

## Aboriginal plant translocations: The intentional propagation and dispersal of plants in Aboriginal Australia

### In brief

As plants become increasingly threatened due to habitat loss and degradation, plant diseases and climate change, efforts to conserve plant species through translocation are also increasing. This study shows that Aboriginal people have been moving plants around and altering their 'natural' distributions through the deliberate propagation and nurture of culturally important species for millennia. This has relevance for the ethics and practice of translocations as well as for biocultural heritage management and research.



### Background

The contemporary definition of plant translocation is defined as the intentional movement of plant material with the aim of increasing the geographic range and/or population size of a species for conservation purposes. It includes both augmenting existing plant populations and establishing new populations in areas outside the natural range of the species. Translocation is a rapidly expanding field of conservation biology, driven by the challenges of conserving species in their own ecosystems, as many of those environments are becoming highly fragmented or modified. The importance of the practice of translocation will continue to grow as plant populations continue to decline under increasing pressure from loss and degradation of habitats, disease and climate change.

However, the translocation of plants that are considered important or valuable by societies is not new.

There are many examples from around the world of plant propagation that either took place before agriculture or independently of it. The current distributions of many plants globally are due to deliberate transport and nurture by humans over millennia. These include not only important food plants but also those with medicinal or narcotic properties and/or cultural and ceremonial meaning.

It has been well-documented that Aboriginal people altered the abundance of species in Australia over millennia through regular burning. There is also evidence of extensive practices of plant processing, storing of grain and irrigation by Aboriginal people. However, it is still debated how much Aboriginal people intentionally dispersed and cultivated certain plant species to increase their range and/or abundance, thus changing the composition of vegetation communities.

LEFT: Fruit of the Quandong tree (*Santalum acuminatum*). John Moss (Public domain).

### What the research looked at

This research was a desktop review of the archaeological, ethnographic, biogeographic and phylogenetic record relating to Aboriginal plant translocations. No Aboriginal people were interviewed.

The key questions addressed were:

1. Were plant materials (propagules) deliberately moved and planted,
2. What types of plants were involved, in which regions and for what purpose; and
3. What impact has this had on contemporary plant distributions?

and what type of translocations were practiced, e.g., moving whole plants, seeds, root fragments, pollen;

The review illuminates an aspect of Aboriginal plant management that has implications for the ecology and ethics of modern translocation science. This is especially so with respect to assisted migrations in response to climate change and concepts of a species' pre-European distribution in Australia.

## Research methods

The research reviewed ethnographic sources, including explorer journals from the 19th century and the accounts of early European settlers, anthropological works, peer-reviewed articles, books and monographs for references to deliberate transport and planting of propagules (plant matter used for propagation, including entire plants, vegetative parts, cuttings and seeds) by Aboriginal people. It drew on current ethnographic evidence published in journal articles and interviews about areas where traditional land management practices survive today to various degrees. No Aboriginal people were interviewed.

The World Conservation Union Guidelines define translocation as the deliberate planting and nurture of plant propagules, and include four types of translocations: assisted migration, introduction, reintroduction and reinforcement. Incidental movements of plants were not included if there was no evidence of an intention to translocate.



## Findings

### Types of plants

Over 50 plant species were recorded as being deliberately translocated by Aboriginal Australians, including at least 20 trees and shrubs, 13 tuberous species (mostly yams), nine non-tuberous herbs and seven grasses. The vast majority (43 species) were, and in some regions still are, important food species, while at least nine were valued for non-food plant materials such as cones for lighting fires and wood for making spears. At least 17 species had or have ceremonial or cultural importance, with translocations of these often taking place as part of a specific ceremony.

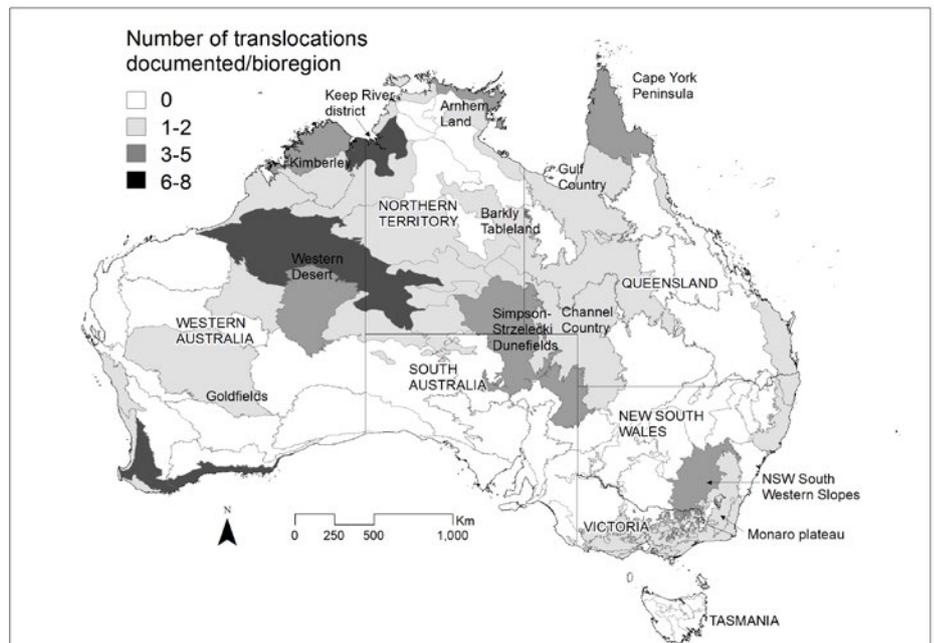
### Types of translocation

Most species had several types of translocation. Introductions (i.e., the establishment of new populations in the known range of the species) were the most common type, documented for 31 species. Reinforcement (i.e., planting into existing populations) was

documented for 23 species, while assisted migrations into new areas outside the apparent native range of the species were documented for 19 species. Ten records involve translocations after European settlement, mostly of people taking important food or ceremonial plants back to gardens to ensure and maintain a connection with sites where they grow in the absence of regular visits there.

### Regions

The records for Aboriginal translocations span 38 of Australia's 89 biogeographic regions, and take in all of the major climate zones. The highest numbers of documented translocations were found in the Mediterranean south-west, the tropical north, and the Western and Simpson Deserts. By contrast, no reliable records of translocations were found for large parts of south-central South Australia, central Queensland and central New South Wales (see Figure 1).



ABOVE: **Figure 1:** Number of plant translocations carried out by Aboriginal people documented by biogeographical region, Australia. State names and specific locations mentioned in the text are identified. Records ranked as being of low verifiability are not included.

LEFT: Jai Joseph and Gerry Turpin discussing traditional processing of Black Bean seeds for consumption. Image: Emilie Ens

### ***The archaeological record***

Little archaeological evidence has been found for most Aboriginal plant management activities, including translocations. The lack of archaeological evidence of plant-management activities is also recognised in other countries, and may be partly due to lack of concerted research effort to date, as well as the often “light footprint” of such activities, particularly where they mimic natural processes. Compounding this, many ancient ‘gardens’, food production systems and associated stories were destroyed rapidly, by earthworks, livestock and cultural decimation.

The only significant exceptions to the lack of archaeological evidence are the “yam gardens”, or soil mounds, of south-eastern Australia and a stone arrangement in the Western Australian Goldfields region that was created above a claypan to celebrate the sowing into claypan cracks of samphire seeds.

### ***The ethnographic record***

The majority of records of translocations come from the ethnographic record. There are frequent accounts from across Australia of Aboriginal people replanting sections of tubers (including yams, lilies, sedges, legumes, ground orchids and numerous other plant groups) after harvesting, and this is by far the most well-known and widely practised example of translocation. This practice takes in the reinforcement of populations and, in some cases, reintroductions to new areas. It has been reported from Cape York, central and western Victoria, Arnhem Land, the Keep River area, the Kimberley and along the south-western coast of Australia.

### ***Biogeographic and phylogenetic insights***

Translocation of at least 18 species is evident from the biogeographic record, and over half of these are

supported by ethnographic and/or phylogenetic evidence. The most common forms of biogeographic evidence of Aboriginal translocations are unusual isolated occurrences or high concentrations of important species, such as *Bugam* or black bean (see case study box on back page).

Assisted migrations from before the rising sea levels of the early Holocene might explain the occurrence of the common New Guinea domesticated plants taro (*Colocasia esculenta*) and bananas (*Musa acuminata*) in northern Australia. It may also explain the spread of some rainforest plants from New Guinea into northern Australia more than 10,000 years ago. Humans are the most likely cause of dispersal of boab (*Adansonia gregorii*) in north-western Australia.

## **First-hand records: Dame Mary Gilmore**

As a child, Dame Mary Gilmore (1865–1962) observed Aboriginal women collecting fresh seed capsules from unburnt shrubs after a fire on the plains in Wiradjuri country of the New South Wales South Western Slopes. They then planted the seeds where burnt shrubs stood, while a “heavy kind” of grass seed was collected, processed, and the best grains planted into the burnt area.

In accounts from 1934 she recalled, “How I remember the grass planting so well is that being a child I thought all seed was the kind wanted, and gathered ripe and unripe, and chiefly the sort that rolls on sickle-shaped terminal. This, I was told, was not what was required, that the wind would plant this; that it was what did

not run, and then catch in the earth, that had to be planted by hand.”

She also described an apparent cross-fertilisation of the fruit-bearing quandong tree (*Santalum acuminatum*), as well as people planting seeds to replace what they ate, preparing the soil by lighting a small fire first. She concluded that “the natives [sic] had a knowledge of their own in regard to conditions of soil, shade and moisture in relation to seed”.

This research supports those observations. The movements of plants by Aboriginal people were – and continue to be – founded on an intimate knowledge of species biology, life history, habitat requirements and horticulture.

The practices described by Mary Gilmore in New South Wales – cross-fertilisation, selection of the best seeds and replacement plantings – have much in common with contemporary conservation translocations.



*Quandong tree (Santalum acuminatum). Image: John Moss (Public domain).*

This factsheet is a summary of a desktop review of written evidence relating to Aboriginal plant translocations. Outside the hub, other cross-disciplinary and cross-cultural research is taking place in this space. For example:

### **Cross-cultural Bugam (black bean) dispersal in northern New South Wales**

New methods of cross-cultural and multidisciplinary research are looking at the translocation of plants by Aboriginal people before colonisation in Australia. In 2016, a team of Aboriginal and non-Aboriginal researchers explored the potential for combining Aboriginal knowledge and linguistics with new genetics techniques to better understand observations and the distribution of *Bugam* (black bean, *Castanospermum australe*) on ridges in northern New South Wales.

This species was a staple food for many people of northern New South Wales; it produces long-lived, large edible seeds (after preparation to remove toxins). Evidence from the *Ngunthungulli* songline explains that *Nguthungulli* (an ancestral spirit likely to represent a real person) carried and left "bean tree" seeds as he journeyed inland along the ridges of the Nightcap Border and McPherson ranges dividing New South Wales from Queensland. This songline was traced for the first time in this research. Genetic analysis of surviving *Bugam* trees in catchments across northern New South Wales revealed genetic homogeneity suggesting common ancestry. The potential contribution of other dispersal mechanisms was excluded, based on the absence of suitable vectors and current distributional patterns at higher elevations and away from water courses, and by analysing a comparative sample from northern Australia.

Rossetto, M., Ens, E. J., Honings, T., Wilson, P. D., Yap, J.-Y. S., Costello, O., Round, E and Bown, C. (2017). From Songlines to genomes: Prehistoric assisted migration of a rain forest tree by Australian Aboriginal people. *PLoS one*, 12(11), e0186663. doi: 10.1371/journal.pone.0186663

## Cited material

Silcock, J.L. (2018). Aboriginal Translocations: The Intentional Propagation and Dispersal of Plants in Aboriginal Australia, *Journal of Ethnobiology*, Vol. 38, Iss. 3, pp. 390–405.

## Further Information

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## Conclusions

The plant management of Aboriginal people can be very different to European models. Aboriginal land management practices often closely follow natural and/or cultural processes and often were not recognised or understood by early European observers. Knowledge was passed down orally through generations and although much has been lost to colonisation, much is still held by Aboriginal people in society today. Very few explorer and early traveller journals include observations of deliberate movements or plantings; most accounts are from people who lived among Aboriginal people for lengthy periods. Most records are single but often detailed first-hand accounts. These are difficult to verify, but taken together with remaining obvious patches of manipulated populations and ethnographic evidence from contemporary Aboriginal knowledge custodians, form indisputable evidence that Aboriginal translocations spanned a wide variety of regions, habitats and lifeforms. New and emerging genetic techniques combined with

environmental niche modelling have the potential to corroborate and further investigate translocations known from ethnographic and historic records (see the *Bugam* case study box).

The most frequently documented practice was the reinforcement of existing populations of important food plants through the replanting of tubers in coastal areas and the seeds of trees, shrubs and grasses throughout Australia. Deliberate introductions and assisted migrations to new areas took place through travel and trade networks, and can be found at old camp sites, middens or mounds.

Stories of ancestors teaching people about selecting, sowing and transporting seeds are common throughout much of Australia, and display a detailed knowledge of propagation and dispersal practices.

There is little doubt that many more of the estimated 20,000 vascular plant species known to have been used directly by Aboriginal people were translocated than is evident in the records.

## Recommendations

The review showed current evidence for translocations is concentrated in areas where there have been long-term Aboriginal led and ethnobotanical studies, which have typically involved in-depth engagement with Aboriginal elders. Similar approaches in other areas in partnership with local knowledge custodians may reveal more information about plant translocations.

The debates about the ethics and philosophy of moving plants will intensify as attempts to conserve species in the face of anthropogenic climate changes increasingly involve assisted migrations.

Against this backdrop, we must acknowledge that people have been promoting the growth and survival of certain species by transporting them from beyond their 'natural' range for thousands of years.

Combined with emerging evidence from phylogenetic and niche modelling studies, the ethnographic record adds to our understanding of species distributions in Australia, providing contemporary relevance for cultural heritage, land management, and biodiversity conservation, including 'novel' strategies like translocation.