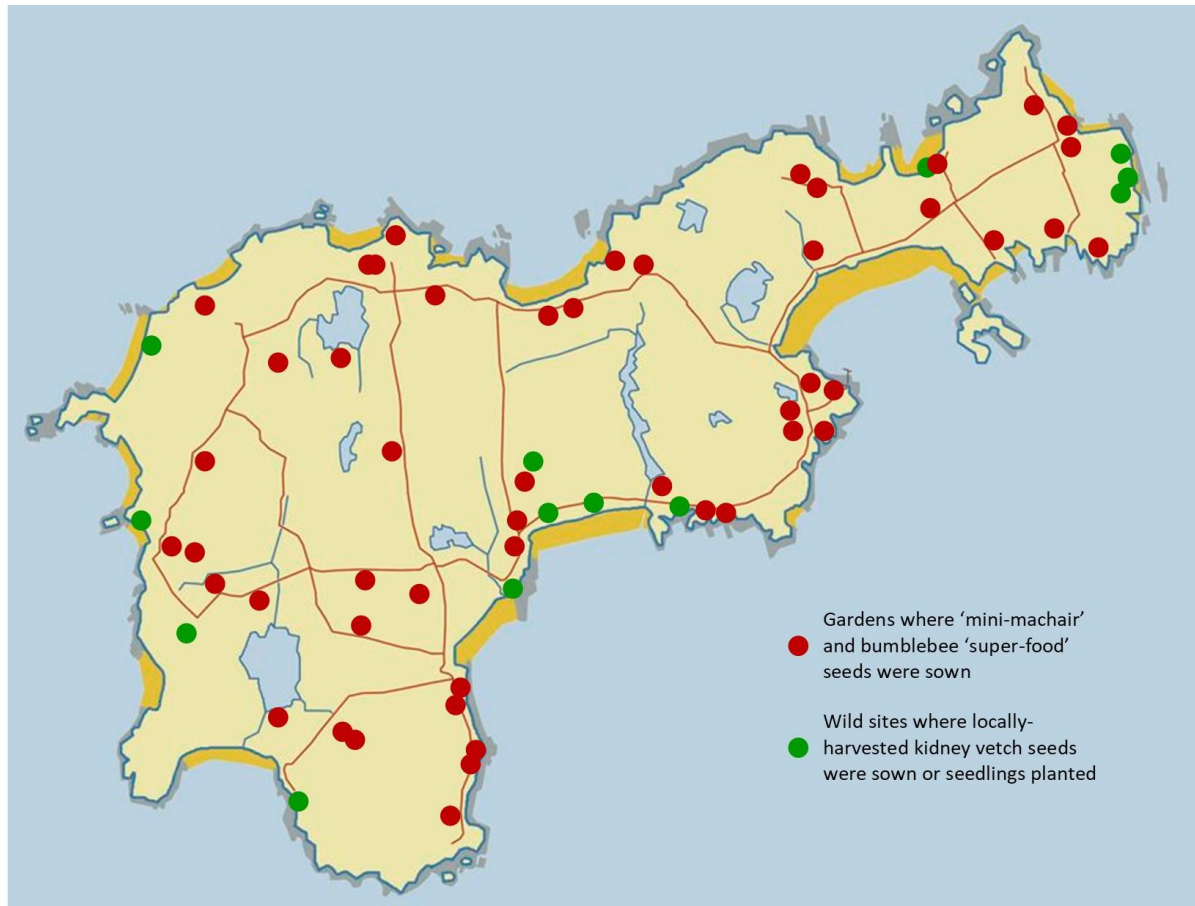


Figure 1. Locations of wild sites planted with locally-harvested kidney vetch, and gardens planted with 'mini-machairs' and bumblebee 'super-foods', over the period 2017-2019.

2. Enhance suitable forage in summer

In 2017, a bespoke mix of seeds of wildflower species known to be favoured by GYBBs and occurring naturally on Tiree was created for the project by the reputable Scottish company, Scotia Seeds. The resulting 'mini-machair mix' comprised:

Bird's foot trefoil *Lotus corniculatus*
 Kidney vetch *Anthyllis vulneraria*
 Yellow rattle *Rhinanthus minor*
 Tufted vetch *Vicia cracca*
 Red clover *Trifolium repens*
 White clover *Trifolium pratense*
 Common knapweed *Centaurea nigra*
 Autumn hawkbit *Scorzoneroide autumnalis*

The mix was re-packaged, labelled with sowing instructions and offered free of charge to residents of the island for growing in gardens only. They were accepted for use in nine private gardens and by the Primary School Garden Club and Early Learning Centre (Pre-5) garden.

Kale seeds were also offered free of charge as GYBB 'super-food', which, if left to flower in spring, provided a very early source of forage for queen GYBBs emerging early from hibernation. Seeds of phacelia and viper's bugloss, both bumblebee favourites, were also distributed to gardeners, but these two were of limited success.

In 2018, a second Tiree community project '[Hebridean Flower Power](#)' received a £2,000 grant from Kew Botanical Gardens via their Grow Wild programme, which was aimed at bringing people and wildflowers together. Although it was a separate project, it was run by the same local ecologist and operated in tandem with Tiree's Great Yellow Bumblebee Project. A further 20 local residents were given the same mix of seeds to create mini-machairs in their gardens, while the School, Baugh Church and Tiree Medical Practice provided larger plots for sowing. In addition, a large area of mini-machair was sown at *Tigh a' Rudha* Care Home where a Sensory Garden was being developed for its residents.



Mrs Margaret Jones enjoying the mini-machair at the Sensory Garden at Tigh a' Rudha Care Home in June 2021. Photographs by Clare Jones.

Uptake of seeds by local gardeners continued and by autumn 2019 a total of 50 mini-machair plots were flowering in gardens scattered about the island (Figure 1). Growth at a number of the garden plots was reviewed annually and several flowered well, attracting bumblebees and other pollinators. Probably the most successful plot was the large mini-machair created next to the Care Home's Sensory Garden. In 2021, it flowered spectacularly, providing residents with a bright carpet of yellow blooms. Again, the level of success of each mini-machair plot was related to poor soil quality with little competing vegetation.

Tiree's Great Yellow Bumblebee Project was given an additional boost in 2019 when it was voted the 2nd best community project by shoppers at Tesco supermarkets, under their [Tesco Bags of Help programme](#), securing a further £2,000 for another year's activities.

3. Monitor numbers of bumblebees

3.1 Methods

As well as collating reports of incidental sightings of GYBBs, 1-hour bumblebee surveys were conducted in 16 areas of flowering machair habitat by 18 local volunteers and five visiting RSPB personnel on sabbatical. The survey method was very similar to the [Bumblebee Conservation Trust's bee walks](#), but adapted to suit Tiree's specific conditions and its volunteers. Basically, surveyors walked slowly for one hour through machair areas rich in GYBB's favourite flowers (Figure 2), in the middle of calm, sunny days, recording the number of each species of bumblebee encountered. For each GYBB seen, its caste and activity were recorded along with the species of

flower it was foraging on. The abundance of GYBB forage flowers along the survey route was also recorded using the [DAFOR scale](#).

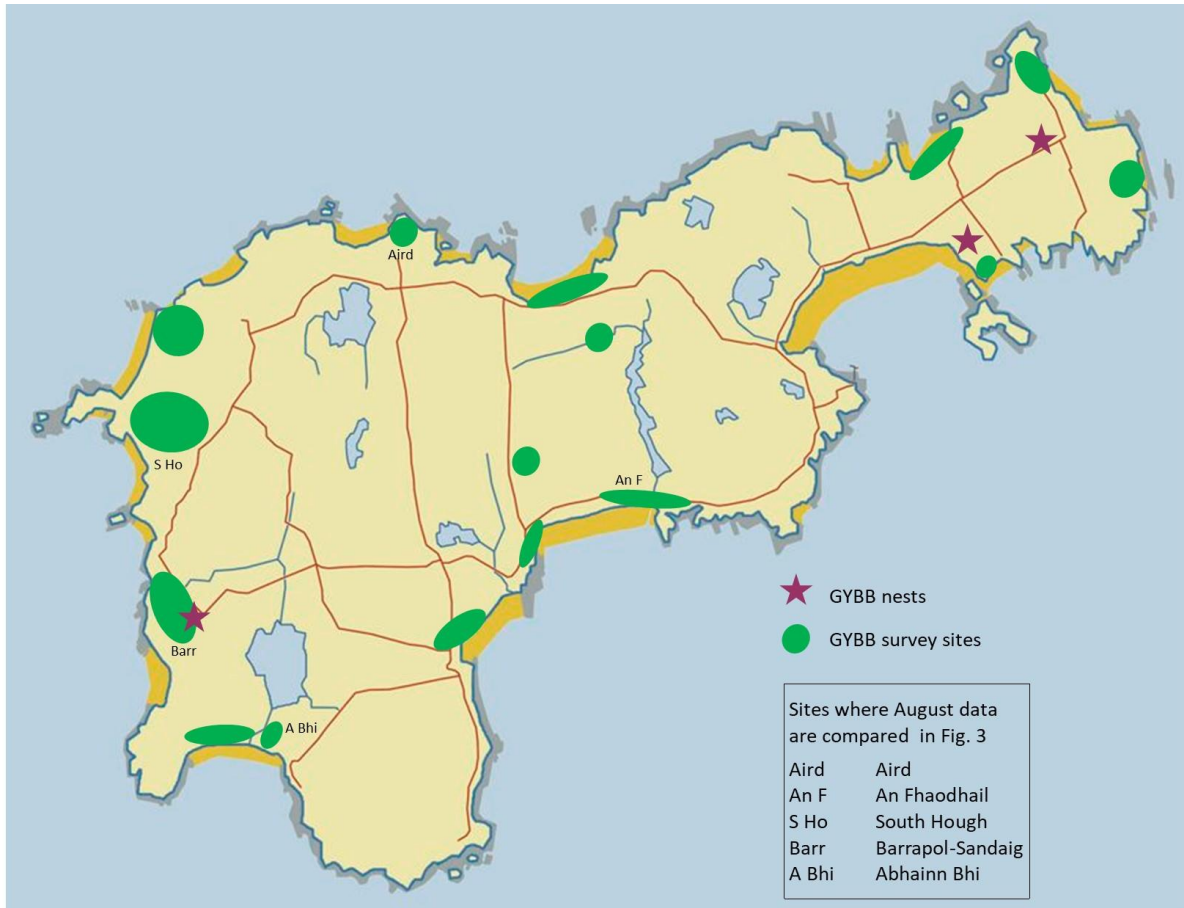


Figure 2. Location of bumblebee survey areas and active GYBB nests

3.2 Results

The number of GYBBs encountered in each year of the project was remarkably higher than the sum of all GYBBs encountered during 2005-2015 (Table 1).

Year	Total GYBBs	Number of surveyors
2005-2015	54	2
2017	105	8
2018	370	10
2019	220	9
2020	213	5*
2021	288	3*

Table 1. Total number of GYBB's recorded each year (surveys and incidental records).

* Fewer surveyors could participate in 2020 and 2021 due to consequences of the Covid-19 pandemic.

On the whole, these higher numbers were most likely due to the increased level of observer effort rather than increased number of bees, e.g. the highest total (370) in 2018 resulted from the presence of a record 10 surveyors. However, when data were corrected for observer effort (mean per transect hour), and phase of colony lifecycle (August only when GYBB colonies are busiest), a potential trend emerged (see Figure 3). Of the 16 areas surveyed, August data for Aird, An Fhaodhail dunes, South Hough, Barrapol-Sandaig, and Abhainn Bhi were selected for comparison as data for these areas were collected more frequently and consistently. Across all these five sites, the mean count of GYBBs per survey appeared to increase dramatically in 2021 (Figure 3).

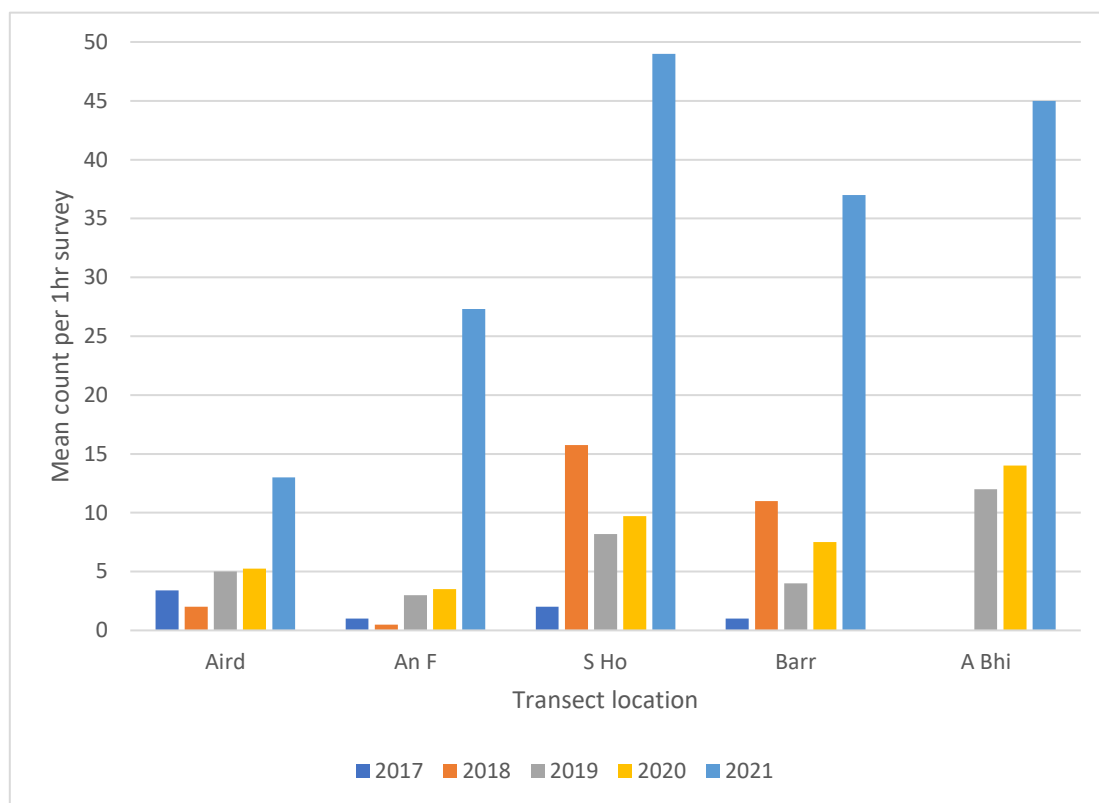


Figure 3. Mean counts of great yellow bumblebees per 1hr survey of flowering machair at Aird, An Fhaodhail dunes (An F), South Hough (S Ho), Barrapol-Sandaig (Barr), and Abhainn Bhi (A Bhi), in the Augusts of 2017-2021. NB. No great yellow bumblebees were seen during the August 2018 survey at An F; surveys at A Bhi did not begin until 2019.

We can attribute the difference in mean counts between years to weather conditions. Growth of the bees' forage plants was hindered by a prolonged summer drought across all sites in 2018. 2019 was mostly cold and wet but warmed up in late summer. The weather in 2020 created a roller-coaster ride for flowers and bees, but finally settled to warm, wet and sunny conditions resulting in simultaneous blooming of all the GYBBs favoured forage flowers, finally enabling successful breeding and a larger number of daughter queens to stock up for, and survive, winter hibernation. April-June 2021 was cold and no queens emerged from hibernation until warmer weather in late June, when larger numbers of queens than ever previously recorded were counted. Summer 2021 continued warm and windless, with occasional rain relieving the drought. This enabled copious machair flowers to support higher breeding rates for the GYBB colonies and, therefore, higher counts. It is possible that this means that even more daughter queens will emerge from hibernation in Spring 2022.

The above findings demonstrate the impact that the vagaries of the Spring-Summer weather can have on the GYBB's success and why, therefore, the species requires such large areas of diverse key forage flowers to ensure that, regardless of the weather, there are always resources available to keep the species going.

There is one other potential cause of the 2021 increase to consider. During the Covid19 lockdown of 2020, many wild animals benefitted from reduced disturbance, noise and pollution caused by human activities, resulting in improved breeding success across a range of species. How this would have an effect on bumblebee breeding success on Tìree is not clear, but it is something to consider given the magnitude of the increase.

Or maybe, just maybe, all that extra forage created by the project participants enabled greater breeding success. Unlikely, but it is fun to think so.

3.3 Bumblebee Blitz

In June 2019, we attempted a coordinated count of queens emerging from hibernation across the whole island. However, the weather was cool and erratic and not conducive to mass emergence. Only two queens were recorded despite eight recorders spending approximately 16 hours in the field. We decided that this method of monitoring the GYBB population was not worth pursuing in subsequent years.

3.4 Nests

Three GYBB nests were discovered during the course of the project, all by chance, and by people who were familiar with the species. Bees were spotted entering and exiting nest sites on roadside banks in 2018 at Barrapol and Ruaig, and in 2021 at Caoles (Figure 2). The Caoles nest was particularly encouraging as the number of GYBBs spotted foraging in the Caoles area had declined over the previous few years.

The Barrapol nest was only the 5th GYBB nest to have ever been recorded on Tiree, so we set up a motion sensitive wildlife trail-cam to record activity, something that we believe had not been tried before with this species. The results were fascinating, showing the manner of entry and exit to the nest, reactions of the bees to levels of daylight and changing weather, and an attempted raid by a meadow pipit with a long stick of grass.



'Bumblebee-cam' at the nest entrance at Barrapol in 2018

4. Raise awareness and understanding of the bee and its needs

4.1 Promotional material

In 2017, we created (a) an information [booklet](#) about the bee and the project for participants and supporters, (b) a widely distributed postcard identifying the bee and inviting people to record and submit their sightings, and (c) a [webpage](#) where visitors could learn about the species and its needs, learn how to get involved and be kept up-to-date with the latest news.



HAVE YOU SEEN THIS BEE ON COLL & TIREE?



Approximate size

Great Yellow Bumblebee

A large, yellow bumblebee with a **clear black band** between the wings
 Help us as part of our Great Yellow Bumblebee project
 Record sightings in this table or contact us at the address below

Your name/contact info:		Number of Great Yellow Bumble Bees	Name of flower/s the bees were seen feeding on
Date	Place		

Contact: Janet Bowler, Balephuill, Tiree ; 01879 220748 ; janetmhunter@clara.co.uk

rspb.org.uk - The RSPB is the country's largest nature conservation charity, inspiring everyone to give nature a home.
 The RSPB is a registered charity. England & Wales no. 237076, Scotland no. SC037654

Post card for identification and recording incidental sightings of GYBBs

4.2 Hebridean Flower Power

The *Hebridean Flower Power* project, funded by Kew Botanical Gardens via their Grow Wild programme, and operated in tandem with Tiree's Great Yellow Bumblebee Project, enabled children and adults to experience the educational, health and environmental benefits of planting, tending and enjoying native wildflowers. As one resident said during a workshop "*I never knew there was so much to know about bumblebees and wildflowers*". The dedicated [webpage](#), set up by Grow Wild, was updated regularly with photographs of tasks accomplished from April 2018 to August 2019. It is probably the best record of the course of the forage enhancement phase of the project, and is well worth a look.

4.3 Tiree School

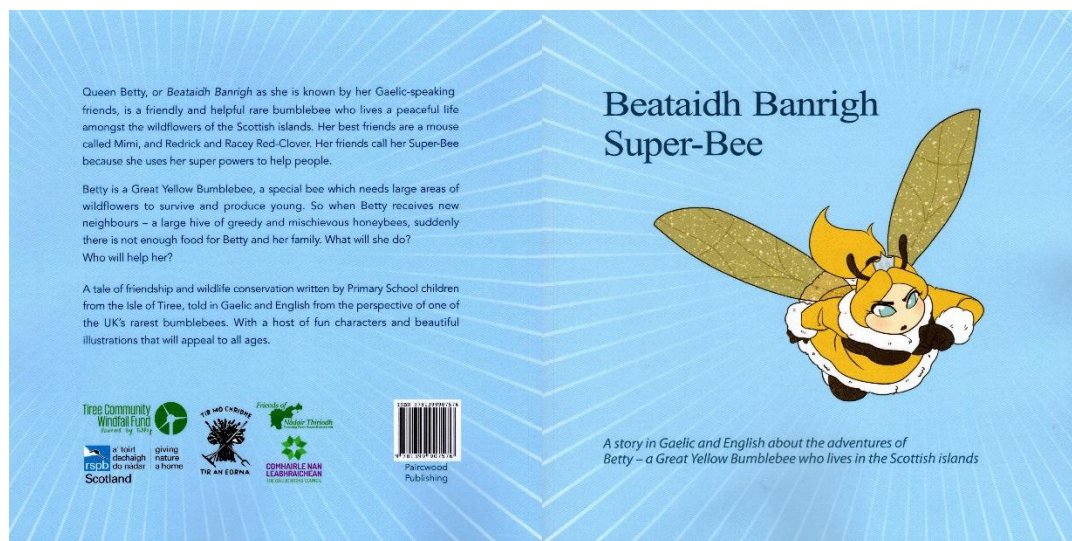
Pupils and staff at Tiree High School and Early Learning Centre (Pre-5) were involved in the project in several different ways. The Pre-5 children came on a short walk to spot bumblebees and drew colourful flowers and insects to attached to lollipop sticks, which were then 'planted' in the newly prepared mini-machair at Baugh Church. The Primary Department's Gardening Club grew and planted out kidney vetch seedlings and created a mini-machair in the school garden. The Secondary Department's technical class were introduced to the project during a visit to the school, and later helped produce small '*Hebridean Flower Power*' signs for participating gardens. Tiree Beaver Scouts painted large pebbles to resemble brightly coloured flowers and bumblebees, and these were placed around a mini-machair at *Tigh a' Rudha* Care Home.



Signs assembled by school students for participating gardens, and pebbles painted by Tiree Beaver Scouts

Last but not least, a group of Primary School pupils created a warm and funny story about a queen GYBB and her struggle to find enough food for her children. A local artist transformed the children's drawings into beautiful illustrations, and current and former Tiree school staff translated the story into Gaelic. A local page designer drafted the layout. In addition to being distributed gratis to book contributors and funders, and sold in outlets on Tiree and via the Gaelic Books Council

[website](#), the book will be distributed free of charge to primary schools within the current range of GYBBs in Scotland, i.e. Western Isles, Orkney Isles and coastal Caithness & Sutherland.



Back and front covers of the children's storybook

4.4 News and updates

News and project updates were posted regularly throughout the project via Tìree's community newsletter - [An Tirisdeach](#), by email to [subscribers](#), and via the [Scottish Pollinators](#) and [RSPB](#) blogs.

4.5 Public talks

In 2017, a short introduction to bumblebees and the project was made at a Primary School assembly, followed by an invitation to get involved. A joint public presentation was made by Kevin Rylands (RSPB) and Janet Bowler at the Rural Centre in 2017, and we joined the Tìree Ranger on two public walks – 'Machair' and 'ID that Bee', to talk about the project and look for bees and flowers.

In 2018, the Cùram Lunch Club invited the project coordinator to give a presentation in Baugh Church, followed by the attendees kindly repackaging and labelling wildflower seeds for the project, and the Tìree branch of the Scottish Women's Institute hosted a talk by the project coordinator at one of their regular meetings in *An Talla* – the Community Hall.

4.6 Community events

In July 2018, in conjunction with *Hebridean Flower Power*, we hired a stall at the annual Tìree Agricultural Show where we handed out packets of wildflower seeds, talked with visitors about the projects, handed out 'Bee Heroes' stickers to children, and fundraised through selling RSPB GYBB pin badges and running a 'guess the number of bumblebees in a jar' competition for children. The little knitted bumblebees in the jar were donated by another Grow Wild project – 'Pollen Counts', and the winner of the competition won a very large knitted great yellow bumblebee.



Stickers, competition bees and prize at Tìree Agricultural Show, 2018

Also in 2018, we ran a stall at the Cùram Teas & Table-top Sale to raise awareness and funds for the project, and to hand out more flower seeds.

A 'Bumblebee Dance' with food, music and games was held in An Talla in November 2018 to celebrate the success of *Hebridean Flower Power* and to thank all the participants for their hard work and support. Shortly after that, we attended the [Nature of Scotland Awards](#) in Edinburgh where Tìree's Great Yellow Bumblebee Project was awarded Highly Commended in the Community Initiative category.

In 2019, the project received a plug on the packet of '[Machair Herbal Infusion](#)' - a new blend produced by Tìree Tea.

In Nov-Dec 2020, locally made GYBB tree decorations were distributed to key participants and supporters to thank them for their involvement.



Christmas tree decoration thank-you gift

Sales and free distribution of the children's storybook '*Beataidh Banrigh – Super Bee*' raised additional awareness of the project and the species' conservation status. In addition to the story, the book contains a 'Bee Facts' page and an 'About the Book' page, which mentions the wider project.

5. Plans for continuing GYBB conservation on Tìree

Although the community project is over, the species will continue to be monitored by RSPB personnel and islanders on a less intensive basis, and there is likely to be further habitat enhancement through RSPB Scotland projects and through Agri-Environment Schemes. In fact, since this project finished, a few crofters on the island are planning summer grazing breaks to enable additional areas of machair to flower. A fantastic result for our bees!

ACKNOWLEDGEMENTS

This project was truly a community effort with many participating individuals and supporters. I've attempted to thank everyone in person below but, with so many, I may have missed one or two. If you are one of them, I do apologise and thank you most sincerely for your support.

The project would not have been possible without generous funding from RSPB Scotland, Tiree Community Windfall Fund, Kew Garden's Grow Wild project, Tesco Bags of Help, Pairwood Publishing, The Gaelic Books Council, The Tiree Association and private individual donors, and without the support and assistance of personnel at Tiree Community Development Trust, Tiree Medical Practice, Baugh Church, *Tigh a' Rudha* Care Home, Tiree Primary and High Schools, Tiree Early Learning Centre (Pre-5) and MacLennan Motors.

Team GYBB – those who took an active role in the project included Mike Archer, Freddy Arnold, Jacqui and Rosemary Bennett, John and Sue Bottomly, John Bowler, Elizabeth Brodie, Alison Brown, Janet Brown, David Buchan, Ishbel Campbell, Lachlan Christie, Alison and David Clark, Stephanie Cope, Fiona Dix, Margaret Doyle, Katie England, Anne Esson, Hugh Fearnley-Whittingstall, Jeannie Fisher, John Fletcher, Mairi Forbes, Vicki Goodier, Margaret Gorman, Rachel Gwilym, Laken-Louise Hives, Dorinda Johnson, Clare Jones, Jackie and Alun Jones, Jo Kennedy, Madeleine Kerr, Molly Knowles, Kim Laird, Mia Langley, Andrea MacArthur, Ishbel MacArthur, Lauren MacArthur, John MacCaskill, Graeme MacColl, Jane MacDonald, Lorna and Aeden MacDonald, Doreen MacDonald, Lachie MacFadyen, Seumas and Sheena MacFarlane, Hugh MacInnes, Katie-Jane MacKechnie, Angus MacKinnon, Annette MacKinnon, Elspeth MacKinnon, Finlay and Innes MacKinnon, Morag MacKinnon, Sheila MacKinnon, Caroline MacLean, Niamh MacLean, Stevie MacLean, Julie and Annie MacLennan, Cairin MacLeod, Flora MacPhail, Donal McCarthy, Karen McGregor, Dr Mike McIver, Maureen McMullen, Rhoda Meek, Kenzi Milne, Andrew Morris, Charlie Nathan, Malcolm and Eileen O'Dea, Anthony O'Diobhailein, Judith Patience, Ulrike Rawson, Betty Robertson, Andy Robinson, Liz and Nigel Robinson, Kevin and Debbie Rylands, Cathy Shaw, Dot Sim, Dr Keith Slater, Cameron Smith, Ian Smith, Linda Smith, Catriona Smyth, Catriona Spink, Dave Taylor, Helen Towner, Bella Trythall, John Tyrer, Olivia Urquhart, Alec Walker and family, Julia Welstead, Colin Woodcock, Jude Worsley, Margaret Worsley, Rou Worsley, Andy Wright and family, Jo and Charlotte Vale, Christian Verstraete, Ann de Zegher.

FURTHER INFORMATION

<https://friendsoftiree.org.uk/tirees-great-yellow-bumblebee-project/>

https://friendsoftiree.org.uk/tirees-great-yellow-bumblebee-project/subscriber_emails

<https://www.growwilduk.com/community-projects/hebridean-flower-power>

<https://www.rspb.org.uk/our-work/our-success-stories/a-growing-buzz/>

<https://scottishpollinators.wordpress.com/2019/02/18/tiree-bumblebee-buzz/>

<https://scottishpollinators.wordpress.com/2020/07/>

<https://scottishpollinators.wordpress.com/2022/01/20/all-smiles-on-the-sunshine-isle/>



Queen Betty, or *Beataidh Banrigh* as she is known by her Gaelic-speaking friends, is a friendly and helpful rare bumblebee who lives a peaceful life amongst the wild flowers. But when greedy and mischievous honeybees show up, she and her family need help to survive. What will she do? Who will help her?

A tale of friendship and nature conservation created by Tìree Primary School children and told in both Gaelic and English. With a host of fun characters and beautiful illustrations that will appeal to all ages.

AVAILABLE FROM:
gybb@friendsoftiree.org.uk



21 x 21 cm | 54 colour pages | Paircwood Publishing 2021