

An historical overview of exotic and weedy plants in the Northern Territory

Andrew S. Mitchell
Herbarium of the Northern Territory
Box 2134, Alice Springs, N.T. 5750

SUMMARY

Much of the history of exotic and weedy species in the Northern Territory is scanty, and this paper only aims to outline the research to-date, and propose further lines of investigation. Herbarium records interstate should be examined and nomenclature checked with early surveys and reports to determine the accuracy of identification and date of introduction. It is hoped that this information will provide a firm basis for the study of introduction and spread of exotic species and further provide accurate details on the history of weedy species enabling better monitoring and control of those species considered to be undesirable.

INTRODUCTION

The vegetation, geomorphology and climate of the Northern Territory have been described in detail by various authors (e.g. Whittem, 1964; Perry, 1960; Perry et al, 1962; and Chippendale 1971) and will not be reiterated here. It is sufficient to say that two general divisions are recognized, viz. the 'Top End' (the monsoonal tropics of the Darwin-Katherine area) and the 'Centre' (the arid and semi-arid subtropics south of about Larrimah). A more sophisticated approach recognizes the four pastoral districts of Darwin and Gulf, Victoria River District, Barkly Tableland, and Alice Springs District. In general, the exotics found in the northern part of the Territory are not found in the southern areas, and those plants considered weedy are similarly restricted. There are, of course, a few exceptions. Red Natal grass (*Rhynchyletrum repens*), for example, was introduced to the Top End prior to 1913, was first recorded in Alice Springs in 1963, and has become common in and around Alice Springs since 1969.

Prior to the last drought (1956 - 1966) there were probably few introduced plants in the Centre with the exception of Bathurst burr (*Xanthium spinosum*) which was well known on Hermannsburg Station (Latz; Nelson, personal communication). Hand feeding was necessary in the latter part of the drought and this was virtually the first time large quantities of hay had been brought into the Centre from southern areas. With the break of the drought, these hay-introduced species were afforded a more hospitable environment, and many were able to germinate and establish. In addition, several previously innocuous species, particularly wild hops (*Rumex vesicarius*) and fleabane (*Conyza bonariensis*), which had been present in very small numbers through the drought, underwent massive population explosions, probably through genetic adaptation to improved environmental conditions.

In considering the history of some of these plants, many early literature sources were consulted, such as explorers'

journals, scientific reports, articles, annual reports, etc. Records of plants occurring in this literature have been taken at face value, as there has not yet been any opportunity to check the relevant specimens which are almost all held by interstate (and sometimes overseas) herbaria. It has become obvious from this brief overview that the history of exotic and weedy species in the Northern Territory is very poor prior to 1954 (when the Herbarium of the Northern Territory was established in Alice Springs) and much more detailed research will be needed to fill in the gaps.

The definitions of a 'weed' and a 'naturalized species' have been discussed by various authors (e.g. Moore, 1975; Wace, 1973), and similarly for 'exotic' (Weir, 1977). Within the context of this discussion the term 'alien' is synonymous with 'exotic', and also with 'introduced species'.

History and development of the Northern Territory

The history of settlement of the Northern Territory has been very sporadic, and development has been slow in comparison with the rest of Australia. It is possible that the Portuguese visited the north coast as early as 1511 (Giles, 1946), and certainly the Dutch had explored sections of the coastline by 1606 (Commonwealth of Australia, 1955; 1965), although both the Dutch and Portuguese considered the area valueless for commerce. When Flinders charted the northern coastline in 1802 he found Malays (Macassans) engaged in harvesting trepang (beche-de-mer) for trade with China. Macknight (1976) states the Macassans visited possibly as early as 1650, and certainly by 1750; the evidence for Macassans visiting the Northern Territory coast earlier than 1650 is somewhat equivocal though radiocarbon dating of charcoal samples gave a figure of 1200 A.D. In any case, they are known to have introduced the tamarind (*Tamarindus indicus*) to Arnhem Land and Groote Eylandt (Macknight, 1976) well before Arthur Phillip established the first colony at Port Jackson in January 1788, and even before James Cook landed at Botany Bay in 1770. It is interesting then, to note that the history of plant introduction and naturalization in Australia started well before that of the founding British Colony. Robert Brown collected along the Arnhem Land coast in 1803, but does not list any introductions in his 'Prodromus'. Sporadic settlement continued along the coast at Melville Island (1824 - 26), Raffles Bay (1826 - 29), and Port Essington (1838 - 49), but all were abandoned. However, even these temporary settlements were sufficient to harbour and disseminate alien plants. Bentham (1870) noted that Ludwig Leichhardt collected hyptis (*Hyptis suaveolens*) at Port Essington in 1845, and Holtze (1892) also notes that it was introduced to Port Darwin from Timor by a Mr. Schmidt about 1870. By 1891 it was well established and was even then recognized as a serious weed. Today it is still regarded as a weed of particular significance in the settled areas of the Top End.

Prickly pear (*Opuntia stricta*) has persisted at the old settlement of Victoria (Port Essington) and whilst extensive, does not appear to be spreading. *Opuntia* species have also been planted at Alice Springs as ornamentals, but are of no concern. At Aileron, there has been some spread of a patch of *Opuntia* along a creek line, but it has been easily contained. Limited exploration of the Northern Territory continued and in 1861 - 62 John McDouall Stuart successfully crossed the continent from south to north. Mueller

(1865) does not list any introduced plants from this trip. In 1863, the Northern Territory was ceded to South Australia which retained control until 1911 when the Territory then reverted to the control of the Commonwealth. During this time (1863 - 1911) the South Australian 'Thistle and Burr Act of 1862' was in force, to be replaced by the 'Noxious Weeds Ordinance 1916 - 1959', and finally by the 'Noxious Weeds Ordinance 1962' which is currently in force. Unfortunately, due to staff restrictions, a weeds agronomist was not appointed in the Northern Territory until 1967.

The first stock introductions to the Northern Territory were in 1866 to the Macdonnell Ranges and since that time most plant introductions have arrived on stock or in hay or been spread by stock movements. Noogoora burr (*Xanthium pungens*), for example, was introduced to an Alice Springs station by seed caught in the coats and tails of cattle trucked across from Queensland. The Northern Territory is somewhat fortunate in that most stock movements are outwards and there is thus a reduced risk of importing undesirable species with stock. However, once a plant is established, stock can very rapidly distribute it over a property. The incidence of noogoora burr in the Territory is also interesting in as much as there is no specimen record of the plant held in the Herbarium of the Northern Territory - pointing out but one of the anomalies in using and interpreting herbarium records. Wace (1973, 1977) points out the potential for dispersal of exotic species by, inter alia, vehicular means. With the upsurge in tourist traffic and the imminent development of large scale mining operations there will be increased opportunities for dispersal of plant propagules in this manner.

Palmerston (Port Darwin) was selected as the site for the main town in 1869 and by 1872 the Overland Telegraph Line was completed. The Telegraph Offices such as that at Alice Springs, often housed several families, who were responsible for the planting of many ornamentals around the Station buildings. The pepper tree (*Schinus molle*), for example, was well evident at the Alice Springs Telegraph Station by 1899, and whilst it has not spread outside the area, it is certainly well-established within its limited range. The period 1880 to 1890 was one of mining activity, population growth and development of the pastoral industry. In 1880 there were only two stations in the Northern Territory; by 1884 there were 10; and today there are over 200. Obviously, as the number of stations increased so did stock numbers, and thus the likelihood of introducing or spreading exotic plants increased. In 1888, there were 218,000 cattle in the Northern Territory, 513,000 in 1911, and over 1.6 million today, obviously providing a very effective vector for the dispersal of certain plant species. There was a severe economic slump after 1890 and development from then on was more or less steady, but slow, with the construction of roads, railways and airports slowly opening up large sections of the outback.

Plant records from literature sources

Most of the early explorers made plant collections during their expeditions which provide reasonably comprehensive records of the vegetation at that time. As stated above, McDouall Stuart found no introduced plants on his continent crossing of 1861 - 62. In 1872, Giles found sowthistle (*Sonchus oleraceus*) abundant on the banks of the Finke River towards its source. On the Horn

Expedition of 1894, Tate again found no exotic species except for sowthistle. There is, however, some evidence to suggest that *Cassia planitiiicola* may be introduced because of its weedy characteristics (Latz, personal communication). Although Tate lists some 125 'exotic species' for his Larapintine Flora, these species are, in fact, cosmopolitan or non-endemic species. By this stage 614 plants were known from Central Australia. Collections by Winnecke in 1883 and Tietkins in 1889 did not yield any exotic species. Ewart and Davies (1917) list seven naturalized species and at least two adventives (several plants are still of uncertain status) out of a total flora of 1737 species. Eardley (1946) lists some 350 species from the 1939 Simpson Desert Expedition of which only two are aliens, viz. feather-top Rhodes grass (*Chloris virgata*) at Charlotte Waters and castor-oil plant (*Ricinus communis*) at Andado Homestead, both obviously introduced by man's activities in the area. Eardley (1946) comments that no Arabian grass (*Schismus barbatus*) was collected, but that it was bound to follow transport routes to Central Australia. To-date, this grass has not been found in the Northern Territory. Symon (1969) published a checklist of the Simpson Desert which lists 353 flowering plants (Eardley's list included lower plants as well) of which five are aliens, viz. buffel grass (*Cenchrus ciliaris*), spiny emex (*Emex australis*), castor-oil plant, small-flowered mallow (*Malva parviflora*) and colocynth (*Citrullus colocynthus*), all from the general vicinity of Andado Homestead, and thus probably dependent on man's activities for their original introduction. It is almost certain that buffel grass, for example, was introduced to the Northern Territory by the Afghan camel drivers who used it as a stuffing in their saddles.

In the Top End of the Northern Territory, Holtze (1892) makes the first mention of introduced plants, though many of those he lists have only appeared in cultivation. Of the 73 species he names, some 17 are now considered naturalized, and five adventive. It should be noted that whilst he was Curator of the Botanic Gardens in Darwin, Holtze experimented with growing several thousand exotic plants for their economic properties. Of the later Top End records (particularly in Arnhem Land) we find Dr. H. Basedow's collection of 1928 contained no introductions. Specht (1958) records 30 alien species from the Arnhem Land Scientific Expedition of 1948, nearly all of them from towns or settlements. Chippendale (1974) lists five aliens from the Cobourg Peninsula Survey.

Most of the very early records of the Flora of the Northern Territory are held at interstate (and overseas) herbaria, and it has not yet been possible to examine much of this material. It was not until 1954 that a Botanist was appointed to the Northern Territory (based in Alice Springs), and only since then has there been a systematic and methodical approach to the recording and cataloguing of the Northern Territory Flora. Obviously, then, as our earliest records of many plants only appear in 1954 or later, it becomes very difficult to interpret the history of exotic plants in the Northern Territory. Five years later, the first checklist of Central Australian Plants was produced (Chippendale, 1959) listing 1101 species of which 18 were considered naturalized. By 1961 two more naturalized species and one adventive had been added to the Central Australian Flora (Chippendale, 1960, 1961). As the Territory became better known botanically, the range of plant records was extended and by 1964 there were five recorded plant introductions from the Top End and 33 from Central Australia

(Chippendale, 1964). Finally, in 1971, a checklist of Northern Territory plants appeared (Chippendale, 1971) listing 113 introduced species (including both naturalized and adventive), which represented just over 4% of the total vascular flora. Ross (1976) notes the percentages of naturalized plants from Victoria (22.49), Sydney region (22.50), A.C.T. (27.92) and N.T. (4.17), and Weir (1977) puts the percentage for Australia at 10%. Amor and Piggin (1977) further emphasize this point and also note the lack of knowledge of subtropical exotic species. Since late 1974, records of the Herbarium of the Northern Territory have been computerized and the latest run for which results have been tabulated (July 1977) shows that this figure (for both naturalized and adventive plants) has only risen to 5.08%, still well below the average. The rate of increase (at just over 10 plants per year since 1971), however, is larger than that for Victoria. It is difficult to say whether this trend will continue as there are two conflicting factors here. The first is the increasing tourist traffic (some 112,000 people a year) and mining development which will assist in the introduction and spread of plant propagules, and the second, the intensive botanical collection which has been undertaken in recent years, has probably resulted in this higher rate of increase. It would appear probable that because of the increased development in the tourist and mining industries that the former factor would have over-riding importance. Certainly, important species are still likely to enter and possibly become established in the Northern Territory, due simply to their proximity in adjacent states. Amongst recent discoveries are onion weed (*Asphodelus fistulosus*) in August 1974, water hyacinth (*Eichhornia crassipes*) December 1975, salvinia (*Salvinia auriculata*) August 1976, and parthenium weed (*Parthenium hysterophorus*) June 1977.

Noxious weeds

As the main primary industry in the Northern Territory is beef cattle production the emphasis has been on the control and eradication of weedy species in the pastoral situation. This includes plants such as hyptis, devil's claw (*Martynia annua*), mimosa (*Mimosa pigra*), *Sida* spp., castor-oil, and Bathurst and Noogoora burrs. Parkinsonia (*Parkinsonia aculeata*), introduced early this century, has recently shown considerable spread over the central Barkly Tableland area, which provides some of the best grazing country in the Territory, and is currently being studied in some detail to determine what action should be taken against it.

People in town areas and similar places of habitation usually suffer from 'inconvenience weeds' which, in the Northern Territory, are all lumped under the general term of 'bindies' or 'bindyii', i.e. any plant with a burr or prickle fruit which normally has a propensity to lodge in the foot, hand or other vulnerable part of the body (hence the other term 'Casanova's curse!'). It can also be a nuisance lodging in clothing. Plants in this category include Mosman River grass (*Cenchrus echinatus*), khaki weed (*Alternanthera pungens*), and caltrop (*Tribulus terrestris*). Then there are also weeds of gardens and lawns, but these are not normally classified as being noxious.

Water weeds have taken on a new significance in the Territory with the comparatively recent discoveries of water hyacinth (1975) and salvinia (1976) in the Top End. Water lettuce (*Psittia stratiotes*), although present in the Northern Territory since 1946 (Blake, 1954), has only recently been of concern following the

recommended ban by the Plant Production Committee of the Australian Agricultural Council.

Alligator weed (*Alternanthera philoxeroides*), elodea (*Elodea canadensis* and *E. densa*) and arrowhead (*Sagittaria montevidensis*), although not known to be present in the Northern Territory, are considered to be weeds whose entry into the Northern Territory should be prevented. Parthenium weed was also in this category until it was discovered at Elsey Reach in June 1977.

ACKNOWLEDGEMENTS

I would like to thank my colleagues, J.R. Maconochie and P.K. Latz, and D.J. Nelson of C.S.I.R.O. for their comments and criticisms during the preparation of this paper.

REFERENCES

- Amor, R.L. and Piggitt, C.M. (1977).- Factors influencing the establishment and success of exotic plants in Australia. In *Proc. Ecol. Soc. Aust. Symp.* 1977. (In press).
- Anon. (1967).- Weeds in the N.T. - Noxious Weeds. Pamphlet No. 14. Primary Industries Branch, Northern Territory Administration, Darwin.
- Anon. (1975).- N.T. noxious weeds list under constant review. *N.T. Rural News Mag.* 1 (4) : 16-17.
- Bentham, G. (1870).- *Flora Australiensis*, vol. 5. L. Reeve & Co., London.
- Blake, S.T. (1954).- Botanical Contributions of the Northern Australian Regional Survey. II. Studies on Miscellaneous Northern Australian Plants. *Aust. J. Bot.* 2 : 99-140.
- Brown, R. (1810).- *Prodomus Florae Novae Hollandiae*. 1960 Facsimile Edition by J. Cramer, Weinheim.
- Chippendale, G.M. (1959). Check List of Central Australian Plants. *Trans. Roy. Soc. S. Aust.* 82 : 321-338.
- (1960).- Contributions to the Flora of Central Australia. No. 1. *Trans. Roy. Soc. S. Aust.* 83 : 199-203.
- (1961).- Contributions to the Flora of Central Australia. No. 2. *Trans. Roy. Soc. S. Aust.* 84 : 99-103.
- (1964).- Records of Northern Territory Plants. *Trans. Roy. Soc. S. Aust.* 88 : 175-180.
- (1971).- Check List of Northern Territory Plants. *Proc. Linn. Soc. N.S.W.* 96 (4) : 207-267.
- (1974).- Vegetation. In Frith, H.J. and Calaby, J.H. Fauna Survey of the Port Essington District, Cobourg Peninsula, Northern Territory of Australia, Division of Wildlife Research, Technical paper 28. C.S.I.R.O., Melbourne.

- Eardley, C.M. (1946).- The Simpson Desert Expedition 1939, Scientific Reports No. 7. Botany - Part 1. Catalogue of Plants. *Trans. Roy. Soc. S. Aust.* 70 (1) : 145-174.
- Everist, S.L. (1959).- Strangers within the Gates. (Plants Naturalized in Queensland). *The Queensland Naturalist* 16 (3 & 4) : 49-60.
- Ewart, A.J. and Davies, O.B. (1917).- The Flora of the Northern Territory. McCarron Bird & Co., Melbourne.
- Giles, L.H.A. (1946).- What of the Northern Territory? Pamphlet. Northern Territory Administration, Darwin.
- Haegi, L. (1976).- Taxonomic Accounts of *Datura* L. (Solanaceae) in Australia with a Note on *Brugmansia* Pers. *Aust. J. Bot.* 24 : 415-35.
- (1976).- Taxonomia Account of *Lycium* (Solanaceae) in Australia. *Aust. J. Bot.* 24 : 669-79.
- Hall, N.H. (1967).- Weeds in the N.T. - *Hyptis suaveolens*. Pamphlet No. 10. Primary Industries Branch, Northern Territory Administration, Darwin.
- (1967).- Weeds in the N.T. - Rubber Bush. Pamphlet No. 13. Primary Industries Branch, Northern Territory Administration, Darwin.
- (1967).- Weeds in the N.T. - *Acacia farnesiana*. Pamphlet No. 11. Primary Industries Branch, Northern Territory Administration, Darwin.
- Harrison, P.J. (1973).- *Hyptis*. *Turnoff* 4 (2) : 28.
- Holtze, M. (1892).- Introduced Plants in the Northern Territory. *Trans. Roy. Soc. S. Aust.* 15 : 1-4.
- Kempe, H. (1882).- Plants Indigenous to the Neighbourhood of Hermannsburg. *Trans. Roy. Soc. S. Aust.* 5 : 19-23.
- Kempe, J. (1880).- Plants Indigenous to the Neighbourhood of Hermannsburg. *Trans. Roy. Soc. S. Aust.* 3 : 129-137.
- Macknight, C.C. (1976).- *The Voyage to Marege*. Melbourne University Press.
- Maconochie, J.R. and Byrnes, N. (1971).- Additions to the Flora of the Northern Territory. *Muelleria* 2 (2) : 133-137.
- Moore, R.M. (1975).- An Ecologist's Concept of a Noxious Weed : Plant Outlaw? *J. Aust. Inst. Ag. Sci.* 41 (2) : 119-121.
- Mueller, F. (1865).- Botanical Appendix. In Hardman, W. ed. The Journals of John McDouall Stuart. Saunders, Otley & Co., London. Libraries Board of South Australia Facsimile Edition 1975.

- (1889).- Botanical Appendix. *In* Giles, E. Australia Twice Traversed, vol. 2. Sampson Low, Marston, Saerle & Rivington, London. Libraries Board of South Australia Facsimile Edition 1964.
- Mueller, F. and Tate, R. (1890).- List of Plants Collected during Mr. Tietkin's Expedition into Central Australia, 1889. *Trans. Roy. Soc. S. Aust.* 13 : 94-109.
- Perry, R.A. (1960).- Pasture Lands of the Northern Territory, Australia. (Land Research Series No. 5). C.S.I.R.O., Melbourne.
- Perry, R.A., Mabbutt, J.A., Litchfield, W.H., Quinlan, T., Lazarides, M., Jones, N.O., Slatyer, R.O., Stewart, G.A., Bateman, W. and Ryan, G.R. (1962).- Lands of the Alice Springs Area, Northern Territory, 1956-57. (Land Research Series No. 6). C.S.I.R.O., Melbourne.
- Raven, P.H. (1963).- The Old World Species of *Ludwigia* (Including *Jussiaea*), with a Synopsis of the Genus (Onagraceae). *Reinwardtia* 6 (4) : 327-427.
- Ross, J.H. (1976).- An Analysis of the Flora of Victoria. *Muelleria* 3 (3) : 169-176.
- Sainty, G.R. (1973).- Aquatic Plants. Water Conservation and Irrigation Commission, Sydney, New South Wales.
- Specht, R.L. (1958).- The Gymnospermae and Angiospermae Collected on the Arnhem Land Expedition. *In* Specht, R.L. and Mountford, C.P. eds. Records of the American-Australian Scientific Expedition to Arnhemland vol. 3. Botany and Plant Ecology, Melbourne University Press.
- Symon, D.E. (1961).- The Species of *Oxalis* Established in South Australia. *Trans. Roy. Soc. S. Aust.* 84 : 71-7.
- (1969).- A Checklist of Flowering Plants of the Simpson Desert and its Immediate Environs. *Trans. Roy. Soc. S. Aust.* 93 : 17-38.
- Wace, N. (?1973).- Naturalized Plants and Native Vegetation in Australia. *In* *Proc. Second Vic. Weeds Conf. Weed Science Society of Victoria, Melbourne.*
- Wace, N. (1977).- Assessment of Dispersal of Plant Species - the Carborne Flora in Canberra. *In* *Proc. Ecol. Soc. Aust. Symp.* 1977. (In press).
- Weir, J.S. (1977).- Exotics; Past, Present and Future. *In* *Proc. Ecol. Soc. Aust. Symp.* 1977. (In press).
- Weston, A.S. (1974).- The Genus *Cenchrus* (Poaceae) in Australia. *Nuytsia* 1 (4) : 375-80.
- Whittem, J.H. (1964).- The Cattle Industry of the Northern Territory. *Aust. Vet. J.* 40 : 79-83.

Winnecke, C. (1884).- Plants Collected in Central Australia.
Trans. Roy. Soc. S. Aust. 8 : 10-13.

In addition to the references listed above, free use was made of much material contained in the following government publications:

South Australian Government Resident's Report on the Northern Territory (various years).

Commonwealth of Australia - Annual Reports for the Northern Territory (various years, especially 1955 and 1965).

Northern Territory Administration -

Agricultural Branch Reports)	
)	
Animal Industry Branch Reports)	
)	
Animal Industry and Agriculture Branch Reports)	
)	various
Annual Reports)	years.
)	
Files)	