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Defining the native and naturalised flora for the Australian continent

R. J. Fensham A,B,C and B. Laffineur A,B

AQueensland Herbarium, Mt Coot-tha Road, Toowong, Qld 4066, Australia.

BDepartment of Biological Sciences, University of Queensland, St Lucia, Qld 4072, Australia.

CCorresponding author. Email: [rod.fensham@Qldgov.au](mailto:rod.fensham@Qldgov.au)

Abstract. The value of distinguishing between plant species regarded as ‘native’ and ‘alien’ has special relevance in the island continent of Australia, where European settlement was a springboard for human-assisted plant dispersal. The year of European settlement is proposed here as providing a distinction between a ‘native’ and ‘naturalised’ flora and is applied for the entire Australian flora of vascular plants. Herbarium collections and ecological criteria were employed to determine the status of 168 species of ambiguous origin. The date of 1788 proved to be a relatively straightforward criterion to assign native and naturalised status and the origin of only 27 plant species remains ambiguous. The dispersal of plants between continents is an ongoing process but European settlement of the Australian continent represents a very sharp biogeographic event for the Australian flora and provides a straightforward criterion for determining the ‘naturalised’ species.

Additional keywords: alien plants, exotic plants, flora, indigenous plants, naturalised, native.

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Introduction

Plant species have been transported around the globe in conjunction with people and recently naturalised species, classified as neophytes, are distinguished from native species, or archaeophytes (van Kleunen et al. [2015](#page14); pp. 155, 156, 183, 298; Pyšek et al. [2017](#page14)). There has also been considerable argument about the value of this distinction (Warren [2007](#page14); Richardson et al. [2008](#page14); Preston [2009](#page14); Warren [2009](#page14); Chew and Hamilton [2011](#page14); Simberloff et al. [2013](#page14); Ricciardi and Ryan [2018](#page14)), and it is recognised that the distinction may be arbitrary in space and time (Warren [2007](#page14)), particularly in a world where the opportunities for dispersal and introduction of species are enhanced by globalisation and changes to land-use (Sax and Gaines [2003](#page14)). It is also recognised that many alien species may not have a negative impact on native biodiversity (Richardson [2000](#page14)), and that the concept can be underpinned by prejudice (Davis et al. [1998](#page14); Warren [2007](#page14)). The latter point is reflected in the xenophobic language used to describe the process of biological invasion including terms such as ‘weed’, ‘noxious’, ‘feral’, ‘invasive’ and ‘alien’ (Richardson [2000](#page14); Warren [2007](#page14)). These terms are not all synonymous with some referring to origin and others relating to processes associated with their colonisation and spread. In the present study, the term ‘naturalised’ refers to species, originating from outside a place of reference, that have become established in self-sustaining populations after a specific data (consistent with Richardson [2000](#page14)). Here the place of reference is the Australian continent and the specific date is 1788 (see below).

Nevertheless, the notion of a native biota pervades conservation science, particularly in the New World where colonisation by Europeans represents a sharp biogeographic watershed (Crosby [2004](#page14)). Even in the Old World neophytes that arrived during successive transmigrations of humans are distinguished from archaeophytes (Pyšek et al. [2004b](#page14)). The naturalised–native distinction is of great interest to gardeners, farmers, naturalists, botanists, ecologists and the lovers of plants. This interest may sometimes represent irrational botanical nationalism but some naturalised plants have become invasive at the expense of native biodiversity and a small proportion have the potential to transform native ecosystems (Vilà et al. [2011](#page14)) and threaten the existence of native plant species (Pyšek et al. [2012](#page14)). There is also an obvious imperative to define native-naturalised species across all the regions of the world to further our understanding of global biogeography and there is much work to be done in this regard (van Kleunen et al. [2015](#page14); Pyšek et al. [2017](#page14)).

An overdue study attempted to provide clarity to the native–alien distinction in Australia (Bean [2007](#page14)). Bean ([2007](#page14)) proposed that the most meaningful definition of an ‘alien’ or naturalised plant species rests on whether they have been introduced by people and is founded on the premise that non-anthropogenic dispersal for most plant species is highly improbable – with the notable exception of wetland species and those with seed obviously adapted to animal dispersal. Bean also points out that there was a long period of human exploration before the British settlement of Australia in 1788 spanning back to Vasco de Gama at least (~15th century).

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For Bean it follows that the suite of plant species without obvious dispersal mechanism, that have not evolved in Australia but were clearly here before European settlement, were probably transported by visitors to our shorelines in the centuries before the establishment of Sydney Cove.

The extent to which these visitations before European settlement provided a means of plant establishment is open to question. The most substantial visits were the regular arrival of Macassan seamen to gather trepang (sea cucumbers) on the north coast of Australia. The annual trade route of the Macassans pre-dates European colonisation by no more than 100 years (Macknight [1976](#page14)) and was almost entirely restricted to the strand-line along the coast. There was a subsidiary trade in timber, but it is hard to imagine that these people, who spend a large amount of their time diving in and out of the sea, or the tools that they might have been carrying, were important vectors for spreading plant seeds. It is well known that the Macassans brought the tamarind (Tamarindus indicus) that grows exclusively on the beach strand-line in the same areas they were known to visit.

There is no other continent where the transition from management by hunter-gatherer indigenous people to agrarian settlers was as sudden or as recent as in Australia. Following the 1788 settlement of Sydney Cove, exploration and settlement proceeded rapidly and within a century most of the continent, with the exception of the central deserts, was inhabited by Europeans. Before 1788 it seems likely that seafaring visitors had rarely been more than a few kilometres from the coast. With British settlement, there was cultivation of fields and the deliberate introduction of crop plants. Trade facilitated by regular shipping routes involved the importation of livestock and other animals including some that became feral. With these plants and animals came the propagules of alien plants, which were by-products in packs of crop seed, grain and hay used to feed livestock on their passage. The domestic animals themselves were also very effective vectors, with seed imbedded in their fur and in the dung that they deposited as they stepped ashore. The livestock were herded and transported to the rapidly expanding frontier, and with them alien plants would have been dispersed and become naturalised (Manzano and Malo [2006](#page14)).

The British settlers had many centuries of acculturated to gardening and for their sense of place and peace of mind the establishment of gardens, generally as much like England as possible, was desirable. The deliberate introduction of cultivated plants for gardens and through incidental transport of garden weeds resulted in another influx of alien plants (Low [1999](#page14); Hulme et al. [2008](#page14)). Unlike other visitors, the British colonisers deliberately sought to tame the land through settlement (Lines [1992](#page14)). The spreading of alien plants reached a crescendo with the founding of Acclimatisation Societies in the 19th century, which had the explicit objective to introduce as much of the world’s biodiversity to Australia as possible (Low [1999](#page14); Cook and Dias [2006](#page14)).

If there was a flow of plants bought by early visitors from Europe and Asia it was a mere trickle compared with the avalanche associated with permanent European settlement commencing in 1788 (Bean [2007](#page14); Dodd et al. [2015](#page14)). The 1788 settlement divide may not be the last word on whether plant species were introduced by people to Australia, but it is of such momentous significance in biogeographic history that it

serves a meaningful distinction between native and naturalised species.

In the present work the definition of naturalised hinges explicitly on the 1788 divide of European settlement on the Australian continent. Species that arrived after this time and have become integrated with the native flora are described as ‘naturalised’. The term excludes ‘alien-cultivated’ species that are confined to cultivation and do not have self-sustaining populations in either native vegetation or modified environments. The extent to which native species that were present in Australia before 1788 and may have subsequently expanded their range is not attempted. Other authors have also elected to define a time period associated with colonisation to filter naturalised from native plant species. The Flora of Hawaii uses the water shed of Polynesian colonisation 2000 years ago (Wester [1992](#page14)), and the Flora of North America uses 1500 to circumscribe the exploration of Columbus (Stuckey and Barkley [1993](#page14)).

The 1788 settlement of Australia coincided with a century of unprecedented enthusiasm for natural history and the building of herbarium collections. These collections, and therefore the relative accuracy for a time of human introduction, provide another reason for using a post-1788 date to define naturalised status. The present study employs historical collections records and other methods to distinguish the native and naturalised flora of the Australian continent using the presence or absence in 1788 as a temporal divide. The work also discusses the accuracy of this process and explores the issues associated with several species for which assigning a native or naturalised status is ambiguous.

Material and methods

Vascular plant species records from Australia’s Virtual Herbarium (CHAH [2017](#page14)), including only preserved specimen data from Canberra, Sydney, Melbourne Hobart, Adelaide, Perth, Darwin and Brisbane herbaria (accessed 27 March 2018) were attributed as native or alien. All records identified as cultivated or potentially cultivated were excluded. Specimens not identified to species and infraspecific taxa were excluded with the exception of two varieties of the grass Cynodon dactylon. Undescribed species were included with a ‘hispid’ name that identifies a reference specimen.

Most of the Australian flora is represented by native species that are either endemic to the continent or are members of genera with distributions centred in Australia. These species are unambiguously recognised as native and attributed as such here. For many naturalised plant species their extra-Australian origin and post-1788 colonisation is also unambiguous. However, there is a subset of the Australian flora that is of ambiguous origin and these species were identified by virtue of their variable attribution within Australian flora treatments, those already identified by Bean ([2007](#page14)) or through discussion with botanical experts.

The following methods have been proposed to define native-naturalised status: (1) palaeobotanical evidence; (2) historical records; (3) ease of naturalisation elsewhere; (4) character of overall distribution; (5) type of habitat; (6) relationship with biota on other trophic levels; and (7) genetic information (Webb [1985](#page14); Pyšek et al. [2004a](#page14)). For the purposes of defining native–naturalised status in the Australian continent the historical

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record is by far the most important. The ambiguous species were assessed using herbarium records with the collections of Banks and Solander (east coast, 1770), Brown (coastal, 1801–1805), Drummond (south-western Western Australia, 1829–1835), Gunn (Tasmania, 1831–1850), Leichhardt (inland New South Wales and Queensland, 1842–1847), von Mueller (northern Australia, 1855–1856; South Australia, Victoria, 1847–1872), Dietrich (central Queensland, 1865–1869) and Dallachy (north Queensland, 1864–1871) proving particularly useful. In some cases uncatalogued specimen records probably held at the Kew Herbarium, London cited in Bentham’s Flora Australiensis (Vols I–VII; Bentham [1863–1878](#page14)) are referenced and the date of the collection is provided based on the knowledge of an individual collector’s whereabouts. Historical texts were also consulted including Robert Brown’s list of species that he considered native to both Australia and Europe (Brown [1814](#page14)). The location of early collections may also be informative and those from human

settlements and other disturbed areas may suggest an alien origin. Conversely, rela tively late first records in extremely remote

locations tend to support an indigenous origin.

Ambiguous species were assigned to the following categories:

(1) species with early records within 5 years of settlement assigned native;

(2) species with early records after 10 years of settlement assigned naturalised;

(3) species with early records after 5 years of settlement assigned native using other evidence;

(4) species with early records within 10 years of settlement assigned naturalised in combination with other evidence; and

(5) species assigned native or naturalised without compelling evidence.

The 5- and 10-year cut-offs are arbitrary, but are not applied in isolation. In general the indication provided by these decision rules can be corroborated either by other collection records in relatively unmodified habitat, or by other evidence. The records were assessed in relation to the settlement of various regions of Australia. Thus, for example the town of Cardwell (Rockingham Bay) was established in 1864 and a specimen collected from that location in 1867 was considered to have been present <5 years after settlement.

In some instances the ecology of the species is invoked using the criterion that populations of native species typically occur in relatively intact habitat where other native species predominate and populations of naturalised species typically occur in modified habitat including human settlements, croplands, roadsides and other frequently disturbed sites. Some short-lived ruderal species are assigned naturalised even though their first occurrence is from a fledgling town within 10 years of settlement. For wetland species the benefit of the doubt is given to an indigenous origin because these species tend to have cross-continental distributions (Thorne [1972](#page14); Santamaría [2002](#page14)). Genetic studies are reviewed and inform attributions where they are available. In some cases, the biogeography of the genus is also relevant and indicative, such as the cases where there are no other members of a genus native to the Australian continent. In some cases the application of all these lines of evidence will

result in misattributions such as when naturalised plants established immediately after settlement are assigned as native, or when a native species has a strong dependence on disturbance and is assigned as naturalised.

Cultivated plants that may have been present on the Australian continent before 1788, such as mango (Mangifera indica), sweet potato (Ipomoea batatas), tobacco (Nicotiana tabacum), taro (Colocasia esculenta), banana (Musa acuminata) and sugarcane (Saccharum officinarum) (McNiven [2008](#page14)) are not included.

Results

The flora of Australia as recognised in our plant species list includes 26 075 species of which 22 725 (87.2%) are unambiguously native. Another 3181 species (12.2%) are unambiguously ‘naturalised’. This leaves a total of 168 species that have been investigated here to determine their native–naturalised status.

The early collecting records allow for the attribution of

91 (54.7%) of ambiguous plant species as native (Category 1, Table [1](#page14)). Another 17 (10.1%) ambiguous plant species are attributed as naturalised using the same criteria (Category 2, Table [1](#page14)). Twenty-eight (16.7%) ambiguous plant species were assigned native despite relatively late collecting records after invoking other criteria (Category 3, Table [1](#page14)). Four (2.4%) ambiguous plant species were assigned naturalised despite early collecting records after invoking other criteria (Category 4, Table [1](#page14)). There remain 27 species that are genuinely ambiguous in terms of their origin, and 20 of these are equivocally assigned native and seven naturalised (Category 5, Table [1](#page14)). Bean ([2007](#page14)) derived a native status for only 11 of 40 assessed ambiguous plant species and the use of 1788 as a date to define naturalised species increases the number of native species to 31 for the same list of candidate species. In general, there is a slight increase in the number of native species relative to most existing flora treatments (Table [1](#page14)).

Discussion

The attribution of the Australian flora using 1788 – the year of the first permanent European settlement – to define the naturalised flora proved relatively straightforward. There were only 168 potentially ambiguous species before this analysis representing 0.64% of the Australian flora. The majority of these were attributed as native or naturalised using the criteria defined here, and only 27 species remain ambiguous.

Generally, the early collection records are adequate to define native/naturalised status using the 1788 criteria. The collections of Banks and Solander are conclusive for 18 of the ambiguous species and the collections of Robert Brown from 1802 to 1805 for 23 species. Another 11 Brown records are from around the Sydney settlement (Richmond, Port Jackson, Woolahra, Parramatta, Table [1](#page14)), where alien species may have become adventive in the 15 or so years between his visit and settlement. Nine of these records have additional collections within 5 years of settlement elsewhere, and are attributed as native while Prunella vulgaris and Hibiscus richardsonii remain equivocal (Table [1](#page14)). Certainly it is not necessarily the oldest specimen that is most informative. Aeschynomene indica was collected by Robert Brown around Sydney after ~14 years of settlement.

Table 1. Ambiguous species assigned as native or naturalised with supporting evidence

Distribution and attribution (\* indicates naturalised) according to checklists generated for Australian states (Abbreviations: NSW, New South Wales; Vic., Victoria; SA, South Australia; WA, Western Australia; NT, Northern Territory; Qld, Queensland; Tas. Tasmania); indicative early collections with the earliest collection relevant to settlement indicated in bold, as well as references for written records confirming pre-settlement occurrence; Years since settlement of the earliest indicative collection (Y); Category (Cat 1, species with early records within 5 years of settlement assigned native; Cat 2, species with early records after 10 years of settlement assigned naturalised; Cat 3, species with early records after 5 years of settlement assigned native using other evidence; Cat 4, species with early records within 10 years of settlement assigned naturalised in combination with other evidence; Cat 5, ambiguous species assigned native or naturalised without compelling evidence). Aquatic (A), and notes relating to other evidence relevant to status. Equivalent names used by Brown (1814) are included in square brackets. Further details on individual specimens can be located using the Australian Virtual Herbarium (http://avh.ala.org.au/, accessed 22 February 2019)



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |  |
|  |  | attribution |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Abrus precatorius | Native | NSW\*, NT, Qld, WA | Islands of the Gulf of Carpentaria, NT, 1803 (Bentham 1863–1878); | 0 | 1 | 0 |  |  |
|  |  |  | Roebuck Bay, WA, 1864; Liverpool River, NT, 1867; Curtis |  |  |  |  |  |
|  |  |  | Island, Qld, 1867; Burdekin River, Qld, 1845 (Fensham et al. 2006) |  |  |  |  |  |
| Aeschynomene indica | Native | NSW, NT, Qld, SA, | Interior Australia, 1859; Upper Victoria River and Sturt Creek, NT, | 0 | 1 | 1 |  |  |
|  |  | WA | 1856; Suttor River, Qld, 1845 (Fensham et al. 2006) |  |  |  |  |  |
| Albizia lebbeck | Native | NT?, Qld, WA | Careening Bay, north-west Australia, 1820 | 0 | 1 | 0 | Occurs in relatively undisturbed areas, |  |
|  |  |  |  |  |  |  | not common |  |
| Alchemilla xanthochlora | Native | NSW\*, Vic. | Mount Latrobe, Vic., 1854; Kosciuszko Plateau, NSW, 1855 | 20 | 3 | 0 | Occurs in vegetation dominated by |  |
|  |  |  |  |  |  |  | other native species in relatively |  |
|  |  |  |  |  |  |  | undisturbed situations |  |
| Alisma plantago-aquatica | Native | NSW, SA, Tas.\*, Vic. | Brown (1814); Goulborn River, Vic., 1853 | ~20 | 3 | 1 | Brown’s advice accepted |  |
| Alocasia macrorrhizos | Native | Qld | Weier Island, Torres Strait, Qld, 1974 | 0 | 1 | 0 | Occurs on an island that has no |  |
|  |  |  |  |  |  |  | permanent settlement |  |
| Alysicarpus ovalifolius | Native | NT\*, Qld\*, WA\* | Croker Island, NT, 1883 | 0 | 5 | 0 | Generally regarded as naturalised; |  |
|  |  |  |  |  |  |  | almost always associated with |  |
|  |  |  |  | <10 |  |  | disturbance |  |
| Alysicarpus vaginalis | Naturalised | NT, Qld\*, WA\* | Mackay, Qld, 1866; Endeavour River, 1883 | 5 | 0 | Generally regarded as naturalised; |  |
|  |  |  |  |  |  |  | almost always associated with |  |
|  |  |  |  |  |  |  | disturbance, Mackay specimen may |  |
|  |  |  |  |  |  |  | be misidentified (D. Albrecht, pers. |  |
|  |  |  |  |  |  |  | comm.) |  |
| Anisomeles malabarica | Native | NT, Qld, WA | Endeavour River, Qld, 1770; Maria Island, NT, 1803; | 0 | 1 | 0 |  |  |
|  |  |  | Keppel Bay, Qld, 1802 | <5 |  |  |  |  |
| Anthosachne kingiana | Native | SA, Tas.\*, Vic. | Torrens River, SA, 1847; Third Creek, SA, 1848 | 1 | 0 |  |  |
| Antidesma excavatum | Native | Qld | McIlwraith Range, Qld, 1962; Lockerbie, Qld, 1980; Claudie River, | >20 | 3 | 0 | Isolated locations; perennial plant not |  |
|  |  |  | Qld, 1982 | >70 |  |  | associated with disturbance |  |
| Aphanes arvensis | Naturalised | NSW\*, SA\*, Tas.\*, | Brown (1814); Derwent Valley, Tas., 1903; Meander Valley, Tas., | 2 | 0 | Brown may have mistaken this for the |  |
|  |  | Vic.\*, WA\* | 1906 | <5 |  |  | native species Aphanes australiana |  |
| Argentina anserina | Native | SA?, Tas.?, Vic.? | Northern Tas., (Bentham 1863–1878); Millicent, SA, 1882 | 1 | 0 |  |  |
| Arthraxon hispidus | Native | NSW, Qld | Toowoomba, Qld, 1875; Canungra, Qld, 1880 | >100 | 5 | 1 | Recognised as a threatened species; |  |
|  |  |  |  |  |  |  | occurs in relatively undisturbed |  |
|  |  |  |  |  |  |  | spring wetlands |  |
| Atriplex semibaccata | Native | NSW, NT\*, Qld, SA, | Inland NSW, 1836; Liverpool Plains, NSW, 1843 | 0 | 1 | 0 |  |  |
|  |  | Tas.?, Vic., WA |  | >50 |  |  |  |  |
| Bambusa vulgaris | Native | NT\*, Qld\* | Darnley Island, Qld, 1997 | 3 | 0 | Cultivated but also naturalised on |  |
|  |  |  |  |  |  |  | Torres Strait Islands in 1847 (Jukes |  |
|  |  |  |  |  |  |  | 1847; pp. 155, 156, 183, 298) |  |
| Bidens bipinnata | Native | NSW\*, NT?, Qld\*, | NT, 1803 | 0 | 1 | 0 |  |  |
|  |  | WA\* |  |  |  |  |  |  |



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| Caesalpinia major | Native | NSW\*, WA | Derby, WA, 1869, Roebuck Bay, WA, 1889 | 0 | 1 | 0 |  |  |
| Callistachys lanceolata | Native | SA\*, Tas.\*, Vic.\*, WA | King George Sound, WA, 1802 | 0 | 1 | 0 |  |  |
| Callitriche palustris | Native | Vic.? | Humes River, Vic., 1874; Broken River, Vic., 1874 | 60 | 5 | 1 | Presumed native because of |  |
|  |  |  |  |  |  |  | cosmopolitan range, aquatic habitat |  |
|  |  |  |  |  |  |  | and identification difficulty |  |
| Cardiospermum | Native | NSW\*, NT, Qld\*, | Broadsound, Qld, 1802; Depot Creek, NT, 1855; Yambarran Range, | 0 | 1 | 0 |  |  |
| halicacabum |  | WA\* | NT, 1855 |  |  |  |  |  |
| Carex buxbaumii | Native | NSW\*, Vic.? | Cobungra, Vic., 1854 | 20 | 3 | 0 | Occurs in vegetation dominated by |  |
|  |  |  |  |  |  |  | other native species in relatively |  |
|  |  |  |  |  |  |  | undisturbed situations |  |
| Carex canescens | Native | NSW, Vic. | Mount Kosciuszko, NSW, 1855; Mt Baw Baw, Vic., 1860 | 20 | 3 | 0 | Occurs in vegetation dominated by |  |
|  |  |  |  |  |  |  | other native species in relatively |  |
|  |  |  |  | >60 |  |  | undisturbed situations |  |
| Carex echinata | Native | NSW, Vic. | Armidale, NSW, 1909; Mt Fainter, Vic., 1926 | 3 | 0 | Occurs in vegetation dominated by |  |
|  |  |  |  |  |  |  | other native species in relatively |  |
|  |  |  |  |  |  |  | undisturbed situations |  |
| Cenchrus caliculatus | Native | NSW, Qld | Northumberland Islands, Qld, 1802; Brisbane River, Qld, 1843 | 0 | 1 | 0 |  |  |
| Cenchrus purpurascens | Native | NSW, Qld, Vic.\* | Richmond, NSW, 1802; Horton River, NSW, 1843; Bowen Downs, | <10 | 3 | 1 | Numerous early records from wide |  |
|  |  |  | Qld, 1874, Flinders River, Qld, 1883; northern New South Wales |  |  |  | ranging locations within 10 years of |  |
|  |  |  | (Stubbs 2001) |  |  |  | settlement; considerable genetic |  |
|  |  |  |  |  |  |  | structure within the Australian |  |
|  |  |  |  |  |  |  | forms, including very distinct |  |
|  |  |  |  |  |  |  | genotypes in artesian springs |  |
|  |  |  |  |  |  |  | (Toon et al. 2018) |  |
| Chenopodium glaucum | Native | NSW, SA\*, Tas.?, | Endeavour River, Qld, 1770; Tas., 1840; WA, 1845; | 0 | 1 | 0 | Probably native and introduced forms |  |
|  |  | Vic.?, WA\* | Gawler, SA, 1848 | <5 |  |  |  |  |
| Chloris virgata | Native | NSW\*, NT\*, Qld\*, | Herbert River to Carpentaria, Qld, 1886; Barrow Creek, NT, 1880; | 1 | 0 |  |  |
|  |  | SA\*, Vic.\*, WA\* | MacDonnell Range, NT, 1875 | >20 |  |  |  |  |
| Chrysopogon aciculatus | Naturalised | NT\*, Qld\*, WA\* | Cairns, Qld, 1897 | 2 | 0 |  |  |
| Coccinia grandis | Native | NT, Qld\*, WA\* | Port Bradshaw, NT, 1948 | 0 | 1 | 0 | Isolated location; possibly a Macassan |  |
|  |  |  |  | >50 |  |  | import |  |
| Cocos nucifera | Native | NT?, Qld | Cairns, Qld, 1941 | 3 | 0 | Late first collection, but established |  |
|  |  |  |  |  |  |  | trees recorded at Emu Beach, Qld, |  |
|  |  |  |  |  |  |  | ~1869 (Thozet 1869); Russell |  |
|  |  |  |  |  |  |  | Island, Qld, 1848 (MacGillivray |  |
|  |  |  |  |  |  |  | 1852); Murray Island, Qld, 1802 |  |
|  |  |  |  |  |  |  | (Flinders 1814); Torres Strait |  |
|  |  |  |  |  |  |  | Islands, Qld, 1845 (Jukes 1847; |  |
|  |  |  |  |  |  |  | pp. 132, 155, 156, 161, 173, 175, |  |
|  |  |  |  |  |  |  | 181, 182, 183, 186, 196, 198, 200, |  |
|  |  |  |  |  |  |  | 201); sea dispersed |  |
| Corchorus olitorius | Native | NSW\*, NT, Qld, WA\* | Upper Victoria River, NT, 1856 | 0 | 1 | 0 |  |  |
| Corchorus trilocularis | Native | NT\*, Qld, WA | Comet River, Qld, 1847; Rockhampton, Qld, 1864; Glendhu Creek, | 0 | 1 | 0 |  |  |
|  |  |  | Qld, 1866 |  |  |  |  |  |
| Cotula coronopifolia | Native | NSW\*, Qld\*, SA\*, | Port Jackson, NSW, 1802; Circular Head, Tas., 1837; Vansittart | 0 | 1 | 1 |  |  |
|  |  | Tas.\*, Vic.\*, WA\* | Island, Tas., 1844; Meunga Creek, Qld, 1863–1866 | <5 |  |  |  |  |
| Crotalaria alata | Native | NT, Qld\*, WA | Gallery Hill, NT, 1879; Gardner, WA, 1891 | 1 | 0 |  |  |



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|  |  |  | Table 1. (continued ) |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |
|  |  | attribution |  |  |  |  |  |



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|  |  |  |  |
| --- | --- | --- | --- |
| Crotalaria juncea | Native | NSW\*, NT, Qld\*, | Curra, Qld, 1843 |
|  |  | WA\* |  |
| Crotalaria laburnifolia | Native | Qld\*, WA\* | Cape Cleveland, Qld, 1819 (Bentham 1863–1878); Gladstone, Qld, |
|  |  |  | 1864; Bowen, Qld, 1867 |
| Crotalaria prostrata | Native | NT, WA\* | Gove, NT, 1971, notes: edge of gravel pit in bauxite area; Kunmunya, |
|  |  |  | WA, 1992; Myra Falls, NT 1993 |
| Crotalaria retusa | Native | NSW\*, NT, Qld\*, WA | Victoria River, 1855; Halls Creek, 1879; Adelaide River, 1882; |
|  |  |  | Gilbert River, Qld, 1913 |
| Cucumis melo | Native | NSW, NT, Qld, SA, | Macquarie River, NSW, 1846; Rockhampton, Qld, 1866 |
|  |  | WA |  |
| Cyclocarpa stellaris | Native | NT, Qld\*, WA | Lockerbie, Qld, 1948; Bickerton Island, NT, 1948 |
| Cynodon dactylon var. | Naturalised | NSW, NT\*, Qld\*, SA, | Brown (1814); Kilcoy, Qld, 1843; Port Curtis, Qld, 1847 |
| dactylon |  | Tas.\*, Vic.?, WA\* |  |
| Cynodon dactylon var. | Native | SA, Vic.? | Lake Benanee, NSW, 1853 |
| pulchellus |  |  |  |
| Cyperus brevifolius | Native | NSW\*, NT\*, Qld\*, | Woolahra, NSW, 1802; Murray River, Vic., 1867; Rockhampton, |
|  |  | SA?, Vic.\*, WA\* | Qld, 1868, notes: moist places; Rockhampton, Qld, 1875, notes: at |
|  |  |  | foot of ridges. Very damp plains; Trinity Bay, Qld, 1886 |
| Cyperus cyperinus | Native | NT\*, Qld | Barron River Gorge, Qld, 1935 |
| Cyperus difformis | Native | NSW, NT, Qld, SA, | Brisbane River, Qld, 1843; Stanley River, Qld, 1843; Dogwood |
|  |  | Vic., WA | Creek, Qld, 1847 |
| Cyperus distans | Native | Qld | Port Jackson to the Blue Mountains, NSW, 1823; Rockhampton, Qld, |
|  |  |  | 1867, notes: waterholes; Herbert River, Qld, 1868 |
| Cyperus hamulosus | Native | NT?, SA\*, Vic.?, WA\* | Oodnadatta, SA, 1894, notes: introduced with camels |
| Cyperus iria | Native | NSW, NT, Qld, SA, | Sturt Creek, NT, 1856; Bowen Downs, 1874; Charlotte Waters, NT, |
|  |  | WA | 1875 |
| Cyperus polystachyos | Native | NSW, NT, Qld, Vic.?, | Australia, 1770; Toogoolawah, Qld, 1843 |
|  |  | WA\* |  |
| Cyperus rotundus | Native | NSW\*, NT\*, Qld\*, | Brown (1814); Port Jackson to Blue Mountains, NSW, 1823; |
|  |  | SA\*, Vic.\*, WA\* | Brisbane, Qld, 1856; Ballandool River, Qld, 1867; Rockhampton, |
|  |  |  | Qld, 1867; notes: a good pasture grass but very troublesome to the |
|  |  |  | horticulturist |
| Cyperus sphacelatus | Naturalised | NT\*, Qld\* | Cairns, Qld, 1935 |
| Datura leichhardtii | Native | NSW, NT, Qld\*, SA\*, | Comet River, Qld, 1847; Lake Eyre, SA, 1857 |
|  |  | WA\* |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| <5 | 1 | 0 |  |  |
| 0 | 1 | 0 |  |  |
| >20 | 5 | 0 | Not common and generally occurs in |  |
|  |  |  | undisturbed vegetation where |  |
|  |  |  | native species dominate |  |
| 0 | 1 | 0 |  |  |
| 0 | 1 | 0 | Genetic evidence for native and |  |
|  |  |  | naturalised forms (Sebastian et al. |  |
|  |  |  | 2010) |  |
| 0 | 1 | 0 | Isolated location; possibly a Macassan |  |
| <5 |  |  | import |  |
| 4 | 0 | Early collections associated with |  |
|  |  |  | disturbance associated with |  |
|  |  |  | settlement |  |
| 0 | 1 | 0 |  |  |
| <5 | 5 | 1 | Collections indicate native origin in |  |
|  |  |  | specialised habitat; species |  |
|  |  |  | generally favours disturbed areas |  |
| >50 |  |  | and very adventive |  |
| 3 | 0 | Remote from disturbance associated |  |
| <5 |  |  | with settlement |  |
| 1 | 1 |  |  |
| <5 | 1 | 1 |  |  |
| >20 | 5 | 0 | Possibly introduced along early inland |  |
|  |  |  | trade routes but its occurrence in |  |
|  |  |  | remote and otherwise pristine |  |
|  |  |  | wetlands suggests native status |  |
| 0 | 1 | 1 |  |  |
| 0 | 1 | 1 |  |  |
| <10 | 5 | 0 | The name may have been misapplied |  |
|  |  |  | by Brown to Cyperus bifax; but |  |
|  |  |  | some of those early collections |  |
|  |  |  | suggest native origin, generally |  |
|  |  |  | favours disturbed areas and is very |  |
| >50 |  |  | adventive |  |
| 2 | 0 |  |  |
| 0 | 1 | 0 |  |  |

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|  |  |  |  | Table 1. (continued ) |  |  |  |  |  |  |
| Species | | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes | |  |
|  |  |  | attribution |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Datura metel | | Naturalised | NSW?, Qld\*, WA\* | Willie Creek, WA, 1999 | >100 | 2 | 0 |  |  |  |
|  | Deschampsia cespitosa | Native | NSW, SA\*, Tas., Vic. | Glen Leith, Tas., 1839 | ~30 | 3 | 0 | Occurs in relatively undisturbed areas, | |  |
|  |  |  |  |  | >20 |  |  | not common | |  |
|  | Dichrocephala | Naturalised | NSW\*, Qld\* | Mulgrave River, Qld, 1891; Yungaburra, Qld, 1918; notes: common | 2 | 0 | Seems to have spread after logging | |  |
|  | integrifolia |  |  | in scrub tracks | >100 |  |  | advanced in Wet Tropics | |  |
| Digitaria aequiglumis | | Naturalised | NSW\*, SA, Vic.\*, | Sydney, NSW, 1905 | 2 | 0 |  |  |  |
|  |  |  | WA\* |  | >40 |  |  |  |  |  |
|  | Digitaria bicornis | Naturalised | NT\*, Qld, WA | Darwin, NT, 1889; Rockhampton, Qld, 1908 | 2 | 0 |  |  |  |
|  | Digitaria radicosa | Naturalised | NT\*, Qld, WA\* | Carins, Qld, 1940 | >50 | 2 | 0 |  |  |  |
|  | Dioscorea pentaphylla | Native | Qld | Thursday Island, Qld, 1897; Hammond Island, Qld, 1999 | 0 | 1 | 0 |  |  |  |
|  | Drymaria cordata | Naturalised | NSW\*, Qld\* | Russell River, Qld, 1886 | ~20 | 2 | 0 |  |  |  |
|  | Dysphania glomulifera | Native | NSW, NT, Qld, SA, | Bordertown, SA, 1851; Diamantina River, Qld, 1862 | 0 | 1 | 0 |  |  |  |
|  |  |  | Tas.\*, Vic., WA |  |  |  |  |  |  |  |
|  | Dysphania pumilio | Native | NSW, NT, Qld, SA, | Muswellbrook, NSW, 1843; Mt Lofty Ranges, SA, 1848; Adelaide, | ~12 | 3 | 0 | A ruderal colonising human | |  |
|  |  |  | Tas.\*, Vic., WA | SA, 1848; Mackesfield, SA, 1848; Mt Beevor, SA, 1848; Mt |  |  |  | settlements by late 1800s | |  |
|  |  |  |  | Barker, SA, 1848 |  |  |  |  |  |  |
|  | Echinochloa colona | Native | NSW, NT?, Qld\*, | Upper Victoria River, NT, 1855 (Bentham 1863–1878); Port | 0 | 5 | 1 | Remote locations, but usually | |  |
|  |  |  | SA\*, Vic.\*, WA\* | Essington, NT, 1840 (Bentham 1863–1878); Cleveland Bay, Qld, |  |  |  | associated with disturbed habitats | |  |
|  |  |  |  | 1877; Darwin, NT, 1880; Mitchell River, Qld, 1882, notes: Found |  |  |  |  |  |  |
|  |  |  |  | often near water or lagoons |  |  |  |  |  |  |
|  | Echinochloa crus-galli | Native | NSW\*, NT\*, Qld\*, | Brown (1814); Dungog, NSW, 1802; Tilba, NSW, 1880; notes: | 0 | 1 | 1 | Occurs in isolated springs in | |  |
|  | [Panicum crus-galli] |  | SA\*, Tas.\*, Vic.\*, | doubtful if native. |  |  |  | Queensland; probably naturalised | |  |
|  |  |  | WA\* |  |  |  |  | in Victoria (N. Walsh, pers. comm.) | |  |
|  | Eclipta prostrata | Native | NSW, NT, Qld\*, Vic. | Brisbane River, Qld, 1856; Rockhampton, Qld, 1867 | ~7 | 5 | 1 | Assigned native because of aquatic | |  |
|  |  |  | \*, WA\* |  |  |  |  | habitat, but probably naturalised in | |  |
|  |  |  |  |  |  |  |  | south-west WA and Victoria | |  |
|  | Elaeagnus triflora | Native | Qld | Rockingham Bay, Qld, 1864, notes: common on all the creeks; | 0 | 1 | 0 |  |  |  |
|  |  |  |  | Seaview Range, Qld, 1864 |  |  |  |  |  |  |
|  | Elephantopus scaber | Native | NT, Qld\* | Endeavour River, Qld, 1770 | 0 | 1 | 0 |  |  |  |
|  | Erodium aureum | Native | NSW\*, NT, Qld, SA\*, | Between Alice Springs and Charlotte Waters, NT, 1875; | 0 | 1 | 0 | Associated with disturbance and | |  |
|  |  |  | WA\* | Hermannsburg, NT, 1879; Pidinga Rockhole, SA, 1880; Bourke, |  |  |  | considered naturalised in NSW, | |  |
|  |  |  |  | NSW, 1886 |  |  |  | WA, SA, Qld, but not NT. The | |  |
|  |  |  |  |  |  |  |  | species was described as an | |  |
|  |  |  |  |  |  |  |  | Australian endemic (Carolin 1970) | |  |
|  | Erythrina variegata | Native | NT, Qld | Saibai Island, Qld, 1885; Hayman Island, Qld, 1934; Bingle Bay, Qld, | 0 | 1 | 0 | Late collection; but perennial plant | |  |
|  |  |  |  | 1951; Clump Point, Qld, 1957; Inglis Island, NT, 1987 |  |  |  | occurring in undisturbed situations | |  |
|  |  |  |  |  |  |  |  | in isolated locations; sea dispersed | |  |
|  | Flaveria trinervia | Native | NT?, Qld\*, SA\*, WA\* | Balonne River, Qld, 1846; Upper Victoria River, NT, 1855 | 0 | 1 | 0 |  |  |  |
|  | Geranium dissectum | Naturalised | NSW?, SA\*, Tas.\*, | Nile, Tas., 1875; Weldborough, Tas., 1877; Georges Bay, Tas., 1879 | >40 | 2 | 0 |  |  |  |
|  |  |  | Vic.\*, WA\* |  |  |  |  |  |  |  |
|  | Geranium homeanum | Native | NSW, Qld, SA?, Tas.?, | Botany Bay, NSW, 1770; Woodford, Qld, 1843 | 0 | 1 | 0 |  |  |  |
|  |  |  | Vic. |  |  |  |  |  |  |  |



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Table 1. (continued )



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| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |  |
|  |  | attribution |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Gnaphalium polycaulon | Native | NSW\*, Qld\*, SA\*, | Darling River, 1860; Yarriambiack Creek, Vic., 1902; Hamilton | ~5 | 1 | 0 |  |  |
|  |  | Vic., WA\* | Bore, SA, 1913 |  |  |  |  |  |
| Heliotropium europaeum | Native | NSW\*, Qld\*, SA?, | Spencer Gulf, SA, 1802; interior of Australia, 1859 | 0 | 1 | 0 |  |  |
|  |  | Vic.\*, WA\* |  |  |  |  |  |  |
| Herissantia crispa | Naturalised | NT?, Qld, WA | Newcastle Waters, NT, 1887 | ~10 | 5 | 0 | Earliest collection is from a settlement |  |
|  |  |  |  |  |  |  | associated with trade and the |  |
|  |  |  |  |  |  |  | species is generally associated with |  |
|  |  |  |  |  |  |  | disturbance |  |
| Hibiscus richardsonii | Native | NSW | Port Jackson, NSW, 1803; Avalon, NSW, 1952; Nambucca, NSW, | ~15 | 5 | 0 | All early records from Sydney, but |  |
|  |  |  | 1958 |  |  |  | unlikely to have been transported |  |
|  |  |  |  |  |  |  | from New Zealand by 1803. |  |
|  |  |  |  |  |  |  | Considered native by Craven et al. |  |
|  |  |  |  |  |  |  | (2011) |  |
| Histiopteris incisa | Native | NSW, NT, Qld, SA?, | Endeavour River, Qld, 1770; Australia, 1802; Port Jackson to Blue | 0 | 1 | 0 |  |  |
|  |  | Tas., Vic., WA | Mountains, NSW1823; Asbestos Hills, Tas., 1844 | >20 |  |  |  |  |
| Hydrocharis dubia | Native | NSW, Qld\* | Clarence River, NSW, 1883; Harrisville, Qld, 1960 | 3 | 1 | Considered naturalised because of late |  |
|  |  |  |  |  |  |  | collection long after settlement |  |
|  |  |  |  | >20 |  |  | despite aquatic |  |
| Hypericum perforatum | Naturalised | NSW\*, SA\*, Tas.\*, | Coromandel Valley, SA, 1881 | 2 | 0 |  |  |
|  |  | Vic.\*, WA\* |  | >20 |  |  |  |  |
| Hypolepis rugosula | Native | NSW, Qld, SA, Tas., | South Esk River, Tas., 1844; Great Western Tiers, Tas., 1845 | 3 | 0 | Associated with disturbance; occurs in |  |
|  |  | Vic., WA\* |  | >5 |  |  | some remote locations |  |
| Indigofera glandulosa | Native | NT\*, Qld, WA | Cashmere, Qld, 1875; Bridge Creek, NT, 1881 | 3 | 0 | Early collections from isolated |  |
|  |  |  |  |  |  |  | locations |  |
| Indigofera linnaei | Native | Qld, WA, SA?, NT | Endeavour River, Qld, 1770; Keppel Bay, Qld, 1802; Chinchilla, Qld, | 0 | 1 | 0 |  |  |
|  |  |  | 1848; Rockhampton, Qld, 1862 | <10 |  |  |  |  |
| Indigofera tinctoria | Naturalised | NT\*, Qld\* | Endeavour River, Qld, 1882; Mt Ragged, WA, 1886 | 5 | 0 | Early collections in remote locations |  |
|  |  |  |  |  |  |  | but usually associated with |  |
|  |  |  |  |  |  |  | disturbance |  |
| Ipomoea aquatica | Native | NT, Qld, WA | Victoria River, NT, 1855; Gascoyne River, WA, 1882 | 0 | 1 | 1 |  |  |
| Ipomoea indica | Native | NSW\*, Qld\*, SA\*, | Endeavour River, Qld, 1770 | 0 | 1 | 0 |  |  |
|  |  | Tas.\*, Vic.\*, WA\* |  |  |  |  |  |  |
| Ipomoea nil | Native | NT, Qld\*, WA\* | Booby Island Queensland, 1770 (Bentham 1863–1878); Suttor and | 0 | 1 | 0 |  |  |
|  |  |  | Burdekin Rivers, Qld, 1845; Victoria River, NT, 1856 | >50 |  |  |  |  |
| Isachne minutula | Native | NT, Qld, WA\* | Cardwell, Qld, 1935; Cairns, Qld, 1936 | 3 | 1 | Occurs in remote undisturbed habitat |  |
| Isolepis marginata | Native | NSW\*, SA\*, Tas., | Rottnest Island, WA, 1839; Epping Forest, Tas., 1842; Gawler River, | >10 | 3 | 0 | Early collections within 10 years of |  |
|  |  | Vic.?, WA | SA, 1848 |  |  |  | settlement at widespread locations; |  |
|  |  |  |  | >90 |  |  | not associated with disturbance |  |
| Isolepis trachysperma | Naturalised | SA?, Vic.\* | Belair, SA, 1935 | 2 | 0 |  |  |
| Juncus bufonius | Native | NSW, NT\*, Qld\*, SA, | Port Jackson, NSW, 1802; Circular Head, Tas., 1838 | ~15 | 5 | 0 | Regarded as having native and |  |
|  |  | Tas., Vic.?, WA\* |  |  |  |  | naturalised forms (Walsh and |  |
|  |  |  |  | >30 |  |  | Entwistle 1994a) |  |
| Koeleria macrantha | Native | NSW\*, Tas.\*, Vic. | Kenmore, Tas., 1842; Mt Franklin, NSW, 1847, notes: growing on ski | 3 | 0 | Occurs in relatively undisturbed |  |
|  |  |  | run |  |  |  | habitat with other native species |  |
|  |  |  |  |  |  |  | dominant, but probably native and |  |



naturalised forms (Foreman and

Walsh 1993)

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|  |  |  | Table 1. (continued ) |  |  |  |  |  |
| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |  |
|  |  | attribution |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Lemna minor | Native | Vic.\* | Brown (1814); Tas., 1837; George Town, Tas. 1843 | >20 | 3 | 1 | Assigned native because of aquatic |  |
|  |  |  |  |  |  |  | habitat |  |
| Leucas decemdentata | Native | Qld | Endeavour River, Qld 1770 | 0 | 1 | 0 |  |  |
| Lobelia purpurascens | Native | Qld, Vic. | Endeavour River, Qld, 1770; Sydney, NSW, 1802 | 0 | 1 | 0 |  |  |
| [Pratia purpurascens] |  |  |  | >50 |  |  |  |  |
| Ludwigia hyssopifolia | Native | NT, Qld\*, WA | Mossman River, Qld, 1936 | 5 | 1 | Assigned native because of aquatic |  |
|  |  |  |  |  |  |  | habitat and occurrence in remote |  |
|  |  |  |  |  |  |  | habitat |  |
| Ludwigia peploides | Native | NSW, SA\*, Vic. | Richmond, NSW, 1802; Snowy River, Vic., 1854; Port Curtis, Qld, | 0 | 1 | 1 |  |  |
|  |  |  | 1847 |  |  |  |  |  |
| Lysimachia japonica | Naturalised | NSW, Vic.? | Tilba Tilba, NSW, 1881 | ~40 | 2 | 0 |  |  |
| Lythrum hyssopifolia | Native | NSW, Qld, SA, Tas., | Lachlan River, NSW, 1812; Launceston, Tas., 1850 | 0 | 1 | 0 |  |  |
|  |  | Vic.?, WA\* |  |  |  |  |  |  |
| Lythrum salicaria | Native | NSW, Qld, SA, Tas., | Brown (1814); Lachlan River, NSW, 1817 | 0 | 1 | 1 |  |  |
|  |  | Vic.? |  | <5 |  |  |  |  |
| Mallotus paniculatus | Native | NSW\*, Qld | Rockingham Bay, Qld, 1864 | 1 | 0 |  |  |
| Malvastrum americanum | Native | NSW\*, NT\*, SA?, | Broadsound, Qld, 1802; between Mt Warraway and Hillston, | 0 | 1 | 0 | Native (subsp. stellatum) and possibly |  |
|  |  | WA\* | NSW, 1836 |  |  |  | naturalised (subsp. americanum) |  |
|  |  |  |  | <5 |  |  | in Australia |  |
| Malvastrum | Naturalised | NSW, NT\*, Qld\*, | Rockhampton, Qld, 1866; Rosewood, Qld, 1876 | 5 | 0 | Widely considered naturalised, |  |
| coromandelianum |  | WA\* |  |  |  |  | favours disturbed areas, but |  |
|  |  |  |  |  |  |  | ‘Rockhampton’ record soon after |  |
|  |  |  |  |  |  |  | settlement |  |
| Marsilea mutica | Native | NSW, NT, Qld, SA?, | Brown (1814); Paroo River, Qld, 1885; Runnymede, NSW, 1888 | ~20 | 3 | 1 | Widespread in remote habitat; |  |
| [quadrifolia] |  | Tas.\*, Vic.?, WA |  |  |  |  | assigned native because of aquatic |  |
|  |  |  |  |  |  |  | habitat |  |
| Melochia corchorifolia | Native | NT, Qld, WA | Sturts Creek and Macadam Ra, NT, 1855 | 0 | 1 | 0 |  |  |
| Melochia pyramidata | Native | NT?, Qld\*, WA\* | Suttor River, Qld, 1845; Victoria River, NT, 1856 | 0 | 1 | 0 |  |  |
| Merremia peltata | Native | Qld | Rockingham Bay, Qld, 1867 | <5 | 1 | 0 |  |  |
| Mollugo verticillata | Native | NSW, Qld\*, Vic.\* | Rockhampton, Qld, 1864 | <5 | 1 | 0 |  |  |
| Momordica balsamina | Native | NSW, NT\*, Qld\*, SA, | Rockingham Bay, Qld, 1867; Charleville, Qld, 1869 | <5 | 5 | 0 | Widely regarded as naturalised, but |  |
|  |  | WA\* |  |  |  |  | not restricted to disturbed areas. Early |  |
|  |  |  |  | >80 |  |  | collections support native status |  |
| Murdannia nudiflora | Naturalised | NT\*, Qld\*, WA\* | Cooktown, Qld, 1962, note: wet sand near small stream; Cairns, Qld, | 2 | 0 |  |  |
|  |  |  | 1976 | >20 |  |  |  |  |
| Murdannia vaginata | Native | NT, Qld\* | NT, 1890; Cox’s Peninsula, NT, 1948; Holmes Jungle, Darwin, 1961; | 3 | 0 | Occurs in remote and relatively |  |
|  |  |  | Adelaide River, NT, 1964 |  |  |  | undisturbed habitat |  |
| Murraya paniculata | Native | NSW\*, NT, WA | Prince of Wales Islands, Qld, 1802; Winchelsea Island, NT, 1803; Mt | 0 | 1 | 0 | Murraya ovatifoliolata is not |  |
|  |  |  | Archer, Qld, 1863 |  |  |  | recognised here, but is considered |  |
|  |  |  |  | <5 |  |  | the native form in Queensland |  |
| Nephrolepis cordifolia | Native | NSW, Qld, Vic.\*, | Rockingham Bay, Qld, 1870 | 1 | 0 |  |  |
|  |  | WA\* |  |  |  |  |  |  |
| Ocimum tenuiflorum | Native | Qld | Victoria River, NT, 1856 | 0 | 1 | 0 |  |  |



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Table 1. (continued )



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |  |
|  |  | attribution |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Oxalis corniculata | Naturalised | NSW\*, NT\*, Qld\*, | Brisbane River, Qld, 1856; Koonenberry Mountain, NSW, 1860 | ~20 | 5 | 0 | Taxonomically uncertain; native and |  |
|  |  | SA\*, Tas.\*, Vic.\*, |  |  |  |  | naturalised forms may exist |  |
|  |  | WA\* |  | <10 |  |  |  |  |
| Papaver aculeatum | Naturalised | NSW\*, Qld\*, SA\*, | Burwood, NSW, 1842; near St Vincent’s Gulf, SA, 1849; Snowy | 4 | 0 | Native to Africa and no other |  |
|  |  | Tas.\*, Vic.\* | River, NSW, 1854–1855 |  |  |  | Papaveraceae in Australia |  |
|  |  |  |  |  |  |  | (Kadereit 1988); proclivity for |  |
|  |  |  |  |  |  |  | disturbed areas |  |
| Paspalum distichum | Native | NSW, Qld, SA\*, Tas. | Goods Island, Qld, 1802; Gracemere, Qld, 1872; South Perth, WA, | 0 | 1 | 1 |  |  |
|  |  | \*, Vic.?, WA\* | 1924; Armadale, WA, 1937; March Fly Glen, WA, 1982 |  |  |  |  |  |
| Paspalum scrobiculatum | Native | NSW\*, NT, Qld, WA | Northumberland Islands, Qld, 1802; Sydney, NSW, 1803 | 0 | 1 | 0 |  |  |
| Paspalum vaginatum | Native | NSW, NT?, Qld, SA\*, | Endeavour River, Qld, 1770; Prince of Wales Islands, Qld, 1802; Port | 0 | 1 | 1 |  |  |
|  |  | Vic.\*, WA | Jackson, NSW, 1802; |  |  |  |  |  |
| Pavonia hastata | Native | NSW\*, Qld\*, SA\*, | Paterson’s, Nepean and Hawkesbury Rivers, NSW, 1802; Liverpool | 0 | 1 | 0 |  |  |
|  |  | Vic.\*, WA\* | Plains, NSW, 1827 (Bentham 1863–1878); Singleton, NSW, 1842; |  |  |  |  |  |
|  |  |  | Brisbane River, Qld, 1855 | >50 |  |  |  |  |
| Peltophorum | Native | NT, Qld\*, WA\* | Litchfield, NT, 1946 | 3 | 0 | Long-lived perennial species in |  |
| pterocarpum |  |  |  |  |  |  | remote locations; sea dispersed |  |
| Phragmites australis | Native | NSW, NT, Qld, SA, | Brown (1814); Endeavour River, Qld, 1770; Circular Head, Tas., | 0 | 1 | 1 |  |  |
| [Arundo phragmitis] |  | Tas., Vic., WA\* | 1837; Hunter Valley, NSW; 1843 |  |  |  |  |  |
| Phyla nodiflora | Native | NSW\*, NT, Qld, Vic. | Brown (1814); near Brisbane River, 1843; Victoria River, NT, 1855 | 0 | 1 | 1 | Native status confirmed by genetic |  |
| [Zapania nodiflora] |  | \*, WA\* |  |  |  |  | analyses, but also non-indigenous |  |
|  |  |  |  |  |  |  | forms south of –23 degrees in WA |  |
|  |  |  |  |  |  |  | and SA (Gross et al. 2017) |  |
| Physalis angulata | Native | NSW\*, NT?, Qld\*, | Endeavour River, Qld, 1770; Flinders River, Qld, 1882; Darwin, NT, | 0 | 1 | 0 | Has Aboriginal names in NT |  |
|  |  | SA\*, WA\* | 1884; Logan River, Qld, 1881; Johnstone River, Qld, 1882 | >50 |  |  |  |  |
| Pistia stratiotes | Native | NSW\*, NT, Qld\*, | Litchfield, NT, 1946; Donalds Lagoon, NT, 1958 | 3 | 1 | Occurs in isolated wetlands; |  |
|  |  | WA\* |  |  |  |  | considered native (Gillett et al. |  |
|  |  |  |  | <5 |  |  | 1989) |  |
| Portulaca oleracea | Native | NSW, NT, Qld\*, SA, | Brown (1814); Port Jackson, NSW, 1803; Isaacs River, Qld, 1845 | 1 | 0 |  |  |
|  |  | Tas., Vic.?, WA | (Fensham et al. 2006); Snowy River, Vic., 1854, Nickol Bay, WA, |  |  |  |  |  |
|  |  |  | 1874; Charlotte Waters NT, 1875 |  |  |  |  |  |
| Potentilla anserina | Native | NSW\*, Vic.? | Brown (1814); Georgetown, Tas., 1804 | 0 | 1 | 0 |  |  |
| Prunella vulgaris | Naturalised | NSW\*, Qld\*, SA\*, | Brown (1814); Parramatta, NSW, 1802; Hobart, Tas., 1849; Rapid | <15 | 5 | 0 | Generally regarded as naturalised; but |  |
|  |  | Tas.\*, Vic.\*, WA\* | Bay, SA, 1850 |  |  |  | early collections indicate it is |  |
|  |  |  |  |  |  |  | native. It has a proclivity for |  |
|  |  |  |  |  |  |  | disturbed vegetation and there are |  |
|  |  |  |  |  |  |  | no other members of the genus in |  |
|  |  |  |  |  |  |  | Australia |  |
| Pseudognaphalium | Native | NSW, NT, Qld, SA?, | Endeavour River, Qld, 1770; NSW, 1802; Circular Head, Tas., 1837; | 0 | 1 | 0 |  |  |
| luteoalbum |  | Vic.?, WA | Mt Royal, NSW, 1842 | >20 |  |  |  |  |
| Pueraria lobata | Native | NSW\*, NT | Mullimbimby, NSW, 1945; Wathuwuy Creek, NT, 1987 | 5 | 0 | Remote locations in NT and north |  |



Queensland, but naturalised and

invasive elsewhere

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|  |  |  | Table 1. (continued ) |  |  |  |  |  |
| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |  |
|  |  | attribution |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Rorippa nasturtium- | Native | NSW\*, Qld\*, SA\*, | Brown (1814); Adelaide Hills, SA, 1850; Kingborough Tas. 1876; | ~15 | 5 | 1 | Widely regarded as naturalised, but |  |
| aquaticum |  | Vic.?, WA\* | South Australia 1879 |  |  |  | occurs in isolated aquatic habitats in |  |
| [Nasturtium |  |  |  |  |  |  | Queensland, and Brown’s advice |  |
| amphibium] |  |  |  |  |  |  | accepted |  |
| Rottboellia | Native | NSW\*, NT?, Qld\* | Inglis Island, NT, 1803; Jervis Island, Qld, 1878 | 0 | 1 | 0 |  |  |
| cochinchinensis |  |  |  | >50 |  |  |  |  |
| Saccharum spontaneum | Naturalised | NT?, Qld\* | Daly River, NT, 1946 | 5 | 0 | Possibly native due to populations in |  |
|  |  |  |  |  |  |  | remote locations but assigned as |  |
|  |  |  |  |  |  |  | naturalised |  |
| Sagina apetala | Naturalised | NSW\*, NT\*, Qld\*, | Adelaide, SA, 1848; Hallet’s Hill, SA, 1881 | 12 | 2 | 0 | Ephemeral, favours disturbed areas. |  |
|  |  | SA\*, Tas.\*, Vic.\*, |  |  |  |  | Considered naturalised despite |  |
|  |  | WA\* |  |  |  |  | early collections |  |
| Salsola australis | Native | NSW, NT, Qld, SA, | Bay of inlets and Endeavour River, Qld, 1770 | 0 | 1 | 0 | Genetics and cytology suggests an |  |
|  |  | Tas., WA |  |  |  |  | Australian form not closely related |  |
|  |  |  |  |  |  |  | to an outgroup from the USA |  |
|  |  |  |  | <5 |  |  | (Borger et al. 2008) |  |
| Samolus valerandi | Native | NSW, Qld, Vic.?, | Brown (1814); Tambo River, Vic., 1854; Snowy River, Vic., 1855; | 1 | 1 |  |  |
|  |  | WA\* | Busselton, WA, 1870 |  |  |  |  |  |
| Schoenoplectiella erecta | Native | NSW\*, Qld\* | NSW, 1770 | 0 | 1 | 1 |  |  |
| [Schoenoplectiella |  |  |  |  |  |  |  |  |
| erectus] |  |  |  |  |  |  |  |  |
| Scleroblitum atriplicinum | Native | NSW, Qld, SA, Vic., | Flinders Ranges, SA, 1851; Lake Pamamaroo, NSW, 1860 | 0 | 1 | 0 |  |  |
|  |  | WA\* |  |  |  |  |  |  |
| Scoparia dulcis | Native | NSW\*, NT\*, Qld\*, | Shoalwater Bay and Broadsound, NSW, 1802 | 0 | 1 | 0 |  |  |
|  |  | WA\* |  |  |  |  |  |  |
| Senna barclayana | Native | NSW, Qld, SA\*, Vic. | Ipswich, Qld, 1843; Chinchilla, Qld, 1846 | 0 | 1 | 0 |  |  |
|  |  | \*, WA |  |  |  |  |  |  |
| Senna occidentalis | Naturalised | NSW\*, NT\*, Qld\*, | Endeavour River, Qld, 1883; Wrotham Park, Qld, 1891 | ~10 | 4 | 0 |  |  |
|  |  | SA?, WA\* |  |  |  |  |  |  |
| Setaria pumila | Naturalised | NSW\*, NT, Qld\*, | Goulburn River, Vic., 1853, Notes: not native | ~20 | 2 | 0 |  |  |
|  |  | SA\*, Vic.\*, WA\* |  |  |  |  |  |  |
| Setaria surgens | Native | NSW, NT, Qld, WA | Brown (1814); Australia, 1802; Chinchilla, Qld, 1847 | 0 | 1 | 0 |  |  |
| [Pennisetum glaucum} |  |  |  |  |  |  |  |  |
| Sida cordifolia | Naturalised | NSW, NT\*, Qld\*, | Gascoyne River, WA, 1886 | ~10 | 2 | 0 |  |  |
|  |  | WA\* |  |  |  |  |  |  |
| Sida spinosa | Native | NSW\*, NT, Qld\*, WA | East Arnhem, NT, 1803 | 0 | 1 | 0 |  |  |
| Sida subcordata | Native | NT, WA\* | Mt Bundy, NT, 1985; Cape Bougainville, WA, 1989 | >80 | 5 | 0 | Remote undisturbed habitat |  |
| Sigesbeckia orientalis | Native | NSW, Qld, SA, Tas.?, | Spencer Gulf, SA, (Bentham 1863–1878); Wide Bay, Qld, 1843 | 0 | 1 | 0 |  |  |
|  |  | Vic., WA\* |  |  |  |  |  |  |
| Solanum erianthum | Native | NSW, NT\*, Qld\* | Brisbane, Qld, 1856; Cardwell, Qld, 1856; Rockhampton, Qld, 1863 | 0 | 1 | 0 |  |  |
| Solanum hystrix | Native | NSW\*, SA, WA\* | Waltabie, SA, 1879; Fowlers Bay, SA, 1879 | >15 | 3 | 0 | Widespread in isolated locations; |  |



perennial plant not associated with

mechanical disturbance



(continued next page )

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Table 1. (continued )



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Status | Distribution, | Indicative early collection details, including (Brown 1814) | Y | Cat | A | Notes |  |
|  |  | attribution |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Sonchus oleraceus | Naturalised | NSW\*, NT\*, Qld\*, | Brown (1814); Fremantle 1838; Albany, WA, 1843; Bethany SA, | <10 | 4 | 0 | Very successful ruderal in disturbed |  |
|  |  | SA\*, Tas.\*, Vic.\*, | 1848; Glenville, SA, 1849 |  |  |  | areas. Possibly mistaken by Brown |  |
|  |  | WA\* |  |  |  |  | for the native species Sonchus |  |
|  |  |  |  |  |  |  | hydrophilus. Clearly considered |  |
|  |  |  |  |  |  |  | naturalised around Perth by |  |
|  |  |  |  |  |  |  | Drummond in 1839 (Keighery |  |
|  |  |  |  | >50 |  |  | 1999). |  |
| Spergularia marina | Native | NSW, NT\*, Qld, SA, | Brown (1814); Parramatta, New South Wales 1881; Five Dock Bay, | 3 | 0 | Brown’s advice accepted until further |  |
| [Arenaria marina] |  | Tas.\*, Vic., WA | NSW 1890; near Kooringa, SA 1892 | >100 |  |  | resolution of taxonomic uncertainty |  |
| Tamarindus indica | Native | NT\*, Qld\*, WA\* | Port Essington, NT, 1945 | 3 | 0 | Long-lived perennial plants on |  |
|  |  |  |  |  |  |  | strandline in locations known to be |  |
|  |  |  |  |  |  |  | frequented by Macassans who |  |
|  |  |  |  |  |  |  | almost certainly introduced this tree |  |
| Tribulus terrestris | Native | NSW\*, NT?, Qld, | Murray River, Vic., 1853; Gilbert River, Qld, 1856; Mt Goningberi, | 0 | 1 | 0 |  |  |
|  |  | SA\*, Vic.\*, WA\* | NSW, 1860; Nickol Bay, WA, 1863 |  |  |  |  |  |
| Urena lobata | Native | NSW\*, NT, Qld\*, | near Herbert River, Qld, 1866 | 0 | 1 | 0 |  |  |
|  |  | WA\* |  |  |  |  |  |  |
| Urochloa subquadripara | Native | NSW, NT, Qld\*, WA | Chinchilla, Qld, 1847; Ballandool River, Qld, 1867 | 1 | 1 | 0 |  |  |
| Utricularia gibba | Native | NSW, NT, Qld, SA\*, | Baines River, NT, 1856; Gracemere, Qld, 1867 | 0 | 1 | 1 |  |  |
|  |  | Vic., WA |  | >50 |  |  |  |  |
| Utricularia subulata | Native | NSW\*, NT, Qld | Mt Tozer, Qld, 1976; Humpty Doo, NT, 1980 | 3 | 1 | Aquatic species in remote locations |  |
| Vachellia farnesiana | Native | NSW, NT, Qld\*, SA\*, | NW coast, WA, 1819–1821; Dawson River, Qld, 1847; Condamine | 0 | 1 | 0 |  |  |
|  |  | WA\* | River, Qld, 1843; Albert River, Qld, 1856; Arnhem Land, NT, |  |  |  |  |  |
|  |  |  | 1856 | >30 |  |  |  |  |
| Vallisneria australis | Native | NSW, Qld, SA, Tas., | Brown (1814); Launceston, Tas., 1842 | 3 | 1 | Widespread aquatic; Brown’s advice |  |
| [spiralis] |  | Vic., WA\* |  |  |  |  | accepted |  |
| Verbena officinalis [prob. | Native | NSW\*, SA\*, Tas.\*, | Brown (1814); central Darling, NSW 1860 | 0 | 1 | 0 | Taxonomic uncertainty; but some |  |
| includes V. africana] |  | Vic., WA\* |  |  |  |  | forms occur with other native |  |
|  |  |  |  | >50 |  |  | species in undisturbed situations |  |
| Vernonia junghuhniana | Native | Qld\* | Warraber Island, Qld, 1997; Lockhart River, Qld, 2014 | 5 | 0 | Occurs in remote and relatively |  |
|  |  |  |  |  |  |  | undisturbed habitat, but very late |  |
|  |  |  |  |  |  |  | collections |  |
| Vigna adenantha | Native | NT, Qld\*, WA | Australia, 1770; Port Curtis, Qld, 1802 | 0 | 1 | 0 | Roots eaten by aboriginal people |  |
| Vigna luteola | Native | NSW, Qld\* | Cardwell, Qld, 1866; Bickerton Island, NT, 1948 | 0 | 1 | 0 |  |  |
| Vigna radiata | Native | NSW\*, NT, Qld, WA | Endeavour River, Qld, 1770; Cardwell, Qld, 1866; Prince Regent | 0 | 1 | 0 |  |  |
|  |  |  | River, WA, 1891 | <5 |  |  |  |  |
| Ximenia americana | Native | NT, Qld | Torres Strait, Qld, 1606, (Windolf 2000); Cardwell, Qld, 1864 | 1 | 0 |  |  |
| Zingiber officinale | Native | Qld\* | Port Douglas, Qld, 1954; Murray Island, Qld, 1971, notes: native | >50 | 5 | 0 | Occurs in native vegetation but |  |
|  |  |  | name ‘kera kera’; Beerwah, Qld, 1971 |  |  |  | possibly introduced by people; has |  |
|  |  |  |  | >50 |  |  | traditional name in Torres Strait |  |
| Zingiber zerumbet | Native | Qld\* | Bamaga, Qld, 1971; Murray Island, Qld, 1971, notes; native name | 5 | 0 | Occurs in native vegetation but |  |
|  |  |  | ‘madub delar’; Badu Island, Qld, 1976 |  |  |  | possibly introduced by people; has |  |
|  |  |  |  | >80 |  |  | traditional name in Torres Strait |  |
| Zoysia matrella | Native | NSW\*, Qld, SA, Vic.? | Kangaroo Island, SA, 1929; Robe, SA, 1938; Stradbroke Island, Qld, | 5 | 0 | Occurs as a dominant in salt marsh |  |
|  |  |  | 1930; Cairns, Qld, 1937 |  |  |  | vegetation |  |
|  |  |  |  |  |  |  |  |  |



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However, it is Stuart’s much later collection from the interior that strongly supports a pre-1788 native status. This is confirmed by the written records of Leichhardt who recorded the species on his pioneering passage through inland Queensland in 1845 (Fensham et al. [2006](#page14)).

Some species widely considered alien were almost certainly present in 1788. The history of coconuts (Cocos nucifer) in Australia has been the subject of previous discussion (Buckley and Harries [1984](#page14)). The lack of observations by Cook and Banks in 1770 (Banks [1962](#page14); Cook [1968](#page14)) or Flinders in 1802–1805 (Flinders [1814](#page14)) may not be all that surprising given the distance they travelled from the coast in tropical waters. Coconuts were clearly naturalised and abundant on the islands of Torres Strait by 1845 (Jukes [1847](#page14); pp. 132, 155, 156, 161, 173, 175, 181, 182, 183, 186, 196, 198, 200, 201). A grove of coconuts was seen on Russell Island (17.229 S, 146.094 E), south-east of Cairns in 1848 (MacGillivray [1852](#page14)). Arecaceae pollen of the ‘Cocos’ type is rare but present in sediments from Lizard Island (14.669 S, 145.469 E) dated throughout the Holocene (Proske and Haberle [2012](#page14)). However, early direct observations from the mainland are relatively late in the historical record despite an assertion that occasional trees were recorded along the Queensland coast in the 1860s (Mueller [1867](#page14)). Mueller may have been referring to the single coconut at Emu Beach recorded around 1869 and presumed to be 40–60 years old (Thozet [1869](#page14)). On this evidence coconuts were rare in Australia outside Torres Strait, but are native to the continent.

In some cases the native status of otherwise ambiguous species is corroborated by genetic studies. Molecular studies verify indigenous forms of the grass Cenchrus purpurascens, including populations in isolated artesian springs that have been present in Australia through the Pleistocene (Toon et al. [2018](#page14)). Molecular studies were used to identify the existence of an Australian form of Salsola tragus widely divergent from other forms, including one from North America (Borger et al. [2008](#page14)). A similar study verifies a form of Phyla nodiflora that is indigenous in Australia (Gross et al. [2017](#page14)).

Purslane (Portulaca oleracea) appears to have evolved elsewhere (possibly Africa) and is classified by Bean ([2007](#page14)) as naturalised to Australia because it has no obvious mechanism for animal dispersal. The species is considered native here as it was recorded during the early years of settlement (Table [1](#page14)) and there are early records of its use by aboriginal people (Thomas [1906](#page14)). It seems to have a long history in Australia, having radiated into different forms (Wheeler [1992](#page14)), including at least one related species restricted to Australian desert dunes (Portulaca intraterranea). However, purslane is common in urban landscapes where it can be seen colonising the cracks in concrete and other competition-free environments, and there may be non-indigenous forms (Walsh and Entwistle [1994b](#page14)). Juncus bufonius is considered native but naturalised forms probably also occur (Walsh and Entwistle [1994a](#page14)).

Some species without obvious adaptation for animal dispersal may well have arrived without the assistance of humans long before 1788. Mimosa (Vachellia farnesiana) appears to have evolved elsewhere (possibly Americas) and is classified by Bean ([2007](#page14)) as naturalised based on this rationale. However, mimosa grows on heavy clays and it is conceivable that migrating birds may have brought seeds embedded in the clay from locations

such as the Philippines. Birds may be a long distance vector for poorly dispersed seeds particularly over long time periods.

A native form of Malvastrum americanum is recognised as the variety stellatum (Hill [1980](#page14)) and is the most common in relatively undisturbed vegetation where other native species are dominant (R. Fensham, pers. obs.). Because the native form is the most widespread, the species is recognised as native here. Brown ([1814](#page14)) considered the origin of the common couch grass Cynodon dactylon as ambiguous. Ludwig Leichhardt regarded the populations he saw in New South Wales in 1842–1843 as non-indigenous (Darragh and Fensham [2013](#page14); pp. 39, 93, 188, 451). However, the variety Cynodon dactylon var. pulchellus is considered to be native to the Murray River (Walsh and Entwistle [1994a](#page14)). In our treatment, we regard this species as naturalised because the alien variety var. dactylon is by far the most common and abundant.

Robert Brown’s ([1814](#page14)) list of Australian species that he also observed from Europe is particularly useful, confirming the historical record for potentially ambiguous terrestrial taxa such as Bidens bipinnata, Calystegia sepium, Cotula coronopifolia, Echinochloa crus-galli, Heliotropium europaeum, Phyla nodiflora, Potentilla anserina, Prunella vulgaris, Rorippa nasturtium-aquaticum, Setaria surgens, Sonchus oleracea and Spergularia marina; but misleading for some species such as Aphanes arvensis and Isolepis setacea that could easily have been mistaken for native species that have subsequently been described.

Cyperus breviculmis and Cyperus rotundus are widely regarded as naturalised but early collections seem to suggest a native status. The former originates from the Americas and the latter from Africa and Eurasia, These species were probably present in Australia although much less common in the pre-1788 landscape and have greatly expanded their ranges in response to disturbance. Another native species, Dysphania pumilio is an arid-zone ruderal that has a proclivity for the relatively competition-free environments associated with disturbance around human settlements. The vines Ipomoea indica and Ipomoea nil seem unambiguously native based on early records but have become adventive.

In some cases, the ecology of plant species has been used to override the evidence of early collections to define a species status with early collections. The early collecting date of Malvastrum coromandelianum from around the four-year old settlement of Rockhampton in 1866 suggests a native status, but it is usually associated with obviously disturbed sites and is attributed as naturalised. Vernonia junghuhniana was first collected on the Torres Strait Islands in 1997, but it occurs in relatively undisturbed situations with other native species (P. Forster, pers. comm.) and is considered native here. However, it is recognised that the ecology alone can be unreliable, particularly for naturalised species that occur in relatively undisturbed vegetation dominated by native plants. The naturalised small herb Misopates orontium occurs in low to moderate abundance in relatively undisturbed woodlands dominated by native species. Conversely, the native species Codonocarpus cotinifolia, Dysphania glomulifera, Dysphania kalpari, Lepidium strongylophyllum, Sclerolaena birchii, Senna notabilis and Senna pleurocarpa represent a range of lifeforms and are all most common and abundant in heavily disturbed situations within the Australian arid zone.

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In our assessment of the historical record we have given the benefit of the doubt to a native status for wetland species because they tend to be dispersed by water birds and generally have pan-continental distributions. Eclipta prostrata was not collected until 1856 from the Brisbane River, where it could conceivably have become naturalised, but has been attributed as native here because of its aquatic habitat and occurrence in isolated localities free from disturbance (I. Cowie, pers. comm.).

The introduction of Tamarindus indica by people before European settlement is unambiguous and other species regarded as native here including Cyclocarpa stellaris, Momordica balsamina, Pueraria lobata and Vigna radiata may have been assisted by humans. Some species that are identified as native are not only adventive but also have the capacity to transform ecosystems. The coconut for example forms dense stands on the strand-line behind tropical beaches in north Queensland replacing a diversity of other native plant species and vigorous vines identified as native here (e.g. Cyclocarpa stellaris, Ipomoea indica and Pueraria lobata) have the capacity to smother fragmented rainforest and have expanded considerably beyond their indigenous range.

Conclusions

The permanent settlement at Sydney Cove in 1788 marked a biogeographic watershed with the first ports, sophisticated agriculture, livestock, horticulture and the transmigration of people from many continents. This study has attributed the Australian flora as either native or naturalised using the pre- and post-settlement divide of 1788. Using this method the Australian flora consists of 22865 native species and 3212 naturalised species (see Supplementary Material Table S1, available at the journal’s website). The collecting records of early botanical explorers were strongly indicative in most ambiguous cases. Using this sharp biogeographic watershed a remarkably tiny proportion (0.1%) of the entire native and naturalised flora remains ambiguous. The use of 1788 as a date to define naturalised species slightly increases their number relative to previous treatments. The attribution of the flora that we have generated provides an important baseline for understanding the ongoing dispersal of plant species across continents.

Conflicts of interest

The authors declare no conflicts of interest.

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