DPLR1\1061

Darwin Plus Local - Final Report (1)

Officer: Linzi Ogden

Section 1 - Darwin Plus Local Project Information (Essential)

Project Reference Number

DPL00005

Q1. Project Title

No Response

Overseas Territory(ies)

☑ Cayman Islands

Lead Organisation or Individual

Christine Rose-Smyth

Partner Organisation(s)

Queen Elizabeth II Botanic Park, National Trust for the Cayman Islands, Cayman Islands Department of Environment

Value of Darwin Plus Local Grant Award

[redacted]

Project Start Date

03 April 2023

Project End Date

15 March 2024

Project Leader Name

Christine Rose-Smyth

Project Website/Twitter/Blog etc.

No Response

Report Author(s)

Christine Rose-Smyth

Report Date

26 April 2024

Project Summary

No Response

Project Outcomes

Checked	**Biodiversity: improving and conserving biodiversity, and slowing or reversing biodiversity loss and degradation;**
Unchecked	**Climate Change: responding to, mitigating and adapting to climate change and its effects on the natural environment and local communities;**
Unchecked	**Environmental quality: improving the condition and protection of the natural environment;**
Checked	**Capability and capacity building: enhancing the capacity within OTs, including through community engagement and awareness, to support the environment in the short- and long-term.**

Section 2 - Project Outcomes (Essential)

On a scale of 1 (high – outcome substantially exceeded) to 5 (low – outcome substantially did not meet expectation), how successful do you think your project has been?

⦿ 3 - Outcome met expectation

Project outcomes and justification for rating above

This one year project sought to extend the long-term project “Out of Flask, Outcrossed, and Out of Danger”, OUTCOME: a complete flask-to-wild reintroduction methodology for a sustainable source of genetically diverse Dendrophylax fawcettii (Grand Cayman endemic Ghost Orchid) for ex situ conservation and in situ ecological restoration.

Ghost orchids are perennial epiphytes with a short flowering season beginning in April, and long seed maturity (9-14 month) periods. The propagation of mature seedlings takes up to three years. The objectives were divided among four annual cohorts. Overall the outcomes met expectations but the results in each cohort were highly variable. For details, please see the Supplemental Technical Report.

2023 Cohort: The goal to produce 6-10 maturing pods for sowing in mid/late 2024 was not met. The single pod that matured dehisced early and no viable seeds were recovered. Even though no near-neighbours were employed, in this highly clonal species, self-incompatibility may have operated. Herbivores and damaged or

immature pollen also played a role.

2022 Cohort: Three of four seed pods maturing from seven pollinations were sown with mixed success. 18 Cohort 2022 flasks are progressing slowly.

2021 Cohort: 80 flasks were progressed by reflasking (49) and or 84 individuals transferred to burlap patches in the shadehouse preparatory to outplanting at QEIIBP.

2019 Cohort: 41 seedlings in QEIIBP suffered 27% mortality by project end. Herbivory was a key factor. Nonetheless, several seedling had grown at least one root of 20-25 cm length.

Lab-based results were satisfactory. Efficiencies were realised with the new equipment with the exception that switching to the manufacturer's own glass vessels did not improve compatibility with their lids. Which still did not fit after autoclaving.

Outreach and capacity: Project received publicity in the local press. The propose article in Department of Environment's magazine "Flicker" is expected to run in the next edition.
Over 20 participants received either formal project training or informal introductions. The bespoke public lecture remains to be scheduled with QEIIBP/NTCI.

The presence of the project strengthened the Queen Elizabeth II Botanic Park's conservation role and standing in a year in which conservation has been set back at a political level in the Cayman Islands.

Supporting Evidence - file(s) upload

DPL00005 Technical Report
02/05/2024
11:36:54
pdf 2.39 MB

Supporting Evidence - links to published document/online materials

Supplement 1 uploaded above: DPL00005 Technical Report.pdf

Technical Report for the DARWIN PLUS LOCAL project "Expanding the ex-situ propagation project for Cayman's Dendrophylax Ghost Orchid".

Project Challenges

The additional year demonstrated that poor outcomes of hand-pollination experienced in prior years are not unusual; solutions were recognised (Lessons, below) but could not be implemented within the one field season of the project.

Lab: The switch to new clear flasks made observation of seedling progress easier. However the expectation that switching to the manufacturer's own glass vessels would cure the problem with fit of autoclaved polypropylene lids did not. Shrinkage remained an issue that was only solved by sterilising in bleach, sterile distilled water and drying in low oven, which added far too much time to the process. Therefore, unspent operational funds were applied to purchasing standard metal canning lids. Vented lids were abandoned as the medium dried too rapidly.

Experimentation with dissection of clumps of small seedlings and even of protocorm clumps showed that they

could be separated successfully, thus increasing the number of useful flasks, even though there was a small increase in flasks failing from contamination, likely from the increased exposure time out of flask to perform the dissections. Though slow growing, provided there is continuing root development, seedlings are retained, overcoming, in part, the limited quantity of germinating seed recovered.

Shadehouse: Increasing watering frequency appears to be encouraging more uniform constant growth. Extending the period on burlap to produce larger plants before outplanting is an improvement.

Lessons Learned

Project worked well within the constraints of funding and time committed and available.

Field: Partial overlapping of seasonality of Dendrophylax flowering and seed pod maturity helped optimise field work but also concentrate the work load. Part of the ex situ population is accessible all year whereas 50% is cut off in the rainy season. Seed pods in those zones can mature before they can be harvested. Solution would require removal of underbrush and/or causeway creation. Camera traps with wifi might be an alternative way to monitor continuously.

Project goals for numbers of successful pollinations seed pods were stymied by (a) unexpected incompatibility among parent plants, (b) more rapid senescence of flowers than usual caused in part by, (c) herbivory. However these setbacks provide new data contributing to a better understanding of population and ecological interactions. It is clear that the population genetics of the study plants should be performed to direct maximal results.

Capacity: The long-tern project benefited from updated equipment. Combining capacity training with project activities in same short season is challenging. Managing the expansion of number of annual cohorts highlights the need to broaden the active participants in the continuing project. 2024/25 will be a “fallow” year in which (a) training can be pursued without any expectations for seed production; (b) preparing to implement the solutions identified above.

With respect to iv) Design your project with as much flexibility as possible, incorporating alternative means of execution when external factors interfere with proposed outputs; apply infinite doggedness and patience.

Section 3 - Project Finance (Essential)

Project Expenditure

Project Spend (indicative) since last Annual Report	2023/24 Grant (£)	2023/24 Total actual Darwin Plus Costs (£)	Variance %	Comments (please explain significant variances)
Staff Costs	[redacted]	[redacted]	0.0	*No Response*
Consultancy Costs	£0.00	£0.00	0.0	*No Response*
Overhead Costs	[redacted]	[redacted]	0.0	*No Response*

Travel and Subsistence	[redacted]	[redacted]	[redacted]	Actual T&S purchases limited to petrol for travel to /from Botanic Park.
Operating Costs	[redacted]	[redacted]	[redacted]	Overage attributable to import shipping costs. Set off against underage in Travel & Subsistence budget.
Capital Items	£0.00	£0.00	0.0	*No Response*
Others	£0.00	£0.00	0.0	*No Response*
Total	[redacted]	[redacted]	[redacted]	

Please provide a short narrative summary on project finances.

Project finances were reasonably simple and there were no large unexpected variances.

Purchases of laboratory supplies from the USA always involve some uncertainty, especially with shipping logistics and costs. Cayman Border and Customs officials added an unexpected impediment by insisting on an import permit for the seed sowing media merely because the word 'seed' appeared in the invoice.

Savings in the operating & T&G budget were applied to purchasing replacement metal lids (see Lesson/learned/Challenges above).

There was no co-financing in this project.

Section 4 - Contribution of Project to Darwin Plus Programme Objectives

Please select up to **one** indicator that applies within **each group/indicator list (A, B, C, D)** and report your results for that indicator in the text box underneath. If you do not have relevant results to report for any of the indicators in a particular group, you can leave them blank.

Please also submit some form of evidence (above) to demonstrate any results you list below, where possible.

Group A: Capability and Capacity - Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-A01: Number of people from key national and local stakeholder groups completing structured and relevant training.**
Unchecked	**DPLUS-A02: Number of secondments or placements completed by individuals of key local and national stakeholders.**
Unchecked	**DPLUS-A03: Number of local/national organisations with improved capability and capacity as a result of project.**
Unchecked	**DPLUS-A04: Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.**
Unchecked	**DPLUS-A05: Number of trainers trained reporting to have delivered further training by the end of the project.**

Group A Indicator Results

NA

Group B: Policies, Practices and Management- Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-B01: Number of new/improved habitat management plans available and endorsed.**
Unchecked	**DPLUS-B02: Number of new/improved species management plans available and endorsed.**
Unchecked	**DPLUS-B03: Number of new/improved community management plans available and endorsed.**
Unchecked	**DPLUS-B04: Number of new/improved sustainable enterprises/ community benefits management plans available and endorsed.**
Unchecked	**DPLUS-B05: Number of people with increased participation in local communities / local management organisations (i.e., participation in Governance/citizen engagement).**
Unchecked	**DPLUS-B06: Number of Local Stakeholders and Local Communities (people) with strengthened (recognised/clarified) tenure and/or rights.**

Group B Indicator Results

NA

Group C: Evidence and Best Practices - Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-C01: Number of best practice guides and knowledge products published and endorsed.**
Unchecked	**DPLUS-C02: Number of new conservation or species stock assessments published.**
Unchecked	**DPLUS-C03: New assessments of habitat conservation action needs published.**
Unchecked	**DPLUS-C04: New assessments of community use of biodiversity resources published.**
Unchecked	**DPLUS-C05: Number of projects contributing data, insights, and case studies to national Multilateral Environmental Agreements (MEAs) related reporting processes and calls for evidence.**

Group C Indicator Results

NA

Group D: Sustainable Benefits to People, Biodiversity and Climate - Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-D01 Hectares of habitat under sustainable management practices.**
Unchecked	**DPLUS-D02: Number of people whose disaster/climate resilience has been improved.**
Unchecked	**DPLUS-D03: Number of policies with biodiversity provisions that have been enacted or amended.**

Group D Indicator Results

NA

Section 5 - Project Partnerships, Wider Impacts and Contributions

Project Partnerships

NA

Wider Impacts and Decision Making

NA

Sustainability and Legacy

“Out of Flask, Outcrossed, and Out of Danger”, a complete flask-to-wild reintroduction methodology for a sustainable source of genetically diverse Dendrophylax fawcettii (Grand Cayman endemic Ghost Orchid) for ex situ conservation and in situ ecological restoration, is a long-term project that will be continued by the applicant.

Non-consumable physical resources provided by this Darwin Plus Local will continue to be used. Darwin Plus Local has provided valuable validation of the overall project.

Section 6 - Communications & Publicity

Exceptional Outcomes and Achievements

NA

Photo, video or graphic to be used for publicity and communications.

Please upload at least one relevant and engaging image, video or graphic that you consent to be used alongside the above text in Defra, JNCC or NIRAS communications material.

392 flower and pod
02/05/2024
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jpg 3.33 MB

Photo, video, and/or graphic captions and credits.

File: 392 flower and pod.jpg

A recently hand-pollinated seed capsule begins to mature alongside its ethereal, white, sister flower of Dendrophylax fawcettii, the Grand Cayman endemic Ghost Orchid. Flower and pod extend out from a tiny, almost leafless, crown and a cluster of grey, photosynthetic, aerial roots that dangle freely or cling to the tree bark to which it is attached.

Grand Cayman, Cayman Islands
Credit: Christine Rose-Smyth

I agree for the Biodiversity Challenge Funds Secretariat, Administrator, and/or JNCC to publish the content of this section.

⦿ Yes, I agree for the BCFs Secretariat and/or JNCC to publish the content of this section.

Please list any accounts that you would like tagged in online posts here. This can include project pages, partners' pages or individuals' accounts for any of the following platforms: LinkedIn, Facebook, Twitter, or Instagram.

Twitter - @verdantisleOR

Section 7 - Darwin Plus Contacts

Please tick here to confirm that you have read and acknowledge the BCF's Privacy Notice on how contact details will be used and stored and that you have sought agreement from anyone that you are sharing personal details with us on their behalf.

⦿ I confirm I have read the Privacy Notice and have consent to share the following contact details

Project Contact Details

Project Contact Name	Christine Rose-Smyth
Role within Darwin Plus Project	Lead Applicant - individual Darwin Plus Local scheme
Email	[redacted]
Phone	[redacted]
Do you need further sections to provide additional contact details?	⦿ No