

Northern Territory Herbarium Destructive Sampling Policy

Document title	Northern Territory Herbarium Destructive Sampling Policy
Contact details	Northern Territory Herbarium
Approved by	
Date approved	
Document review	As required
TRM number	<NA if not required>

Version	Date	Author	Changes made
1.1	January 2021	Ian Cowie	First Draft
1.2	November 2023	Nick Cuff, David Albrecht, Louis Elliot and Aiden Webb	Modifications to first draft for finalisation
1.3	August 2024	Nick Cuff, Brydie Hill	Final version for approval

Acronyms	Full form
<Eg: NT>	<Eg: Northern Territory>
DNA	Index Herbariorum code for NT Herbarium Darwin (Darwin North Australia)
NT	Index Herbariorum code for NT Herbarium Alice Springs
CHAH	Council of the Heads of Australasian Herbaria

Contents

1. Purpose & Context	4
2. Background	4
3. Scope	4
4. Legislative requirements	4
5. Requirements when making requests to destructively sample from specimen collections	5
6. Criteria for approval to destructively sample from specimen collections	5
7. Conditions for destructively sampling from specimen collections	6
8. Definitions	7
9. Legislation and associated documents	8
9.1. Agency resources	8
10. Appendix 1	9
11. Attachment 1	10

1. Purpose & Context

This Policy outlines the requirements, criteria and conditions for researchers seeking to destructively sample material from the physical specimen collections held by the Northern Territory Herbarium.

2. Background

The collections held by Australasian herbaria are maintained with the goal of balancing the preservation of herbarium specimens with the need to use them for taxonomic and systematic research. The Australasian herbarium community also acknowledges the changing needs of the scientific community and endeavours to support a wide range of botanical research.

For the purposes of this document, destructive sampling is defined as the removal of material from a specimen for research purposes other than routine taxonomic examination. Removal of leaf material for extraction of DNA, phytochemical or isotope studies (i.e. genetic or biochemical research), or removal of seeds for propagation, is regarded as destructive sampling. Dissection or removal of parts of a specimen for microscopic inspection is not, if it remains within the bounds of normal taxonomic practice and specimen handling protocols are followed.

Requests for destructive sampling of specimens from the Northern Territory Herbarium are considered on a case-by-case basis and according to the merits of the request. Every effort will be made to accommodate the needs of researchers where requests are in accordance with this policy. Where possible, researchers must make every effort to source fresh material and only request destructive sampling from herbarium specimens when there is no other option. Provision of a loan or physical access to specimens *does not* include permission to destructively sample material. Permission for destructive sampling will only be granted through specific application.

3. Scope

This Policy provides guidance for researchers and NT Government staff on the assessment of applications for destructive sampling of plant material that forms part of the NT Herbarium specimen collections.

4. Legislative requirements

The Northern Territory Herbarium is not responsible for validating the provenance or permit authorisation of specimens housed in the collection. Users of materials are responsible for ensuring that State and Commonwealth legislative requirements are met, and that international conventions and treaties are not contravened.

Biological Resources Act 2011.

Research in relation to any genetic resources or biochemical compounds derived from plant specimens which are part of the Northern Territory Herbarium collection that may now or in the future constitute biodiscovery requires assessment under the Northern Territory's *Biological Resources Act 2011*. If proposed research involves or has the potential to involve biodiscovery (see definitions), the researcher may be required to enter into a formal Benefit Sharing Deed with the Northern Territory Government or other interested parties. To seek approval to take biological resources (including material destructively sampled for accessing genetic resources) that may constitute biodiscovery involving Northern Territory Herbarium specimen collections, a researcher is currently required to gain written permission from the relevant permit-issuing authority.

Convention on International Trade in Endangered Species of Wild Fauna and Flora and Australian Environment Protection & Biodiversity Conservation Act 1999

The Convention on International Trade in Endangered Species of Wild Fauna and Flora and Australian Environment Protection & Biodiversity Conservation Act 1999 control the movement of specimens and parts of specimens of some taxa. A list of Australian CITES-listed species is available at <http://www.cites.org/eng/resources/species.html>. In the Northern Territory, this list applies particularly to species of cycads and orchids. Specimens or samples of CITES listed taxa can be sent only to CITES registered scientific receiving institutions. For information on registration and registered organisations, see <http://www.environment.gov.au/topics/biodiversity/wildlife-trade/trading-and-out-australia/non-commercial-trade/scientific>

Specimens in collections may have been treated in various ways (e.g. with preservatives, sterilants, insecticides, freezing, gamma irradiation) at times. Records on the history of treatment of specimens may not be available. Material from specimens is supplied with no warranty of any kind, and the lending institution is not liable for misinterpretations or false results obtained as a result of these treatments.

5. Requirements when making requests to destructively sample from specimen collections

- 1) Requests to destructively sample Northern Territory Herbarium specimens should be made in writing to the Northern Territory Herbarium's Chief Botanist at DNA. Refer to the form *Application for Destructive Sampling of Northern Territory Herbarium (DNA and NT) specimens* (see attached). NT Herbarium staff can provide assistance with developing such requests and can be consulted in writing via Herbarium@nt.gov.au.
- 2) The researcher may use the samples collected, and any progeny or derivatives thereof, for non-biodiscovery purposes only. If, at any point in the future, the researcher wishes to undertake biodiscovery on the samples collected, or on any progeny or derivatives thereof, written approval must be obtained from a relevant permit-issuing authority. Any future research on or other manipulation of samples, progeny or derivatives that are deemed to comprise biodiscovery will be subject to a separate agreement consistent with legislative requirements under the Biological Resources Act YEAR.
- 3) Material must not be removed for genetic or biochemical research without written approval from both the Chief Botanist at DNA and, if required, the relevant permit-issuing authority. Destructively sampled plant material will only be forwarded to the researcher's borrowing institution after all required written approvals are in place and have been provided to the NT Herbarium for record keeping purposes.
- 4) For large or complicated requests, researchers are encouraged to visit the Northern Territory Herbarium (Darwin and/or Alice Springs) to select specimens for sampling.

6. Criteria for approval to destructively sample from specimen collections

- 1) Permission will not be granted to destructively sample from type collections or historical specimens (pre 1900), or from taxa represented in the herbarium by less than three collections, except in exceptional instances as deemed appropriate by the Chief Botanist.

- 2) Removal of material for destructive sampling will be done by, or under the direct supervision of staff of the NT Herbarium and under the guidance of an experienced taxonomist. It is preferable that all sampling is done before any associated loan of specimen collections is provided to a receiving institution. Approval for a third party to sample from a specimen collection will only be approved in exceptional circumstances and in writing by the Chief Botanist.
- 3) Removal of material for a second study with the same focus will not be approved unless clear justification is provided (i.e. material removed from the same specimen on separate occasions by the same or different researchers for studies with the same/similar aims). An example where this may be approved is if there is significant question over the identity of a type that will have taxonomic/nomenclatural implications.
- 4) Material may be destructively sampled from a specimen only if there is adequate material available and only if the scientific integrity of the specimen is not compromised by its removal.

7. Conditions for destructively sampling from specimen collections

- 1) Researchers must provide details of the proposed methods and amount of material required from each specimen (or groups of specimens). Researchers will typically be provided with double the agreed, specified amount of material wherever practicable as per item 8 below. This will allow for redundancy in analytical pipelines. Surplus material must be made available for return upon request by the Chief Botanist.
- 2) Where possible, samples should be taken from the material in fragment packets and/or from obscured portions of the specimen. Specimens with the most abundant leaf, fruit or flower material should be sampled first. Care must be taken not to damage the scientific value of the specimen.
- 3) Material removed from a specimen collection at the time of sampling and not forming part of the provided sample will be returned to a fragment packet on the specimen, or placed in the specimen packet, box or spirit container at the time of sampling.
- 4) For each specimen from which material has been sampled, an archival-quality paper slip annotated in typescript or indelible ink (not ballpoint pen) must be attached to the sheet or packet. The annotation slip should indicate what was removed, the nature of the study, the researcher's name and institutional affiliation and the date (see Appendix 1 below).
- 5) Sampled material or derivatives (including aliquots, extracts, formulae, synthetic pathways and images) must not be made available to any third parties without written permission from the Chief Botanist at DNA and a separate authorized Materials Transfer Agreement.
- 6) Sampled specimens should be cited by the Northern Territory Herbarium's accession number in any resulting publication(s) and a copy of the publication(s) sent to the Chief Botanist at DNA. The lending institution must be acknowledged in any resulting publication(s).

Samples for anatomical and other studies

- 7) Depending on the nature of the study and the specific requirements of the institution involved, physical records derived from specimens (e.g. permanent microscopic slides, SEM stubs and/or photographs) should be appropriately housed, preferably with the major national, regional, state or territory herbarium hosting the research as the Northern Territory Herbarium is currently unable to store this material. This material should be cross-referenced to the associated specimen and made

available to other researchers upon request. The researcher is encouraged to provide the Chief Botanist with a list of material lodged.

Samples for molecular studies

- 8) The fate of all material provided under an approved destructive sampling request and the results of all molecular analyses derived from these must be made available to be made available to the Northern Territory Herbarium as soon as is practicable after finalisation of analyses.
- 9) Molecular sequence data must be lodged in a publicly accessible database (e.g. GenBank). The Northern Territory Herbarium's unique specimen accession number must be included in the specimen voucher field.
- 10) GenBank and other accession numbers must be included on the annotation slip (see below for example). If retained extracts are used to sequence additional regions, the researcher is encouraged to provide the additional GenBank numbers and associated results to the Chief Botanist at DNA.
- 11) The Northern Territory Herbarium does not require the return of excess derived products from any downstream analysis derived from destructive sampling from specimen collections.

8. Definitions

Table of terms used and their definition

Annotation	A supplementary label or note added to a specimen collection to provide taxonomic updates or confirmations subsequent to the original label information associated with the mounted specimen collection
Biodiscovery	Means research on samples of biological resources, or extracts from those samples, to discover and exploit genetic or biochemical resources of actual or potential value for humanity
Biological Resources	Includes genetic resources, organisms, parts of organisms, populations and any other biotic component of an ecosystem with actual or potential use or value for humanity
Bioprospecting	The taking of samples of biological resources, existing in situ or maintained in an ex situ collection of such resources, for research in relation to any genetic resources, or biochemical compounds, comprising or contained in the biological resources
Genetic Resources	Any material of plant, animal, microbial or other origin that contains functional units of heredity and has actual or potential value for humanity

Material preserved in liquid	Spirit collections preserved in alcohol
Separate Fruits	Specimen collections held in the designated carpological collection of the Northern Territory Herbarium.
Specimen or specimen collection	A preserved dried plant mounted on archival sheet.
Type (or nomenclatural type) specimen	The element (typically a specimen collection) used to describe a taxon and to which the name of a taxon is permanently attached. The published scientific name and official description of the taxon are associated with this type specimen. Various categories of type specimens are defined in the International Code of Nomenclature for Algae, Fungi and Plants (Turland et al. 2018).

9. Legislation and associated documents

Protection of Objects of Moveable Cultural Heritage Act (1986) [Federal Register of Legislation - Protection of Movable Cultural Heritage Act 1986](#)

Environment Protection and Biodiversity Conservation Act (1999) [Federal Register of Legislation - Environment Protection and Biodiversity Conservation Act 1999](#)

Northern Territory of Australia Weeds Management Act (2001) [Legislation Database \(nt.gov.au\)](#)

Northern Territory of Australia Territory Parks and Wildlife Conservation Act (1976) [Legislation Database \(nt.gov.au\)](#)

Convention on the International Trade in Endangered Species of Wild Flora and Fauna (1963)

Northern Territory of Australia Biological Resources Act (2006) [Legislation Database \(nt.gov.au\)](#)

9.1. Agency resources

Northern Territory Herbarium Specimen Collections Management Policy

Northern Territory Herbarium Specimen Collections Loans Policy

10. Appendix 1

Example annotation slips

Leaf material removed for DNA analysis.
DNA isolation number: GB123
GenBank number: AF234567
G.K. Brown (MELU) 7 Jun 2011

Fruit removed for SEM imaging.
C. Tauss (PERTH) 21 Jul 2011

11. Attachment 1

NT Herbarium Destructive Sampling Request