

# Saving Our Special Nature of Montserrat

## Newsletter 6, March 2018

### Foreword



Male Montserrat oriole, Montserrat's national bird on red heliconia, Montserrat's national plant. Photo: Dr Mike Pienkowski

Welcome to the sixth issue of the newsletter about the project entitled *Maximising long-term survival prospects of Montserrat's endemic species and ecosystem-services*. This is a good and reasonably concise title for technical use – but is a bit of a mouth-full for everyday use. So we thought that, for the latter, we might try something shorter – but meaning much the same thing, as well as trying to capture also the wider aspects. You see it above. It has not skipped our notice that it does lend itself to an abbreviation relevant to the urgency and importance of the matter: *SOS Nature of Montserrat*.

We are very grateful for the many kind and encouraging comments from people welcoming the first five newsletters. We hope that you enjoy this one too. In it, we note the exciting news of a new species to science described from specimens in Montserrat, update on other progress by the Montana State University team in working up their data and finalising the Montserrat Virtual Museum of Natural History, talk some more on the challenges of dealing with human-introduced invasive species of plants and animals which imperil native wildlife, describe further progress in satellite-aided mapping and monitoring of ecosystems, and the incorporation of studies in schools education. We are delighted too with the progress of local *Adopt a Home for Wildlife* projects. We include

progress reports on implementing some other elements of our project conclusions, from work started earlier in the project. We note also the interest in other UKOTs in using some of the techniques pioneered by this project in Montserrat.

Please feel free to show or forward these newsletters to others. If anyone sees these and would like to be added to the circulation list, please send your email address to [cwensink@ukotcf.org](mailto:cwensink@ukotcf.org). For more information on the project, the main contacts are:

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## Species new to science described from Montserrat specimens - the first of several resulting from this project?

Regular readers of the newsletter will recall that in *SOS Nature of Montserrat* issue 4, we briefly reported the interesting discovery on Montserrat by Dr Justin Runyon, Associate Researcher at the Montana State University, USA, during some fieldwork in June 2017. He found a previously undescribed fly (meaning that it had not been formerly identified, described and given a scientific species name). It is in a group of invertebrates, Dolichopodidae (long-legged flies), in which he is particularly interested. Flies in this group are tiny (1-9 mm long) and so are rarely collected. They are usually metallic green with long, slender legs. This family of flies is the 3rd largest with over 8,000 species worldwide.



Female specimen of *Chimerothalassius runyoni*. Reproduced under Creative Commons Attribution License <http://creativecommons.org/licenses/by/3.0> from Brooks, S.E. & Cumming, J.M. (2018) New species of *Chimerothalassius*

Shamshev & Grootaert (Diptera: Dolichopodidae: Parathalassini) from the West Indies and Costa Rica. *Zootaxa* 4387 (3): 511-523, DOI: <https://doi.org/10.11646/zootaxa.4387.3.6>. © 2018 Magnolia Press

The 2005 Centre Hills survey focused on beetles, but many long-legged flies were caught in nets and were taken back to the laboratory at Montana State University. No dolichopodid species were known from Montserrat prior to the survey, simply because no-one had studied them. In the years that followed the 2005 survey, 62 species (26 genera) of Dolichopodidae were found. 15 new species were new to science. This was more species than predicted based on the size of Montserrat and comparing with neighbouring islands (as for beetles - see pages 3-5). Justin gave a very interesting evening lecture, following Dr Ivie's talk on beetles, during his June visit, which was really well attended at the Montserrat National Trust offices.

Dolichopodidae are very common in and around streams and other water bodies and on vegetation. Males often have ornaments to attract females. Adult flies are predators, feeding on smaller invertebrates including larvae of mosquitoes, a common and disease-carrying pest and a particular problem in some areas around Montserrat, such as Carr's Bay.

Dr Justin Runyon said at the time, "For me, I guess the highlight of the trip was catching that little fly on Woodlands Beach. It has only been collected once before – ever – from Dominica and that specimen was damaged. I got quite a few and this will allow me, or someone else [back at the laboratory], to actually describe it and give it a name so that is one of the most exciting finds."

When back at the lab in Bozeman, Justin sent the specimens off to the Diptera Unit at the Canadian National Collection of Insects in order for them to be described formally. In February 2018, the two specialists, Scott Brooks and Jeffrey Cumming, published a paper in the scientific journal *Zootaxa* describing this tiny species.

In 2002, the genus *Chimerothalassius* had been established for a single species *Chimerothalassius ismayi* by Shamshev & Grootaert, when it was found on beaches in New Zealand. Almost a decade later, Brooks and Cumming described the first new world species from Dominica but, as explained earlier, this was from one specimen, a female, and fragmentary, with not enough material to describe and name the species. As Justin found several male and female specimens, it has been possible to name a new species of *Chimerothalassius*, from Dominica and Montserrat, while at the same time they record the presence of the genus in Central American, based on the newly discovered Costa Rican female specimens.

In total, there are now 5 species in this genus, with *Chimerothalassius runyoni* the newest to be named. *Chimerothalassius runyoni* is being considered as conspecific to Dominica and Montserrat, meaning that they are the same species, although further specimens are needed to establish whether they are, in fact, separate species.

Authors are not allowed to name species after themselves, for several reasons. One of these is that, in the full formal name of



Rocky coastal type locality of *Chimerothalassius runyoni* sp. nov. at Woodlands Beach, Montserrat (photo by Justin Runyon). Reproduced under Creative Commons Attribution License <http://creativecommons.org/licenses/by/3.0> from Brooks, S.E. & Cumming, J.M. (2018) New species of *Chimerothalassius* Shamshev & Grootaert (Diptera: Dolichopodidae: Parathalassiinae) from the West Indies and Costa Rica. *Zootaxa* 4387 (3): 511-523, DOI: <https://doi.org/10.11646/zootaxa.4387.3.6>. © 2018 Magnolia Press

the species, the describing authors are listed after the generic and species names. However, a happy consequence of this is that the naming specialists can credit Justin's hard work by making the specific name *runyoni* (Runyon's in Latin; specific names always start with a lower-case letter, and generic names with a capital).

This story highlights how taxonomy is a continual process and that, sometimes, only one piece of the jigsaw puzzle is available to us in order to make choices about where a species fits and how to compare with others. It also shows us how unique the ecosystem on Montserrat is, and that in its "nooks and crannies" biological riches are waiting to be found. The island can also contribute to science on a global scale as with the information gained here mysteries from around the world can be unpicked.

*Chimerothalassius runyoni* has been providing a service to the island, unpaid, by eating the larvae of pest species such as mosquitos, for some time. This tiny public servant now has a name and we should cherish the contribution it makes to our well-being.

The full paper is cited as: Brooks, S.E. & Cumming, J.M. (2018) New species of *Chimerothalassius* Shamshev & Grootaert (Diptera: Dolichopodidae: Parathalassiinae) from the West Indies and Costa Rica. *Zootaxa* 4387 (3): 511-523, DOI: <https://doi.org/10.11646/zootaxa.4387.3.6>.

Justin is confident that there are several other new species in his collections, but painstaking work by him and colleagues in various institutions will be needed to work through these.



Above: Part of the audience – who, to their own surprise, became insect enthusiasts – attending the lecture at Montserrat National Trust. Right: Dr Justin Runyon working on his collections during his visit to Montserrat. Photos: Catherine Wensink



# Progress on Montana State University's beetle work and the Montserrat Virtual Museum of Natural History

*There have been a few set-backs over the last few months in getting the database launched as there have been some computing system problems and health problems in the team. Also, Ohio State University, which hosts the database computer has had three personnel changes in last year after having the same person for 10 years. A new permanent position has been filled and started at the end of January 2018. Furthermore, MSU has had some computer system changes. We are grateful to Dr Mike Ivie and his team for ensuring that all data are safe (as they do routinely) and working out how to overcome the problems. As a result, although there will be delays of a few weeks in getting everything up and running for the public, these delays will be minimised and the team will ensure all works. We wish them all well, and hope to announce access details in our next issue of SOS Nature of Montserrat.*

## Update on Montserrat Virtual Museum of Natural History

Almost all the beetle data has been captured from the various institutions, has been checked and is in the database. It had been on schedule and almost complete. However, we received a huge return loan of bark beetles and the number of species for Montserrat went from 13 species known to 64, so that information needed to be entered, in order for it to be as complete as possible.

This just goes to show how much of a changing situation we have in terms of data for Montserrat. Even in the lifetime of the project, we are uncovering the complexity of how data management of biological data is an ever-changing situation. All of that material needs to be entered. Sarah Rubun is working on that now. Each specimen has a label on it for identification (see images). All locations are in the database but we don't have all of the specimens in yet. Each has a unique identification/barcode label on it.

Most of the additional collecting of new material that was done in summer 2017, when the Montana State University (MSU) team was on island, will not be included when the current project funding ends. It will, however, be done. It will be easy to do

this in future, but it takes time and we cannot add the additional individual data-records in the timeframe that we have left within the funded project period. It should not be underestimated how good a record this will be for Montserrat. According to Dr Mike Ivie, leader of the MSU team: "This is more than anyone has for anything anywhere else in the island. Nobody has that many records backed up by a voucher (e.g. individual museum specimen)."

The Montserrat Virtual Museum of Natural History (MVMNH) is in various development phases. James Beck is leading on this. Information will be added continuously and will continue beyond the end of the currently funded project period. Input from those on-island is being used to design and finalise the portal.

Once all the data in the database have been verified, these can be migrated into the system with all records at once. There will be several uses for the portal on island.

The portal will be open access, meaning that it can be freely used by anyone with an internet connection. MSU will continue to manage the database records behind the scenes, adding to it where possible and in collaboration with Montserrat National Trust (MNT), the Government of Montserrat (GoM) and UKOTCF. In future, it would be great to provide an opportunity for a Montserratian to receive training from MSU to take this forward, but this would need to be a committed individual with a lifetime of work ahead! The portal can be used as a tool for schools to teach about the natural environment with information that is locally appropriate to the schools.

NGOs, particularly MNT, and civil society will be able to follow the island's own natural history and may be able to use it as a tool for more engagement with the community and in the region as a centre of excellence.

Governments need data that allow them to meet obligations under international agreements and laws for biodiversity protection, and plan where resources go. Although Montserrat is not signed up to the Convention on Biological Diversity, it has come a long way towards this with its Conservation and Environment



From left: (1) Individual bar-code numbers used to link specimens to database

entries. One is placed on the bottom of each pin holding a Montserrat specimen. (2) A green long-horn beetle with its bar code attached. (3) Curated bark beetles incorporated into the main collections. (4) An example drawer of a fully curated with databased specimens. Photos: Montana State University.

Management Act, and it is already included in some other international conservation agreements. Data management is an important aspect of this, and the MVMNH portal puts Montserrat ahead of many others in the region in this regard.

### Gaps in the data, gaps in our knowledge

All of the data assembled like this allow us to look for where are there gaps in the data. It also allows us to ask questions, *e.g.* how many endemic species are found on Montserrat?

The Table below, from a 2005 report, outlines some of the categories endemic species fall into (from: [https://www.kew.org/sites/default/files/assets/KPPCONT\\_047452\\_Primary.pdf](https://www.kew.org/sites/default/files/assets/KPPCONT_047452_Primary.pdf), page 237).

Distributional status	Code	Description
Island Endemic	IE	Montserrat only
Local Endemic	LE	Few Islands, i.e. St. Kitts, Montserrat & Guadeloupe
Leeward Island Endemic	LIE	Sombrero to Dominica
North Eastern Caribbean Endemic	NEC	Puerto Rico to Dominica
Lesser Antilles Endemic	LAE	Sombrero to Grenada
West Indian Endemic	WIE	Not on mainland, or only south Florida
Widespread Native	WN	West Indies and Mainland
S. America and Lesser Antilles Native	SA	Sombrero to Grenada & S. America
Native	N?	Full distribution unknown
Exotic	EIS	Invasive Species (exotic species not introduced on purpose)
Biological Control Agent	EBC	Exotic spp introduced for beneficial purpose
Status Uncertain	?	Identity not yet ascertained, or range in dispute

The first challenge with any specimen is to identify it. There are a huge number still unidentified because there are no descriptions and no revisions. Then they have to be compared with material in the collection in Montana. For each specimen, we have to make an educated decision on what group it fits into. In fact, things get changed every so often, as knowledge of the natural world continually improves. So, for example, we may have a widespread native (WN) that, when someone looks at it, turns out to be actually an amalgamation of several species. Then these get divided up, and so the species on Montserrat might get reclassified as something else because of work going on elsewhere. So, for instance, in the 2005 report, we mention that the tenebrionid genus *Cyrtosoma* is one of the things we did not ever recollect. We now have someone revising that genus for the Antilles, and it is actually not a new island endemic (IE in the table); it is the Guadeloupe species, which means it fits in to the LIE category. As it has not been seen since 1898, we are beginning to think that maybe the specimen has been a mislabeled record. That said, few individual changes do not change the overall bigger picture. Things are difficult to assign and are subject to change with increased knowledge, but we cannot start working on the problem until we know a given species exists. We are at this stage still for a lot of this.

This is exacerbated by the fact that there are

so few specialists, both in the world and locally on Montserrat. St Kitts and Nevis have 35 species of beetles recorded. So we may have a massive number of things that we know occur on Montserrat but, because there have been few collections on St Kitts and Nevis, we may have recorded things on Montserrat that are also found on St Kitts and Nevis, but we will not be able to compare until there is more collecting on those islands. Montana State University now has a lot of material from St Kitts and Nevis as part of a project funded by the UN, but this information has not been analysed and will not be for some time! Getting it worked up is going to take years. However, it will be much easier because we have the inventories of Montserrat and some other islands to compare and fit things into. About

20% of material from St Kitts & Nevis has been analysed but, looking at it and at the forest, it has been devastated by monkeys and so there is likely to be far fewer species than in Montserrat. The bromeliad plants have been ripped out. Normally, there would have been such epiphytes (plants which grow on others, for structural support but not parasitically) everywhere, including orchids at the mid-elevation level. However, all that can be seen are tree branches and sky.

For interest, green monkeys were introduced from Africa about 400 years ago. As long as the sugar production was going, the sugar companies were controlling the monkeys. Sugar production ended in 2005, but now nobody is doing anything about monkeys, which are having a devastating impact on the natural environment. It is very likely that, after this analysis is complete, there are going to relatively fewer species beetle species

on St Kitts & Nevis, compared to Montserrat, but this work will take time.

Dr Ivie explains that: "It's like a jigsaw puzzle with 20%-50% of the pieces missing. Montserrat is ahead of everyone except Guadeloupe."

One of the reasons for this is because the first species recorded for Montserrat was in 1893. However, up until very recently (1998), there was virtually nothing further collected. The effects of this

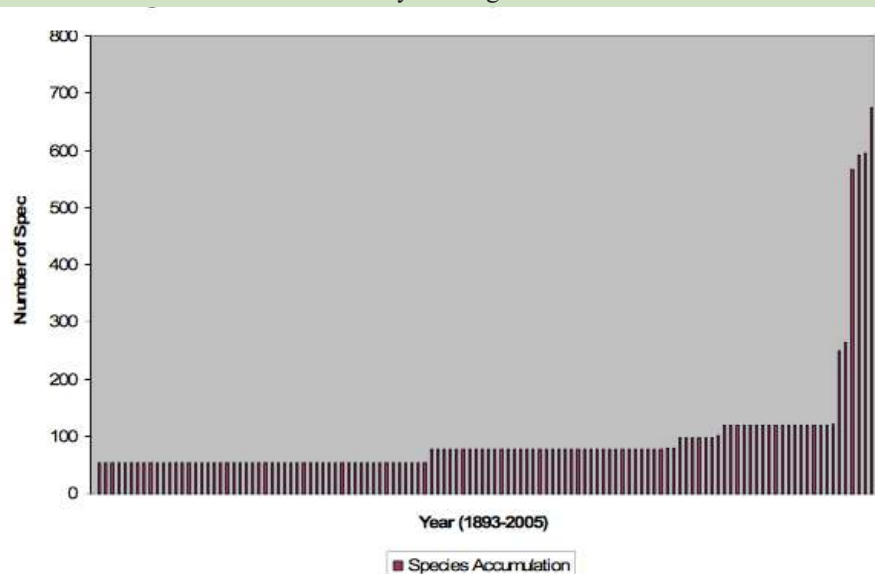


Fig. 4.10. Accumulation of beetle species discovered on Montserrat from 1893 to 2005.



can be seen in Figure 4.10, taken from page 68 of the 2005 report, to which reference was made above. Our knowledge of Montserrat's beetle fauna is all post-2000 really. One can see when that project started. The number of species went from 250 to 700. Some species are not shown in the diagram because we do not have the year they were collected. Whenever we are doing anything like this, we always have missing data because so many of the species are only known from one specimen.

Figure 4.9 (to the right, also taken from the 2005 report) shows the number of species we have with only single specimens or 'singletons'. This is a structural problem of data: if one has only one specimen, it is known only from one place. Therefore, these do not get counted as

endemics as how would one know it is an endemic if there is only one? A second specimen could come from, say, Trinidad, but we do not have a second collection. We can deal with only those 350 species from the left of the graph, for each of which we have many specimens.

The number of island endemics for Montserrat is likely to increase with further knowledge, but this will take time. It takes other work on other islands as well, and so it will always be a work in progress. It is such a large pool of information. The natural world is big – fortunately!

Unfortunately, addressing this challenge is not helped by the way in which project grant-funding operates: with a beginning, middle and end. The tenebrionid genus *Cyrtosoma* was collected in 1893 and no one has ever worked with it before. It has been waiting for a specialist to look at it. Now there is a graduate student at Montana State University looking at it. None of us will live long enough for all the questions to be answered. It is not going to happen, but that does not mean we do not continue to work on them. We must use the data we have and keep improving and expanding the data-set.

What do we know spatially about the data? We are missing a huge amount of information about the south of Montserrat, the whole south side of the Centre Hills, upper mid-elevations and high elevations, e.g. Katy Hill, the Silver Hills because it has been so badly eroded, and beach areas in the north. Further sampling could take place here for a more complete picture. At the higher elevations, we may be able to look for indicator species of climate-change over time, but also other interesting questions such as how can that same elevation on Katy Hill compare with the area in the south? There are areas in the south as high as Katy Hill, but the structure of the vegetation is different as this area is more protected from the elements. We have a wind-blown dwarf forest. The area in the south is protected by Gages Wall. So, does Katy Hill have specialised things for a dwarf wind-blown forest or is it a disproportionate representation of what is happening in the south? Perhaps Katy Hill has more species present because it was not entirely destroyed by the volcano? The south may have all recent species. We do not know the answers at this stage, but we are starting to know some of the questions to ask. We hope and plan to be back when resources (which we and UKOTCF are always seeking) allow.

### Impressions from June 2017 visit

Overall, during MSU's trip in June, they did not see any cause for concern yet, but this could still come up while analysis goes on. Montserrat is, fortunately, in relatively good shape in terms of invasive species of beetles, but the agave weevil is going to

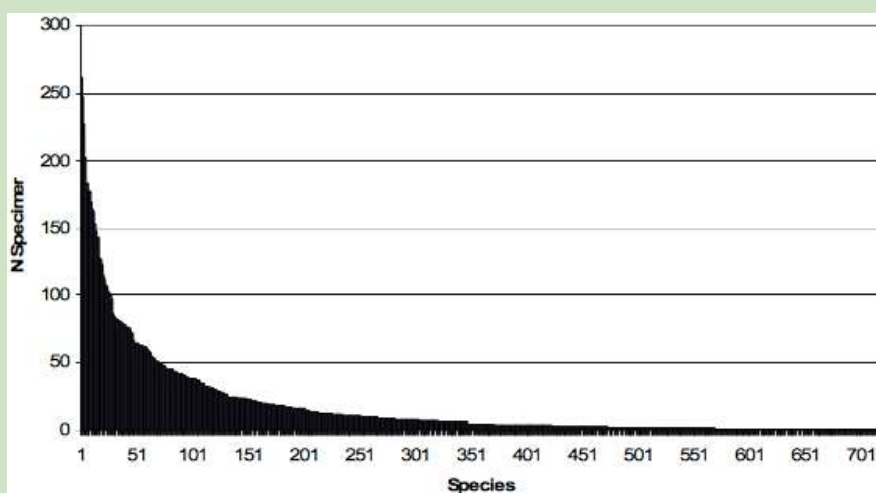


Fig. 4.9. Abundance of each species in the data set.

get to Montserrat sooner or later. All of the agave in the north is going to go if it is not kept out. It is found in the Virgin Islands and Anguilla. People there did not want to use slow growing native agave, and so brought in other species from Florida. The weevil got to Florida from Mexico, and so it has moved around the Caribbean in these horticultural plants.

The MSU team are most interested in endemics no one has seen before. Exotic species that are invasive species (brought in by humans and threatening the native species) are equally important, but negative. Where we should be looking are Silver Hills, where so much is devastated by over-grazing and there is so much invasive plant life. In the south, the ash-flows have stopped for now at least, and things have started to recover. Those areas are very susceptible to invasive species, because some of their characteristics are that they are good colonizers and rapid reproducers. We have not been able to study anything in those areas.

Mike concluded that Montserrat is still rich in biodiversity saying: "It is off the scale, and we have no explanation for that."

### Regional context

Dominica is very intact, in terms of vegetation cover and biological richness. It has been well studied. For example, it has had the Bredin-Archbold-Smithsonian Biological Survey, several expeditions from the British Museum, and MSU have been there several times. Dominica has 64 species of bark beetle. It has 10 times the vegetated area of Montserrat. Therefore, a much larger species number than Montserrat would be expected. However, tiny Montserrat has 60 species of bark beetle. That is too many on these assumptions. This is found time and again in all kinds of beetle groups. That makes it more biodiverse than anything would predict. We cannot come up with an explanation.

Dominica has a higher elevation than Montserrat and so would expect more species. It is also closer to South America, from where species tended to spread as the younger volcanic islands of the eastern Caribbean were formed in geological time. So one would expect during the Pleistocene geological period, the farther north, the more depauperate (or less variety of species). However, when compared to Dominica, Montserrat is much richer than one would expect on this model.

Possibly, Montserrat has retained habitat during the successive volcanic eruptions while perhaps those eruptions on Dominica were more extensive. Undoubtedly, Montserrat has lost species since the settlement of man and Europeans, but has retained many more than we would expect from neighbouring islands. So far, we have no definite explanation.



# Environmental Education

From 1st to 15th December 2017, the Montserrat National Trust invited students from schools across the island to take part in educational activities at the Trust and its surrounding gardens. The Trust has many projects on-going at the moment, including this one, and so it was an opportunity to showcase several of these to the children of the island. Four classes from 1st and 2nd forms of the Secondary School started off the activities on the first day. Students were given an opportunity to learn about the islands' endemic species and the importance of protecting them.

They took part in a quiz and they watched a video on Montserrat by Stewart McPherson, author of *Britain's Treasure Islands* – a book highlighting the UKOTs. UKOTCF gave huge amounts of time to Stewart to help him write his book, which covers all of the UKOTs. UKOTCF also helped him to secure some funding from Kickstarter to produce the open access mini-documentary on Montserrat as well as others, including some with a thematic focus, in order to produce a range of education material.

Nicolas and Mappie taught each student to propagate one of Montserrat's endemic species, the pribby *Rondeletia buxifolia*. The students will return in a few months time to collect their plants, which they will then plant at school or at home, thus doing their bit for conservation on the island, by maximising the area where pribby is found. There should be no reason why pribby should not be seen across the whole island, where it belongs.

Students were rewarded at the end of the day with an oriole pin presented by MNT Clerical Assistant, Dyan Archer. In giving feedback on the sessions, the teachers thought that the time was well spent and that they found the exercise to be informative and well organised. They also looked forward to it becoming an annual event.

Overall, 332 students attended in groups of about twenty students. Schools included: Montserrat Secondary School, Look Out Primary School, St Augustine Catholic Church, Lighthouse Academy and Brades Primary School. This was an excellent turn-out, and MNT did very well to engage with the schools to make this happen.

Meanwhile, in Nottingham, UK, UKOTCF's Catherine Wensink presented the project to St John's CofE School, during their Science Week, which this year was based on conservation. The whole school was present for the assembly, which included around 90 pupils with range of ages from 5-11. They enjoyed very much learning about the oriole and the new fly discovered on Montserrat (see article on pages 1-2). One of the year-one pupils (around 5 years old), on walking out of the room made a promise to look after nature, so the inspirational message appears to have worked! The children are entering a poster competition, which will give them a chance to incorporate what they have learned throughout the week.



Views of the school students and their MNT tutors at the MNT's Botanic Gardens, 1- 15 December 2017. Photos: Montserrat National Trust



# Alien invaders!

Addressing the challenges posed by alien invasive species forms key parts of several elements of our current project. Unlike the science-fiction movies, the alien plant and animal species threatening rare native species and ecosystems are not doing so under their own master-plans. They are the result of unwise or unintended actions of humans. So, we have some responsibility to address these issues.

Here, we report first a new invader and another potential one, and then a possible approach to addressing one already here but now posing a serious threat.

## Flowerpot snake a new invasive for Montserrat?

New species keep arriving on Montserrat. In April 2017, as was noted in a previous edition of this newsletter, an unidentified specimen of blind-snake was found close to the Belham River. It differs from our endemic species, the coffin borer *Antillotyphlops monastus*, in size and colour (see images). Staff of the Montserrat National Trust have identified it as “probably *Indotyphlops braminus*”, a species from India which is spreading all over the



Above: endemic coffin borer blind-snake *Antillotyphlops monastus* (this individual about 28 cm long); below: head of alien, potentially invasive blind-snake, probably *Indotyphlops braminus* (with millimetre scale). Photos: Nicolas Tirard, Montserrat National Trust.



world linked to the plant trade.

After reporting this to the Department of Environment, the specimen was given to a team from Bard College (Simon's Rock, Massachusetts) visiting the island, for it to be identified formally. A paper is currently being written by Robert Schmidt,

from Simon's Rock to report the presence of this new potentially invasive species on Montserrat. It is unclear if this new species will have any detrimental impact on the native fauna. It is, however, a possibility, as the invader feeds on the same prey as our endemic species and can therefore possibly out-compete it. Only time will tell.

This snake is very interesting indeed, as it is one of the few parthenogenetic vertebrates. The population consists only of female individuals, able to lay eggs without fertilisation. This characteristic makes it very efficient as an invasive species, as the introduction of a single individual can very quickly lead to the establishment of a new population. Add to that the fact that it is a subterranean species, often hidden in flower pots, and one will understand why it is now one of the most widespread reptile species in the world. It also shows how important biosecurity is for a country.

In Montserrat, importation of soil is now forbidden (plants need to be brought bare-rooted). It is important for people to realise that this is the best and cheapest way to avoid biological invasion. This time, a minute and shy blindsnake has been introduced, but next time it might be a venomous species. Fire ants were absent from Montserrat before the volcanic eruption. This aggressive and painful species probably arrived on our shore the same way the blindsnake did about a decade ago, via Antigua. They not only have an impact on human well-being, but also on wildlife; fire ants attach to eggs and hatchlings of ground-nesting species on Montserrat. This would include the sea turtles that visit the island to nest.

The team talked more about the threat of invasive species and the way in which the local community can get involved in the Trust's activities on the Culture Show with Rose Willock on Saturday 24th March: <https://montserratradioecho.wordpress.com/2018/03/24/saturday-march-24-2018-the-cultural-show-pre-show-youth-interviews-with-rose-willock/>.

## Antigua lethal yellowing of palms

Another example of damage caused by an invasive species is visible on our neighbour island. Antigua has been contaminated by a disease called “lethal yellowing” affecting the palm trees. This disease, which is caused by a phytoplasma, a bacteria-like organism, but spread from one palm to the next by an insect, has



*Cocos nucifera*: (left) healthy; (right) leaf yellowing symptoms due to lethal yellowing. Photo: N. A. Harrison



been introduced on several Caribbean islands through the palm trade and is currently threatening to kill most of the coconut trees and some other ornamental species as it spreads throughout Antigua.

It is important for people in Montserrat to be vigilant and not to allow a single palm tree to be imported from Antigua, as it might carry the disease and cause irreversible damage to our island's native palm species, many of which are vulnerable to extinction because of their small populations (see article on broom palm in the *Did you know?* series in *SoS Nature of Montserrat* issue 4).

### A practical solution to other invasives: “uprooter” to rid the island of rubber vine

An inhabitant of Old Towne, Lawrence Hurley, who has worked in different plant nurseries in Texas and Maryland in the US, has offered some advice on how to remove some of the invasive species present on Montserrat. He has been active in a couple of volunteer groups in the US, who give their time in order to remove invasive alien species from sensitive ecosystems. He understands the impact they can have, and would like to help in Montserrat too.

His main concerns lie with the rubber vine (purple allamanda, *Cryptostegia madagascariensis*), which has become very visible especially in the Silver Hills and north of the island (see photo on page 10 of *SOS Nature of Montserrat* 5), and the neem tree *Azadirachta indica*. Two different approaches have been suggested:

- 1) use of a herbicide to treat the stump after cutting it;
  - 2) use of a mechanical tool called an “uprooter”, allowing the removal of small to medium plants entirely.
- Option 2 might be suitable for the rubber vine, but this will take considerable effort and time to create a dent in the population.

Larry spends only part of his time in Montserrat, but was on-island in late March and early April. Nicolas Tirard worked with him in this period and reports that the uprooter works well for shrubs up to about 1-2 inches in diameter, so that it should be to deal with most invasive purple allamanda plants. Larry has kindly loaned the device to MNT for further testing.



Above: “Uprooter” tool. Photos: [www.theuprooter.com](http://www.theuprooter.com);  
below: in operation by Larry Hurley in Montserrat.  
Photo: Nicolas Tirard

## Nursery update

On Friday 16 March 2018, the first pods of the Montserrat orchids reached maturity. Three pods were cut open under sterile conditions and the seeds sown on agar on an asymbiotic medium in sterile flask. Antony Tangkai, visiting from the Trinidad Horticultural Society, was here to oversee the operation. Germination is expected in the next couple of weeks.

If germination is successful, more seeds will be collected and planted in the coming weeks, and we look forward to the transplantation phase, which should occur in May, with deflasking scheduled for October. The ultimate aim is to release the endemic orchid seedlings in the open, before reintroducing them into the wild.



## Further integrating the natural environment into physical planning

In an earlier stage of our project (see *SOS Nature of Montserrat* 3, page 7), international environmental and social planning specialists, Dr Jo Treweek and Ms Jennifer Hruza, advisers on environmental audit to the World Bank and other international banks, donated their skills to work with Montserrat Physical Development Authority and others to identify ways of even more integration of the natural environment and physical planning.

In the last visit of the present project, UKOTCF's Dr Mike Pienkowski is working with Minister of Environment Hon. David Osborne, his senior officials in Physical Planning, Ms Lavern Ryan, and Environment, Ernestine Corbett, as well as Mr Nicolas Tirard, MNT, to arrange further implementation of the recommendations of Jo and Jennifer.

## SOS Nature of Montserrat team on Montserrat Radio ZJB

Now a regular feature during UKOTCF's visits to Montserrat, members of the project team Mike Pienkowski (UKOTCF) and Nicolas Tirard (MNT) again joined Rose Willock for about an hour of discussion on her Saturday morning show on ZJB Radio on Saturday 24 March 2018.

The discussion of about half an hour can be heard at <https://montserratradioecho.wordpress.com/2018/03/24/saturday-march-24-2018-the-cultural-show-pre-show-youth-interviews-with-rose-willock/>.



## New habitat map informs future of the South (and the North)

In *SOS Nature of Montserrat* 5, page 10, we recalled some of the work initiated by the UKOTCF/MNT project on satellite mapping, and the help being provided to JNCC and UK-based consultancy Environment Systems in undertaking further work in this area. The project's Nicolas Tirard has continued to help with this JNCC work and reports this here.

A first version of the habitat map of Montserrat has been produced using satellite data from the Pléiades system. This map allows the evaluation of the size of the different habitats of Montserrat, and their evolution over time. This first map can be updated each time new data are available. This could be new satellites imagery or when additional surveys are conducted.

On this habitat map, the island is divided into “polygons” based on the colour characteristics of the imagery. Each polygon represents a habitat type, based on similarity with places that were ground-truthed (*i.e.* actually going to a site to identify what is there).

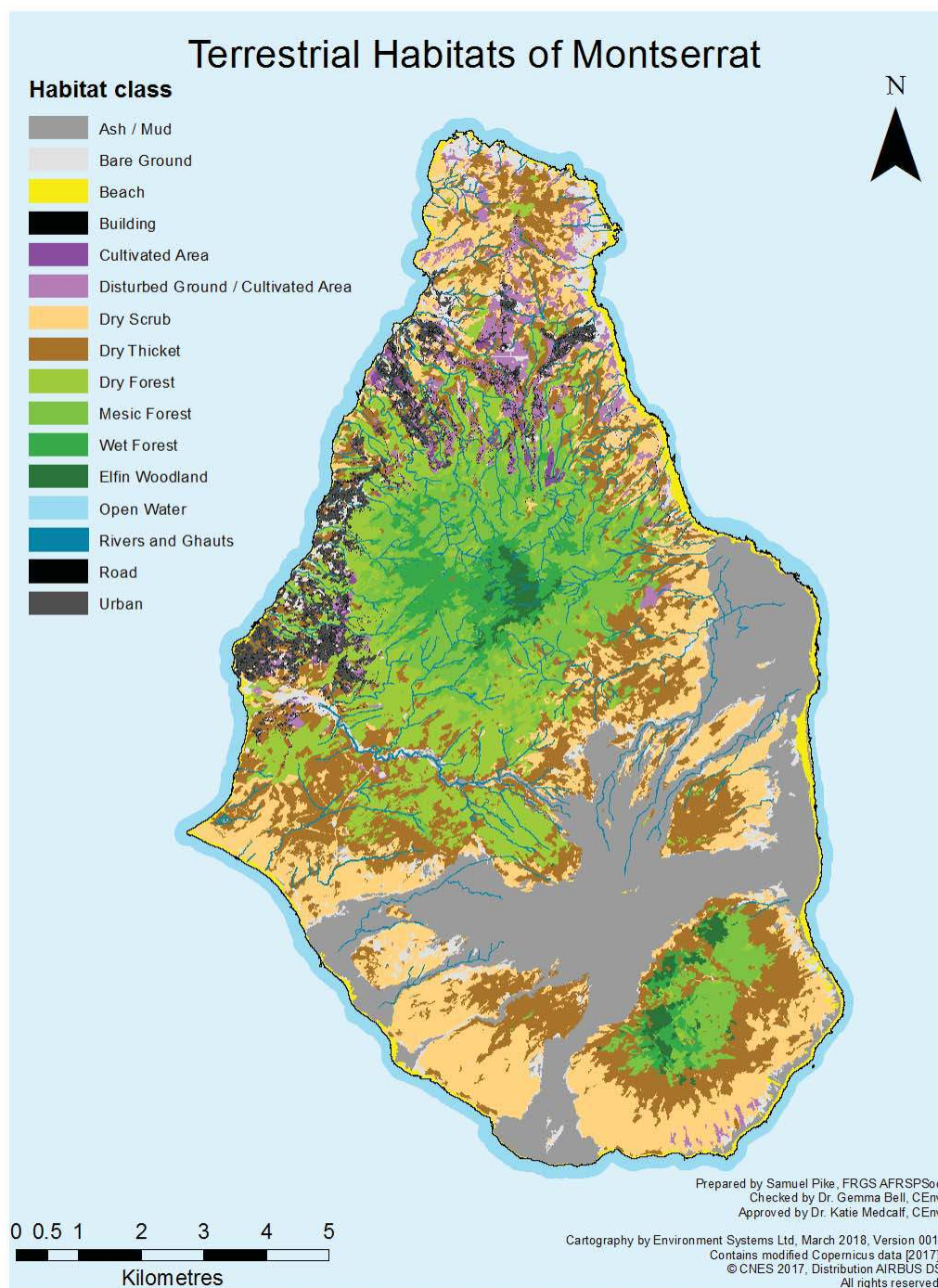
Some information displayed on the map was quite surprising in a way that was not easily explained (see map on next page). The canopy

cover was dramatically low or high on some of the polygons. As the information is geographically positioned, it is then easy to go to the location and assess the situation.

We have been to some of these areas and each one can be explained easily:

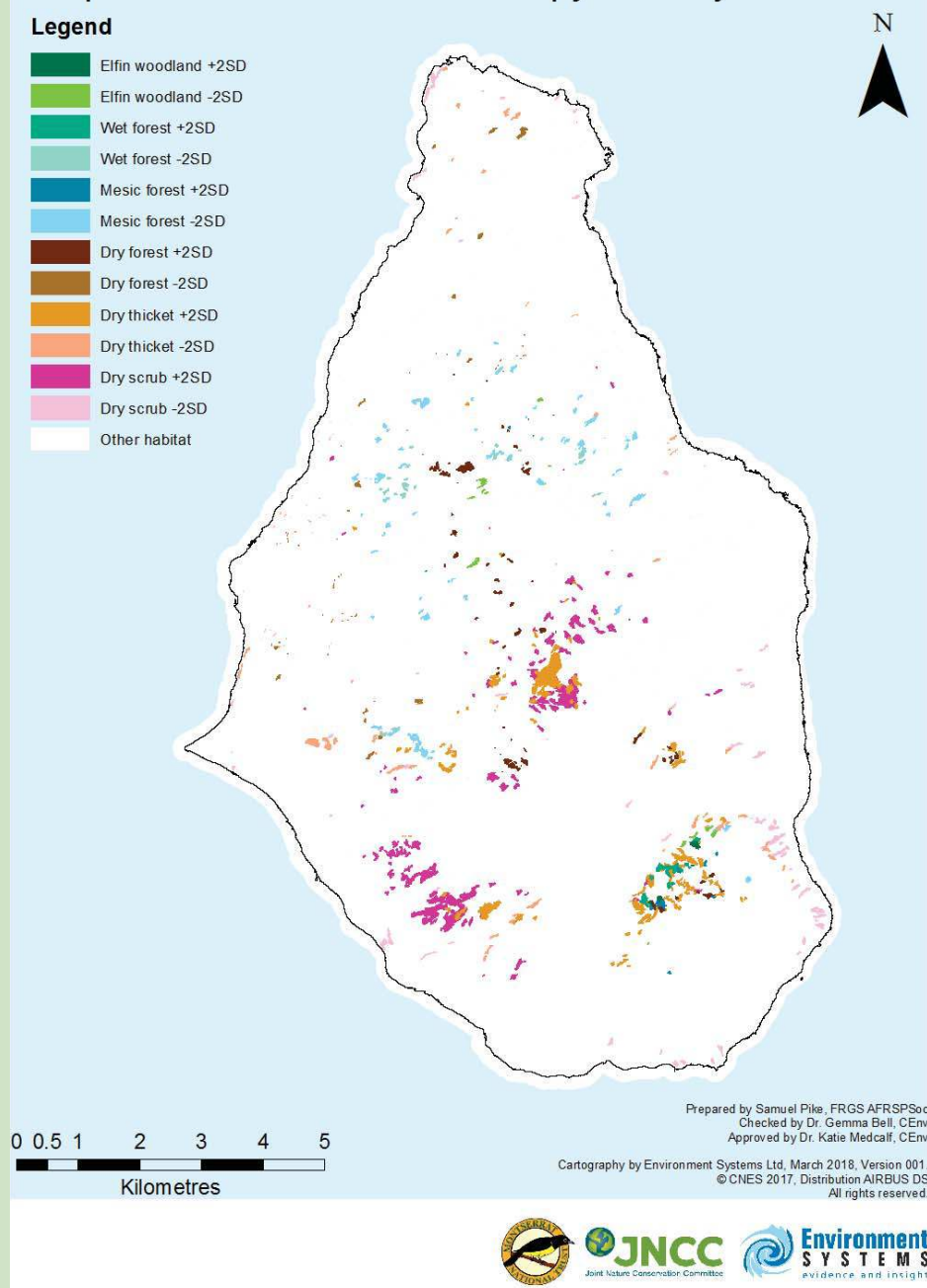
- Some are former agricultural plots, where tree cover has been removed several years ago and has not yet fully recovered;
- Some are areas heavily affected by the volcano, where vegetation would change very quickly from one year to the other;
- Some areas are recent development (agriculture in Cork Hill, geothermal drilling in St Georges Hill, housing development in Woodlands...);

This project reached an end on 22 March 2018, and the results have been handed by JNCC to the Government of Montserrat. The beautiful maps that have been produced will be displayed at the Montserrat National Trust after being printed locally.



## Spatial Metrics: Forest Canopy Density Outliers

"Outliers" in the analysis (see text on previous page).



Readers of these newsletters will remember about the series of workshops held by this project at the Montserrat National Trust to reach an agreement between the island stakeholders about how to manage the south of the island. During those workshops, James 'Scriber' Daley, from the Department of Environment's Forestry Section, shared his concerns that some of the ecosystems there were being damaged by feral animals (mainly goats, sheep and pigs). One of the problems he faced was that access to these areas was difficult, making it hard to follow up with the situation. Many stakeholders wanted to get some numbers related to the size of the habitats, and their evolution over time.

Now that a habitat map has been produced, facilitated through this project, further developing our initial satellite analyses reported earlier, we can continue to answer some of the questions stakeholders had, for example:

1. The map clearly indicates areas of main concern, the surface they cover, and reveals some potentially very interesting habitats that we did not know about. For example, according to the analysis, some parts of South Soufriere Hill look very much like the elfin woodlands of the Centre Hills. It is not known if this is really an elfin woodland or something entirely different, as more exploration is needed.
2. The map can be updated when new satellite images are available, allowing for a remote-sensing assessment of the different habitat areas over time. It will therefore be possible, in the coming years, to follow trends and to assess if a specific habitat is at risk of extinction or not.
3. The analysis shows that the vegetation cover of some areas directly affected by the volcano is changing very quickly. There is an opportunity to study this "recolonisation process".

We are just starting to use this information, and it is already clear that it will be very powerful!

## Did you know...?

### Phasmatodea in the West Indies

Most people erroneously believe that a small island like Montserrat must have a limited number of species, and that they are probably all well known. Readers of this newsletter, especially those who attended last year's presentation by Dr Mike Ivie, already know that the first part is wrong. Montserrat has more than 800 beetle species on 100 km<sup>2</sup>. The second part of this sentence is equally wrong. In fact, most of the fauna of the island remain poorly explored.

This includes a popular group of insects: the stick insects. Many species belonging to this group are endemic to one or several islands in the Caribbean but, whilst the nearby islands of Guadeloupe and Dominica have been extensively surveyed, no information has ever been published about those animals on Montserrat. As far as we know, ten species are found in Guadeloupe, eleven in Dominica, and only one in Montserrat. This low number is a strong indication that we need to do more work on this group in order to gain a better knowledge of our biodiversity! We may well have many more species new to science in our backyards. *Photo: Catherine Wensink*





## *Adopt a Home for Wildlife* progress at Old Road Bay

As reported in *SOS Nature of Montserrat 4* (pages 8-9), local entrepreneur and contractor, Dwayne Hixon, expressed the wish to “adopt” the site of Old Road Bay as part of this project, as soon as he was granted access to it by the authorities. His plan is to develop the site in a naturally sustainable way. The site is 19 acres of new land that has been gained from the sea through the activities of lahars (water-borne flows) of volcanic material over the last ten years. The substrate is very poor, consisting mainly of sand, rocks and gravel, and has been heavily colonised by pioneer and invasive species, such as acacias and *Casuarina* pine.

The first part of the work done by Dwayne consisted of removing most of the ash and the invasive plants such as the *Casuarina* pine. This allowed him to have a better understanding of the topography of the new lot. Considering this, he decided to divide the area in three zones, to reach the best possible combination of natural, aesthetic and financial value for the new land.

### **1. Beach bar / restaurant with landscaped ground (2 acres)**

This area to the north of the lot should be protected from most of the lahars by being outside of the natural flow of water running through. The plan is to build a restaurant near but back from the beach, with a naturally landscaped playground. The restaurant will be located far enough from the water-front to avoid



*Above: pipes (which will eventually be cut off near ground level) will be concrete-filled to provide a foundation for the bar and restaurant. Below: View to show how far the building (at right of picture) is set back from the beach, both to protect nesting turtles and to minimise risk during storms. All photos in this article: Dr Mike Pienkowski*



disturbing turtles nesting. In addition, lighting will be designed to minimise risk to the turtles.

A parking area will be built landward of it, to prevent cars from going on to the beach itself. A stone flower-planter will be built within the parking area and will act as a barrier to potential future lahars. It is intended that this long planter (about 6 feet by 100 feet) will be used to display native and/or endangered attractive plants, such as pepper cinnamon, ovetop palm and broom palm.

### **2. Golf course, with some ornamental trees (around 17 acres)**



*Dwayne Hixon, Nicolas Tirard (MNT) and Mike Pienkowski (behind camera; UKOTCF) discuss the plan, while looking, from near the planned building, over the wetland area to the golf course.*

Most of the surface of this new development is intended to become a golf course. (The old golf-course was slightly upstream in the Belham Valley and is now covered by several metres of volcanic material.) It is currently covered by grass that arrived naturally and managed to grow on the very poor sandy soil with no extra watering. This will be kept, as it minimises the cost and negative environmental impact of fertilising and watering plants not naturally adapted to local conditions. Some existing trees have been kept to help stabilise the soil and provide some shade, and it is the intention of Dwayne to replant more native ones, with good ornamental properties, such as the saman, white



*Foreground and below hill: the start of appropriate tree-planting to protect the site (see text)*



cedar and gum tree. The project's native plant nursery at MNT's Botanic Garden will provide seedlings.

On the east side of this development, along what used to be the coastline, but is now at the inland side, a line of strongly rooted trees will have to be planted, and discussions are underway with MNT to determine the best option.

### 3. Restoration of a wetland area (size will vary naturally, about 1 acre)

One of the good environmental surprises of this development will be the attempt to restore a pond area between the two zones described above. (See also *SOS Nature of Montserrat* 5 (page 12) where Mike Pienkowski (whose early career was as a shorebird biologist) described some of the water-birds visiting the site on migration in November 2017.)



*The hollow which has been made to hold water for wetland birds and other animals during wet periods is on the right.*

When excavating, Dwayne realised that the natural flow of water running through the Belham River when there is heavy rain goes though the north part of the adopted area, along the (largely buried) former jetty at Old Road Bay. Instead of fighting nature, he took the decision to work with it, and to restore a functioning wetland, that will act as a buffer in case of flooding. He is leaving part of the old jetty exposed, both for its historic interest and as a



*The highest part of the exposed old jetty is in the foreground. This slopes down before being covered by unexcavated volcanic material at the back in the middle ground (with the planned golf course on the flat area beyond). The lower part of the jetty was for the police boat, and will now form the low weir holding back shallow water to the left (east) in wet periods - see text.*

sort of weir to hold back some of the water when the water-table is high enough to form temporary pools on the surface.

This decision not only makes sense economically (it is the cheapest option to protect the investment in the restaurant), but it is also a way to recreate a habitat, coastal ponds, that has been almost entirely wiped out of Montserrat following eruption and human development in the north.

We all look forward to the success of this project working in harmony with the natural environment, and wish Dwayne success.



*View from the hill at Old Towne down the road to the site, with the pond hollow between the trees almost in line with the road, and the planned golf course to the left in front of the sea.*

## Bad news from UK Government's Darwin Plus programme

In *SOS Nature of Montserrat* 5, pages 8-9, we described the large amount of work undertaken by project partners and additional ones to work up and submit a proposal to Darwin Plus to build on the exceptional success of this project over the last two years (plus its preparation time), to move to the next stages necessary for effective conservation in Montserrat. The partners were therefore very disappointed to hear that the proposal for funding was unsuccessful. The disappointment was all the more intense because the feedback from the Darwin Plus panel made it clear that they understood neither the application nor Darwin Plus's own instructions, but took no efforts to enquire before taking their decision.

Nevertheless, the project partners are continuing to look for alternative funding sources, and will certainly continue the work, although it will, at least temporarily, be at a lower intensity than it warrants.

Among other aspects, this newsletter series will also continue, as will the *Adopt a Home for Wildlife* initiative and the *Montserrat Virtual Museum of Natural History*.