



PlantNetwork

**The Plant Collections Network
of Britain & Ireland**

Plant Records Group Meeting

Positive Plant Records

12th May 2016

The Eden Project

#positiveplantrecords

www.plantnetwork.org

Programme

- 10.00** **Registration and coffee**
- 10.15** **PlantNetwork Plant Records Forum**
Rupert Wilson, Horticultural data Principal Data Manager RHS
- 10.30** **Using mapping to monitor invasive species**
Chris Bisson, Plant Records Manager Eden Project
- 11.00** **The Monkey Puzzle Map**
Sarah Horton, Founder Monkey Puzzle Map
- 11.30** **Plant records and the International Conifer Conservation Programme**
Rob Cubey Plant Records Officer, Royal Botanic Garden Edinburgh
- 12.00** **Managing Digital Assets in Botanical Collections: Capturing, storing and sharing photos.**
Havard Ostgaard Manager of Botanical Software Ltd in the UK
- 12.30** **Plant health at the Eden Project – why none of it works without accurate plant records**
Dr Rachel Warmington, Plant Pathologist Eden Project
- 13.00** **Questions and discussion**
- 13.15** **Lunch**
- 14.00** **PlantNetwork AGM**
- 14.45** **Tour of Eden Project**
- 16.15** **Next steps for Plant Records forum**
- 16.30** **Close**

THE GARDEN LABEL AND SIGN COMPANY

We are pleased to have received sponsorship for our Positive Plant Records training day from The Garden Label & Sign Company a trading division of Engraving Materials provider, 908 Ltd, they began trading in 2007, under the watchful eye of, appropriately named, Managing Director, Miss Beverley Garden.

The company specialises in the design and production of bespoke, durable, labelling for horticulture. Offering an engraving service, as well as supplying blank labels to those who have their own engraving equipment. Their label range is complimented by their own design of reusable metal label holders, tree label fixings and an array of other products commonly used by nursery's and growers.

All of the engraved products are manufactured in house, using the latest in CO2 laser technology. As a result engraving orders generally take a matter of days to design, proof and complete. Computerised records of all engraving orders are kept on file which is essential for those returning customers who find their labelling projects stretch over months or even years.

Take a look at our YouTube channel which is constantly updated with new videos. You will be able to see exactly how some of our engraved labels are made, along with many informative product videos... www.youtube.com/user/908Ltd

The Garden Label & Sign Company, Unit 6 Derwenthaugh Marina, Blaydon on Tyne NE21 5LL

Tel: 0845 9008 908 Email: enquiries@gardenlabelling.co.uk

Speaker Biographies

Chris Bisson

Plant Records Manager, Horticultural Science Team, Eden Project.

Chris has spent his entire working life working with plant-based data of some sort. He worked in a team at RBG Kew creating species targeting guides for MSB collection trips for four years before becoming the Plant Records Manager at the Eden Project in Cornwall. An interesting move from the world of plant conservation to horticulture! At Eden Chris' main roles are to manage the living collections data, name verification, to compile and record material transfer and licenses. In his time at Eden, Chris has been involved in a vast array of horticultural and educational projects, ranging from creating a GIS to working with A-level students on DNA extraction. He's currently involved in the conservation of the rare Lizard Juniper.

Sarah Horton

Sarah founded the Monkey Map project.

<https://monkeypuzzletrees.wordpress.com>.

Trees are catalogued by the postcode area where they are found in the UK, and by country internationally. Trees are found by Sarah, and also increasingly by a number of other enthusiasts and 'Agents' across the UK, and the world, who send in details of their findings. Many of these are Twitter friends who have contributed their sightings of monkeys to our growing catalogue. Most monkeys are in the UK, but there are some international monkeys as well.

Robert Cubey

Plant Records Officer, Royal Botanic Garden Edinburgh
Responsible for the Living Collection database at the RBGE and currently trying to expand its uses across large scale aggregators, new users and new platforms.

Havard Ostgaard

Manager of Botanical Software Ltd in the UK.

In addition to being a keen gardener, Havard has a degree in Computer Science from the University of Oslo and the University of York and more than 25 years' experience working with software design and development. For the last 10 years, he has worked on the IrisBG team trying to make life easier for botanic gardens around the world.

Dr Rachel Warmington, Plant Pathologist, Eden Project

After spending eight years as a tax adviser Rachel decided on a change of career, completing a Horticulture degree at Pershore College in 2009. She then worked for several years as a Head Gardener, followed by a short time as a Horticultural Tutor, before choosing to specialise in plant pathology. Rachel completed a PhD at Warwick University, receiving The Marsh Horticultural Science Award (Highly Commended) in 2013 for her research, prior to taking up the position of Plant Pathologist at the Eden Project in October 2014.

Speaker contact details are available on the delegate sheet.

All presentations from our training and conferences are shared through our website. www.plantnetwork.org. Our website search facility also allows you to find previous newsletter articles, presentations and downloads. As always, please get in touch if you have any suggestions for website content.

Plant Records

As holders of living collections we understand the importance of keeping plant records but how often do we hear of interesting ways our records are being used? This meeting will focus on Positive Plant Record stories. Speakers will share information including how plant records are used for mapping invasive species, quarantine checks and citizen science projects. Attendees are encouraged to bring in example policies from their gardens and there will be opportunities to look at examples, share ideas and take a few ideas away for the development of your garden policies including those relating to collection management and responsible sourcing.

Plant records underpin the management of plant collections in any garden. Ensuring high standards of record keeping and maintaining efficient systems to handle plant records is justified when considering the investment in the plants themselves. Maintaining accurate data about plant collections enables their use in informing visitors, science research, supporting conservation strategies, historical interest and many other purposes.

Whilst the simplest record systems allow the storage and retrieval of basic plant information, more detailed systems can make a significant contribution to the scientific management of living collections.

The rise of legislative instruments such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Biological Diversity (CBD) and the Nagoya Protocol place ever greater requirements on collection holders to obtain and retain collection data. Keeping records of plant transfers is critically important to ensure that the original terms are honored and maintained.

PlantNetwork aims to:

- promote best practice in record-keeping amongst members; through meetings of the Plant Records Group, by providing information to members on appropriate policies, data standards, equipment and software.
- promote the development and maintenance of information systems for plant collections, both within individual collections and amongst the network
- encourage the use of initiatives such as BGCI Plant Search, RBGE multi-site search and International Plant Exchange Network. Disseminate information on plant collections maintained by members.
- co-operate with such organisations as Botanic Gardens Conservation International (BGCI) and Plant Heritage (formerly NCCPG) in helping to document plants held in collections in Britain and Ireland, in particular by contributing to BGCI's PlantSearch and Plant Heritage's Threatened Plants Project
- encourage members to develop record-keeping in the broader areas of phenological observations as well as recording information on pests, diseases and other subjects (germination, propagation, hardiness)

The PlantNetwork Directory of Botanical Collections in Britain and Ireland

First published in hard copy in 1999. The Directory, with some updates, is now available online but there are many records out of date. Please update the entry for your garden in the Directory at:

www.plantnetwork.org/resources/directory

Scroll down to the list of gardens, click on your garden. Scroll to the end of the entry for your garden and click on the link to download a copy. Make any changes, save the file and post it to Rupert Wilson, or send it to him as an email attachment.

If you need any help with either method, please contact Rupert Wilson, PlantNetwork Board Member. rupertwilson@rhs.org.uk

Resources

International Plant Exchange Network (IPEN)

A model for the acquisition and the exchange of living plant material within the botanic gardens community in respect of the ABS requirements of the CBD. IPEN is a voluntary registration system intending to facilitate the botanic gardens plant exchange in accordance with the CBD provisions. IPEN is characterised by the following aspects:

- only for botanic gardens according to the definition by the BGCI
- IPEN covers only the exchange of living plant material, meaning living plants or parts of plants
- only for non-commercial exchanges: Plants must not be sold for profit or used for any kind of commercial activity

- IPEN includes a documentation system (IPEN numbers, that makes the origin of the plant material traceable at any stage of plant exchange

The backbone of the network is the IPEN Code of Conduct, a three-page document stating the unified policy of the IPEN member. This covers acquisition, maintenance and supply of living plant material by the gardens as well as benefit-sharing. The Code further provides a Material Transfer Agreement (MTA) to be used for exchanges with institutions that are not member of the IPEN network.

Abstract from www.bgci.org

Nomenclature verification

Tropicos®

Missouri Botanic Gardens' Tropicos® was originally created for internal research but has since been made available to the world's scientific community. All of the nomenclatural, bibliographic, and specimen data accumulated in MBG's electronic databases during the past 25 years are publicly available here. This system has over 1.2 million scientific names and 4.0 million specimen records. A number of tools have been developed including a name matching service.

<http://www.tropicos.org/NameMatching.aspx>

The Plant List

A working list of all known plant species. It aims to be comprehensive for species of Vascular plant (flowering plants, conifers, ferns and their allies) and of Bryophytes (mosses and liverworts).

Collaboration between the Royal Botanic Gardens, Kew and Missouri Botanical Garden enabled the creation of The Plant List by combining multiple checklist data sets held by these institutions and other collaborators.

Plant Search

The only global database of living plant, seed and tissue collections:

- Search 1,309,221 collection records, representing 461,365 taxa, at 1,099 contributing institutions
- Locate threatened, rare, medicinal and other plant species in living collections
- Connect with living collections to aid your conservation, education and research efforts

By uploading your collection records onto the Plant Search your collections become available to the plant collection community (locations are not shared via the web search engine) and your records will be verified automatically.

www.bgci.org/plant_search.php

Data management

OpenRefine (formerly Google Refine) is a powerful tool for working with messy data: cleaning it; transforming it from one format into another; extending it with web services; and linking it to databases like Freebase –

<http://openrefine.org>

Mendeley

Is free software which allows you to search and annotate PDFs. A good way to search for plants in PDF plant records, Index Seminum etc.

<https://www.mendeley.com/>

GIS and mapping

The Alliance for Public Gardens GIS is a consortium of biological collection managers and GIS professionals who are dedicated to making geographic information systems more accessible to arboreta, botanical gardens, cemeteries, display gardens, historic landscapes,

natural reserves, parks, theme parks, zoos, and other managed landscapes for use in asset management, biodiversity conservation, education, and scientific research –

<http://publicgardensgis.ucdavis.edu>

QGIS

QGIS is a user friendly Open Source Geographic Information System (GIS) licensed under the GNU General Public Licence. QGIS is an official project of the Open Source Geospatial Foundation (OSGeo). It runs on Linux, Unix, Mac OSX, Windows and Android and supports numerous vector, raster, and database formats and functionalities.

<http://qgis.org/en/site/about/index.html>

OS Open data

The Ordnance Survey offer a range of quality assured, regularly updated products that enable you to analyse your data, build interactive websites and create stunning visuals, all for free, in return for OS acknowledgement. OS OpenData can be combined with other open datasets available from a variety of sources

<https://www.ordnancesurvey.co.uk/business-and-government/products/opendata-products.html>

Checking plant accessions for problem material

RHS draft document

We are grateful to the RHS for sharing this document currently under development. Author John David, Head of Horticultural Taxonomy, RHS Wisley would welcome any feedback. johndavid@rhs.org.uk.

There are a number of questions that need to be asked when new plant material is received:

Question	Points to consider
What is the immediate source of the plant material?	<ul style="list-style-type: none">• Low risk sources would be botanic gardens with a collections policy in place* and non-specialist wholesale nurseries• Medium risk would be universities and research institutes, specialist nurseries or national plant collection holders• High risk would be an individual or an online supplier
Is the material of known wild origin?	<ul style="list-style-type: none">• Look for a collector's number or any information that indicates the material originated in the wild, such as a collection locality, "from ..."

	<ul style="list-style-type: none">• Even if propagated from plants growing in a garden where the plant is not native, it could still have been wild collected originally• If in doubt ask your supplier if they are aware if the material you are buying is of known wild origin and, if possible, when it was sourced and if known, then see ‘when was it collected?’ below.
Is the material of cultivated origin?	<ul style="list-style-type: none">• If collected from a public park or private garden overseas, then it is less likely that there are any restrictions, although permission to collect should have been sought. However, some countries may seek to control access to their cultivated plants, especially crops and the country’s legislation should be checked.• Material obtained from an overseas nursery could present a risk, especially in certain countries (and online suppliers could present a particular risk) and assurances should be sought on legal

	status of wild collected material offered by the supplier.
What kind of material is it?	<p>Seeds, bulbs, corms or rhizomes (any perennating material) could have been collected from the wild and apart from the plant health checks, need to be verified as to its origin</p> <p>Specimen trees and shrubs are less likely to be a problem, other than identified above</p>
Where was it collected?	<ul style="list-style-type: none"> • If wild origin, it needs to have been collected in accordance with the source country's laws; so be careful about anything that might be from a national park or nature reserve; forests and other managed habitats can also need special permits. • Most countries have lists of rare or threatened species which it is illegal to collect, or would require a permit to collect, so check red lists for the country concerned. • If collected from outside of the UK then plant material is likely also to require a

	<p>permit to export in addition to a permit to collect</p>
<p>When was it collected?</p>	<p>Pre 1992 (pre CBD) material should not be a problem, although botanic gardens do see them as a risk as well. If a country had plant collecting legislation in place before then, that should have been adhered to.</p> <p>1992 – 2014 (post CBD) material should have evidence that permits to collect were obtained (usually a Prior Informed Consent and Mutually Agreed Terms) in addition to any national legislation. However, unless the CBD provisions have been embedded in national legislation of source country, they are not obligatory. That said, most botanic gardens will not accept material without these permits and some have destroyed plants that may have been collected without permits.</p> <p>12 Oct. 2014 onwards (post Nagoya Protocol/EU regulation). Wild origin plants collected after this date need to have permits (PIC & MAT), particularly if the</p>

	source country is a signatory of the Nagoya Protocol. We will need to be aware of the permits as these lay out the conditions for collecting and any subsequent sharing of plant material.
--	--

If in doubt, ask for the paper work!

* Some Botanic Gardens have collections policies but not all: please check this before acquiring material. Botanic Gardens often issue an Index Seminum that contain wild collected seeds, often identified as such in a separate section. While Botanic Gardens strive to comply with the CBD, we need to be cautious about such sources for unless the seed has been sourced from the country where the garden is located, the material may not be fully compliant. Schemes such as IPEN give a measure of confidence about the status of the material. What also needs to be taken into account is that this seed is shared for non-commercial uses (usually research or education), so we should ensure that plants derived from these sources do not get transferred into the commercial sector without prior agreement of the source.

Plant records and living collections data policy and procedures. Eden Project 2016

Thanks to Chris Bisson and the Eden Project for sharing this policy. Associated Appendices are shared via the PlantNetwork website along with all presentations from this training day.

Introduction

Eden Project has a legal requirement to keep an accurate and up-to-date record of all plant material; this is specified and required by the following legislation and licenses:

- UK Wildlife and Countryside Act (Appendix)
- Invasive Plants (Schedule 9)
- Protection of Wild Plants
- Endangered Species (Schedule 5 and Import and Export)
- Plant Health Order (Containment Notice)
- CITES License
- CBD – Nagoya Protocol (See Procurement Section)
- Cannabis Cultivation License
- HSE - Management of the risk from falling trees or branches (See Tree Assessment Section)

Therefore, the importance of record keeping and accurate data management must remain one of Eden Project's highest priorities.

In 1997, when the procurement of plants started in earnest, we created a plant records system to enhance the scientific and horticultural usefulness of the living collections. The protocols of other botanic gardens such as RBG Edinburgh, RHS Wisley and RBG Kew have been an invaluable help, however, Eden is a unique modern garden so whilst we ensure highly accurate records, the systems that we put in place are flexible and adaptable to keep up with the fluidity of the project.

In 1998 we acquired BG-BASE as our plant records database. This has served our purposes sufficiently but we are open to

exploring new database solutions. Our plant records procedures and administration have been designed around BG-BASE enabling easier data capture. However we are aiming for this handbook to be applicable and useful independent of the database we currently use.

The key to accurate plant records is a good relationship and understanding between the Green Team and the Plant Records department. The process is two-way, with the horticultural staff ensuring up-to-date information gathering and Plant Records disseminating that information back to the Green Team, other Eden Project teams and the public.

Many thanks to Joanna Thomas, who created the first Plant Records Policy in 2008, and to Dr. Alistair Griffiths, who was a driving force behind many of the innovative uses of Plant Records at Eden Project.

Name Verification and Horticulture at Eden Project

Here at Eden we use the Angiosperm Phylogeny Group III (APG III) classification system. It is essential that our name verification and interpretative labels adhere to this.

Name verification is the responsibility of the Plant Records Lead who ensures that any name used at Eden Project has been verified by every means available within his/ her resource. It is essential that every 'Accepted' name has a reference source and all synonyms are linked within the database. Plant taxa with Plant Breeders Rights (PBR) are to be recorded as restricted material in the Accessions Table (see accessions and propagations). Common names must also have a reference source.

Plant Records and Plant Procurement

A plant to be accessioned must fit within the defined goals and purposes of a specific collection or garden area. A team lead may provide a manager with a list of needed plants, if a taxon fits the requirements of the plant bed, the team manager will investigate the practical logistics of obtaining them. It is essential for Eden Project to procure plants as responsibly as possible. In order to do this we must work within a particular framework (see **Procurement and Acquisitions policy**) which

is heavily reliant on good records and data stored within our database. Sources that we use will be investigated for factors that could be potentially infringe any CBD restrictions, be detrimental to our plant collection and reputation (Appendix 1). It is essential that we comply with aspects listed in the introduction.

Plant Record Forms

There are several forms that exist that have been used here at Eden Project in the past; these can be found in the Appendix. However, in some cases to avoid double-handling of data and to save time it is acceptable to communicate Plant Records with hand written lists and/ or email. There is an electronic plant records form that can instantly be sent to the Plant Records Lead.

All data and records must include an Accession number, date of recording, number of plants, type of record and source if new accession.

Accessioning and Record Keeping

Eden's unique accession number contains eight figures; the first four being the accession year and the second four are sequential. For example 19981972 or 20080036.

Once the plant material has been delivered to site or the nursery then it must be allocated an accession number as soon as possible. The accession number links the plant material to details on botany, taxonomy, donor/source, seed storage, propagation and planting history.

Accession numbers are allocated exclusively by the Plant Records Lead or Seed Store Lead.

Here at Eden Project a single accession number is given to a plant or number of plants when it is:

- the same taxa
- from the same source
- received in the same period
- the same propagule type (plant, seed, bulb, cutting etc.)

Any deviation from one or more of these four factors will require a separate accession number.

For wild collected plant material a single accession number should be allocated when the collection information differs in any aspect i.e. material collected on different days, material collected from the same species but from different plants etc.

Accession Workflow

The accessioning of plant material is not only important; we are required to do it legally. Therefore it is essential to do this as soon as the material arrives.

Forward delivery notes and/or the New Accessions Form (Appendix 4) to Plant Records as soon as possible on arrival of the plant material.

Liaise with Plant Health Team to ensure knowledge of plant material arrival.

The members of staff responsible for completing this paperwork are the Team Manager, the Team Leads at Bodelva or at Watering Lane Nursery or the horticulturist in charge of the area. An accession number is designated to the plant material by Plant Records (with the exception of seed), the information captured onto the database and the appropriate plant labels sent to the member of staff.

All accessions that have been donated by an institution, are accompanied by a Standard Material Transfer Agreement or have Plant Breeders Rights are required to have a 'Yes' in the RESTRICTION field in the BG Base Accessions record. All other plant material will display a 'No'

All accessions forms, delivery notes, collection details and MTAs are filed by plant records in hard copy and archived in the Horticultural Drive.

Accessioning seed

All seed deliveries must be addressed and sent to the Seed Store Lead at Watering Lane nursery with the exception of bulky sacks to be sown in situ which can go straight to site.

The Seed Store Lead allocates seed accession numbers, writes clearly on the seed packets and stores the seed prior to propagation. The Seed Store Lead writes the accession numbers on the delivery note next to the plant names or on a New Accessions Form. This information is entered onto the database. The relevant Lead, propagator and horticulturist are notified of the seeds arrival and accession numbers. Accession labels are sent to the propagator if and when requested.

Accessioning Wild Collected Material

Plant material that has been collected from the wild or is a propagule of wild sourced material is to be treated as restricted material. All wild collected material must be sourced responsibly and comply with the requirements of the CBD and Nagoya Protocol (Appendices 2 & 3). Original location and collection data must be entered in the relevant fields in BG Base.

Plant material which does not need accessioning

This should be reviewed from time to time due to the nature and scale of the project where plant material is brought in for numerous reasons. If in doubt, please discuss this with plant records before making a decision.

Commercial plants

Commercial plants cover any plant material (seed, bulbs, plants) which enter Eden for retail and as such are exempt from accessioning. Any plants subsequently joining the permanent collection must be accessioned retrospectively.

Trials and research

Seed procured for agricultural and commercial trials (conducted at Watering Lane Nursery or within the Bodelva estate) may need to be accessioned to enable seed storage management. This is to be reviewed on a case-by-case basis.

Reaccessioning

Reaccessioning should always be the last resort.

Plant material may have to be reaccessioned for a number of reasons:

- If the original plant label has been lost and details of the plant cannot be accurately found.
- When 2 or more accessions of the same species have grown together and there is no way of differentiating the different accession numbers.
- If the plant material accessioned was thought to consist of one taxa and is found to contain a mixture of taxa.
- When seed is collected from a plant, the seed will require a new accession number because it is genetically different from its parent. This is also true for seedlings which have self-seeded from a particular plant.
- If the plant is vegetatively propagated, sometimes it is necessary to reaccession if the material is going to be used in a research project.

This may make the tracking of the plant material easier through the duration of the project. In all cases the final decision for reaccessioning is made by Plant Records, however with more pressures on staff time and resources the decision to destroy material devoid of accession information is very likely. This decision will be decided by the relevant team manager and plant records.

The details of this reaccessioning process are to be recorded in the RECD_HOW and Source Information fields of all accessions potentially involved. Where relevant include the mother accession's name(s) and accession number, and the date that the seed or cuttings were collected.

Labelling

The labelling of accessions must be viewed in a long-term perspective, as many of our collections have been in the garden for several years, and their identity must be preserved with labels

despite weathering, natural disasters, and reorganization in the garden. They are vital to successful identification and accurate plant records. This will always require the diligence of staff to maintain its effectiveness. Permanent labels eventually deteriorate and should be checked annually and renewed when required.

Permanent labels must only be made by designated Plant Records staff trained in the correct use of the database and the labelling printers. As much as possible, mature plants ready for planting should be given permanent labels while still in the nursery.

When the Plant Records form is submitted for a proposed plant out, the horticultural staff will make sure that there are accessions labels. Permanent labels will be affixed on, or adjacent to, permanent plantings in the best manner appropriate to the type of plant material. This may be on a stake, or on a coiled wire around the trunk or large limb of a tree. If a number of individual plants of the same accession are planted as a contiguous group, they may be labelled as a group with several permanent labels as needed to identify them. This may be the case with ground covers, mass seed broadcasts and in the restoration projects.

The correct labelling of plants at Eden is crucial both for staff and visitors. There are two main types of label, the accession label and the display label.

Accession labelling

The accession label is crucial in linking the plant to the records on the database and therefore the plant's provenance and history. Once an accession label has been lost it makes tracking down the details of the plant in question very difficult, and in most cases all this information will be lost. Only in certain cases can a new Accession number be allocated (3.5)

The accession label is a discrete green plastic label which displays the plant's scientific name, accession number and in some cases the qualifier. The label is placed in the ground or container behind the plant or attached to the woody parts of the

plant with plastic coated wire. This is the final step in the accessioning and planting process.

Requesting an accession label

Request all labels from plant records. The information required is the name, accession number, location of the plants and the number required. Annual plants do not automatically get accession labels due to the constraints of time and resources. They can be produced if requested by the receiving horticultural team member, ideally as early as possible after procurement.

Attaching an accession label

Please see Appendix 5 for full details.

The number of labels needed may not necessarily reflect the number of plants planted. Only one or two labels may be required in some cases.

Interpretation Labels

For greater detail refer to the **Interpretation Labels Policy**. The name/s of taxon/taxa selected for an interpretation label must be verified with source, this also applies to any common name used.

Watering Lane Nursery

With little or no access to Eden Project network and internet, all propagation records are recorded on a Watering Lane Excel spread sheet. It is for this reason that there is a gap in the plant records on BG-Base. When propagation material is deemed acceptable to join the living collection a record is created. Implementation of the propagation program is the responsibility of the Nursery Manager. To ensure the smooth continuity of records communication is vital between Nursery and Seed Store teams.

Due to the nature of the Eden Project, propagation is carried out at a significant rate; therefore use these guidelines only for propagation of certain trials, research projects, hard to propagate

material or material not propagated previously and which is destined for use in the biomes or pit.

Propagation Records

Recording Propagation

Propagation activities can be placed into two categories:

- Seed sowing (at the nursery or in situ on site)
- Vegetative propagation (cuttings, division, tubers and other propagules separated)

Details should be recorded in the relevant section of the nursery spreadsheet, with as many sections filled in as possible.

If material is taken from an existing plant in the form of seeds then the parent accession number and qualifier should be noted. Plant Records allocates a new accession number (see Re-accessioning).

In most cases the number of seed or cuttings being propagated can be recorded as 'mass' unless a very small number is propagated.

If seed is sown directly into a bed on site then the information can be recorded on a Plant Records Form (Appendix 6), and the condition recorded as alive.

If material is taken from an existing plant in the form of cuttings then the parent accession number and qualifier should be noted. Plant Records allocates a new qualifier.

If tubers are divided from the mother plant or a plant is divided and replanted then the information can be recorded on a Plant Records Form. A new qualifier can be allocated.

Send to the plant records department with number of labels requested and whether a qualifier is required.

When the material propagated has rooted or is pricked out, then the material can be classed as plant material and a therefore can be recorded as a plant record.

Plants will be moved through the nursery as their cultural requirements dictate. The designated lead of the relevant collection or location will be notified when requested plants are

available for planting out. Requests for propagation will be considered fulfilled when the appropriate plant material has reached finished pot size. Any replacement of plants will require a new propagation request. Labelling of nursery plants may be handwritten or machine printed. If the plants are potted up individually and may be used for more than one garden site, they should have one plastic tag per pot. For ease of labelling and tracking, it is preferable not to combine different accession numbers of the same species in the same flat in the nursery, and to keep individual plants of the same accession together until they are ready for movement to Bodelva. As much as possible, Plant Records staff will facilitate this process by preparing an appropriate number of greenhouse labels for a flat of seedlings prior to the first pricking out and potting up.

Propagation activities which do not get recorded

Do not record propagation activities for annuals, crops, vegetables, bedding etc. The Nursery lead at Watering Lane collates this information and stores it in spread sheet format on Eden's intranet at <http://wln/>

Do not record propagation details for trials on commercial ornamental or agricultural crops for the Agronomist or Commercial Development teams.

Quarantine Records

Refer to Plant Health Operating Procedures for complete picture of requirements.

The importance of keeping up-to-date records for P1 and Quarantine 4 (QUAR4) quarantine facilities is essential. There is a high volume of plant movement in these areas and the potential for disease escape is higher than other areas. It is therefore suggested that each facility is to undergo a full stock check every three months, on top of general record keeping to 'iron-out' any outlying accessions etc.

Plant Records

Once a plant has arrived and has been accessioned, it will then be planted or located at the nursery or horticultural compound ready for planting. It is at this stage that a plant record should be

created. The accession number which is first allocated when the plant material arrives is then given a qualifier.

Qualifiers

A qualifier is a label allocated to the accession when it is first recorded at a location. This becomes a suffix added to the accession number.

The qualifier links an individual plant or group of plants at a certain location with the accession (it is the location that is the important piece of information).

Qualifiers run alphabetically and consecutively from A to Z and are determined by the next available qualifier for that accession on the database.

There are three main reasons why and when we use qualifiers:

- When accessions are planted in different areas therefore there are separate records created which keep track of the accession in each location.
- To easily distinguish different age or size of plants as would be the case if cuttings of the parent plant were taken.
- A batch of plants may be required for study and individuals of each accession can be separated easily by giving them different qualifiers. This is often carried out with tree species whose individual heights and growth is of interest or for plants used in scientific experiments.

Labels designated for Temporary Display plants are produced without Qualifiers. This is to avoid confusion around the recording of a large group of plants that are constantly moving. However, qualifiers for these accessions are used on the database.

Recording plant activities

It is vital that 'significant changes' with an accession and qualifier are recorded. These include: planting, dividing, removing dead material, disease, moving and heavy pruning. It is essential that this happens as soon as possible to ensure that we can keep track of our plants at all times. The minimum information this will

give us is the location, number and condition of every plant on site and allows us to accurately query the database and provide up to date information about our living collection.

Horticultural activities which include planting, moving and removal of plants should ideally be recorded on a Plant Records Form.

Inventories or lists of plants can be produced from the database when large numbers of plants are being recorded, for example when stocktaking or planting or removing a large batch of material (Appendix 7)

Number of plants

This is the number that is being planted, removed or moved.

If the number of plants is greater than 20 or are difficult to count due to mergence or size than the term 'mass' can be used.

When planting bulbs or seed is sown directly into a bed the term mass can also be used as the emergence from the ground may differ from the amount planted/sown.

'Number left' refers to the amount of plants in the same accession in the old location when plants have been moved. Or it could mean the amount left in the same location after plants have been removed or are dead.

Location of plants

Please refer to Maps Folder on J:\ Drive for site maps and bed locations at Eden:

J:\Common\6. Science Team\PlantRecords\Maps+ Locations

Further, in-depth maps of Eden and Watering Lane nursery may be obtained from Plant Records.

When a plant is planted for the first time or dead or removed, the location needs to be written. When a plant is being moved or divided then the old and new location needs to be written.

Condition of plants

When plant information is recorded, either on the Plant Records Form, New Accessions Form or stocktaking list, record the

condition of the plant or plant material when it arrives and/or is planted. There are 7 codes which should be used:

- **Good (G):** This is when a plant has an overall good or excellent appearance.
- **Fair (F):** The plant may be slightly damaged or have a pest problem.
- **Alive (A):** This code is often used for herbaceous perennials or bulbs when they are dormant and the vegetative parts of the plants are not visible. This code is also used by the plant records department when no condition has been recorded by the horticulturist but other information has been recorded about a plant.
- **Poor (P):** This is when a plant looks very unhealthy.
- **Removed (R):** This is when a plant/s are harvested or a plant is no longer required in its present location.
- **Dead (D):** This is used when a plant dies. A reason for death must be put into the CHECKNOTE field if the death is attributed to a pest or disease.
- **Unable to locate (U):** This is used when a plant is entered on the database as being in a certain location but cannot be found there but it is unknown what has happened to it.

If a plant has a condition other than good (G) or fair (F) then the reasons why should be explained including any visible pests and reasons for death or removal. For more information refer to the Plant Health Operating Procedures.

Once an accession has been recorded as dead, it will no longer show up on inventory lists of live plants but all historical information will remain on the database.

Stocktaking

In addition to completing Plant Record Forms which detail day-to-day horticultural activities, it is still important that regular stocktakes of all areas are carried out to remove any problems caused by human error, oversight, or the death or self-seeding of

plants. It is also a time to request new labels if they have been lost or to replace old ones.

Types of stocktaking

One-off stocktakes can be carried out if redevelopment or renovation work has been done in certain areas or when a new member of horticultural staff needs to familiarise themselves with a certain area. Equally if there is any confusion over plants or labels.

Regular stocktakes must be carried out on every area on site and at Watering Lane nursery. These ideally should be carried out once a year but every two years is the norm. They take place in the horticulturalist's quieter periods.

The gardeners in charge of each area are responsible for stocktaking, recording and sending the forms or lists to Plant Records, under the supervision of their line manager. Plant Records can lead or assist this process at any time.

Recording a stocktake

An inventory list for each area can be printed from the database and recorded onto for stocktaking (Appendix 7).

A simple tick if the plant is there, noting any amendments to numbers and condition.

If the plant is dead, removed, moved or divided then use the codes as on Plant Records Form with any new locations of divisions.

If any new plants or accessions are found then these can be added to the list to include the plant name, accession number, number and condition. If the accession number is not known please indicate any information as to where the plant came from in order to assist Plant Records in recording.

Any new labels that are needed can also be requested and Plant Records will print and send back to the member of staff.

Temporary Display Team Records

A vital part of horticulture here at Eden, the workflow of Temporary Displays team has a high risk potential for the spread

of disease (see Plant Health Procedures) and loss of accession data. It is for this reason that the urgency and speed of the records is high.

Accession labels for Temporary Displays will not, as of 2016, contain a Qualifier. However, the qualifier information will still exist on the database.

Transfer and use of material by externals outside of Eden Project

As an Educational Charity, our plant material cannot be distributed for the financial gain of any party.

Requests from other institutions, including botanical gardens, arboreta, universities and individual researchers should be referred to the Science Team Manager and Plant Records Lead for approval. The request should specify the exact plant materials, amounts of material needed, and the purpose for which they will be used. Eden Project's response should include an attachment of two Standard Material Transfer Agreement forms (Appendix 8) one of which should be completed and returned to Eden, the other to be kept by said institution or individual. Restricted special collections or collections made under permits are not to be distributed without approval of original donor or permitting agency. This information will be stored on file along with all of the other SMTA's.

If there is any doubt about the integrity of said institution or person, it is essential that more in-depth inquiries are made.

For more in-depth information please refer to the **Material Transfer Agreement Policy** (Appendix 8) and **Sustainable Supplier Form** (Appendix 2).

Appendices

- Appendix 1 Eden Project acquisitions checklist
- Appendix 2 Eden Project responsible supplier and nursery form 2016
- Appendix 3 The Nagoya Project and Eden Project January 2015
- Appendix 4 New accessions form
- Appendix 5 Plant labelling 1 and 2
- Appendix 6 Plant records form
- Appendix 7 BG base inventories
- Appendix 8 Eden MTA Policy and MTA agreement

The full policy will be shared through the PlantNetwork website

NOTES

