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Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

Important note *To be completed with reference to the Reporting Guidance Notes for Project Leaders:
it is expected that this report will be about 10 pages in length, excluding annexes*

Submission Deadline: 30th April 2017

Darwin Plus Project Information

Project reference	DPLUS037
Project title	Conserving the genetic diversity of St Helena's threatened endemic flora
Territory(ies)	St Helena
Contract holder institution	Royal Botanic Gardens, Kew
Partner institutions	St Helena Environmental Management Division (St Helena Government)
Grant value	£69,247 (£7,910 2016/17)
Start/end date of project	1 April 2015 – 31 September 2017 (six month no cost extension to the project approved by Darwin)
Reporting period (e.g., Apr 2016-Mar 2017) and number (e.g., AR 1,2)	April 2016 – March 2017 AR2
Project leader name	Thomas Heller
Project website/blog/Twitter	https://storify.com/KewUKOTs/conserving-the-genetic-diversity-of-st-helena-s-th
Report author(s) and date	Thomas Heller, Marcella Corcoran, Vanessa Thomas-Williams

1. Project overview

This project is focussed on the conservation of the threatened endemic flora of St Helena in the South Atlantic Ocean, an isolated island more than 1000 miles from the coasts of Angola and Namibia.



St Helena is home to 45 endemic higher plant species, many under severe threat of extinction, with at least ten with fewer than 100 plants remaining in the wild, and several more with fragmented, small or declining ranges. *Ex-situ* material (banked seeds, plants in cultivation) are an important resource for conservation activities in St Helena, being used as a source of plants for habitat restoration and species reintroductions, as well as providing long term security for genetic diversity where the outlook for individual wild populations is uncertain. This project is seeking to improve the representation of the threatened endemics in *ex-situ* collections through a gap analysis of existing *ex-situ* collections, capacity building in seed conservation and horticulture (training and equipment), and collecting and banking seeds and spores of endemic plants.

2. Project stakeholders/partners

The Environmental Management Division of the St Helena Government has responsibility for effective management of the environment on the island, including its plant life, and is therefore the principal stakeholder and partner in this project. Much of the capacity building and activities are focussed on the teams working within EMD. The project proposal was developed in direct collaboration between Kew and EMD from the outset.

The principal activities for this second year of the project have been developing *ex-situ* collections of St Helena's endemics (Activities 3.1-3.5), as well as surveying inaccessible localities by quadcopter drone (Activity 1.3). Largely due to the relative unpredictability of the timing of plants setting fruit, but also St Helena's isolation and consequent expense of travel from the UK, this activity is one that is undertaken solely by in-country staff of the EMD this year. With extensive experience of working with the endemic plants in the field, along with data mobilised through the gap analysis (Output 1, <https://goo.gl/T4RY7a>), EMD staff are well placed to undertake monitoring and day-to-day decisions on targeting plants for seed collecting. Nevertheless, Kew staff have been available to respond to any technical queries and provide advice where required, such as handling fern spores. The main challenge in this regard is that any issues affecting team members has an impact on activities that is not easily mitigated. For example, a persistent foot problem experienced by Vanessa Thomas-Williams, requiring surgery, has severely limited her ability to undertake field work on the difficult terrain of the island. While her team are able to continue visits to the field, deployment of the drone is not easily delegated, as only Vanessa has the training and experience of using the quadcopter to date.

During Year 1 of the project, staff of the St Helena National Trust and the Landscape and Ecology Mitigation Programme participated in the in-country horticultural training delivered by Marcella Corcoran (RBG Kew). Horticultural support from Kew has continued in Year 2 of the project, with Marcella available to respond to requests for advice on managing horticultural *ex-situ* collections of endemic plants from SHNT and LEMP nursery staff.

3. Project Progress

3.1 Progress in carrying out project Activities

Activities 1.1 (compiling data), 1.2 (gap analysis and collecting targets), 2.1 (UK training for St Helena-based staff), 2.2 (in-country training for St Helena-based staff), 2.3 (procuring equipment) were all completed in Year 1 of the project and were reported in AR1.

Activities planned for this year of the project were 1.3 (surveying sites by quadcopter drone) and continuation of Activities 3.1 to 3.5 (monitoring target populations, making, processing, banking and shipping seed collections).

Activity 1.3 Key populations and remote locations surveyed by drone. Time has been spent by Environmental Management Division (EMD) staff gaining flying experience with the quadcopter drone. Two challenges have limited implementing this activity: the mobility of a key team-member (see section 2, above); and suitable weather conditions, with exceptionally still conditions required for flying in the typically exposed sites of particular interest, where the prevailing wind speeds are close to the limit recommended for flying the quadcopter. Sites for surveying have been identified for survey in the coming months. See Annex 3.

Activity 3.1 Monitor target populations for availability of seed, & 3.2 make seed collections Members of the Environmental Management Division (EMD) team have been making regular visits to target populations across the island identified in the gap analysis and, while success has been met in locating target populations, few plants have been found to be in fruit. Rainfall over the last year has been unusually dry, with data from the Bottom Woods meteorological station indicating that rainfall for the 2016 calendar year was as much as 30% below the mean rainfall for the past 40 years, with only 1984 recorded as being drier. August 2016 was the driest recorded, 70% below the mean for this month. See St Helena Government announcements regarding the drought <https://goo.gl/BLWKeu>, <https://goo.gl/ijzhBs>, and copy of rainfall data supplied from Bottom Woods meteorological station <https://goo.gl/hqvBFq>. This lack of rain has had a marked impact on the flowering and fruiting of St Helena's endemic plants, with very few species yielding sufficient quantities of seeds for collecting. 11 collections have, though, been possible. These are (see also Annex 4):

Berula bracteata from behind High Peak, a species only represented by a single collection at the MSB from a different locality, and not banked before in-country.

Commidendrum robustum from Thompson's Wood Campground, one of the populations highlighted for targeting in the project gap analysis as not being duplicated at the MSB.

Carex diana collections from Longwood Barn and High Peak Dell, both of which are populations identified for targeting in the gap analysis.

Petrobium arboreum collections from High Peak and High Ridge, a species not previously banked at the MSB.

Pladaroxylon leucadendron collections from High Peak and Diana's Peak, a species not previously banked at the MSB.

Osteospermum sanctae-helenae from EMD's native plant nursery. Though cultivated, the provenance of these plants is a population now extirpated by the airport development.

Frankenia portulacifolia from Man and Horse Cliffs. Though not a target population, it is a significant collection in terms of quantity from a species which typically produces small numbers of seeds.

Commidendrum spurium from Mount Vesey, the only remaining wild population, and a significant addition to the *ex-situ* collections of this species.

Herbarium vouchers have not been collected, due to the small and vulnerable nature of the populations concerned. However, the experience of EMD staff working with all the endemic species gives confidence in their correct identification. Leaf samples collected in silica gel provide us with options for better understanding of the diversity and historical introgression of St Helena's endemics.

Activity 3.3 Dry and clean seed collections, & 3.4 bank seed collections locally All collections have been dried using a silica gel drum-dryer, and cleaned, using a combination of hand-sorting, sieving, and Agriculex aspirator, where appropriate, and moisture levels monitored using a TinyTag hygrometer probe. See Annex 3.

Activity 3.5 Ship duplicate seed collections to the Millennium Seed Bank Three of the seed collections made this year have been sent to the MSB. See Annex 5. A further batch of seed collections will be sent for duplication at the MSB in May with a resident travelling to the UK, with 8 collections made during the reporting period, as well as collections made during April 2017 (an additional 12 collections so far. These will be reported in the final project report). A final batch of material will be sent to the UK in the final month of the project.

3.2 Progress towards project Outputs

Output 1 Gap analysis and action plan

Aspects of this output relating to consolidating disparate data sources and undertaking a gap analysis were completed in Year 1 and evidence provided in AR1. See logframe presented in Annex 2. There are no further developments to report here, as planned.

Many localities on St Helena are challenging to access due to the difficult terrain, and are home to poorly-known, or indeed likely hitherto undiscovered populations of endemics. The use of a radio-controlled quadcopter is one solution to survey such areas, and a DJI Phantom drone was purchased for this purpose, and some training was provided to EMD staff in Year 1 (see AR1). A number of challenges has prevented deployment of the drone to the level intended at the outset, as explained in Section 3.1, above. The information gained through surveying using the drone will be used as an indicator of success of this aspect of Output 1 in the final report.

Output 2 Capacity building: seed conservation and horticulture skills and equipment

Again, the activities relating to this Output were completed in Year 1 of the project, and reported in AR1.

Output 3 *Ex-situ* collections

The development of *ex-situ* seed collections has been the main output planned for this year, with the number of endemic plant species with at least one new collection banked used as an indicator of success in delivering this output. For the project to date, new collections of 21 of the 45 endemic plants have been made (16 seed plants, and 5 species of ferns, see <https://goo.gl/73yHO5> for a list of endemic species and the numbers of collections made of each). Progress towards delivering this output has been severely set back by the drought experienced by St Helena over the past year, as explained in section 3.1, above. 22 species remain to be collected in the next six months. 2 species are not likely to be banked during this project: *Lachanodes arborea*, for which initial work suggest that its seeds do not survive drying (see Annex 3), and *Hymenophyllum capillaceum*, which has green spores and therefore not a good candidate for banking using conventional seed-banking protocols.

A further indicator of success towards this output is the size of collections made, with 500 seeds as a target. This indicator is a useful measure of success (larger collections permit greater use, such as in germination testing, research and propagation), though accurate seed counts are not easily achieved in-country, and the time-lag between receipt of collections at the MSB and availability of seed counts is rather long to enable full reporting during the lifetime of the project. 19 collections received at the MSB have been processed to date, data from which is presented (see <https://goo.gl/pAEW8T>). 14 of these collections are of more than 500 seeds

or spores (after taking into account that collections are split approximately 50/50 between EMD's collections and the MSB). Due to the minute size of fern spores, the MSB is only able to estimate numbers (as they do with orchid seeds). All fern collections have been estimated as consisting of more than 5000 spores. 5 collections fall below the threshold of 500 seeds, as a result of limited availability in the field, and are flagged for 'bulking up' through propagation of nursery plants. It is anticipated that figures will be available for all the collections made thus far in the project, but not those collected in the final months.

The genera known or suspected of hybridisation amongst the species in St Helena are *Trochetiopsis*, *Commidendrum*, *Berula* and *Wahlenbergia*. The collections of the first two genera have been from plants considered sufficiently isolated to preclude the possibility of hybrid progeny. The collection of *Berula bracteata* was made from a population where cross pollination with *B. burchellii* is a possibility, but unconfirmed. Collections of *Wahlenbergia* have yet to be made for this project. See Annex 4, and gap analysis (<https://goo.gl/Jvx4YH>).

3.3 Progress towards the project Outcome

“Output 1 will ensure that collecting is done in a targeted manner and thus new *ex-situ* collections will be a valuable addition to those already existing, capturing a greater range of threatened genetic diversity”. As previously noted (see AR1), the gap analysis is proving to be a useful exercise in directing collecting efforts for this project. Combining data from recent comprehensive field surveys with known *ex-situ* collections has been revealing. While it was known at the beginning of the project that EMD had amassed significant numbers of seed collections in their local seed bank, (of cultivated and wild origin), with very good coverage of the most well-known and largest populations, the gap analysis shows that for many of the endemics, a number of sites have not previously been sampled (see gap analysis <https://goo.gl/Jvx4YH>). These gaps should be high priorities for targeted collecting because, although few of the species have been the subject of genetic analysis, there is a strong likelihood that these isolated populations harbour genetic variation not present in 'core' populations. These gaps have continued to be addressed through collecting for this project. Most of the collections made this year have been from target populations (see Activity 3.1 in section 3.1, above).

As explained in Sections 3.1 and 3.2 above, full deployment of the drone has been limited, but it is anticipated that the final months of the project will see the drone used to survey some of the key sites identified, as EMD staff gain more confidence in flying the drone.

“Output 2 will ensure that conservation activities are carried out according to best practice during the lifetime of the project as well as building capacity for future conservation efforts”.

Partners have given feedback attesting to the usefulness of the training give (in the UK and in St Helena, covering topics relating to horticulture and seed conservation), with some examples of highlights and some examples of resulting improvements (see Annex 3) and a report on horticultural activities at <https://goo.gl/zg4OT1>.

With regard to horticultural capacity building, of particular note is the benefits gained by relatively new members of staff with comparatively little horticultural experience. Techniques deployed as a consequence have included trialling different mixtures of growing media, which have produced often dramatic differences in vigour; and the importance of structured monitoring and recording data, giving a basis on which to measure progress and improvements.

With regard to seed conservation, feedback has highlighted the value of being able to monitor seed moisture relations using a hygrometer and techniques to better manage drying collections. Partners have also provided evidence (Annex 3) of making good use of the supplied equipment, including the aspirator, used to separate seed material from debris, and the oven, used to recharge silica gel used to dry the seeds.

“Output 3 will ensure that the genetic diversity of St Helena's threatened flora is conserved for future generations and available for use in plant reintroductions, habitat restoration and research”.

As detailed in section 3.2, this is the outcome that has proven most difficult to make progress on during the past year, as a result of poor rainfall affecting the availability of seeds in wild plants. Nevertheless some significant *ex-situ* collections have been secured and now available for future conservation work, with the gap analysis providing a valuable baseline against which to measure success, with all collections filling an identified priority. Of particular interest are the spore collections made from endemic ferns, which have received little attention in *ex-situ* efforts in St Helena to date. These spores will form the basis of developing horticultural collections at Kew, and have highlighted the need for building capacity for culturing spores in-country, as has been achieved with success with ferns endemic to Ascension Island.

Nevertheless, much work remains to be done to achieve all that was planned to fully achieve this outcome. 22 species remain to be collected in the six months remaining of the project. Since late January, significant rainfall has resumed on St Helena, with the vegetation responding with new growth and flowering (see Annex 3). Indeed 12 collections have been made in April so far, including of 4 of the remaining 22 target species. Prospects of fully delivering Output 3 are good, though more work needs to be done to focus collecting on the more obscure populations described above, which will contribute more to the stated outcome, as these continue to be entirely absent from *ex-situ* accessions.

3.4 Project support to environmental and/or climate outcomes in the UKOTs

St Helena's National Environmental Management Plan 2012-2022 outlines 10 headline objectives. This project contributes directly to two of these:

"B. Enhance implementation of the NEMP through participatory planning, knowledge management and capacity building.": Use of the gap analysis is continuing to be of value in knowledge management and help identify priorities for conservation work. This project has included a significant element of capacity building through training.

"D. Safeguard St. Helena's environment, both terrestrial and marine, for future generations through effective environmental management including through improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity.": Not only do banking seeds in long-term facilities safeguard remaining genetic diversity, the material is of vital importance in the success of propagation, species reintroductions and habitat restorations all of which are part of safeguarding St Helena's environment.

The project is also contributing to commitments of the CBD, [Art.9](#) especially (*Ex-situ* conservation), but also [Art.12](#) (Research and training), [15](#) (Access to genetic resources), [17](#) (Exchange of information) and [18](#) (Technical and scientific cooperation); and directly to targets 8 ("At least 75 per cent of threatened plant species in ex situ collections..."), and 15 ("The number of trained people working with appropriate facilities sufficient according to national needs") of the [GSPC](#) and [Aichi target 12](#) ("By 2020 the extinction of known threatened species has been prevented...").

3.5 Monitoring of assumptions

Three principal risks were identified at the design stage of this project:

"Unusual seasonal weather results in poor seed production." This risk has come to bear in this past year, with exceptionally dry weather until late January (see Activity 3.1 in Section 3.1, above). The consequent poor availability of seeds resulted in the need to request a six month extension to the project, which has been granted.

"Quadcopter is damaged or lost in inaccessible location." This risk still holds true. Indeed, with gusting winds, caution against flying in difficult conditions has been exercised by partners. Additional practice will hopefully give the confidence needed to fly the drone in more challenging conditions.

"Injury due to difficult terrain." The original assessment of this risk is unchanged. That a number of target populations are in sites hard to access means that this risk remains a very important one to manage carefully. To access some populations is impossible with the

resources available to this project, while others may be accessible, but require careful assessment and planning.

4. Monitoring and evaluation

The first activity of this project to be completed was the data consolidation and gap analysis undertaken for Output 1. These provide a key baseline by which the ongoing collecting (Output 3) can be monitored, by the extent to which new collections fit the priorities identified. By comparing the range of seed collections banked by the end of the project with what existed at the outset we will have a good means of demonstrating an improvement in the range of material secured for future conservation work, an important outcome for this project. As already reported in previous sections, collections made to date compare favourably with targets identified in the gap analysis.

Partner feedback and reporting has given some indication of the effectiveness of the capacity building provided in year 1 (e.g Annex 3), though more detailed evidence of change would help to better demonstrate success in achieving the desired outcome. In view of this, a more structured questionnaire will be devised to aid partners in expressing improvements in methods and successes, such as ease of using new equipment, and information on seedling mortality.

5. Lessons learnt

One of the main pitfalls of the project design during this last year has been the extent to which the remaining activities are only undertaken by staff EMD in St Helena. While at Kew we are in regular contact to provide technical support remotely, there is little that can be done assist directly with practical activities. It would have been better, though expensive, to have had further visits to St Helena by Kew staff. Though this would not have helped especially with collecting activities, given the drought, assistance in deploying the drone and horticultural support may have been of benefit to delivering the outputs.

6. Actions taken in response to previous reviews (if applicable)

Queries raised in the review of AR1, are addressed here:

“Are there any contingency plans if the drone is damaged during flying?”: Spare rotors and rotor guards were purchased with the drone, as these are the parts most commonly damaged. Other spare parts and repairs are available in the UK if required, but may take some time due to the isolation of St Helena.

“Might drones be used to sample inaccessible plants?”: Certainly drones available currently aren’t capable of this. It is conceivable that drones could be modified to do this to some extent, but the variation in how seeds are presented in different species require dexterity and skill in order to not damage plants excessively.

Following Darwin guidance, the underspend in Year 1 was not available for use in year 2.

7. Other comments on progress not covered elsewhere

N/A

8. Sustainability and legacy

The project has been designed to have a sustained legacy. The exercise to bring together various data sources and produce a gap analysis will help our partners with planning conservation activities beyond the lifetime of the project. Likewise, the capacity building (training and equipment) enabled by this project will improve the management of seed and horticultural collections, improving seed viability and longevity, as well as the success and efficiency of propagation work. The resulting improvement in *ex-situ* collections themselves is intended to have a long-term legacy, in that it is specifically intended to prevent further loss of

genetic diversity from what remains of the endemic plant species, diversity which is key to their long-term survival.

9. Darwin identity

Due to the drought limiting collecting activities, it has been difficult to gather interesting results and stories to promote the project. With collecting activities resuming at an increased pace, and planned use of the drone, there will be more opportunities to assemble materials to promote the project and activities through social media and other outlets (EMD newsletter, local news, Kew blog).

10. Project Expenditure

Table 1: Project expenditure during the reporting period (1 April 2016 – 31 March 2017)

Project spend (indicative) in this financial year	2016/17 D+ Grant (£)	2016/17 Total actual D+ Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs			0%	
Consultancy costs	0	0	0%	
Overhead Costs			0%	
Travel and subsistence	0	0	0%	
Operating Costs			0%	
Capital items	0	0	0%	
Others (Please specify)	0			

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2016-2017 – if appropriate

Project summary	Measurable Indicators	Progress and Achievements April 2016 - March 2017	Actions required/planned for next period
<p>Impact</p> <p>The genetic diversity of St Helena’s threatened endemic flora secured as high quality seed collections in long-term storage, representative of wild populations. Capabilities of conservation staff in St Helena to monitor wild plants and manage <i>ex-situ</i> collections improved.</p>		<p>As a result of work on this project to date, it has been possible to secure new material of many of St Helena’s endemics previously poorly represented in <i>ex-situ</i> collections, where it is increasingly becoming apparent that genetic diversity is partitioned across population on the island, and bottlenecks are likely behind poor survival rates. Availability of material will further increase as the project progresses.</p> <p>Capacity building has improved the capabilities of conservation staff in St Helena to manage <i>ex-situ</i> collections, as well as raising awareness of the importance of conserving all remaining diversity of endemics plants, and not only those most easily accessed.</p>	
<p>Outcome Output 1 will ensure that collecting is done in a targeted manner and thus new <i>ex-situ</i> collections will be a valuable addition to those already existing, capturing a greater range of threatened genetic diversity. Output 2 will ensure that conservation activities are carried out according to best practice</p>	<p>Collections made for the project fill gaps identified in the gap analysis.</p> <p>Partners reporting improved results in managing horticultural <i>ex-situ</i> collections.</p> <p>All St Helena endemics with a range of seed collections banked in-country and duplicated at the MSB. Ferns with spores stored at</p>	<p>The gap analysis is proving to be a valuable tool in planning collecting, with most of the collections made to date having been made from populations identified as part of that exercise.</p> <p>Partners have given feedback attesting to the usefulness of the training given (both in seed conservation and horticulture), with</p>	<p>Priorities for the six months granted as a no-cost extension to this project are:</p> <p>Make full use of the quadcopter drone to survey key difficult to access areas for endemic plants.</p> <p>Target endemic species for which no collections have been secured during the course of this project.</p>

<p>during the lifetime of the project as well as building capacity for future conservation efforts. Output 3 will ensure that the genetic diversity of St Helena's threatened flora is conserved for future generations and available for use in plant reintroductions, habitat restoration and research.</p>	<p>the MSB.</p> <p>Quality of banked seed collections high.</p> <p>New seed collections being used for propagation in local native plant nurseries.</p>	<p>particular highlights, and some examples of resulting improvements. See Section 3.3 of this report.</p> <p>Though progress towards securing collections of all St Helena endemics has been limited by the drought, some significant collections have been made over the past year. See Section 3.3 of this report.</p> <p>Initial processing data from the MSB suggest good collections in terms of quantity. Where small collections have been reported, the constraints are clearly beyond the control of the collectors (e.g. very small populations, high proportions of empty seeds produced)</p>	
<p>Output 1. Gap analysis and action plan</p>	<p>1.1 Database of <i>ex-situ</i> collections (seed and living collections) and wild populations accessible in St Helena and Kew.</p> <p>1.2 List of species and populations identified for targeted collecting.</p> <p>1.3. Poorly known/inaccessible populations assessed using 'quadcopter' drone and data recorded.</p>	<p>This output was, for the most part, successfully delivered in year 1 of the project, and reported on in AR1, with evidence of indicators 1.1. and 1.2 provided therein. There are no further developments to report here, as anticipated. Gap analysis available here: https://goo.gl/Jvx4YH</p> <p>Indicator 1.3 remains an appropriate indicator, but difficulties in implementing Activity 1.3 has limited progress to complete delivery of Output 1 to date. See Section 3.2 of this report.</p>	
<p>Activity 1.1 Data sources from Kew and St Helena assembled, standardised and compiled.</p>	<p>This activity was completed in year 1, and reported in AR1.</p>		

Activity 1.2 Priority lists and collecting plans drawn up for all endemic species.		This activity was completed in year 1, and reported in AR1.
Activity 1.3 Key populations and remote locations surveyed by drone.		Practice flights made, but mobility of key team member and unfavourable conditions have prevented proper deployment. Sites for survey in remaining months of project identified.
Output 2 Capacity building: seed conservation and horticulture skills and equipment	<p>2.1 Two St Helena Government staff trained in advanced seed conservation techniques and propagation work.</p> <p>2.2 Equipped with 'quadcopter' drone to monitor and assess difficult to access plants, resulting in high quality population data.</p> <p>2.3 Equipped with vacuum cleaner, seed aspirator and drying oven for collecting and processing of seed collections. All seed collections cleaned in-country to a high standard.</p>	This output was successfully delivered in year 1 of the project and reported on in AR1, with evidence of indicators 2.1, 2.2. and 2.3 provided therein, the difficulties in deploying the drone notwithstanding.
Activity 2.1. Staff from St Helena to visit Wakehurst Place for seed conservation and horticultural training.		This activity was completed in year 1, and reported in AR1.
Activity 2.2. Staff from Kew to visit St Helena to deliver in-country training and collecting and horticultural support.		This activity was completed in year 1, and reported in AR1.
Activity 2.3. Procure equipment and ship to St Helena.		This activity was completed in year 1, and reported in AR1.
Output 3. <i>Ex-situ</i> collections	<p>3.1 All endemics represented by at least one new high quality seed collection, including bankable ferns.</p>	<p>Progress towards this output has continued, but severely limited by the unusually low levels of rainfall for much of the last year.</p> <p>3.1 21 of the 45 endemic plants are now represented by a new collection, 7 of these by two or more collections. Included among these are the</p>

	<p>3.2 All collections with more than 500 seeds. Where quantity not achieved constraints identified and plans to overcome in place.</p> <p>3.3 Species where hybridisation likely collected under controlled conditions.</p>	<p>spores of 5 species of endemic fern, previously not the focus of banking efforts to date.</p> <p>3.2 19 collections received at the MSB have been processed to date, data from which is presented (see https://goo.gl/pAEW8T). 14 of these collections are of more than 500 seeds or spores (after taking into account that collections are split approximately 50/50 between EMD's collections and the MSB). 5 collections fall below this threshold as a result of limited availability in the field, and are flagged for 'bulking up' through propagation of nursery plants.</p> <p>3.3 The genera known or suspected of hybridisation amongst the species in St Helena are <i>Trochetiopsis</i>, <i>Commidendrum</i>, <i>Berula</i> and <i>Wahlenbergia</i>. The collections of the first two genera have been from plants (some wild, some cultivated) considered sufficiently isolated to preclude the possibility of hybrid progeny. The collection of <i>Berula bracteata</i> was made from a population where cross pollination with <i>B. burchellii</i> is a possibility, but unconfirmed. Collections of <i>Wahlenbergia</i> have yet to be made for this project. See Annex 5, and gap analysis (https://goo.gl/Jvx4YH).</p>
<p>Activity 3.1 Monitor target populations for availability of seed.</p>		<p>Monitoring target populations has continued throughout the course of the year, with populations EMD team were unfamiliar with have been located. A number of populations are difficult or impossible to access.</p>
<p>Activity 3.2 Make seed collections, with associated data and voucher specimens, as appropriate to vulnerability of target populations.</p>		<p>Eleven collections of eight species of St Helena edemics have been made, along with data and leaf samples in silica gel. Herbarium specimens have not been collected due to the small and vulnerable nature of the populations concerned. 18 species remain to be collected in the final months of the project.</p>
<p>Activity 3.3 Dry and clean seed collections, using internationally approved protocols.</p>		<p>All collections have been dried using a silica gel drum-dryer, and cleaned, using a combination of hand-sorting, sieving, and Agriculex aspirator, where appropriate, and moisture levels monitored using a TinyTag hygrometer probe. This will continue as more seed collections are made.</p>
<p>Activity 3.4 Seal and bank seed collections in local seed bank.</p>		<p>When sufficiently dry, all seed collections are sealed in tri-laminate foil bags using a heat-sealer, and stored in a fridge with EMD. This will continue as more seed collections are made.</p>

<p>Activity 3.5 Ship duplicate seed collections to MSB.</p>	<p>Three seed collections have been duplicated at the MSB this year, with an additional 20 collections (12 of which were collected April 2017) due to be sent with a St Helena resident visiting the UK in May 2017. A final batch of material will be sent to the UK in the final month of the project.</p>
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Annex 2: Project’s full current logframe as presented in the application form (unless changes have been agreed) - – if appropriate

N.B. if your application’s logframe is presented in a different format in your application, please transpose into the below template. Please feel free to contact Darwin-Projects@tsi.co.uk if you have any questions regarding this.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Impact:</p> <p>The genetic diversity of St Helena’s threatened endemic flora secured as high quality seed collections in long-term storage, representative of wild populations. Capabilities of conservation staff in St Helena to monitor wild plants and manage <i>ex-situ</i> collections improved.</p>			
<p>Outcome:</p> <p>Output 1 will ensure that collecting is done in a targeted manner and thus new <i>ex-situ</i> collections will be a valuable addition to those already existing, capturing a greater range of threatened genetic diversity.</p> <p>Output 2 will ensure that conservation activities are carried out according to best practice during the lifetime of the project as well as building capacity for future conservation efforts.</p> <p>Output 3 will ensure that the genetic diversity of St Helena’s threatened flora is conserved for future generations and available for use in plant reintroductions, habitat restoration and research.</p>	<p>[Outcome-level indicators not part of original application]</p> <p>Collections made for the project fill gaps identified in the gap analysis.</p> <p>Partners reporting improved results in managing horticultural <i>ex-situ</i> collections.</p> <p>Quality of banked seed collections high.</p> <p>All St Helena endemics with a range of seed collections banked in-country and duplicated at the MSB. Ferns with spores stored at the MSB.</p> <p>New seed collections being used for propagation in local native plant nurseries.</p>	<p>Data for new collections available.</p> <p>Partners reports from nursery activities.</p> <p>Processing results from MSB database.</p> <p>Data for new collections available.</p> <p>Partner reports from nursery activities.</p>	

<p>Output 1 Gap analysis and action plan</p>	<p>1.1 Database of <i>ex-situ</i> collections (seed and living collections) and wild populations accessible in St Helena and Kew.</p> <p>1.2 List of species and populations identified for targeted collecting.</p> <p>1.3. Poorly known/inaccessible populations assessed using 'quadcopter' drone and data recorded.</p>	<p>1.1 Database accessible in St Helena and Kew.</p> <p>1.2 Targeting lists.</p> <p>1.3. Reports, publicity, e.g. newspaper reports, blogs.</p>	<p>Risk: Quadcopter is damaged or lost in inaccessible location</p>
<p>Output 2 Capacity building: seed conservation and horticulture skills and equipment</p>	<p>2.1 Two St Helena Government staff trained in advanced seed conservation techniques and propagation work.</p> <p>2.2 Equipped with 'quadcopter' drone to monitor and assess difficult to access plants, resulting in high quality population data.</p> <p>2.3 Equipped with vacuum cleaner, seed aspirator and drying oven for collecting and processing of seed collections. All seed collections cleaned in-country to a high standard.</p>	<p>2.1 Training reports, feedback from MSB staff.</p> <p>2.2 Database with population data. Habitat and population images.</p> <p>2.3 Kew's Seed Bank Database, with details of seed quality and cleaning undertaken.</p>	
<p>Output 3 <i>Ex-situ</i> collections</p>	<p>3.1 All endemics represented by at least one new high quality seed collection, including bankable ferns.</p> <p>3.2 All collections with more than 500 seeds. Where quantity not achieved constraints identified and</p>	<p>3.1 Training reports, feedback from MSB staff.</p> <p>3.2 Database with population data. Habitat and population images.</p> <p>3.3 Kew's Seed Bank Database, with details of seed quality and cleaning</p>	<p>Risks: Unusual seasonal weather results in poor seed production. Injury due to difficult terrain.</p>

	<p>plans to overcome in place.</p> <p>3.3 Species where hybridisation likely collected under controlled conditions.</p>	<p>undertaken.</p>	
<p>Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)</p> <p>1.1 Data sources from Kew and St Helena assembled, standardised and compiled.</p> <p>1.2 Priority lists and collecting plans drawn up for all endemic species.</p> <p>1.3 Key populations and remote locations surveyed by drone.</p> <p>2.1 Staff from St Helena to visit Wakehurst Place for seed conservation and horticultural training.</p> <p>2.2 Staff from Kew to visit St Helena to deliver in-country training and collecting and horticultural support.</p> <p>2.3 Procure equipment and ship to St Helena.</p> <p>3.1 Monitor target populations for availability of seed.</p> <p>3.2 Make seed collections, with associated data and voucher specimens (either herbarium specimens or photos, as appropriate to vulnerability of target populations).</p> <p>3.3 Dry and clean seed collections, using internationally approved protocols.</p> <p>3.4 Seal and bank seed collections in local seed bank.</p> <p>3.5 Ship duplicate seed collections to MSB.</p>			

Annex 3 – supplementary material



Report for DPLUS037 April 25th 2017.

Problem Specie *Lachanodes arborea*

We been monitoring the *Lachanodes arborea* (she cabbage) for many years. This specie now extinct in the wild, but we been propagating this specie by seed and cutting now growing in cultivation. Some times in a flowering season we can collect 100 to 1000 seed and other times no seed. However only few trees been producing viable seed.

Unfortunately, we can't store the seed as other Asteraceae species like *Melanodendron integrifolium* and *Petrobium arboreum* all grown in the same habitat. We used the same seed processing techniques as other species. I hope we can get help from Kew and MSB for this specie.

We did an experiment, stored the seed for six months and a year, out of 100 seed, no seed germinated. We also try leaving the seeds for three days in the drying room and then sow the seed, no seed germinated. To get a good result we germinate the seed as soon as we collect them from fresh, normally a day, germination rate is 100%.

Over the years last two years the trees been flowering, many flowers but the seeds are not viable.

Seed collecting in the wild

After the long dry period, St Helena started having rain since late January 2017 through February 2017 over this period of having rain the dryland annuals species started to germinate, this including *Osteospermum sanctae-helenae*, *Hypertelis acida*, *Chenopodium helenense*, *Hydrodea cryptantha* also the barn fern *Ceterach haughtonii*. Although we been collecting some of these species in cultivation from our living gene bank some of the plant populations are remote related species.

St Helena have seen climate change over the years which effected flowering seasons to all our endemic species, species flower and produce seed different times of the year. Most times we will start monitoring seed in the wild, timing the seed when it will be ready, only to get their mice and other invasive species already eaten the seed.

Also since the rain other endemic perennial species are starting to flower. The gap analysis has been useful in planning collection although some areas will be unsafe to get to.

20 collections will be sent to bank in the MSB and will be transport to Kew in May 2017, these species included two collections of *Petrobium arboreum*, two collections of *Pladaroxylon leucadendron*, and one collection of *Commidendrum spurium*, which were collected through the cloud forest project one collection of *Osteospermum sancate-helenae* grown in the living gene bank to help to increase seed production, this is the provenance of Dry gut Longwood (airport site). Two collections of *Frankenia portulacifolia*, one collection we don't have in our seed bank and MSB. We also mansion to collect a good sample of *Commidendrum rugosum* and *Eragrostis saxatilis* for the first time from Man and Horse cliffs. 8 species of fern collection were also collected. Also one collection from *Panicum joshuae*.

We will continue to monitor the areas highlighted in our gap analysis throughout the coming months. Below is two table showing weather details throughout the Island for the month of January and February 2017.



Man and Horse collecting Hair grass and scrubwood seed, also monitoring the tea plant. 6th April 2017



Tea plants growing on cliffs next to sea shore. Manti bay, no seed. 19th April 2017



Bone seed starting to germinate at Manti bay 19th April 2017.



Salad plant germinating at Great stone top, below the cliffs facing the airport 10th April 2017

ST HELENA WEATHER SUMMARY FOR JANUARY 2017														
Station	2017 RECORDINGS						5 YEAR AVERAGE							
	Rain	Rain-days	Temperature °C		%	Wind	Sun	Rain	Temperature °C		%	Wind	Sun	
	mm	days	Max	Min	RH	km/day	hrs/mth	mm	Max	Min	RH	km/day	hrs/mth	
Bottom Woods	23.9	15	23.1	18.0	79.3	529.1	191.2	10.0	15	22.1	16.7	67.6	156.1	139.0
Scotland	24.7	12	20.8	16.0	86.5	53.5	176.1	13.0	9	20.1	15.8	80.6	120.0	187.4
Harpers Education	35.4	10	23.0	17.4	65.2	142.3	-	11.2	6	22.0	15.8	79.7	46.4	-
Barren Ground	32.4	18	24.0	18.5	83.4	143.0	-	9.8	11	24.2	14.0	87.1	165.7	-
James Town	7.6	7	31.4	22.2	-	-	-	1.5	2	22.1	16.4	-	-	-
Briars	17.0	8	-	-	-	-	-	0.0	0	-	-	-	-	-
Sapper Way	31.0	7	-	-	-	-	-	9.0	7	-	-	-	-	-
Middle Point	13.5	15	-	-	-	-	-	6.0	15	-	-	-	-	-
Longwood Field	12.0	15	-	-	-	-	-	7.5	15	-	-	-	-	-
Longwood Lawn	22.0	6	-	-	-	-	-	16.8	14	-	-	-	-	-
Hutts Gate	47.0	1	-	-	-	-	-	14.3	4	-	-	-	-	-
Plantation	28.6	12	-	-	-	-	-	12.6	6	-	-	-	-	-
Bates Branch	27.6	12	-	-	-	-	-	12.9	6	-	-	-	-	-
Thompsons Wood	29.5	11	-	-	-	-	-	14.5	8	-	-	-	-	-
Taglate	32.1	12	-	-	-	-	-	15.1	11	-	-	-	-	-
Mulberry Gut	24.0	7	-	-	-	-	-	9.5	7	-	-	-	-	-
Half Tree Hollow	19.0	9	-	-	-	-	-	0.0	0	-	-	-	-	-
Sandy Bay below B/Hedge	28.5	11	-	-	-	-	-	5.0	2	-	-	-	-	-
Ruperts	16.0	9	-	-	-	-	-	0.0	0.0	-	-	-	-	-
Ladder Hill	6.5	3	-	-	-	-	-	0.0	0.0	-	-	-	-	-
Peaks Nursery	39.5	14	-	-	-	-	-	0.0	0.0	-	-	-	-	-
Note: Bottom Woods data obtained from 'The met Office'														
Note: No rainfall was recorded within the last 5 years from Ruperts and Ladder Hill & Peaks Nursery.														
ST HELENA WEATHER SUMMARY FOR FEBRUARY 2017														
Station	2017 RECORDINGS						5 YEAR AVERAGE							
	Rain	Rain-days	Temperature °C		%	Wind	Sun	Rain	Temperature °C		%	Wind	Sun	
	mm	days	Max	Min	RH	km/day	hrs/mth	mm	Max	Min	RH	km/day	hrs/mth	
Bottom Woods	115.2	26	22.1	18.0	82.0	529.1	115.4	9.8	23.8	18.8	91.8	503.0	161.7	
Scotland	246.4	25	21.0	17.5	84.7	40.0	123.8	0.0	22.4	17.1	83.3	154.4	152.7	
Harpers Education	196.0	19	22.1	17.8	72.1	135.1	-	35.0	25.2	15.8	79.5	54.7	-	
Barren Ground	203.6	25	22.7	18.3	86.4	130.8	-	24.6	23.4	17.9	93.4	156.1	-	
James Town	48.0	14	28.3	22.3	-	-	-	70.0	22.7	18.2	-	-	-	
Briars	132.5	22	-	-	-	-	-	46.6	-	-	-	-	-	
Sapper Way	154	23	-	-	-	-	-	78.7	-	-	-	-	-	

	.0													
Middle Point	117.0	26	-	-	-	-	-	68.9	-	-	-	-	-	
Longwood Field	88.4	26	-	-	-	-	-	53.3	-	-	-	-	-	
Longwood Lawn	155.9	23	-	-	-	-	-	60.9	-	-	-	-	-	
Hutts Gate	203.6	10	-	-	-	-	-	102.0	-	-	-	-	-	
Plantation	241.8	25	-	-	-	-	-	104.7	-	-	-	-	-	
Bates Branch	259.6	23	-	-	-	-	-	76.3	-	-	-	-	-	
Thompsons Wood	163.5	26	-	-	-	-	-	114.4	-	-	-	-	-	
Taglate	320.4	24	-	-	-	-	-	79.5	-	-	-	-	-	
Mulberry Gut	162.0	23	-	-	-	-	-	96.5	-	-	-	-	-	
Half Tree Hollow	105.0	21	-	-	-	-	-	92.0	-	-	-	-	-	
Sandy Bay below B/Hedge	224.5	19	-	-	-	-	-	102.2	-	-	-	-	-	
Ruperts	78.8	20	-	-	-	-	-	0.0	-	-	-	-	-	
Ladder Hill	57.5	15	-	-	-	-	-	0.0	-	-	-	-	-	
Peaks Nursery	281.0	23	-	-	-	-	-	0.0	-	-	-	-	-	
Note: Bottom Woods data obtained from 'The met Office'														
Note: No rainfall was recorded within the last 5 years from Ruperts and Ladder Hill, Peaks Nursery & HTH														

Seed cleaning and equipment.

With the help from this project our section had the opportunity to received equipment to help with seed cleaning, a hygrometer to measure seed eRH. Also an oven which we used to dry out silica gel, for the drying bins.

Some of the equipment in used:





Cleaning *Eragrostis episcopus* seed and drying out silica gel.



Hand sorting seed collections

We have identify an area that we would like to send the drone to take some pictures in the next few months, hoping that the weather is right. We would like to see if we can spot any living extinct *Trochetiopsis melanoxylon*.

A training picture taken with the drone.



Training seed conservation and horticulture.

Horticulture training were good as we had new staff, this give them the opportunity to learn new techniques.



Marcella did two weeks training in horticulture this included:

- RBG Kew ex-situ collections; St Helena priority species.
- Planning and setting up seed germination in trays and pots.
- Planning and setting up trials for vegetative prop by cuttings.
- Fern propagation vegetative of ferns. Collecting spores.
- Review of nursery facilities as a group. Threats to plants in the nursery.
- Practical-seed treatments and sowing.
- Cleaning spores/sow on compost. Transferring sporophytes to compost.
- Composting: what is possible? Growing media. Plant containers. Prep of seed for sowing.
- Watering and care of seed pots.
- Pricking out seedling and potting on plants.

- Recording germination and observation notes.
- Recording cultivation and monitoring successes.

September 2015 I had the opportunity to undertake overseas training in seed conservation techniques course, supported by this project.

The course was held at the Millennium seed bank, Wakehurst Place, whom we work closely with to safeguard our wild endemic plant diversity.

During the course we study theoretical aspects to seed banking such as seed-air moisture relations, seed storage behaviour, germination and dormancy



Collecting spores from *Elaphoglossum dimorphum* (Toothed tongue fern) from the Depot.

Dear Tom

Please see attached seed information, also the report we did on the Horticulture training. Karen and Stefan did the horticulture training they both say they enjoy the course, sowing seeds and propagation by cutting they say that it was the highlight because they sow seed in different compost and find out how the endemic germinate and develop in different compost, what compost to use for different species. It also give them the opportunity to know how importance monitoring, data collection is, and the results could help in the long term as reference.

My highlight of the conservation training knowing about the humidity in seed and how seed gain or lose moisture depending on the RH of the surrounding air. Because we don't have a drying room (nice to have one..) which is kept at one temperature. Here on St Helena we don't have a drying room, It was nice to know to cover the seeds at night, until we get the chance to sort the seed. Also at night seed take up moisture, which I didn't know, I really enjoy the whole course.

Take care

Kind regards

Vanessa

Annex 4 – supplementary material

Collections made April 2016 - March 2017								
Date collected		Species	Collectors	Prefix	Collection number	Country	Location	Population
14/04/2016	Cyperaceae	Carex diana		ECS	1556	St. Helena	Longwood Barn, south facing	Natural
11/05/2016	Asteraceae	Commidendrum robustum		ECS	1561	St. Helena	Thompson's Wood Campground	Mixed
02/06/2016	Asteraceae	Petrobium arboreum	Andrew darlow, Lournes Malan	ECS	1570	St. Helena	South side of High Peak	Natural
15/06/2016	Asteraceae	Pladaroxylon leucadendron	Andrew Darlow, Lourens Malan	ECS	1582	St. Helena	High Peak above the Dell	Natural
08/07/2016	Apiaceae	Berula bracteata		ECS	1614	St. Helena	Behind High Peak	Natural
24/06/2016	Asteraceae	Petrobium arboreum	Andrew Darlow, Lournes Malan	ECS	1618	St. Helena	High Ridge DPNP	Natural
29/06/2016	Asteraceae	Pladaroxylon leucadendron	Andrew Darlow, Lourens Malan	ECS	1619	St. Helena	Diana's Peak National Park, Byrons and longwood side of Dianas	Natural
03/11/2016	Asteraceae	Osteospermum sanctae-helenae	Karen Williams, Liam John,	ECS	1676	St. Helena	Endemic Wall	Planted/Cultivated
30/11/2016	Cyperaceae	Carex diana	Karen Williams, Brianna Yon	ECS	1694	St. Helena	High Peak Dell	Mixed
07/02/2017	Frankeniaceae	Frankenia portulacifolia	Darrell Leo, George Thomas, Stefan Leo, Leam John.	ECS	1729	St. Helena	Man and Horse Cliffs	Natural
27/02/2017	Asteraceae	Commidendrum spurium	Andrew Darlow	ECS	1734	St. Helena	Mount Vesey	Natural
Collections made since April 2017								
Date collected		Species	Collectors	Prefix	Collection number	Country	Location	Population
06/04/2017	Asteraceae	Commidendrum rugosum	Vanessa Thomas-Williams, Stefan Leo, Karen Williams	ECS	1744	St. Helena	Man and Horse Cliffs	Natural
06/04/2017	Poaceae	Eragrostis saxatilis	Vanessa Thomas-Williams	ECS	1748	St. Helena	Man and Horse Cliffs	Natural
11/04/2017	Frankeniaceae	Frankenia portulacifolia	George Thomas, stefan Leo, darrell Leo	ECS	1747	St. Helena	Prosperous Bay Plain valley	Natural
18/04/2017	Cyperaceae	Bulbostylis lichtensteiniana	Vanessa Thomas-Williams, Amy Dutton	ECS	1749	St. Helena	High Peak- Red Rock	Natural
18/04/2017	Asteraceae	Commidendrum rugosum	Vanessa Thomas-Williams, Amy Dutton	ECS	1750	St. Helena	The Dell High Peak	Natural
18/04/2017	Dryopteridaceae	Dryopteris napoleonis	Vanessa Thomas-Williams, Amy Dutton	ECS	1751	St. Helena	The Dell High Peak	Natural
18/04/2017	Woodsiaceae	Diplazium filamentosum	Vanessa Thomas-Williams, Amy Dutton	ECS	1752	St. Helena	Red rock High Peak	Natural
18/04/2017	Aspleniaceae	Asplenium platybasis var. platybasis	Vanessa Thomas-Williams, Amy Dutton	ECS	1753	St. Helena	Above the dell High Peak	Natural
18/04/2017	Lomariopsidaceae	Elaphoglossum furcatum	Vanessa Thomas-Williams, Amy Dutton	ECS	1754	St. Helena	The Dell High Peak	Natural
18/04/2017	Dicksoniaceae	Dicksonia aborescens	Vanessa Thomas	ECS	1755	St. Helena	High Peak Red rock	Natural
18/04/2017	Aspleniaceae	Asplenium compressum	Vanessa Thomas-Williams, Amy Dutton	ECS	1756	St. Helena	The Dell High Peak	Natural
25/04/2017	Poaceae	Panicum joshuae	Stefan Leo, Gurrance Leo	ECS	1757	St. Helena	Blue Point	Natural

Annex 5 – supplementary material

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Annex 1

PRO FORMA

NOTIFICATION OF TRANSFER

The following plant material is transferred to the Board of Trustees of the Royal Botanic Gardens, Kew, United Kingdom ("RBG Kew") in accordance with the terms and conditions of the Memorandum of Collaboration between the Environmental Management Division of the St Helena Government and RBG Kew, dated 18th February 2015.

By signing this Notification of Transfer, EMD hereby confirms that the plant material and associated data has been collected and is being transferred into the collections at RBG Kew in accordance with all applicable laws and regulations, permits, consents and/or licences.

DATE COLLECTED	COLLECTOR NAME	COLLECTION NO.	FAMILY (IF KNOWN)	GENUS OR SPECIES (IF KNOWN)	SPECIMEN TYPE(S) (E.G. HERBARIUM SPECIMENS/ SEEDS/ MATERIAL FOR DNA STUDIES/ LIVING PLANT MATERIAL)
14.04.2016	L. Malan	ECS-1556	Cyperaceae	Carex dianae	Seed
11.05.2016	G. Leo N. Henry	ECS-1561	Asteraceae	Commidendrum robustum	Seed
08.07.2016	N. Henry, S. Leo G. Leo, L. John	ECS-1614	Apiaceae	Berula bracteatum	Seed

SIGNED: *fehenus*

DATE: 06. October 2016.

For and on behalf of EMD

Name: VANESSA E. THOMAS-WILLIAMS
 Position: ENDEMIC NURSERY OFFICER
 ENVIRONMENT MANAGEMENT DIVISION,
 ENVIRONMENT & NATURAL RESOURCES DIRECTORATE, ST. HELENA GOVERNMENT
 SCOTLANDS, ST. HELENA ST. LIZZ.

SIGNED:

DATE:

For and on behalf of the Board of Trustees of the Royal Botanic Gardens, Kew

Name:
 Position:

A copy of this document signed by EMD will be forwarded to RBG Kew with each consignment of plant material. RBG Kew will countersign this copy and return it to EMD as acknowledgement of receipt by RBG Kew under the terms of the Memorandum of Collaboration

Annex 6 – supplementary material

URLs used in the report text:

Gap analysis <https://goo.gl/T4RY7a>

Drought news items <https://goo.gl/BLWKeu>, <https://goo.gl/ijzhBs>

Meteorological data <https://goo.gl/hqvBFg>

List of endemics with numbers of collections made to date <https://goo.gl/73yHO5>

Processing results of MSB accessions <https://goo.gl/pAEW8T>

Horticultural report <https://goo.gl/zq4OT1>

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	✓
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	✓
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	✓
Have you completed the Project Expenditure table fully?	✓
Do not include claim forms or other communications with this report.	