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Tasmanian Floral Resources for Honeybees

— *Focus on tea tree* —

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Tasmanian Floral Resources for Honeybees

Focus on tea tree

By Mark Leech

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Foreword

The need for each state to develop a beekeeping resource database to assist the beekeeping industry and relevant national and state government departments when determining beekeeper usage of government-controlled lands has long been recognised.

This volume builds on the 2004 Apiary Industry Census and 2005 Apiary Industry Profile undertaken in Tasmania by the Forest and Forest Industry Council and the Apiary Working Group.

This study has confirmed Leatherwood (*Eucryphia lucida*) as the main reliable nectar flow for the Tasmanian beekeeping industry. In addition, tea tree (*Leptospermum spp*.) has been identified as an emerging opportunity, with some beekeepers having produced and tested medically-active honey from local tea tree resources.

A survey of beekeepers was undertaken to determine the level of engagement and interest in this potential opportunity. Beekeepers expressed interest in using tea tree as another resource to secure and expand their businesses. A strategic program of research to investigate the properties of honeys from leatherwood and tea tree species would maximise the prospect of securing returns from these resources for the industry.

The pocket field guide produced as an additional component of this project is intended to provide a user-friendly tool for beekeepers to help identify Tasmanian native flora likely to be accessible and beneficial to honeybees. It is an essential element of a suite of products that describes Tasmania's honeybee industry and the floral resources accessed by honeybees.

This report, an addition to RIRDC's diverse range of over 1900 research publications, was funded by the Honeybee R&D program, which aims to improve the productivity and profitability of the Australian beekeeping industry.

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Peter O'Brien

Managing Director

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- Joshua Crawford who designed and compiled the field guide
- Lea Edwards (Program Coordinator, RIRDC Established Rural Industries) for her support and coordination activities.

Abbreviations

AHBIC	Australian Honeybee Industry Council
AP	Australian Parliament
DPIW	Department of Primary Industry & Water
FTE	Full time equivalents (a measure of employment*
FFIC	Forest & Forest Industry Council of Tasmania
NVA	Natural Values Atlas
TCFA	Tasmanian Community Forest Agreement
TBA	Tasmanian Beekeepers Association
TCPA	Tasmanian Crop Pollinators Association

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Executive Summary

What the report is about

The development of a floral database for Tasmania is an important contribution to the sustainable development of the honeybee industry in that State. Availability of a comprehensive information database describing accessible floral resources will assist beekeepers to secure and expand their operations.

Who is the report targeted at?

The report provides an overview of the Tasmanian industry, with particular consideration of the potential development of a tea tree honey component. It is accompanied by a field guide to the native flora of Tasmania accessed by honeybees, *Apis mellifera.* The report and field guide will provide useful information to beekeepers and their peak bodies, governments, consultants and researchers.

Background

Tasmania is the last state to produce a nationally available floral database. This project builds on collaborative work done with the Tasmanian Forest and Forest Industry Council in 2005 and supports the recommendation of the National Workshop on the Effects of Honeybees on the Environment held in Canberra in 1989.

The Tasmanian industry is best known for its unique leatherwood honey, producing approximately 1,000 tonnes of this product per year. While the industry is already an important contributor to regional economies, its role could be further enhanced by utilisation of additional floral resources, potentially including the widely distributed species of tea tree (*Leptospermum*) in Tasmania.

Aims/objectives

To provide a review of floral information of relevance to the Tasmanian apiary industry, and a field guide to species distribution and floral data.

Methods used

The 2004 Apiary Census was based on a survey of 80% of the industry, and provided the data for the floral distribution maps and floral data. A second survey was undertaken in 2008 focussed on discovering the extent of the knowledge base relating to tea tree species. A pocket-size field guide of native flora accessed by honeybees has also been produced, and describes species and field records from the Natural Values Atlas and associated hive site locations.

Results/key findings

There has been a decrease in hive registrations of approximately 18% from 18,000 to 15,000 in the four years since the industry profile data was collected, likely resulting from non-compulsory hive registration. The apiary industry is a small but important regional employer supporting approximately 153 jobs, of which approximately 100 are full-time job equivalents.

The industry remains dependent on leatherwood honey as the main reliable nectar flow, producing on average 1000 tonnes per year. There appears to be a renewed optimism regarding the long-term management and viability of the leatherwood resource. There is also an extensive tea tree resource, for which relatively little information exists. Beekeepers have expressed interest in pursuing tea tree as another opportunity to both secure and expand their business. There is a need for a strategic approach to a research program investigating the properties of honeys from the leatherwood and tea tree species.

The field guide provides mapped distribution of the main native flora known to be of benefit to honeybees. The mapped distribution of hive sites and species provides a quick visual reference and an indication of possible gaps in resource use.

Implications for relevant stakeholders

The publication of key findings of the industry profile, a floral database, and a field guide provides an overview of the industry and available floral resources. This information will provide a platform for practitioners, research bodies and government decision-making and funding bodies.

Recommendation

Recommendations point to the need for research into new resource opportunities and innovation in increasing the use of melliferous flora of Tasmania.

Introduction

Comprehensive information on the use of each State's flora is essential for the maintenance, development and security of the beekeeping industry. Tasmania is the last state to produce a floral database in a format that is nationally accessible.

This project has built on the work undertaken in Tasmania by the Forest & Forest Industry Council (FFIC) and the ministerial Apiary Working Group, in conjunction with a RIRDC project that undertook a census of the industry in 2004 and produced an industry profile (Leech, 2005). That data and report, which was based mostly on anecdotal information, is currently the only comprehensive data set on certain aspects of the Tasmanian apiary industry.

This report summarises those findings and builds on the work of the FFIC, provides new information on tea tree as an emerging opportunity, and is accompanied by a field guide to the native flora of Tasmania used by honeybees.

A new survey of beekeepers was undertaken to establish the level of understanding of, and interest in, pursuing tea tree honey as a new and potentially valuable product.

Background

The Tasmanian Apiary Industry Profile (Leech, 2005) provided the context and background for production of this Tasmanian floral database. The information derived from this study will provide an overview of the Tasmanian honeybee and pollination industries.

The 2004 Apiary Census captured valuable information about the flora used by bees and beekeepers in their apiary management. Native flora and introduced flora were found to contribute to bee nutrition and honey yield in an interlinked mosaic across the landscape. Species usage information was provided by beekeepers from their own knowledge.

It was considered that where honeybees accessed flora in extensive natural settings, there may have been more species utilised than indicated. There are at least 51 native floral species accessed by honeybees, and more than 41 introduced species. All the information provided by beekeepers for these project was anecdotal, with little documented information and no ground truthing.

Managed honeybees, *Apis mellifera*, make extensive use of all flora whether native or introduced. The floral database produced from the 2004 Apiary Census has provided the following information.

- At least 93 species and plant associations are identified by beekeepers as being accessed by managed honeybees.
- Leatherwood (*Eucryphia lucida*) is the most important floral element in the Tasmanian floral sequence, being accessed by approximately 12,500 hives from at least 280 sites. It is the latest-flowering species, providing crucial winter stores.
- Blue Gum (*Eucalyptus globulus)*, Prickly Box (*Bursaria spinosa*) and the tea trees (*Leptospermum* and *Melaleuca* spp) are other native species that consistently produce sizeable commercial honey flows.
- The plants consistently considered by beekeepers to be most important for pollen – Crack Willow, Gorse and Blackberry – are all considered serious environmental weeds.
- Production of clover-blackberry "white honey", once the mainstay of the industry, is threatened by changing agricultural practice and biological control.

Industry Profile

The apiary industry in Tasmania is characterised by the dominance of leatherwood honey, which contributes about 70% of the annual production of about 1,000 tonnes of honey. The industry is based on approximately 15,000 registered hives (18,000 hives in the 2003 register), operated by 17 registered semi-commercial and commercial beekeepers, with up to 10 fully commercial operations, including 4 businesses with more than 1,000 hives, and one of more than 3,000 hives.

Leatherwood grows in rainforests in the southern and western areas of the state, largely within regions managed and controlled by State Government authorities as either production forests or the World Heritage Area. Leatherwood honey has a strong flavour and particularly distinctive aroma. It is unique to Tasmania and has established a worldwide reputation as a distinct honey type (DPIW, 2008). Its production is predominantly based on migratory beekeeping activity, where the peak nectar flows are sought to provide a honey surplus. Contributions by non-native vegetation, including a number of environmental weed species, are also essential to the success of the industry.

Since the 2004 Apiary Census there has been a series of changes in the industry, including amalgamations of some larger operations, and a decrease in the number of registered hives from approximately 18,000 in 2003 to approximately 15,000 in 2008. The categories showing greatest changes were the 'less than 20 hives' and '100 to 200 hives' groups, each of which recorded a 50% decrease in number. These categories are considered to be non-commercial in status, and the decrease could be due to non-compulsory hive registration requirements, which itself would represent a disturbing trend given increasing biosecurity concerns.

There are a number of supply chain pathways, including some successful value-adding operations, both large and small. Smaller recreational and semi-commercial operators are all involved in packing, and direct market at least some of their product. Many of the larger semi-commercial and some of the commercial beekeepers sell their honey in bulk to packers either locally in Tasmania or in mainland Australia, and at least one large operator exports some bulk honey. It appears that a significant price premium is gained for packaging and marketing, dependent on the target market. However, value-added returns were not provided in the census. Bulk honey prices have varied from $4,500/tonne to $3,500/tonne in the 2 years 2007-2008 (Wolfhagen, 2008). Large price fluctuations make it difficult for primary producers to plan for capital replacement, such that many operations have aging and inefficient equipment. Operations that have some supply chain control appear to be buffered from the large commodity price fluctuations.

Many beekeepers are involved in crop pollination, either as paid-service or incidental pollination contributions. While pollination service provides a small percentage of the industry cash flow it is an essential input to the expanding horticulture, seed and agricultural crop sectors. The crop pollinators have developed a Code of Practice (TCPA, 2007) as a guide to a professional standard of service that also provides an annual pricing structure for pollination service by crop type.

Based on the 2008 hive registrations the sector had approximately 15,000 registered hives. In noteworthy changes:

- Total hive numbers have more than doubled from 7,200 in 1962-63 to 14,948 in 2008
- Numbers of commercial (≥200 hives), have increased from 8,000 in 1987-88 to 11,950 in 2008, a 67 % increase.

Typically an industry is considered to consist of those producers/processors that rely on the commodity/product as their main income source. It is important to consider that all honey produced in Tasmania, whether by 'commercial' producers, semi-commercial, or small beekeepers contributes to the 'honey economy'. Many very small producers sell or barter their value-added packaged product at markets and local stores.

Table A. Employment statistics

Employment							
Hive Numbers	**Census FTE**	**Hives Registered**	**Estimated Industry FTE**	**Hives per FTE**	**Estimated Permanent Full Time Employees**	**Estimated Part Time or seasonal**	**Total Numbers employed**
20 to 99	3.30	1560	18	87		50	50
100 to 199	7.00	2410	17	142	17 (mostly owner operators)		17
200 to 999	25.25	5255	30	175	20	20	40
> 1000	35.25	8440	35	241	23	23	46
Total			100		60	93	**153**

Note: Agreed estimates, 20-49 .2 FTE, 50-99 .5 FTE; 100-199 1FTE, ≥200 based on reported numbers. Split permanent: seasonal based on 0.66 of FTE as permanents, seasonal an equal number. This is based on limited information provided after the interviews.

Although in a national setting, beekeepers with greater than 1,000 hives have been considered the main commercial sector, there are a number of beekeepers in Tasmania with less than 500 hives who employ up to six full time equivalent employees in what appear to be economically viable businesses. Business success is largely achieved through vertical integration and control of the supply chain, with operators packing, marketing and retailing their own product, and avoiding wholesalers by selling directly to consumers at markets. At least three beekeepers in this category are regular participants at the main weekend markets, providing low overhead retailing and a direct link to their customer base.

Business Characteristics

The honey businesses have been characterised following national convention, providing a very simplistic breakdown of the industry. In Tasmania the categories are not mutually exclusive, with many businesses involved in a number of the following categories.

- **Producers**
  - Recreational <200 hives
  - Semi-Commercial 200-999 hives
  - Commercial ≥1,000 hives

The groupings follow the convention of a number of studies. From the analysis of data, larger commercial operators appear to be almost 40% more efficient than businesses with 200-999 hives, and 70% more efficient than small operations (Table A; 'Hives per FTE'). However, scale is not necessarily a good indicator of efficiency, and there are a number of smaller vertically-integrated operations that appear to be very successful. In addition, businesses focussed on pollination will never achieve the high hive production of those focussed on honey production, as their hive management differs.

- **Packers and marketers**

These categories are not mutually exclusive, as demonstrated by the large packers that have direct factory sales, supply local retailers, and have significant export sales. Similarly, many well-equipped small producers may pack their honey and that of smaller operations and sell at markets and local shops.

- **Bulk Producers**

Some larger producers wish to remain focussed on primary production, as the change to a vertically-integrated business requires significant infrastructure investment, as well as a different skill set. A number of semi-commercial operations supply bulk honey to local and mainland packers.

- **Pollination Providers**

The Tasmanian Crop Pollinators Association has produced a code of practice for crop pollinators (TCPA, 2007) as a means of improving the professional delivery of services to agriculture and horticultural enterprises.

Quality Assurance

All the main commercial operations have adopted or are in the process of developing 'B-Qual' processes to gain accreditation or maintain a high standard of activity. B-Qual Australia Pty Limited has been established by the Australian Honeybee Industry Council as an independently developed and audited food safety program. As with most quality standards, it has potential to become a technical licence to operate and a market entry requirement, with no price premium gained.

Organic Certification

There has been considerable expansion of organic certification of apiaries since the 2004 Census, when there were none recorded. There are currently four organically certified apiaries accounting for 4500 hives, representing 38% of commercial hives in Tasmania. Beekeepers with organic certification state that this provides them with increased market acceptance and price premiums in some instances.

Site Use by Tenure

Table B provides an indication of the use and importance of different land tenures for the main groupings of beekeepers based on 2004 Census data.

Table B. Site use by land tenure in Tasmania

Operation Size	DPIW Total hives	%	Sites	Ave hives	Forestry Tasmania Total hives	%	Sites	Ave hives	Private Total hives	Sites	Ave Hives
≥1000	4334	48%	43	101	4665	52%	80	58	10888	161	68
200-999	740	19%	22	34	3155	81%	98	32	4864	139	35
100-199	30	5%	1	30	613	95%	18	34	1122	38	30
20-99					121	100%	7	17	119	7	17

The split for the large producers indicates a spread of risk across tenures for leatherwood honey production. The figures are aggregated to preserve their 'commercial-in-confidence' status, however, a detailed analysis indicates that only one business actually has a 50:50 split, one is almost entirely on DPIW-managed lands, and another almost entirely on Forestry Tasmania property, and the remaining two have less than half on DPIW managed lands. Private property provides wintering, the majority of resources for hive-build up, honey production and breeding sites. Some producers very actively use private property sites, chasing peak flows of various flora, including some agricultural weeds. This is done to produce honey and build hives to peak numbers in time for the leatherwood season.

The majority of operations of less than 1,000 hives are dependent on State Forests. Regional distribution of business addresses provided some indication of the spread of activity across the State. While commercial operators tended to move large numbers of hives from the North and Central North regions to the West Coast and Gordon forests, the majority of beekeepers tended to work within their region. This primarily related to the availability of local resources.

One large beekeeper with leatherwood sites in the southwest and west tended to be buffered from major regional climatic fluctuations.

Main Nectar Yields

At the outset, we note that these data are census-derived, and while representing the majority of hives in the State, are potentially 'blurred'; the data set is also incomplete. However, it does give an indication of the relative importance of the different contributions of various flora to commercial honey production. It is also important to note that the production site maxima are unlikely to coincide, as some species do not contribute annually, and different sites have different climatic factors affecting yield in any given year, both within and across species.

Table C. Main nectar sources and yields in Tasmania

Species	Potential Max production kg	Potential Ave production kg
Leatherwood	1,210,054	897,374
Clover/blackberry grouping	317,678	249,700
Blue Gum	82,290	37,396
Prickly Box	58,555	27,810
Coastal Heath	55,000	41,500
Tea tree	35,814	21,670

Figures are derived from the 2004 Apiary Census database.

Pollination

The supply of pollination services by beekeepers is essential to the horticultural and agricultural crop industries. Management of pollination services often requires specific hive management strategies that can reduce the opportunity for maximum honey yield. The Tasmanian Crop Pollinators Association has developed a Code of Practice to assist in the orderly and professional management of crop pollination. In the past this sector has suffered from an ad hoc approach to service provision, and in turn, the services have commonly been undervalued by factors such as incidental pollination by feral bees, and a barter or quid pro quo approach to the provision of service. While the pollination sector is important to the industry, it contributes only a small percentage of the industry cash flow.

Table D. Crop pollination statistics for Tasmania

POLLINATION TABLE												
Crop	**Total Hives 03/04 Pollination**	**Ave $/hive 03/04 Survey**	**Code of Practice Price Guide**	**Ave Time on Crop (months)**	**Pollination Period** (Time spent on crops is averaged as months. The table reflects activity across the whole state)							
					Jan	Feb	Jun	Aug	Sep	Oct	Nov	Dec
Apples	1002	34	40-55	1-2					■	■	■	
Apricots	240	46	95	1-2				■	■	■		
Blackcurrant	270	44	80	1				■	■			
Blueberries	40	50	95 open 110 nets	3					■	■	■	
Brassicas (all)	1008	48	80	1.5					■	■	■	■
Canola	514	32	78	1						■	■	■
Carrots	138	89	122	1-2	■	■						■
Celery	10	100	---	1	■							
Cherries	595	37	95 open 110 nets	2					■	■	■	■
Chicory	38	30	130	2	■	■						■
Chinese Cabbage	(180)	47	---	1-2					■	■		
Clover, Red/white	304	45	78 to 5/1 130 18/1	2	■	■					■	■
Fennel	44	100	130	2	■	■						
Onions	120	96	150	2	■	■						■
Pak Choy	(137)	53	----	1-2							■	■
Raspberries	202	46	---	1						■		■
Pumpkins	6	72	---									
Strawberries	32	38	---									
TOTAL	**4565**	Ave $43										

Notes : The table has been derived from data collected in the 2004 Apiary Census and a Tasmanian Crop Pollinators Association survey for 2003-2004. While it has not been possible to compare the two surveys exactly, the highest number of hives from either survey has been used as a default statistic. The Code of Practice price guide for 2006-07 has been used for financial estimates.

Floral Data

Floral data has been derived from the extensive site records of the 2004 Apiary Census. All the information provided is anecdotal, and can only be used comparatively; no absolutes should be drawn from the data. Most values have been provided as a range unless there was consistency across the region or State. Estimates of pollen values have varied significantly between beekeepers; this may relate to the relative importance of any species on a given site, or be related to the species mix that bees are accessing.

Biosecurity

The threat of pest and disease incursions is the most significant issue facing the honeybee industry and honeybee pollination dependent industries.

A survey initiated by the TBA in 2008 discovered the presence of *Nosema ceranae*, previously undetected in the State. Following this discovery a working group has been established to develop a biosecurity plan for the Tasmanian apiary industry.

Methods

This project has 3 components:

- Review of the Tasmanian Apiary Industry Profile (Leech, 2005);
- A survey of the resource provided by tea Tree species, and
- Production of a field guide to the native flora accessed by honeybees in Tasmania.

The review of the Tasmanian Apiary Industry Profile provided the background on which to base this work. The comprehensive data set has been used to produce the maps by plant species of hive sites.

Tasmanian Apiary Industry Profile

The 2004 Apiary Census achieved a sample size of approximately 80% of registered hives from apiary units with 20 or more hives. The semi-commercial and commercial business units were intensively sampled as they represented the majority of the registered hives and honey production. As the Census was undertaken in a time of resource uncertainty and public protest, the appointment of the consultant had to be bipartisan between the Government body, the FFIC and the beekeeper representatives. An introductory letter and survey form was sent to all beekeepers with registered hives, a series of regional meetings was held and the larger operations were visited and their owners/operators interviewed.

The data collected in this review has provided a current snapshot of the industry, and the most comprehensive information available for certain aspects of the industry. The majority of the information provided was anecdotal, against a background in which no long-term or time-series data are recorded or kept by beekeepers. The information in the Introduction and Background sections of this report has been summarised and updated from the Apiary Industry Profile.

Tea Tree Survey

The survey also sought information on the use of the tea tree resource, in order to help identify the existing knowledge base, degree of current use, availability of new information and general interest in pursuing the potential opportunity it offers. The Tea Tree Survey was limited to beekeepers with 50 or more hives.

The survey form was a modified version of the one used in the 2004 Apiary Census, as that form had been agreed to by all parties. All registered beekeepers on the 2008 apiary register with 50 hives or more were sent an explanatory letter and the survey form, together with a stamped, addressed envelope. Most beekeepers knew of the author through earlier work, making introduction easy. The majority of beekeepers with 300 hives or more were personally interviewed. The latter group makes up the majority of the industry accounting for 10,600 hives or 76% of hives registered in 2008. Follow-up phone calls and interviews were also made for a subset of non-respondents.

Field Guide to Native Flora

It was decided in the course of project development that a small visual Field Guide would be useful to beekeepers. The Field Guide has been based on a pocket guide in A6 format to allow publication without losing image scale or content. This provides the same image sizes as a larger format production while maintaining the functionality of the “pocket size” publication. The species are those noted by beekeepers as being useful to their bees at a particular site.

The Guide is intended to provide an easily understood visual assessment of native flora distribution and use by honeybees. The floral sequence data has been regionalised and the range of values for honey yield and pollen values are provided on a State-wide basis.

Species distribution maps have been based on site records of the Tasmanian Natural Values Atlas. The NVA, developed and managed by the Resource Management and Conservation Division of the Department of Primary Industries and Water, is a comprehensive set of maintained natural values records with integrity and validation (DPIW 2008). Its use at the printed map scale of the field guide provides a surrogate for species distribution, however, in some instances species will occur outside the recorded points.

Hive locations are those reported by beekeepers in association with the species taken from the 2004 Apiary Census data. An attempt at creating some notion of species significance based on low honey yield and pollen value eliminated only one species from the guide. This indicates that the floral species reported by beekeepers as being important to their bees are either yielding honey, or are considered an important source of pollen.

Results

Tea Tree Survey

The response rate to the initial mail out to beekeepers with between 50 and 299 hives was very poor. The larger beekeepers had been contacted for an appointment. Follow-up was undertaken for a subset of beekeepers with 50-299 hives by telephone interview. Table E (below) gives a breakdown of the response rate; number of hives has been used to provide an indication of significance.

Table E. Tea tree survey statistics

Group (Number of hives)	No. of Hives surveyed	No. of Business Units Surveyed	No 0f Hives in Group	No of Business Units in Group	% of Hives in Group	Group as % of total surveyed	Group as a % of Total Hives
≥ 1000	8600	5	8600	4	100%	74%	62%
300-999	1550	4	2000	5	78%	11%	14%
100-299	1050	6	2576	16	41%	8%	18%
50-99	485	8	750	11	65%	3%	5%
Total	11685	23	13926	36	84%		

Final survey numbers included 76% of registered hives in the State, and thus provided confidence in the information obtained. The focus of the survey was to find out the extent of current knowledge and use of the tea tree resource in Tasmania. Species included were generically referred to as 'tea tree', as there was relatively poor species identification in the 2004 survey, and a number of species are commonly referred to as 'tea tree'. It was hoped that the survey would identify any improvement in the knowledge base.

Results of the survey were as follows:

- Of the 23 beekeepers interviewed, only five indicated that they actively targeted tea tree as a honey-yielding resource. One beekeeper described moving his hives early one year due to the drought, and being surprised by the rapid yield from the flowering tea tree at a leatherwood site, achieving up to 50 kgs of honey per hive in three weeks. The majority of beekeepers interviewed did not actively pursue tea tree, and were only vaguely aware of its potential.

- The process of interviewing and discussing the potential of tea tree as a valuable honey encouraged a number of beekeepers to consider trialling resources of which they were aware. The issue of testing was raised, with few beekeepers knowing where or how to get their honey tested.

- A number of those interviewed were aware of significant areas of tea tree, most likely Manuka (*Leptospermum scoparium)* and indicated willingness to put some hives out to trial the resource.

- No beekeepers had regularly tested their tea tree honey for any activity, whether peroxide or non-peroxide based.

- Two beekeepers were achieving significantly higher prices for their tea tree honey, without any claims of therapeutic activity; this is most likely a 'spin-off' from the source name of the honey as a surrogate for therapeutic properties for healing.

- One beekeeper was aggressive in his marketing of tea tee honey gaining significant price increases over other honey.

- Two leading beekeepers were pursuing a joint research project with the University of Tasmania to determine what compounds exist in leatherwood honey, and what therapeutic activity it may have. This work may extend to include tea tree honey.

The resource

While the species maps give an indication of species distribution, the site-specific information needs to be ground-truthed. It appears that tea tree is associated with many of the leatherwood sites on the West Coast and the south-west. This poses an issue to most beekeepers targeting leatherwood honey as the tea tree honey taints the first take of leatherwood. Tea tree species usually begin flowering a month earlier than the leatherwood. This could allow collection of pure tea tree honey from these sites, potentially providing a significant industry resource with good access and hive site conditions. A number of beekeepers thought that this approach would work for them, and indicated contemplating an early move of at least some of their hives onto their tea tree-rich leatherwood sites. One beekeeper had leased leatherwood sites for a tea tree honey collection prior to leatherwood honey collection, and moved his hives at an agreed time. This activity may provide a model for future resource access. An additional important factor, however, is that adverse weather can often be an issue with an early move to the sites on the West Coast and the South-west.

Additional Research

Leatherwood

Significant work has been undertaken since 2004 by the Apiary Working Group and Forestry Tasmania to ensure a sustainable future leatherwood resource. The Apiary Industry Management Plan initiated in 2005 is nearing completion and addresses the issues of standard licence agreements across tenure, and management of the leatherwood resource. Conversion of public native forest to plantations has effectively ceased and management of old-growth forest containing leatherwood has changed from the traditional 'clear fell, burn and sow' silviculture process to aggregated retention. Work by Leaman et al. (2008) has identified the potentially available leatherwood resource based on a predictive model, and projected that with changes to management, the long term reduction in the accessible resource will be less than 6% (see Appendix 2. Leatherwood Distribution Map).

Tea Tree

Tea tree honey has begun to attract the attention of the consumer and beekeeper. New Zealand has lead the research into the healing activity levels of some honey with a particular focus on Manuka, *Leptospermum scoparium*. 'Non-peroxide' healing activity level has been identified in honeys from a number of species, but appears to be most reliably produced from Manuka. The New Zealanders have trade-marked their acronym UMF® (Unknown Manuka Factor), which relates to a relative score of laboratory-tested potency as compared to those of known antiseptic agents, mainly standard phenol solutions. Very high financial returns have been recorded for honey with UMF® greater than 20. It appears that this trend has increased all tea tree honey prices, regardless of any stated healing factors.

While some beekeepers are making use of the extensive Tasmanian tea tree resource, the *Leptospermum* distribution maps (Appendix 3) indicate that there is a lot of unused resource. Often beekeepers have reported tea tree as being present, providing no honey, but providing a pollen resource. These sites are usually on the west coast where the leatherwood (*Eucryphia lucida)* flowers so prolifically that bees will prefer to visit that. Tea tree has been unpopular on these sites as it "taints" the first leatherwood honey take. However, the tea tree usually begins flowering three to four weeks before the leatherwood, providing the opportunity to obtain a pure tea tree take prior to the leatherwood flow. The resource remains a significant source of economic potential, with a further need for research into peroxide and non-peroxide activity levels of tea tree honeys by species, region and site conditions.

While little botanical information has been provided it has become evident that different tea tree species produce nectar differently across sites. It would be useful to identify the different species for which beekeepers have some knowledge of honey and pollen characteristics. This could be the first part of a bigger project to "prove up" the tea tree resource and identify the species and areas that are most likely to yield and provide higher value therapeutically-active honey.

Pioneering research and market development has been undertaken in New Zealand to develop bio-active Manuka honey as a health and medical product with a registered standard. The well recognised UMF® trademark, signifying a laboratory-tested standard of antibacterial activity has provided a global benchmark. Much of the pioneering and developmental work has been lead by Professor Peter Molan of the Waikato Honey Research Unit (see http://bio.waikato.ac.nz/honey/). The transfer of research to industry has produced significant economic outcomes with international demand for active Manuka honey greater than available supply.

Much work remains to be done with the Tasmanian tea tree resource, firstly to identify the extent and accessibility of the Manuka (*Leptospermum scoparium)* resource and to find out if and when there is therapeutically-active honey produced. Other species are also reported as producing honey that is locally known for its "healing" properties, and this is also worthy of investigation. More recent work in New Zealand (Porter 2008; Leach 2008) has begun to explore the opportunity for developing Manuka plantations on farms and indigenous land to increase the active honey resource and provide

returns to landowners. It has been reported that the only way to test the activity-generating characteristics of a site is to collect the honey and test it. Activity has been tested at the hive and the bees must be involved in the development of the honey's healing activity. There is also evidence that activity varies with time and temperature (Leech 2008 Pers. Comm).

Other Species

There is an increasing awareness among a small number of beekeepers of niche markets for species-specific "pure" honey that yields higher than "normal" returns. An example is Mountain Pinkberry (*Leptecophylla juniperina),* a very attractive plant covered in pink berries, that produces a high yield of honey with a distinct caramel flavour. There is anecdotal evidence of other species producing "active" honey, potentially providing an opportunity for individual entrepreneurs or a coordinated research and marketing initiative.

Discussion

The Industry Profile developed in 2005 has provided a data platform against which to assess recent changes in the industry. There have been a number of significant changes in the three years since then, including major business buyouts, more value-added trials, a decrease in the number of registered hives, the discovery of *Nosema ceranae*, and a parliamentary inquiry. The discovery of *Nosema ceranae* by a TBA-initiated survey has caused considerable concern, as it is potentially a very destructive disease. Fumagillin, a fungicide effective in its control, is not registered in Australia, and disease management can only be achieved through bee husbandry. A recent paper by Higes *et al.* (2008) indicates that *Nosema ceranae* infection may contribute to Colony Collapse Disorder.

Leatherwood honey remains the dominant honey yield by species, and work done by Leaman *et al.* (2008) predicts a sustainable resource modelled on parameters of likely occurrence and new forestry management practices. However, leatherwood remains in the realm of a commodity honey, which would seem unfair given its uniqueness in flavour and location at the "ends of the earth". While prices received for leatherwood are generally higher than the Australian average (Crooks, 2008) there is still an industry desire to raise the price point through innovation. Research initiatives to discover the compound mix in leatherwood may lead to quantifiable health benefit discoveries and its elevation in price above a commodity food, much the same as has happened with Manuka honey in New Zealand.

Honey from Manuka, *Leptospermum scoparium*, presents possibly the greatest new opportunity for the honeybee industry in Tasmania and its offshore islands. There is a lot of work to be done to identify the resource, then prove it up, but there remains potential for production of an expanding high value product as in New Zealand. The apparent lack of knowledge and information could be addressed through field days to improve species identification, assisted by the publication of the field guide produced as part of this project, and the coordination of a strategic approach to proving the resource and testing of honey for therapeutic activity.

The greatest risks to the industry would now appear to be exotic diseases and pests, including the newly discovered *Nosema ceranae* and the increasing threat of invasion of the *Varroa destructor* mite that is now in New Zealand and New Guinea. The control of environmental weeds, such as crack willow, gorse and cape weed poses a significant threat, as they are sought-after high value pollen sources vital to spring build up of hive strength. The Australian Parliamentary House Committee Review, "More Than Honey" (2008) noted the greatest threat to the industry was biosecurity, but further significant and unaddressed threats relate to the advancing age profile of the industry, the lack of suitable and accessible training, and diminishing ability to attract young people.

Recommendations

- Identify the Tasmanian tea tree species that beekeepers have some knowledge of by a ground-truthing exercise.

- Identify the tea tree species associated with leatherwood sites. Determine if there is interest in short term leasing of the tea tree-rich sites for a tea tree take prior to the leatherwood season.

- Systematically prove and test the tea tree resource across the State. This under-used resource has significant potential to produce higher value honey, and with testing for 'healing' activity has the potential to do for Tasmania what Manuka honey has done for the industry in New Zealand.

- A number of projects could be developed to look at the potential for active Manuka plants to be established on private land. This requires initial work to identify if the 'activity' is genetically transferred, or is site or climatically affected. If 'activity' is genetically transferred there is potential for development of a significant industry benefiting both landowners and beekeepers.

Appendices

Appendix 1. Floral Distribution and Data

A comprehensive database was constructed from the 2004 Apiary Census. This has provided information by operator, site characteristics and floral species information. The floral sequence and floral data provided in the regionalised tables and the State aggregations by species have been derived from the data set.

The regionalisation of the floral sequence into six regions modelled on the three telephone districts was an attempt to break the information up into zones of use.

The following description provides the split used in the floral database:

North West:	The '04' telephone district south to the Arthur River, then a line due east to the '03' boundary;
North:	The western '03' telephone district west of the Tamar River, extending down the Midlands Highway;
North East:	The eastern '03' telephone district east of the Tamar River, extending down the Midlands Highway;
West:	The '04' telephone district south of the Arthur River, and a line due east to the '03' boundary;
South West:	Those forests in the Derwent and Huon forest districts managed for leatherwood; and
South East:	All those other areas in the '02' telephone district.

The zones all have unique climatic influences and floral differences.

The sequence reflects flowering times and duration within the 6 regions. Differences occur within regions and care must be used in applying the information, as the range for each species indicated by the bar chart is cumulative across the region. Thus, e.g., a species may flower for one month in the southern part and two months on the coast, but that may appear as three continuous months of flowering.

The information provided in the Floral Sequence tables has been derived from the 2004 Apiary Census data. The number of sites and the number of hives accessing a particular species provides a measure of relative importance. Pollen nutrition value was rated by beekeepers from 1-5, with 5 being the highest value. Flowering may vary within regions, and the bar graph is the cumulative flowering period within the region. Honey yield has been provided as a range unless it was a constant across sites. Lighter shading indicates a small number of hives accessing an alternative period.

North-west				Native Vegetation															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering years**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Silver Wattle	Acacia dealbata	9	375	1	1-2	5	0												
Blackwood	Acacia melanoxylon	8	325	1	1	2-5	---												
Coast Wattle	Acacia sophorae	5	250	1	1-2	4-5	0-2												
Bottle Brush	Banksia marginata	1	20	---	---	---	---												
Serrated leaf Banksia	Banksia serrata	1	20	2	2	1													
Heaths	Epacris (various spp.)	23	2168	1	2-4	3-5	0												
Blue Gum	Eucalyptus globulus	4	>136	1-3	1-2	4-5	0-2												
Smithton peppermint	Eucalyptus nitida	3	220	80	10	5	---												
Stringybark	Eucalyptus obliqua	22	738	7-10	2-4	1-4	3												
White Gum	Eucalyptus viminalis	1	---	3	2	4	0												
Leatherwood	Eucryphia lucida	37	1042	1	1-5	3-4	33-80												
Tea Tree Unnamed	Leptospermum spp.	47	3111	1	1-4	5	0-15												
Woolly Tea Tree	Leptospermum lanigerum	1	36	2	2	2	5												
Manuka	Leptospermum scoparium	1	36	1	1-2	0-5	0-12												
Swamp paperbark	Melaleuca ericifolia	1	100	1	2	5	0												
Paperbark	Melaleuca spp.	1	100	1	1-2	5	0												
Tallowwood	Pittosporum bicolor	5	350	1	1-2	5	0												
Shaggy pea	Pultenaea spp.	13	1184	1	2-4	5	0-5												
Understorey	Various	7	403	1	2	5	---												

North-west				Non-Native Vegetation Agriculture/Horticulture															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering years**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Cape Weed	Arctotheca calendula	1	150	1	1	5	0												
Hawthorn	Crataegus monogyna	1	150	1	1	5	0												
Spanish Heath	Erica lusitanica	1	100	1	2	5	0												
Blackberry	Rubus fruticosus	70	> 3460	1		3-5	6-40												
Pyrethrum	Tanacetum cinerariifolium	1	150	1	4	---	---												
Dandelion	Taraxacum officinale	1	36	1	5	5	0												
Clover (various)	Trifolium sp	59	3157	1	2	3-5	0-22												
Gorse	Ulex europaea	13	1150	1	2-4	5	0-2												
Agricultural weeds	Various	4	74	1	1-2	5	---												
			Suburban																
Garden Flora	Various	3	>100	1	12	5	2												

North				Native Vegetation															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering years**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Silver Wattle	Acacia dealbata	5	110	1	2	4	0												
Prickly Box	Bursaria spinosa	30	1652	1	0-2	1-5	0-35												
Mountain Pinkberry	Leptecophylla juniperina	1	30	1	4	---	30												
Native Hop	Dodonaea viscosa	1	20	1	1	5	20												
Heaths	Epacris (various spp).	44	2114	1	4-7	1-5	---												
Unnamed Eucalypts	Eucalyptus spp.	3	74	1	1	5	30												
Black peppermint	Eucalyptus amygdalina	22	1475	0-50	1	1-3	0-7												
White Gum	Eucalyptus dalrympleana	1	30	---	3	1	0												
White Top	Eucalyptus delegatensis	5	180	0-10	0-3	1	0												
Blue Gum	Eucalyptus globulus	3	192	2	1	3	0												
Stringybark	Eucalyptus obliqua	5	180	7	1	1	0												
White Gum	Eucalyptus viminalis	5	217	3-10	1	1-3	0												
Paperbark	Melaleuca spp.	4	114	1	1	5	0												

North				Non-Native Vegetation Agriculture / Horticulture															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Cape Weed	Arctotheca calendula	16	1384	1	1	3-5	0												
Wild Turnip	Brassica rapa ssp campestris	1	20	1	1	1	0												
Hawthorn	Crataegus monogyna	50	2300	1	1	3-5	0												
Broome	Cytisus scoparius	1	24	1	1	5	20												
Apples	Malus sp	4	140	1	1	---	---												
Apricots	Prunus armeniaca	3	74	1	1	5	0												
Blackberry	Rubus fruticosus	37	1720	1	1-3	5	12-33												
Crack Willow	Salix fragilis	48	2730	1	1-2	5	o												
Dandelion	Taraxacum officinale	39	1922	1	1-2	1-4	0-16												
Clover	Various	58	2617	1	1-4	3-5	0-37												
Gorse	Ulex europaea	42	1990	1	5-6	5	0												
Thistles	Various	3	192	1	2	3	0												
				Suburban															
Garden Flora	Various	8	73	1	12	1-5	---												

North-east				Native Vegetation															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Coast Wattle	Acacia sophorae	3	---	1	1-2	5	0												
Bottle Brush	Callistemon spp.	5	212	1	1-2	1-2	0-20												
Prickly Box	Bursaria spinosa	11	1038	1	2-4	1-2	0-30												
Blue Gum	Eucalyptus globulus	4	139	4	2	4	55												
Ironbark	Eucalyptus sieberi	2	60	6	2-4		30												
White Gum	Eucalyptus viminalis	16	1140	4	2-4	4	25												
Tea Tree	Leptospermum spp.	3	89	1	2	---	---												
Tea Tree	L. scoparium	2	360	1	2	5	11												
Paperbark	Melaleuca squarrosa	2	60	1	2	----	---												
				Non-Native Vegetation Agriculture / Horticulture															
Cape Weed	Arctotheca calendula	9	909	1	1	5	0												
Hawthorn	Crataegus monogyna	3	45	1	1	4	---												
Lavender	Lavendula sp	16	1140	1	1	1	30												
Lotus major	Trifolium cernuum	16	1140	1	1-4	3	0												
Blackberry	Rubus fruticosus	20	1205	1	1	3	35-60												
Crack Willow	Salix fragilis	25	2049	1	1-2	5	0												
Clover	Trifolium various	24	1323	1	1-4	3-4	30												
Gorse	Ulex europaea	4	130	1	3	5	0												
				Suburban															
Garden Flora	Various	7	870	1	12	3	25												

West				Native Vegetation															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Waratah	Agastachys odorata	29	2090	1	1	1-3	0-1												
Horizontal Scrub	Anodopetalum biglandulosum	4	300	---	2	---	0												
Sassafras	Atherosperma moschatum	18	1350	1	1	1	0												
Bottle Brush	Banksia marginata	15	1200	---	2	1	4												
Bauera	Bauera rubioides	21	1590	1	1	1	0												
Prickly Bottlebrush	Callistemon viridiflorus	15	1200	---	1	1	0												
Native Plum	Cenarrhenes nitida	9	540	---	2	2	0												
Heaths	Epacris (various spp).	28	2690	1	1	2-4	0-5												
Gum topped Stringybark	Eucalyptus delegatensis	19	1510	20	1	4	0												
Smithton Peppermint	Eucalyptus nitida	19	1510	2	1-2	4	0												
Leatherwood	Eucryphia lucida	128	7789	1	1-4	1-4	30-115												
Tea tree unnamed	Leptospermum spp.	17	840	1	1	3	0												
Woolly Tea tree	Leptospermum lanigerum	22	1690	1	1-2	3-4	0												
Manuka	Leptospermum scoparium	24	1800	1	2	4	0												
Swamp Paperbark	Melaleuca ericifolia	28	2050	1	2	3-4	0-13												
Paperbark	Melaleuca squarrosa	9	540	1	2	2	0												
Yellow Eye	Xyris operculata	20	1590	1	1-2	1	0												
				Non-native Vegetation															
Blackberry	Rubus fruticosus	2	200	1	1	4	10												
Gorse	Ulex europaea	3	240	1	2	5	0												

South-west				Native Vegetation																
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Blackwood	Acacia melanoxylon	2	50	1	2	4-5													
Horizontal Scrub	Anodopetalum biglandulosum	4	120	1	1	0	0-14												
Native Laurel	Anopterus glandulosus	20	940	1	1-2	0-3	0-38												
Sassafras	Atherosperma moschatum	1	25	1	2	0-1	0												
Bottle Brush	Banksia marginata	1	40	2	1	0	0												
Mountain Clematis	Clematis aristata	4	130	1	2														
Heaths	Epacris (various spp).	6	170	1	1-7	2	0												
Unnamed Eucalypts	Eucalypt spp.	4	85	1	3	3-	0-30												
Snow Gum	Eucalyptus coccifera	1	25	4	2	5	0												
Gum-topped Stringybark	Eucalyptus delegatensis	21	995	1-10	1-3	3-5	0-38												
Blue Gum	Eucalyptus globulus	1	25	2	2	---	---												
Stringybark	Eucalyptus obliqua	47	1688	1-14	1-4	1-5	0-38												
Cabbage Gum	Eucalyptus pauciflora	2	50	1-4	3-4	3-5	---												
Alpine Yellow Gum	Eucalyptus subcrenulata	1	30	4	1	5	0												
Leatherwood	Eucryphia lucida	116	3622	1	1-4	1-5	8-110												
Deciduous leatherwood	Eucryphia milliganii	13	460	1	2	1-5	0-15												
Cutting Grass	Gahnia grandis	7	160	1	1-4	1-5	0												
Button Grass	Gymnoschoenus sphaerocephalus	3	70	---	2	---	0												
Tea tree Unnamed	Leptospermum spp.	27	647	1-5	1-12	2-5	0-40												

South-west				Native Vegetation Continued															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Woolly Tea tree	Leptospermum lanigerum	1	40	1	---	---	4												
Manuka	Leptospermum scoparium	17	840	1	1	---	3-12												
Paperbark Unnamed	Melaleuca spp.	5	140	1	1-2	5	5-7												
Musk	Olearia argophylla	3	75	1	2	5	0-15												
Lancewood	Phebalium squameum	6	80	1-4	2	4-5	5-30												
Dogwood	Pomaderris apetala	4	100	1	2-3	5	0-14												
Christmas Bush	Prostanthera lasianthos	5	150	1	1-2	1-5	0-6												
Prickly Beauty	Pultenaea juniperina	2	50	1	3	---	---												
Wildflower	Various	8	225	1-5	1-2	4-5	12-30												

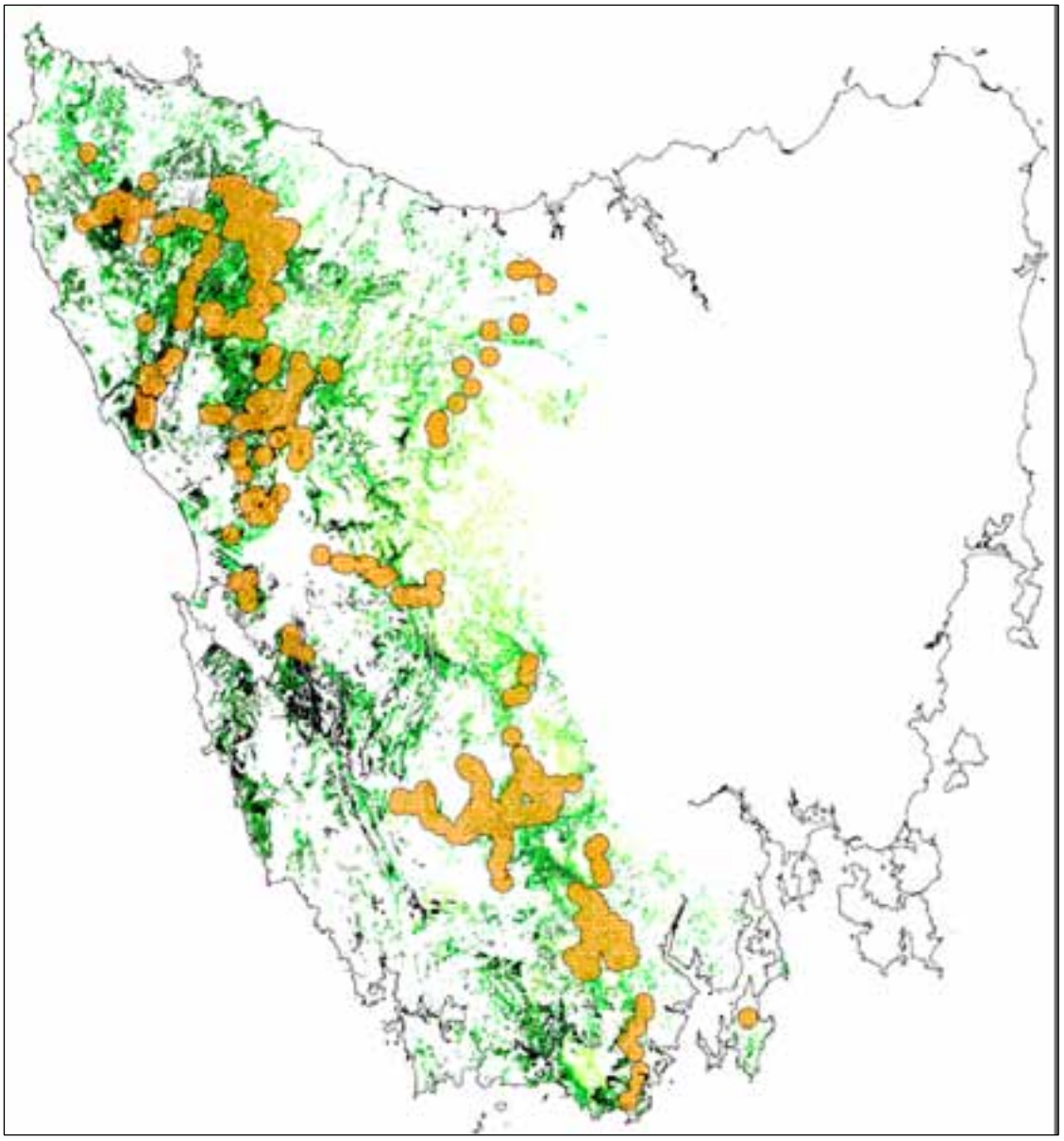
South-east				Native Vegetation																
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Silver Wattle	Acacia dealbata	4	111	1	1-3	1-3	0-10												
Black Wattle	Acacia mearnsii	3	28	1	1-2	3-4	0												
Blackwood	Acacia melanoxylon	1	12	1	2	3	0												
Coast Wattle	Acacia longifolia ssp sophorae	1	14	1	1	5	0												
Wattles unnamed	Acacia spp.	5	83	1	2-5	2-4	0												
Prickly Moses	Acacia verticillata	3	20	1	2	3	0												
Sheoak	Allocasuarina verticillata	1	24	1	2	3	0												
Golden Pea	Aotus ericoides	1	24	1	2	4	0												
Prickly Box	Bursaria spinosa	55	1844	1-7	1-3	1-5	3-50												
Yellow Bottlebrush	Callistemon pallidus	5	110	1	1-2	4	4-14												
Native Hop	Dodonaea viscosa	1	24	1	3	1	2												
Heaths	Epacris (various spp).	4	96	1	2-3	2-3	0												
Black Peppermint	Eucalyptus amygdalina	6	98	8-15	1-2	1-2	0-35												
Blue Gum	Eucalyptus globulus	62	1893	1-12	1-7	1-5	5-60												
Stringybark	Eucalyptus obliqua	3	68	4-15	2-3	3-5	0-20												
Black Gum	Eucalyptus ovata	11	325	1-4	1-4	3-5	8-40												
White Peppermint	Eucalyptus pulchella	1	24	---	1	4	0												
White Gum	Eucalyptus viminalis	10	270	2-10	1	0-5	0-30												
Tea tree	Leptospermum spp.	19	485	1-2	1-3	0-5	0-30												

South-east				Non-Native Vegetation Agriculture / Horticulture															
Common Name	**Botanical Name**	**sites**	**hives**	**Flowering year**	**Flowering duration**	**Pollen 1-5**	**Honey kg/hive**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Opium Poppies	Papaver somniferum	1	25	1	1	4	10												
Wild radish	Raphanus raphanistrum	1	20	1	3	3	0-5												
Blackcurrants	Rubus nigrum	2	13	1	1-4	2-5	0-5												
Blackberries	Rubus fruticosus	30	978	1	1-3	3-5	0-20												
Raspberries	Rubus spp.	1	15	1	2	---	0												
Loganberries	Rubus spp.	1	12	1	4	2	0												
Crack Willow	Salix fragilis	29	947	1	1-3	4-5	0-8												
Charlock	Synapsis arvensis	5	160	2	1	3	1												
Dandelion	Taraxacum officinale	9	196	1	1-3	2-5	0-10												
Clover	Trifolium various	22	690	1-15	1-3	1-5	4-25												
Gorse	Ulex europaea	10	354	1	1-5	4-5	0												
Thistle various	Various	7	220	1-10	1-12	3-4	1-10												
Grapes	Vitis vinifera various	1	40	1	1	1	4												
Agricultural Weed	Various	4	174	1	1-2	5													
				Suburban															
Cotoneaster	Cotoneaster spp.	2	49	1	1	4	5												
Garden Flora	Various	6	117	1	1-4	12	0-30												
Berries	Rubus spp.	1	12	1	3	---	---												
Weeping Willow	Salix babylonica	1	24	1	4	2	0												
Pussy Willow	Salix discolor	1	24	1	4	2	0												
Linden	Tilia europaea	2	35	1	1-2	2	0												
Home Orchard	Various	6	95	1	2-4	4	0												

Appendix 2. Leatherwood Distribution Map

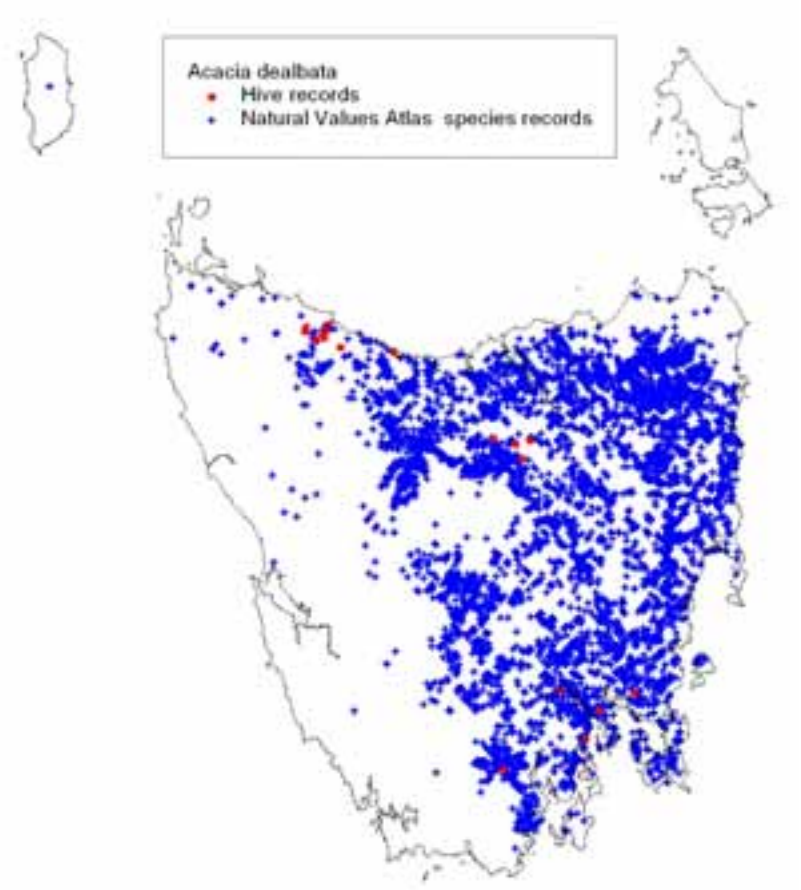
From Leaman *et al* (2008)

Summary of theoretical accessibility and utilisation of leatherwood					
	Leatherwood Productivity Class ('000)				Total (ha)
	1	2	3	4	
Area (ha)	344	333	241	172	1,090
Accessible (ha)	212	218	163	103	696
Utilised (ha)	95	72	57	27	251
% of area accessible	62	65	68	60	64
% of accessible utilised	45	33	35	26	36



Appendix 3. Species distribution maps and floral data

Silver Wattle, *Acacia dealbata*



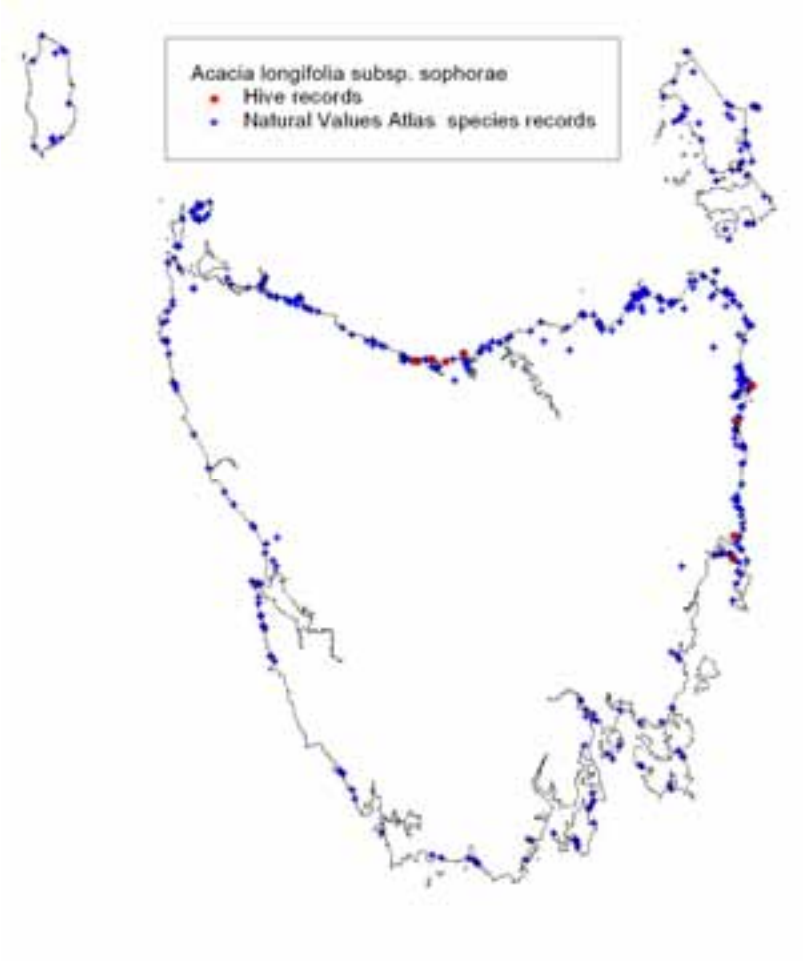
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW									■	■		
N								■	■			
NE												
W												
SW												
SE								■	■	■		

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
19	1121	1	1-2	1	0-10

Coast Wattle, *Acacia longifolia subsp. sophorae*



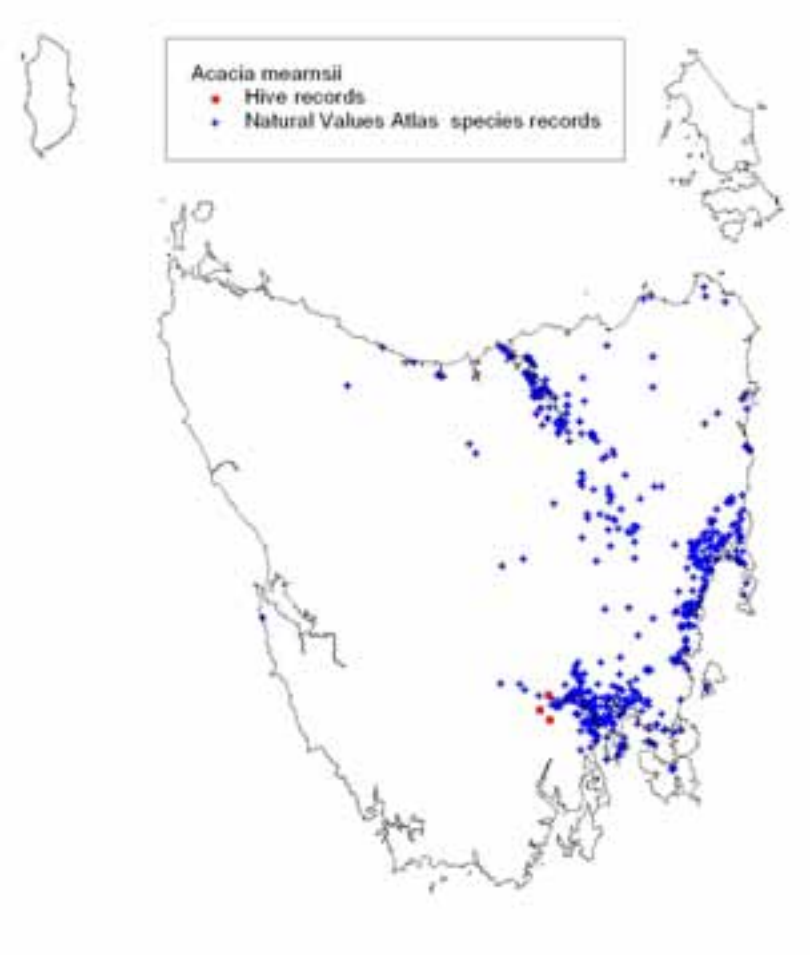
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW									■	■		
N												
NE								■	■	■		
W												
SW												
SE								■	■	■	■	■

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
13	264	1	1-2	4-5	0

Black Wattle. *Acacia mearnsii*



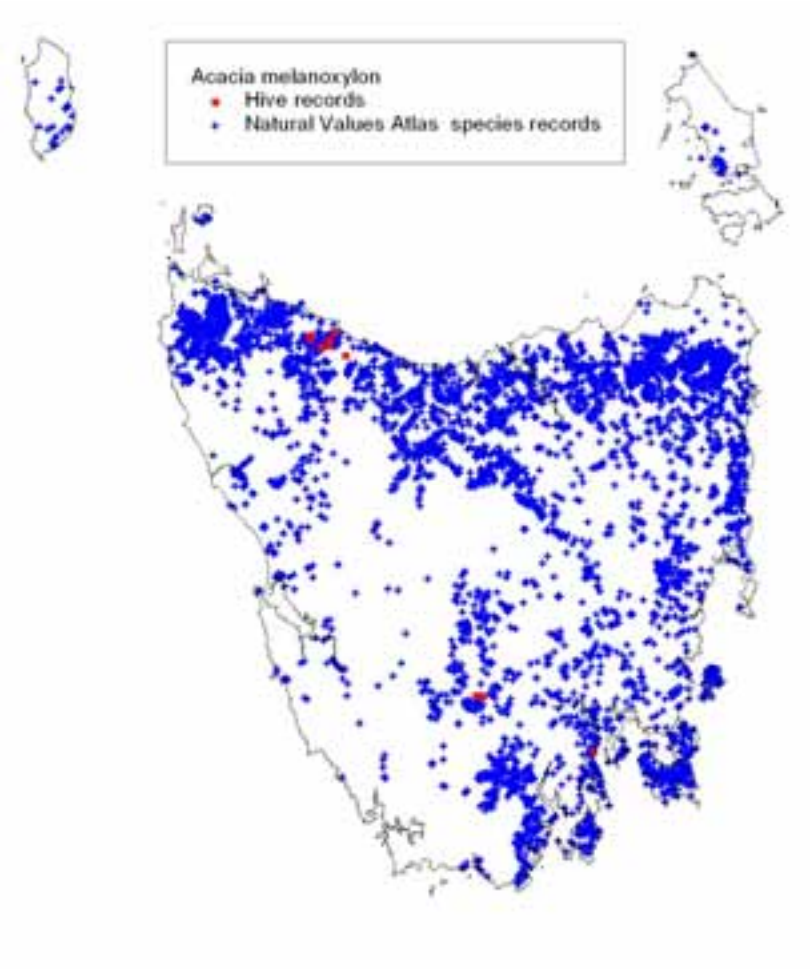
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE	■	■	■					■	■	■		

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
3	28	1	1-2	3-4	0

Blackwood, *Acacia melanoxylon*



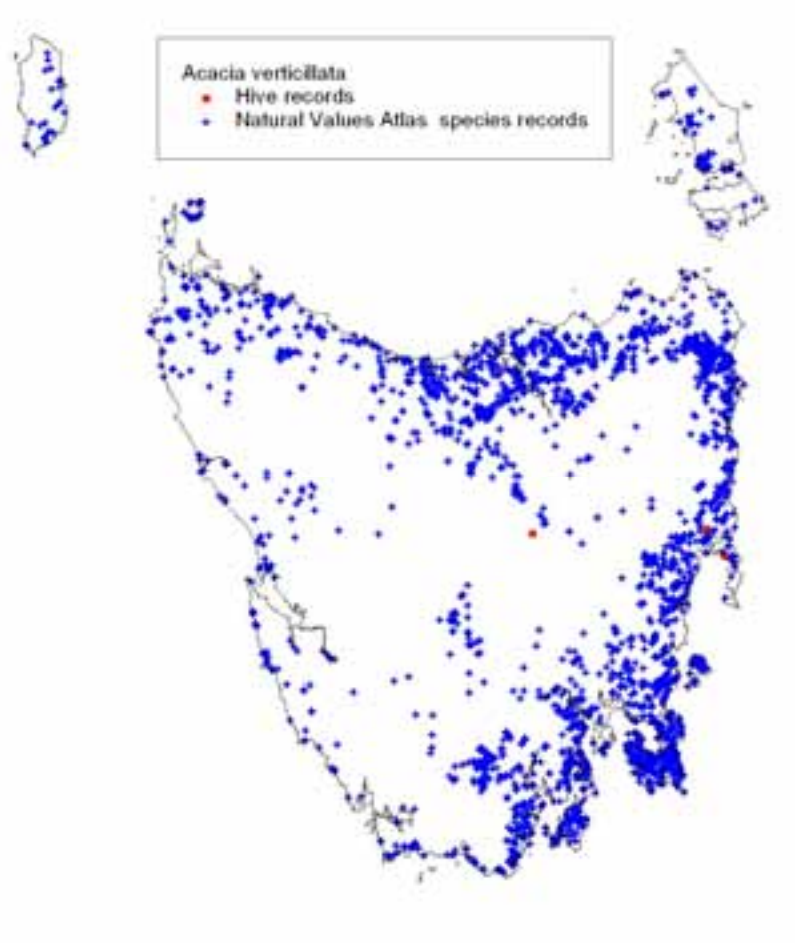
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW									■	■		
N												
NE												
W												
SW								■	■			
SE									■	■		

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
11	387	1	2	2-5	0

Prickly Moses, *Acacia verticillata*



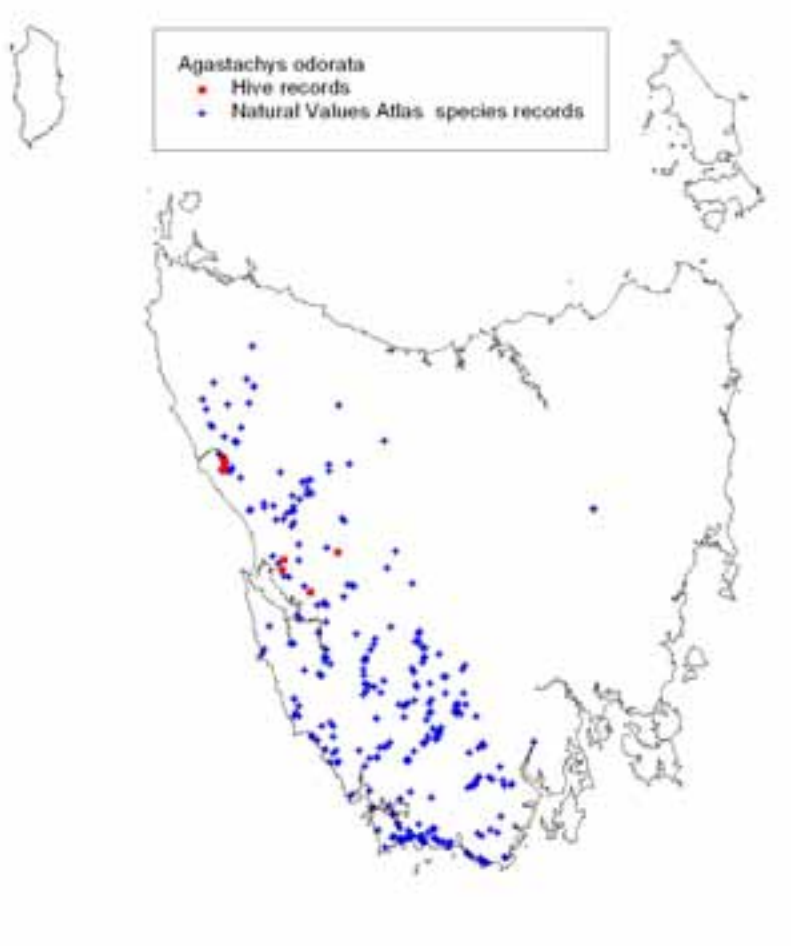
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE									▬	▬		

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
3	20	1	2	3	0

White Waratah/Fragrant Candlebush, *Agastachys odorata*



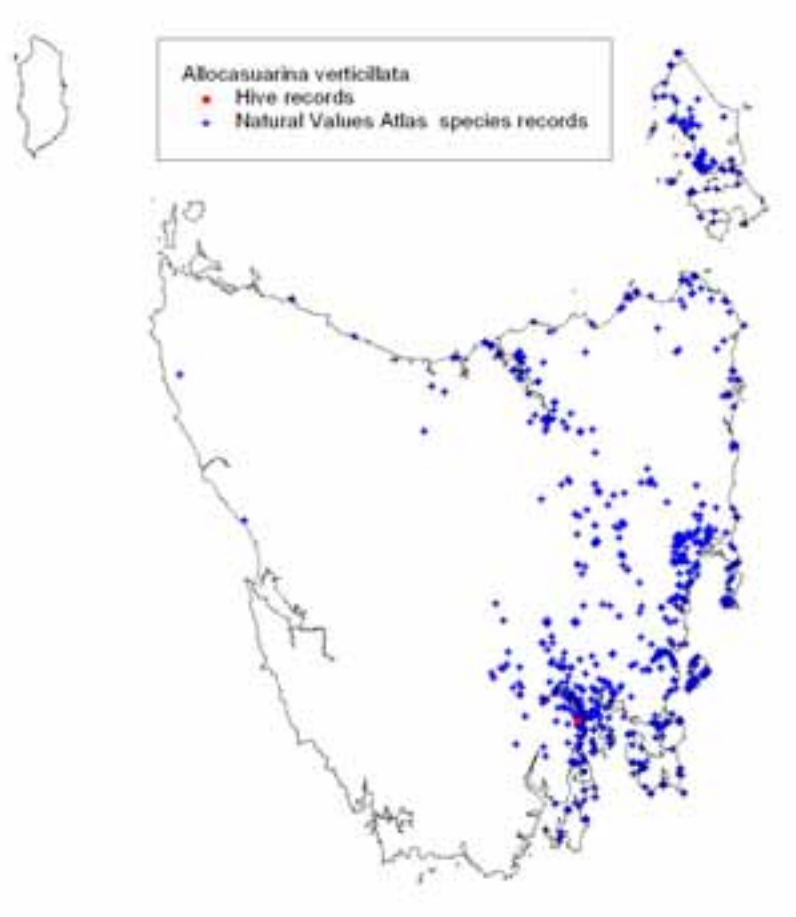
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
29	2090	1	1	1-3	0-1

Sheoak, *Allocasuarina verticillata*



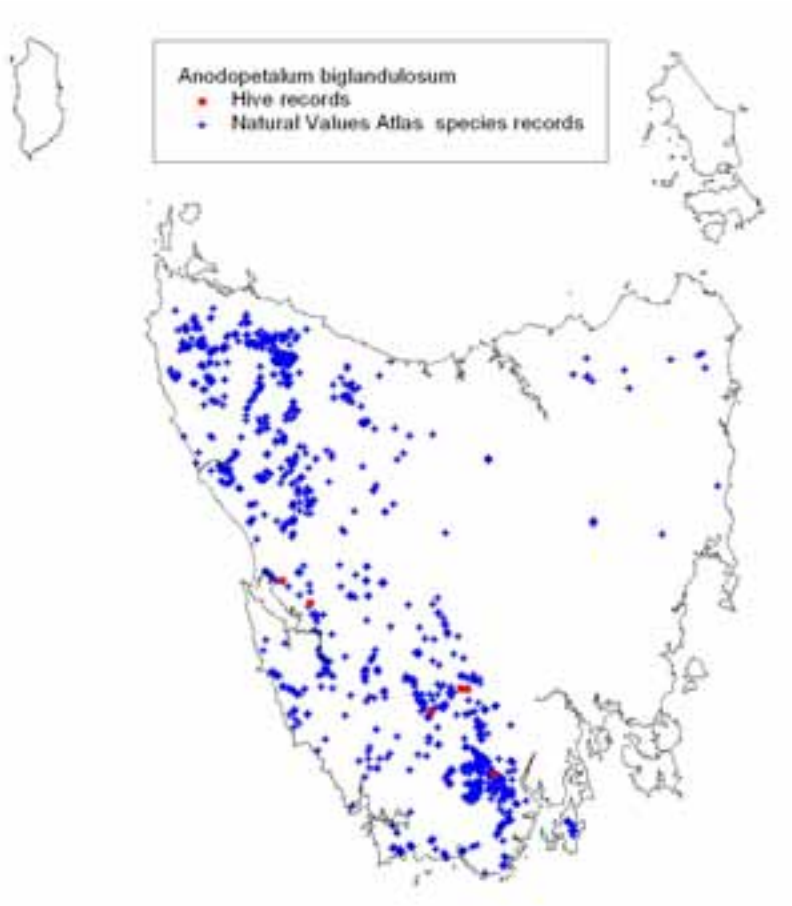
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE										▬	▬	

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	24	1	2	3	0

Horizontal, *Anodopetalum biglandulosum*



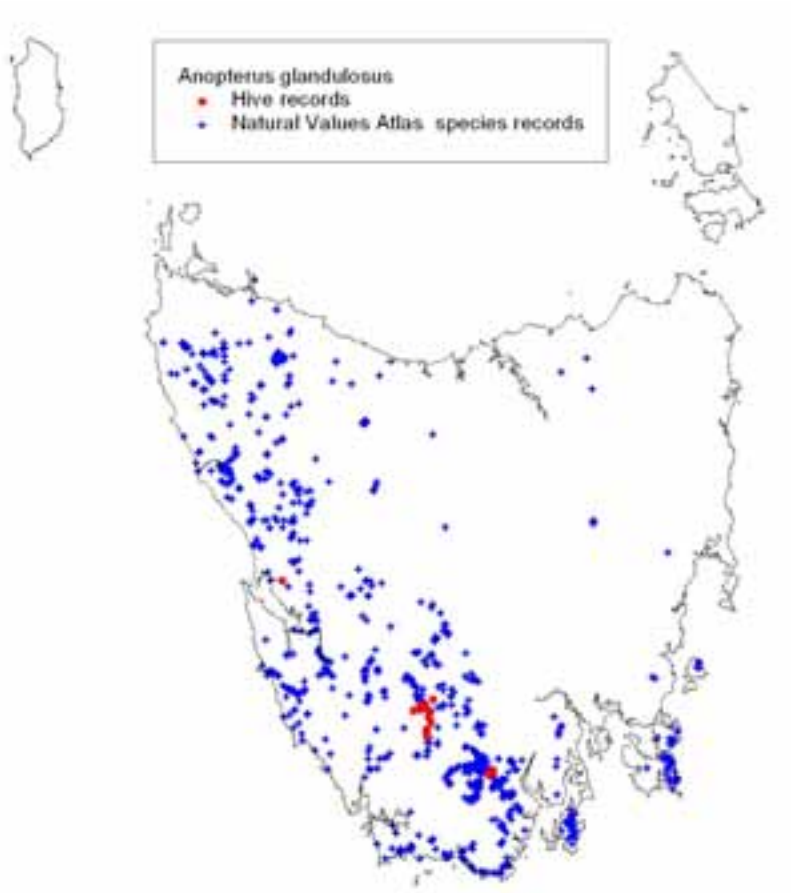
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W	▬											▬
SW										▬		
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
8	420	1	1-2	0	0-14

Tasmanian Laurel, *Anopterus glandulosus*



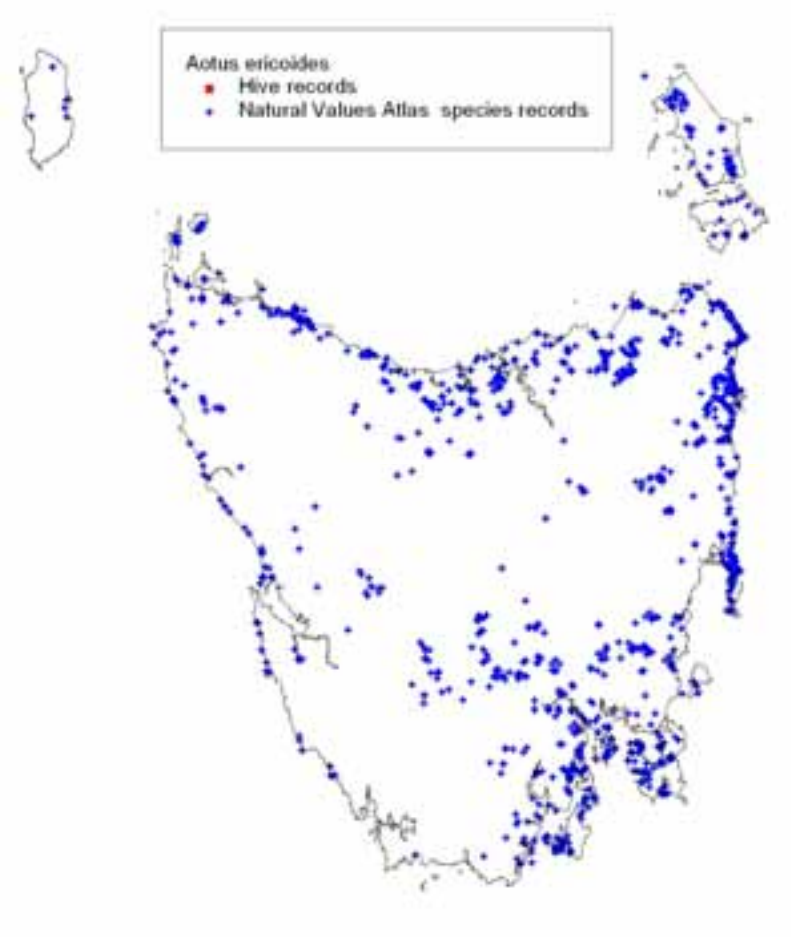
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW		■	■								■	■
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
22	1040	1	1-2	0-3	0-38

Golden Pea. *Aotus ericoides*



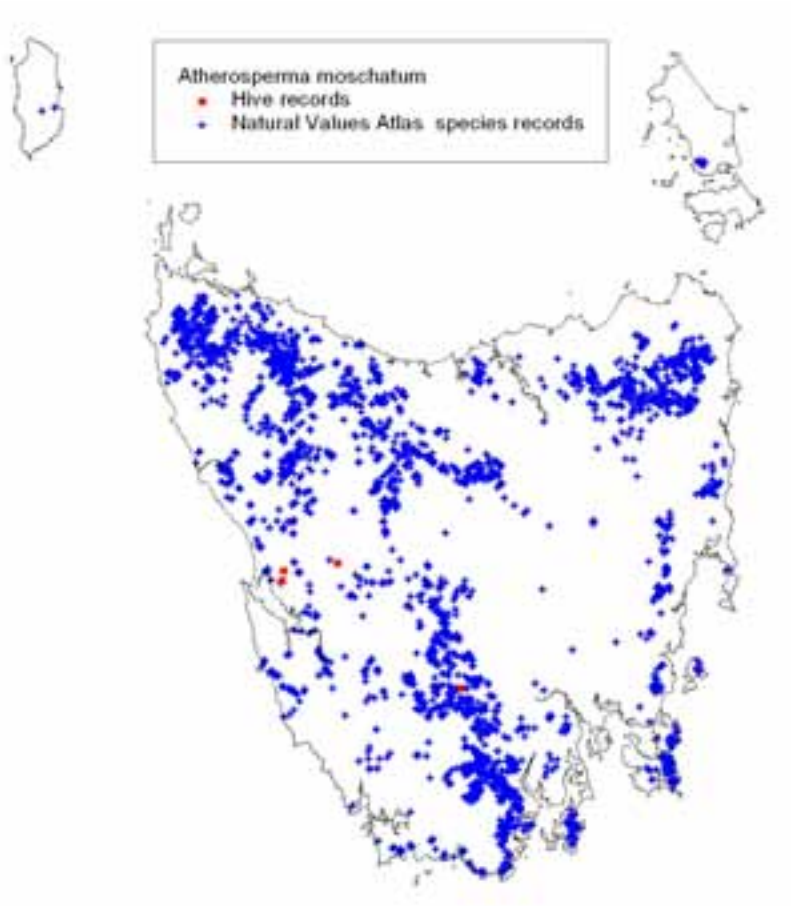
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE										▬	▬	

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	24	1	2	4	0

Sassafras, *Atherosperma moschatum*



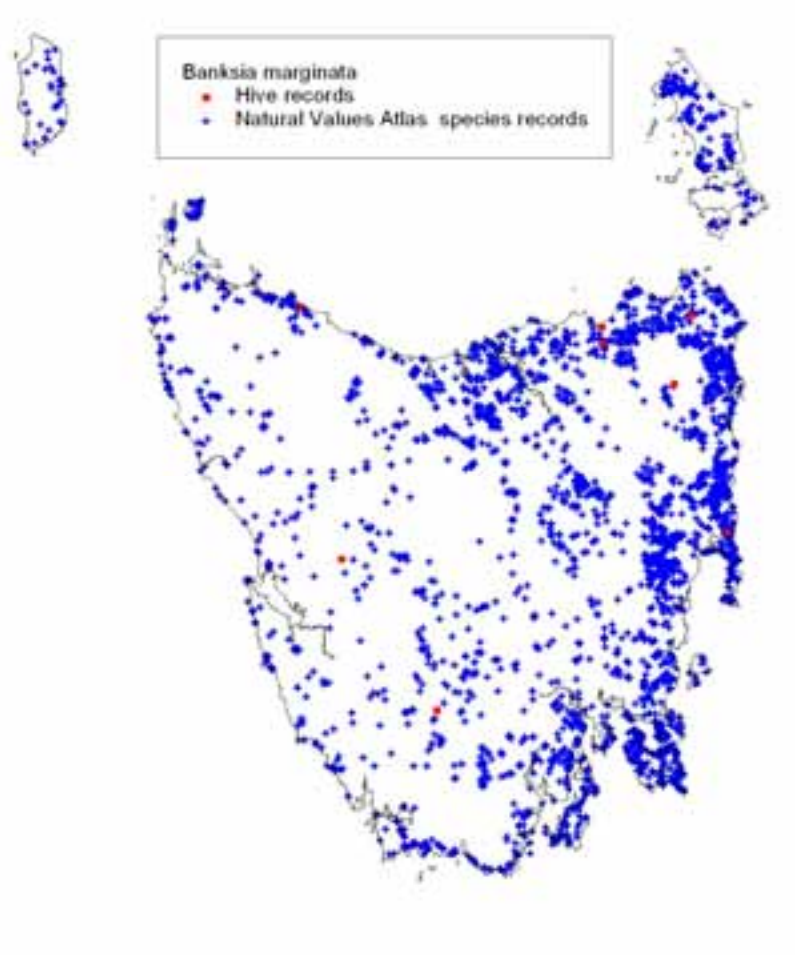
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W								▬				
SW								▬	▬			
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
19	1375	1	1-2	1	0

Silver Banksia, *Banksia marginata*



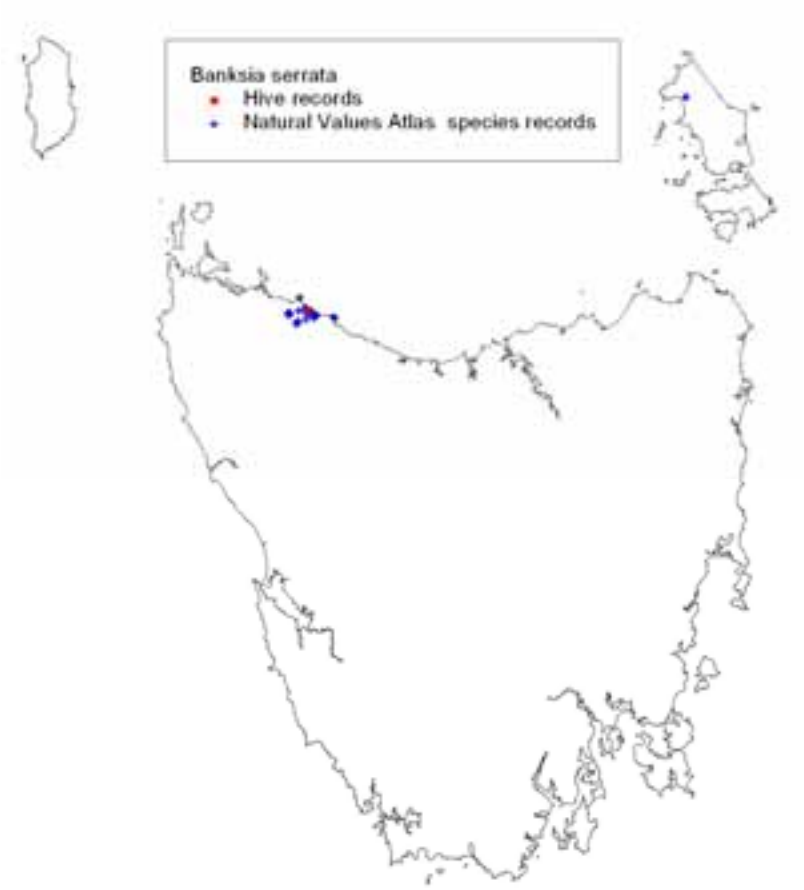
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE			■	■								
W			■	■	■							
SW			■	■								
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
22	1472	1-2	1	1-2	0-20

Serrated Leaf Banksia, *Banksia serrata*



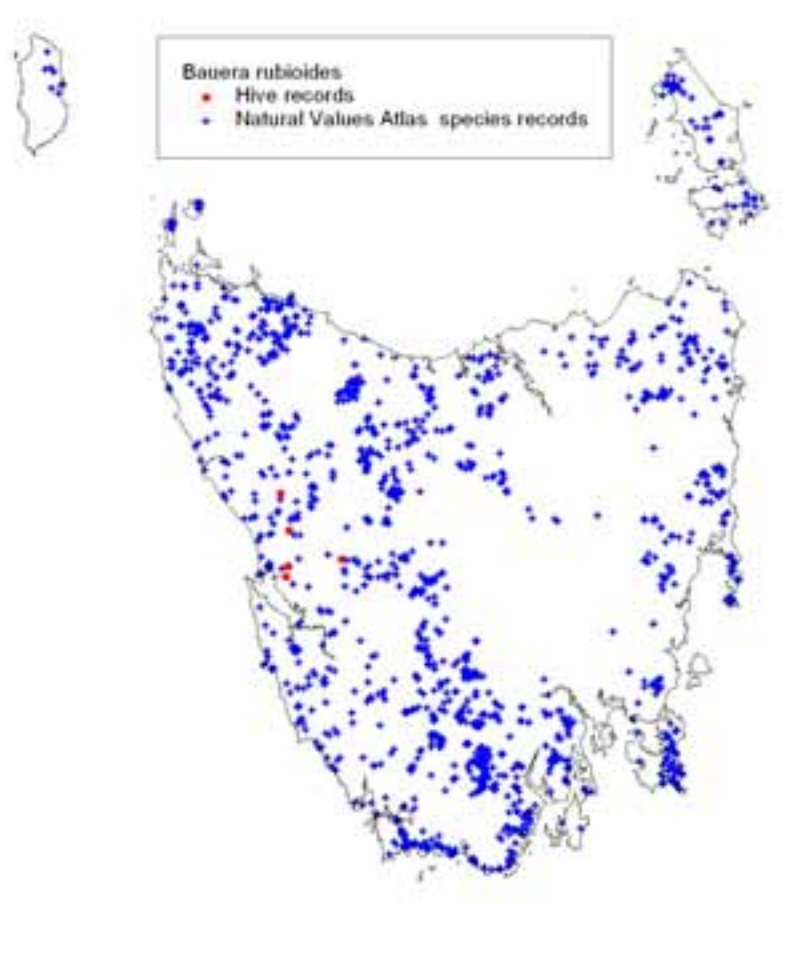
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	20	2	2	1	10

Bauera, *Bauera rubioides*



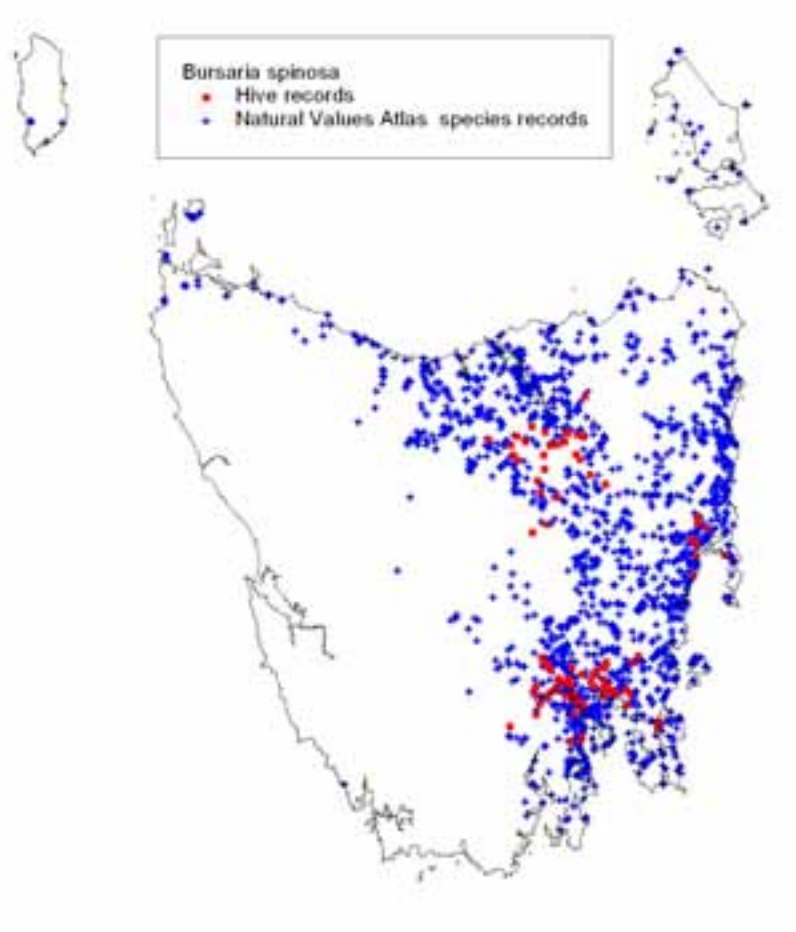
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
21	1590	1	1	1	0

Prickly Box, *Bursaria spinosa*



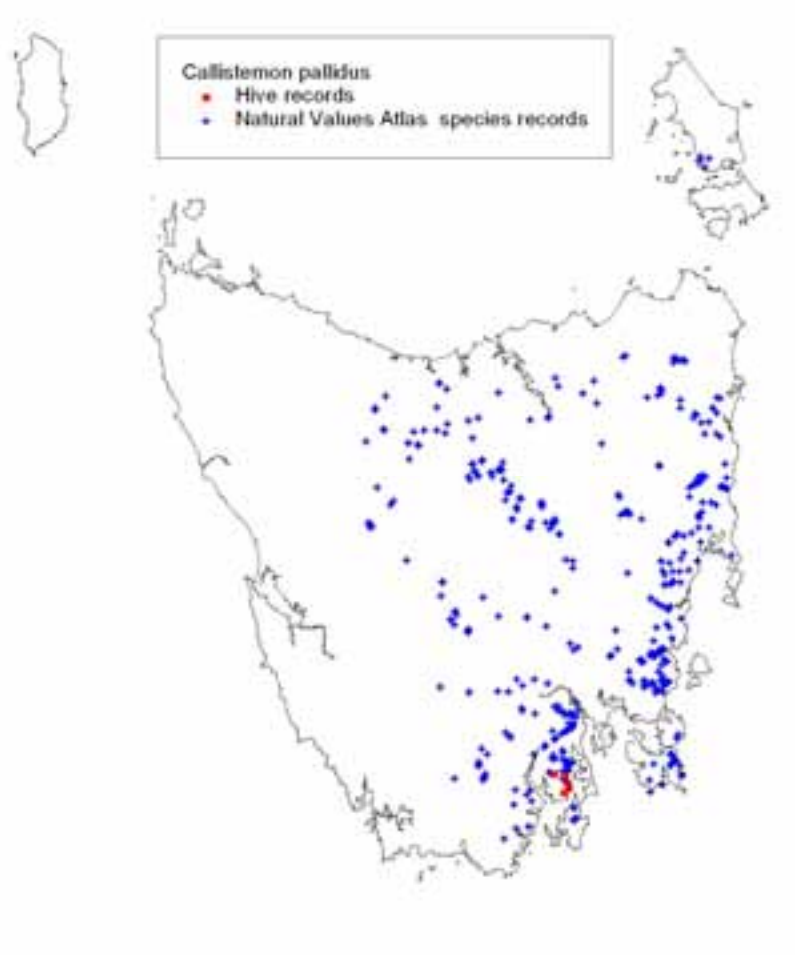
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N											■	■
NE	■	■	■									
W												
SW												
SE	■									■	■	■

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
96	4534	1	1-4	1-5	0-50

Yellow Bottlebrush, *Callistemon pallidus*



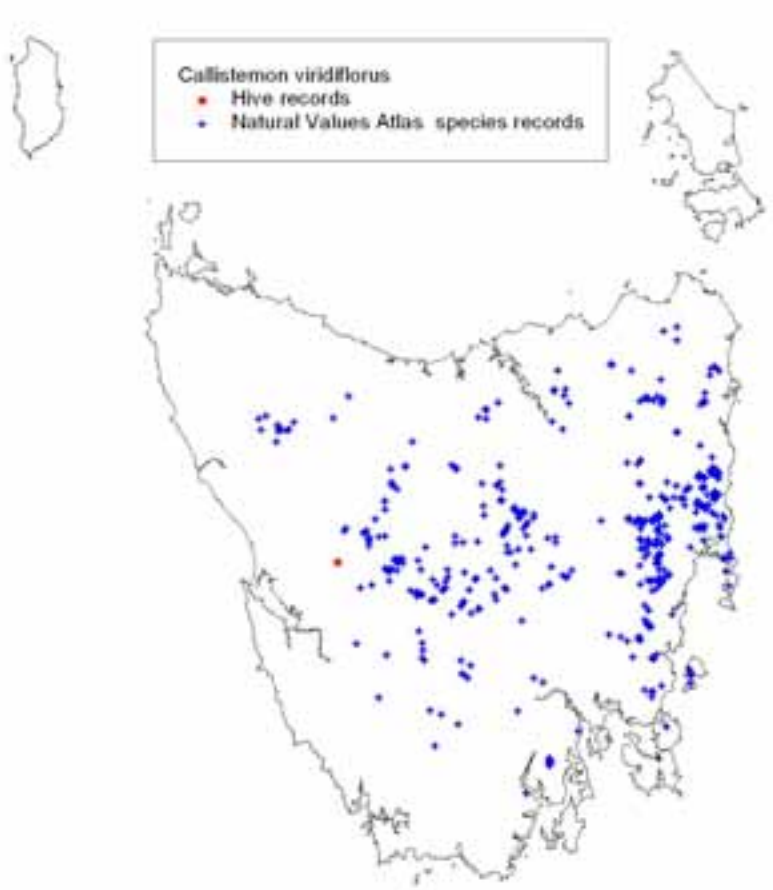
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE											■	

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
5	110	1	1-2	4	4-14

Prickly Bottlebrush, *Callistemon viridiflorus*



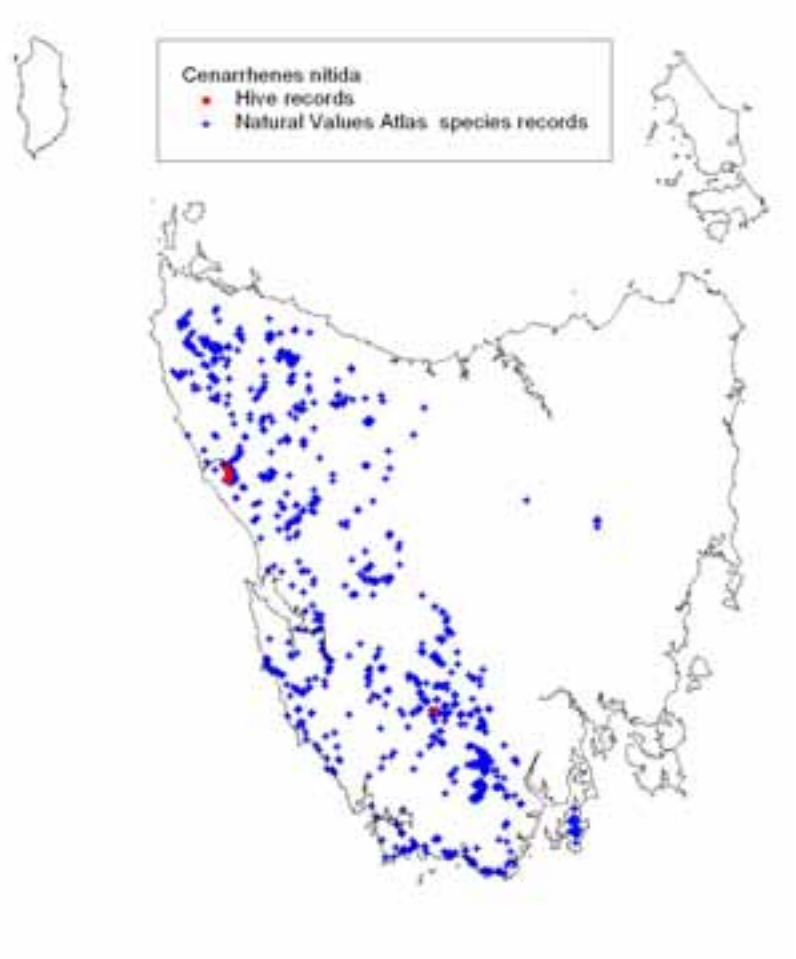
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												▬
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
15	1200	-	1	1	0

Native Plum, *Cenarrhenes nitida*



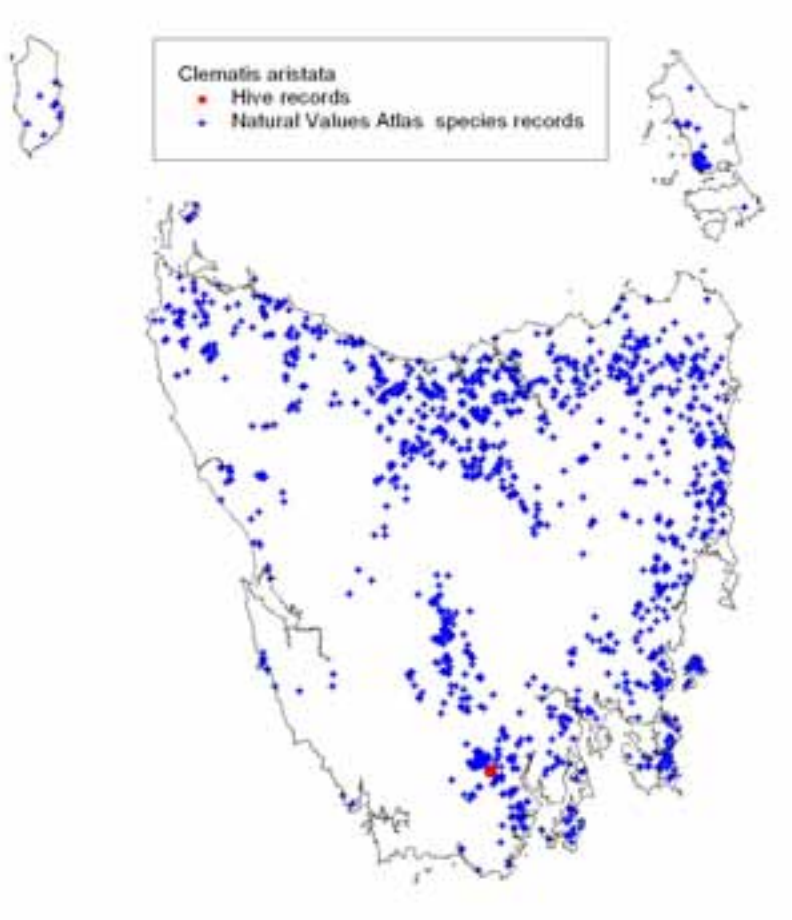
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W									▬	▬		
SW									▬	▬		
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
10	585	-	2	2	0

Mountain Clematis, *Clematis aristata*



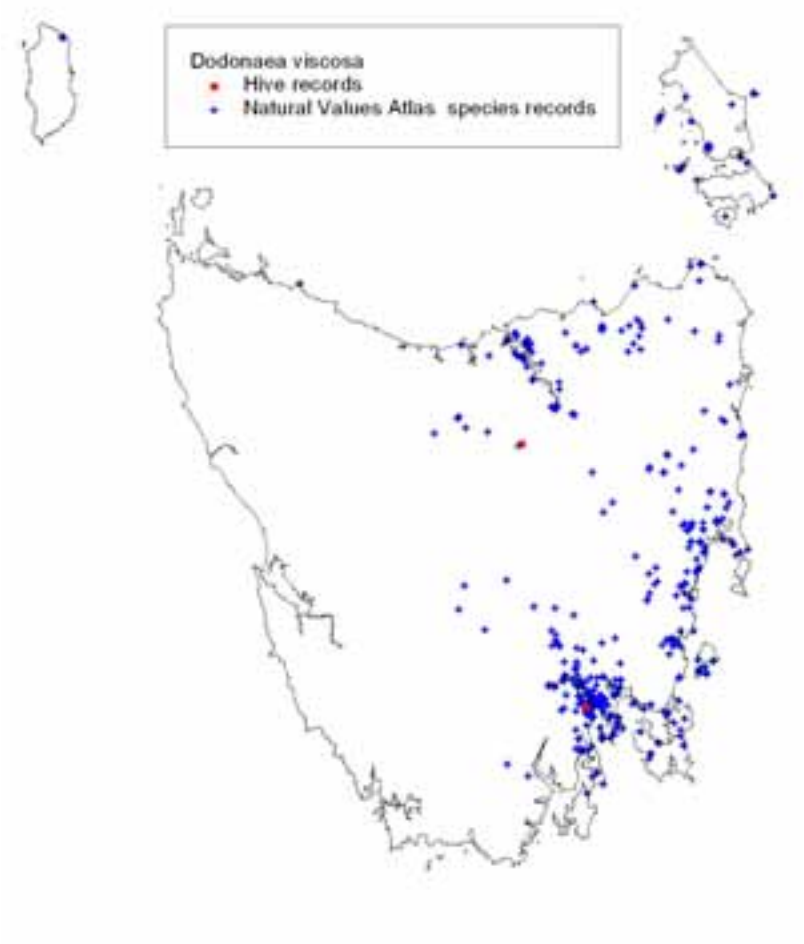
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
4	130	1	2	-	0

Native Hop/Broadleaf Hopbush, *Dodonaea viscosa*



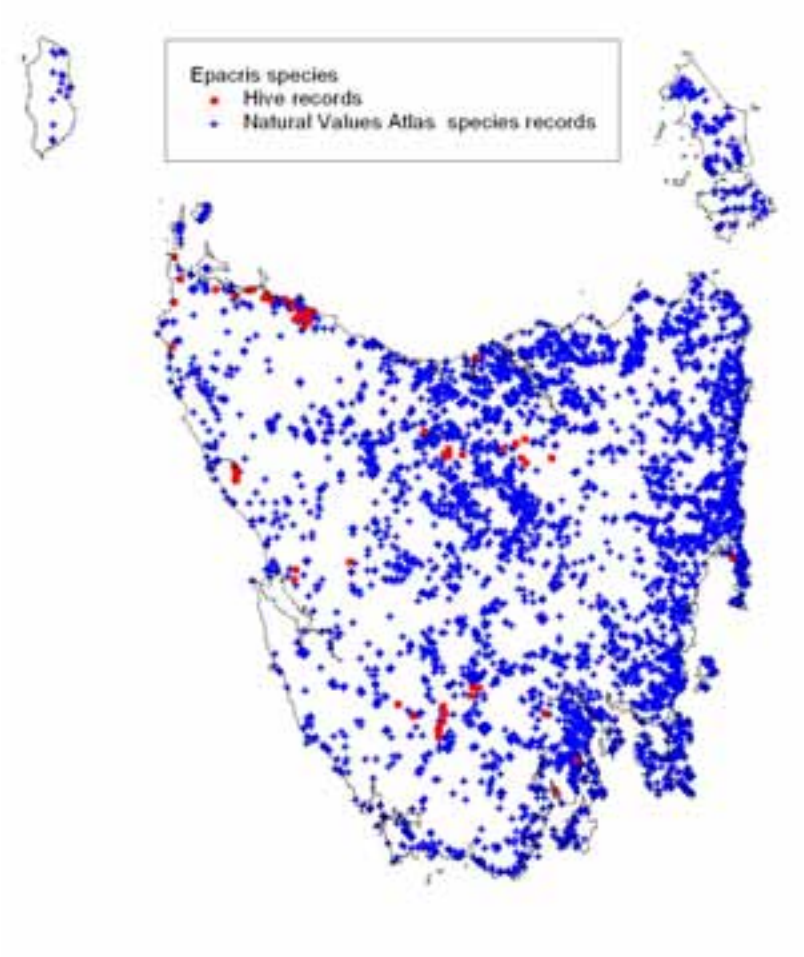
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N	▬											
NE												
W												
SW												
SE										▬		

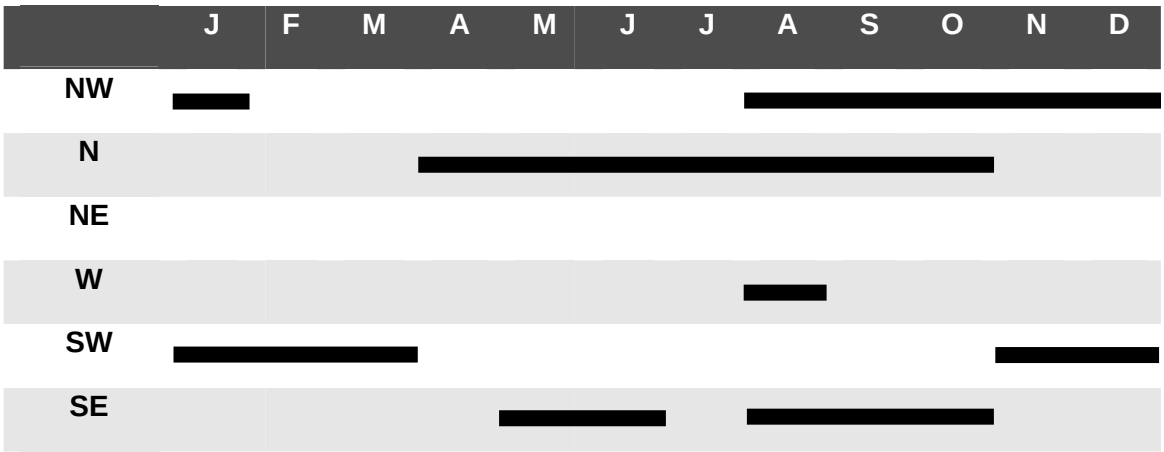
Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
2	44	1	1	1-5	2-20

Heaths, *Epacris* species



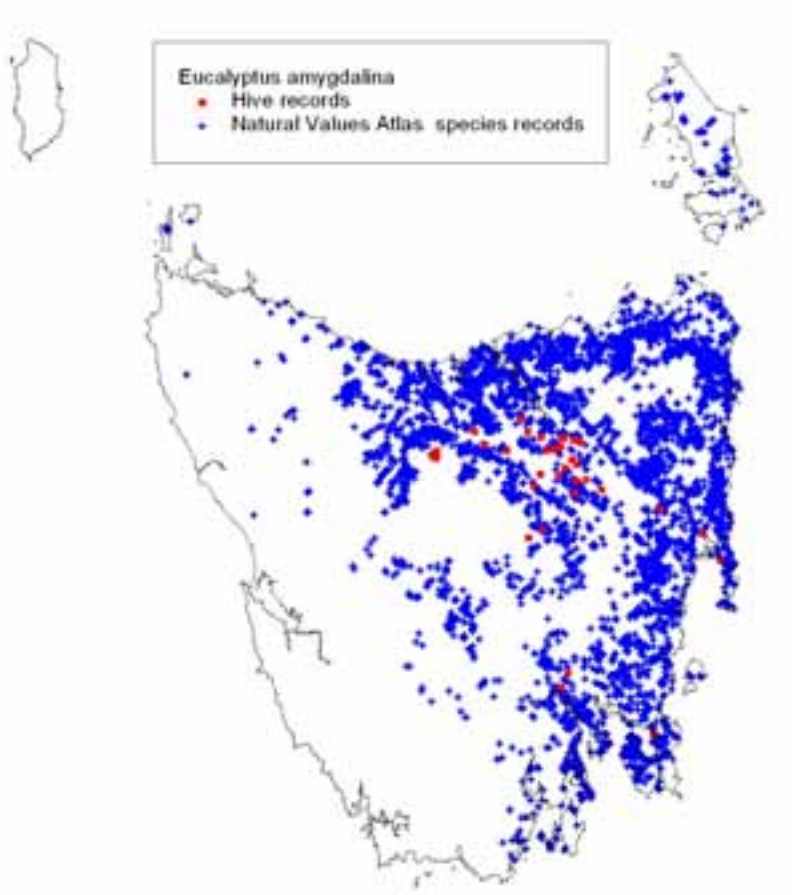
Floral Sequence



Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
105	7238	1	2-7	1-5	0-5

Black Peppermint, *Eucalyptus amygdalina*



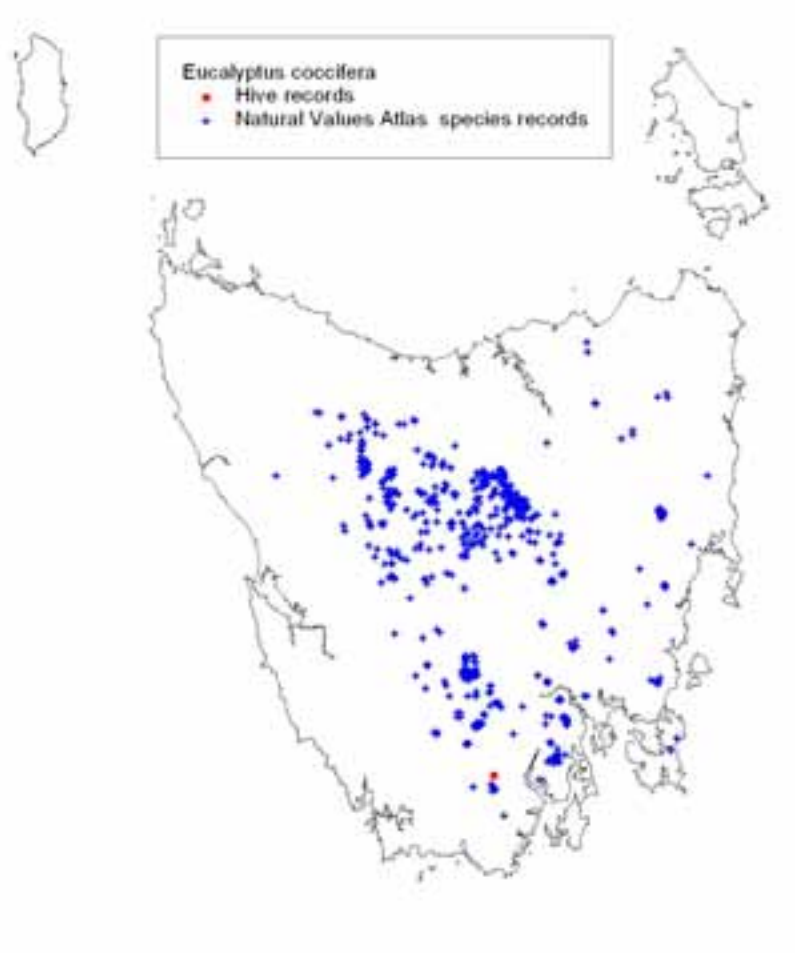
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N	▬										▬	
NE												
W												
SW												
SE	▬									▬	▬	▬

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
35	2457	8-15	1-2	1-3	0-35

Snow Gum, *Eucalyptus coccifera*



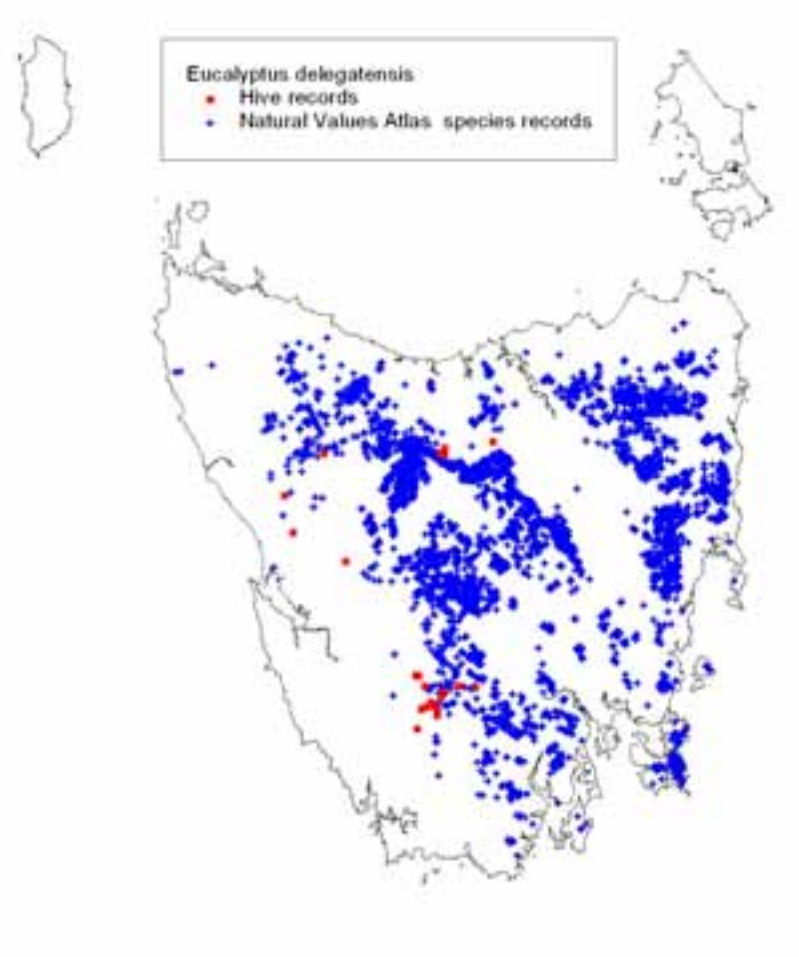
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW		■	■									
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	25	4	2	5	0

White Top/Gumtopped Stringybark, *Eucalyptus delegatensis*



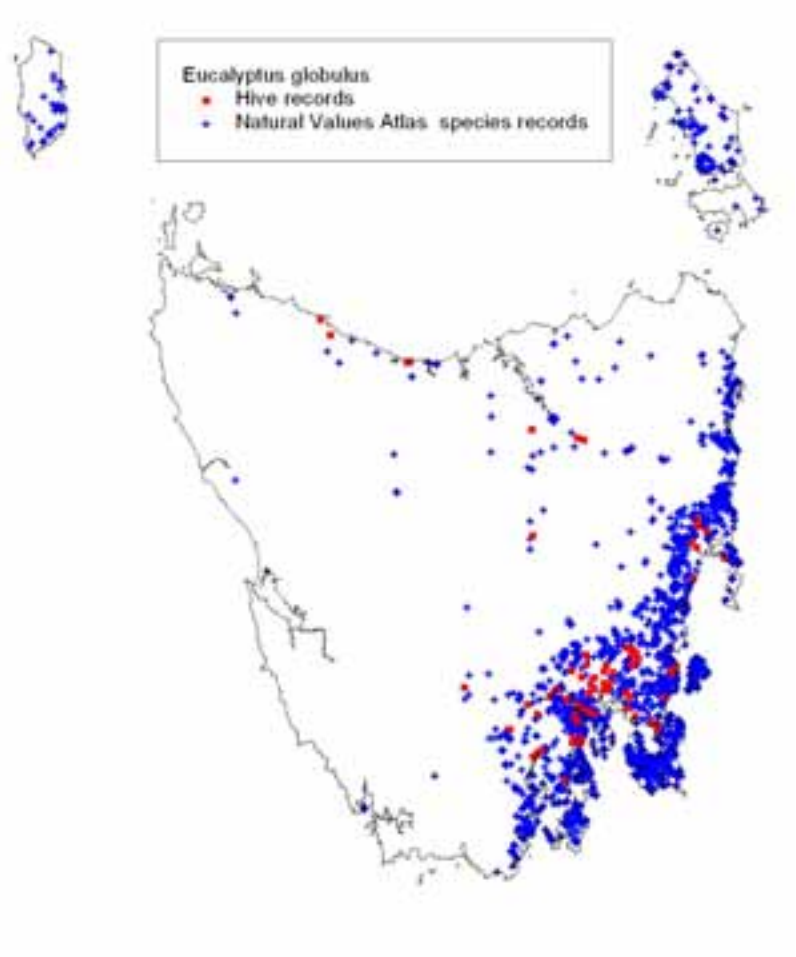
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N	▬	▬	▬	▬							▬	▬
NE												
W	▬											
SW		▬	▬	▬								
SE												

Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
45	2645	1-20	0-3	1-5	0-38

Blue Gum, *Eucalyptus globulus*



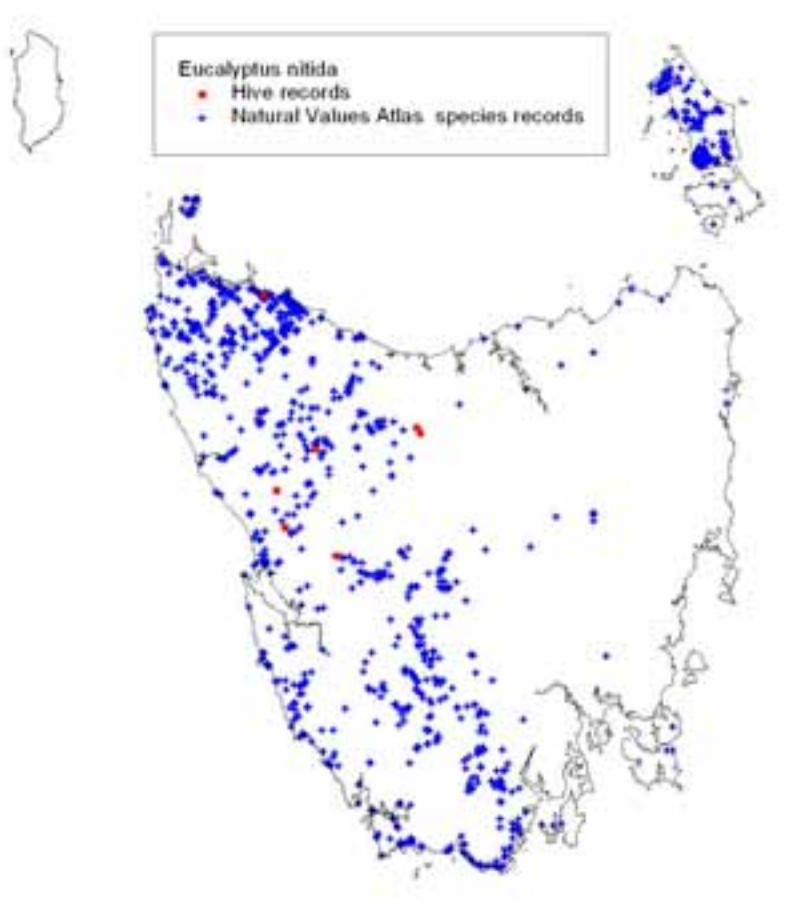
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW	■									■	■	■
N											■	
NE										■	■	
W												
SW											■	■
SE	■					■	■	■	■	■	■	■

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
74	2385	1-12	1-7	1-5	5-60

Smithton/Western Peppermint, *Eucalyptus nitida*



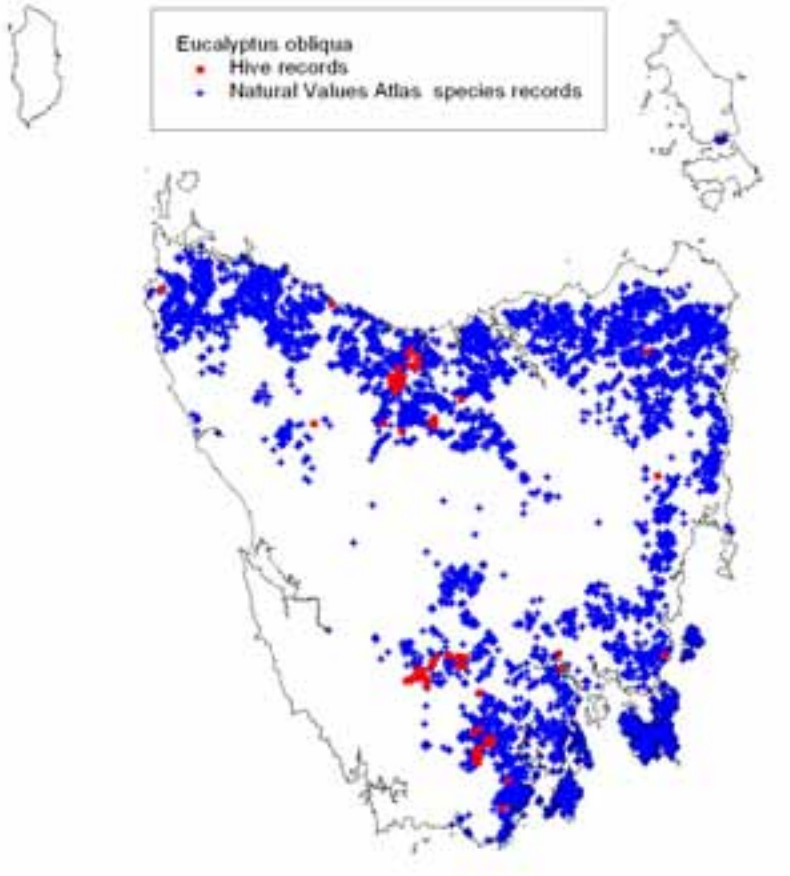
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW	■	■	■	■	■	■	■			■	■	■
N												
NE												
W											■	■
SW												
SE												

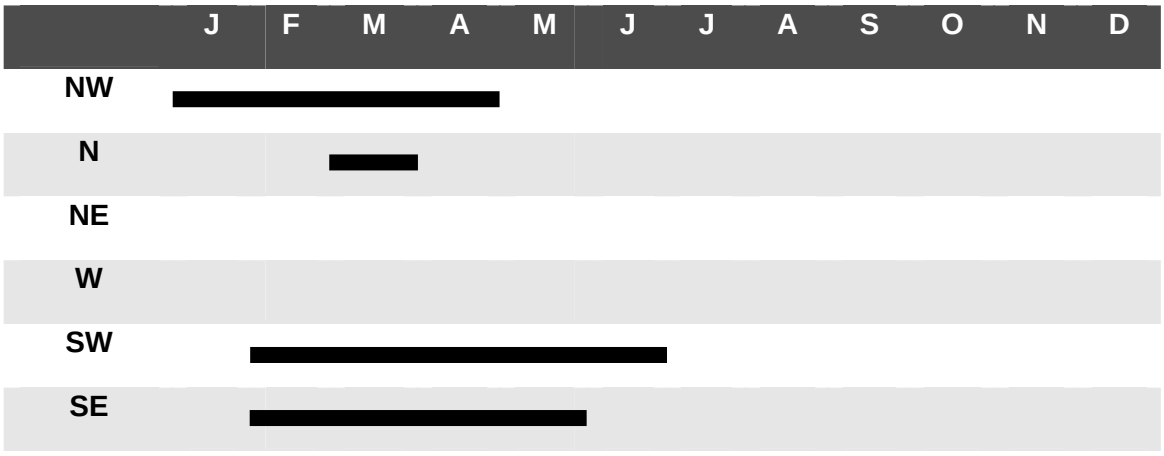
Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
22	1730	2-80	1-10	4-5	0

Brown Top Stringybark/Stringybark, *Eucalyptus obliqua*



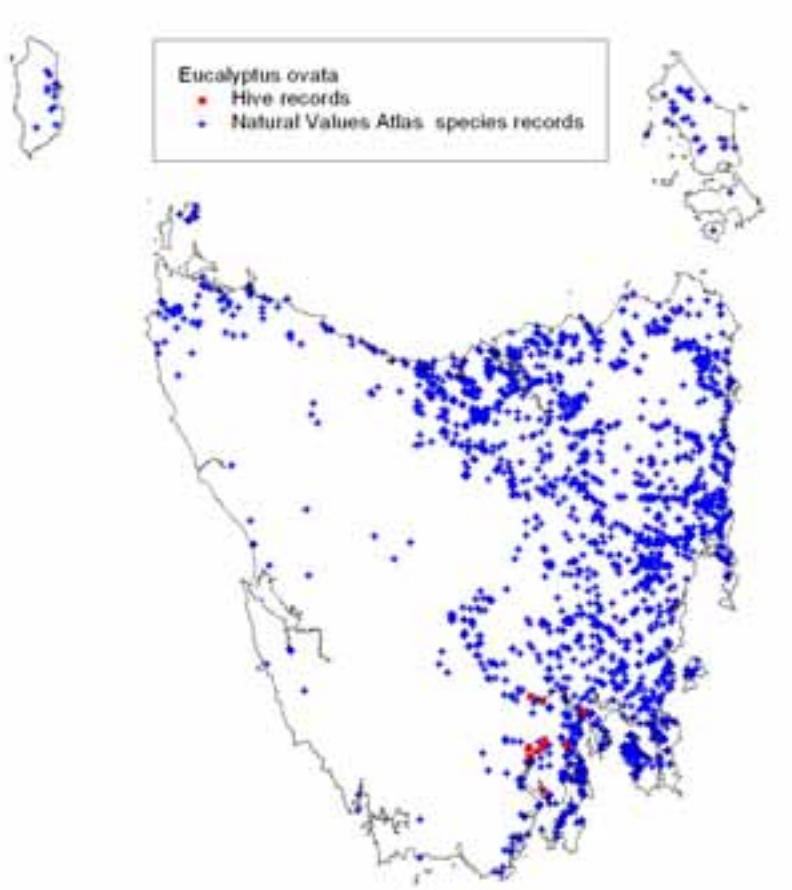
Floral Sequence



Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
82	2784	7-14	2-4	1-5	3-38

Black Gum, *Eucalyptus ovata*



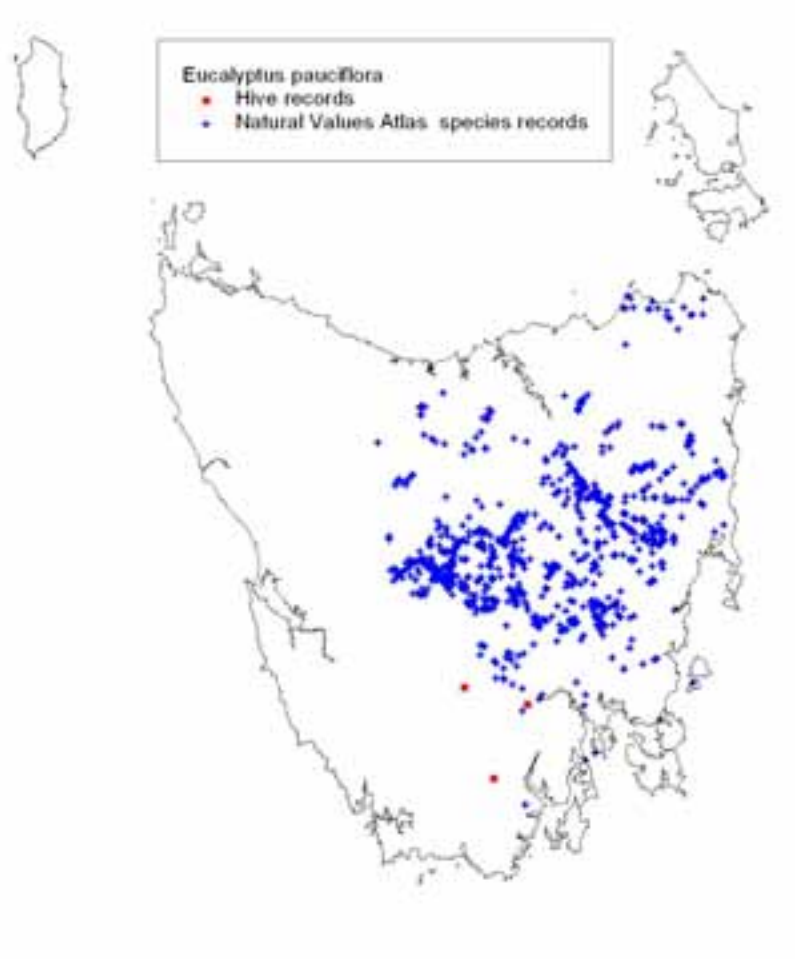
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
11	325	1-4	1-4	3-5	8-40

Cabbage Gum, *Eucalyptus pauciflora*



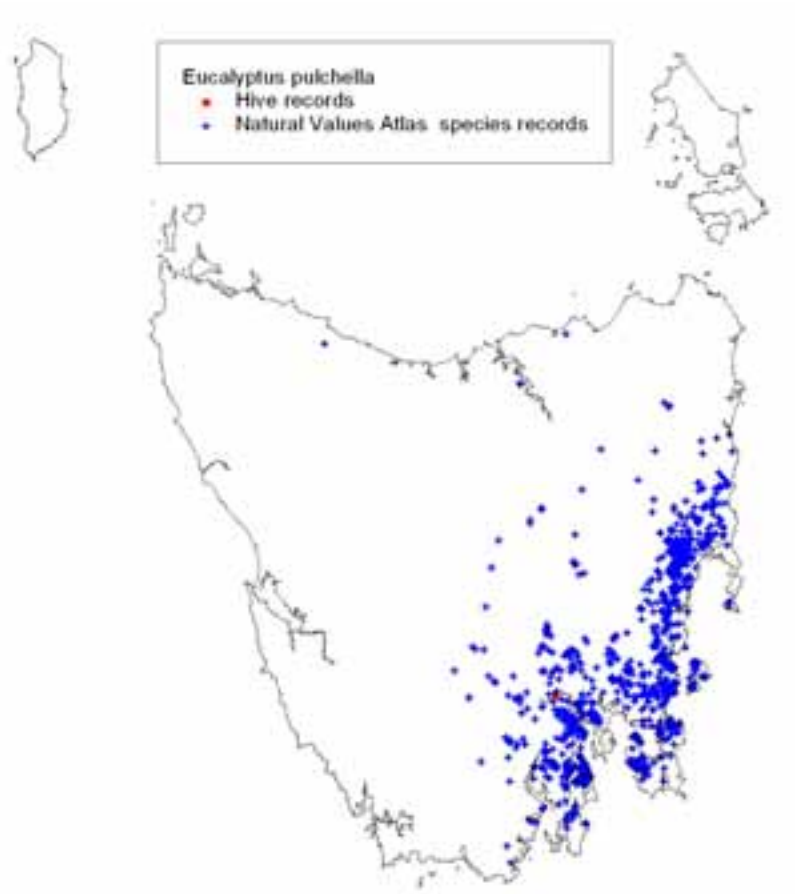
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW	■	■	■							■	■	■
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
3	65	1-4	3-4	3-5	0

Peppermint, *Eucalyptus pulchella*



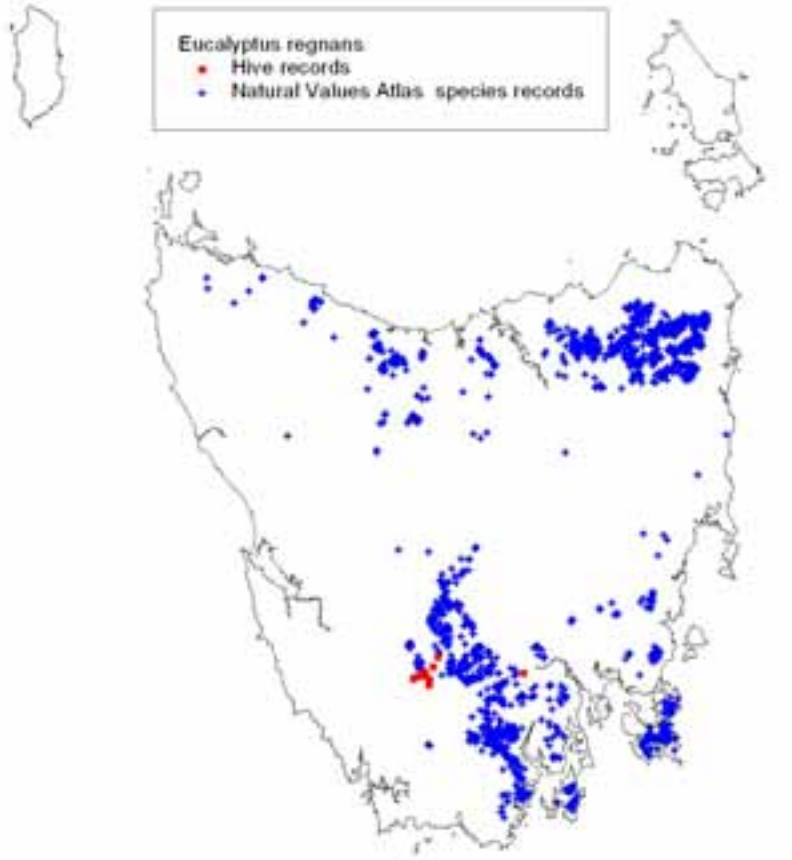
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	24	-	1	4	0

Swamp Gum/Giant Ash, *Eucalyptus regnans*



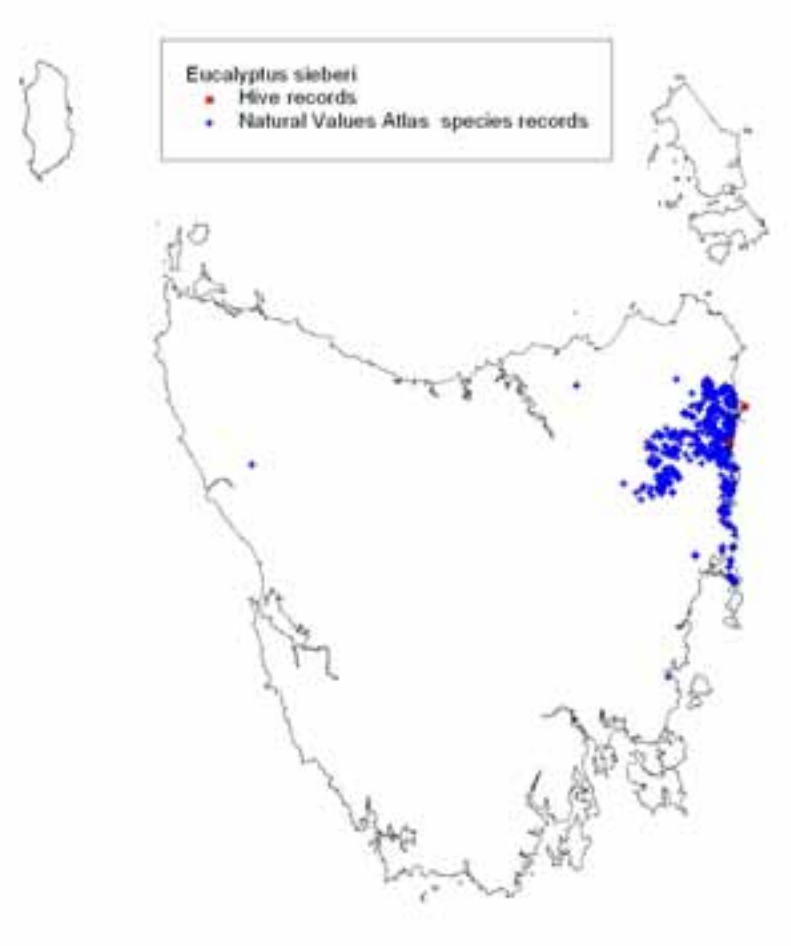
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW			■	■	■							
SE												

Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
14	735	7	1-2	3	0-38

Ironbark, *Eucalyptus sieberi*



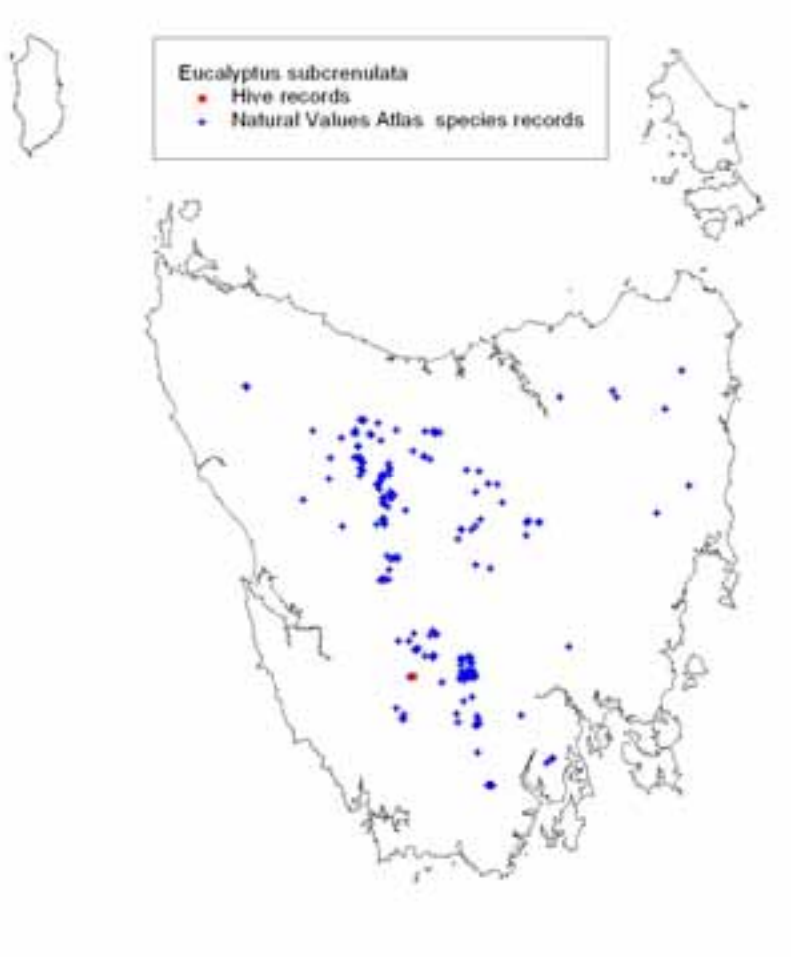
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE								■	■	■	■	
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
2	60	6	2-4	-	30

Alpine Yellow Gum, *Eucalyptus subcrenulata*



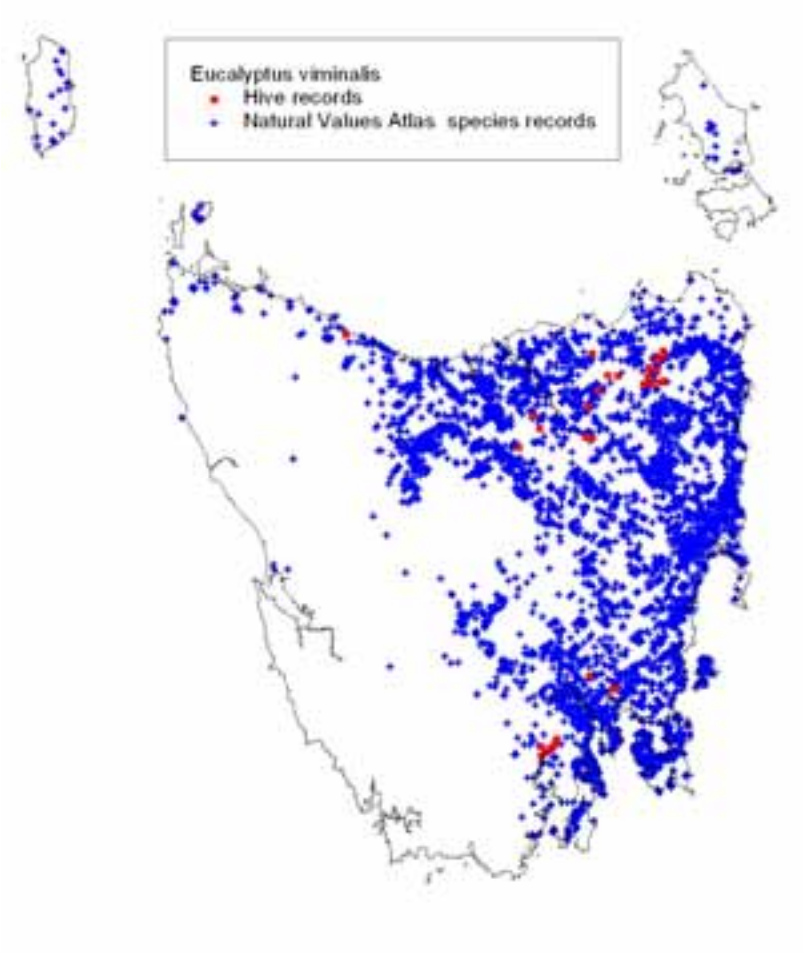
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW			▬									
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	30	4	1	5	0

White Gum, *Eucalyptus viminalis*



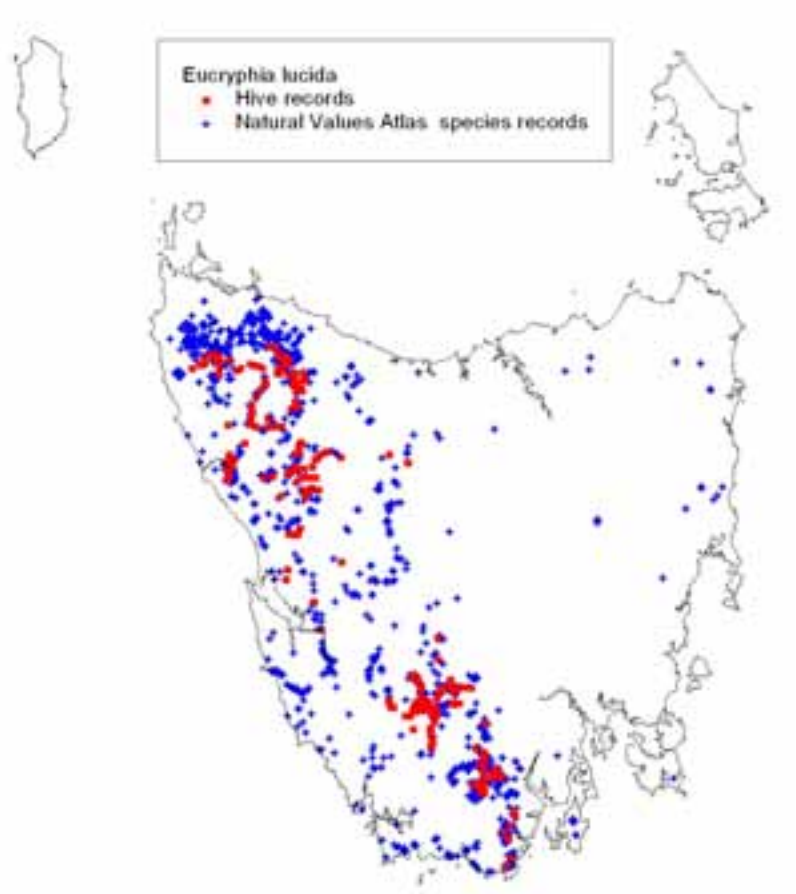
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW	■	■										
N											■	
NE	■	■	■	■								
W												
SW												
SE	■											

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
32	1627	2-10	2-4	0-5	0-30

Leatherwood, *Eucryphia lucida*



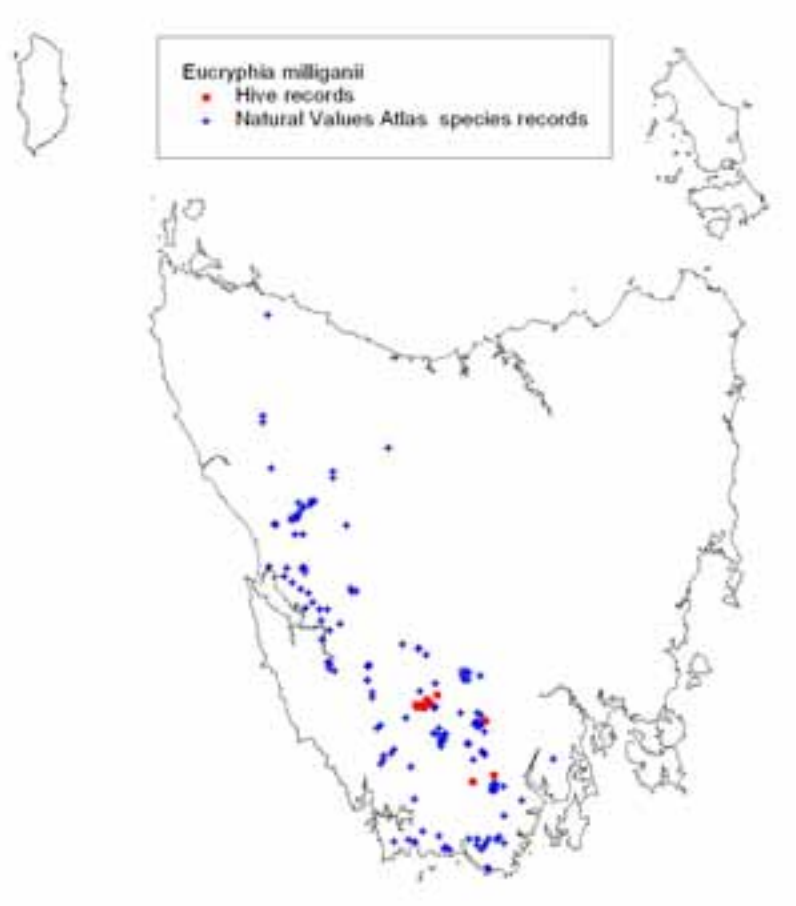
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
281	12453	1	1-5	1-5	8-115

Dwarf Leatherwood, *Eucryphia milliganii*



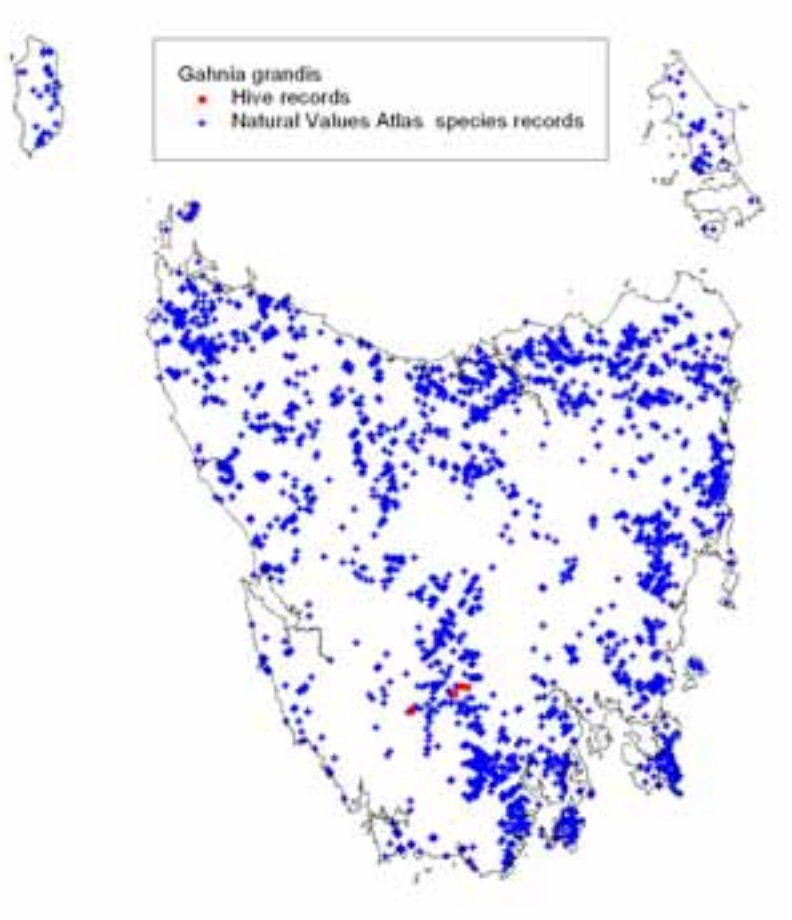
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW	■	■	■	■								
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
13	460	1	2	1-5	0-15

Cutting Grass, *Gahnia grandis*



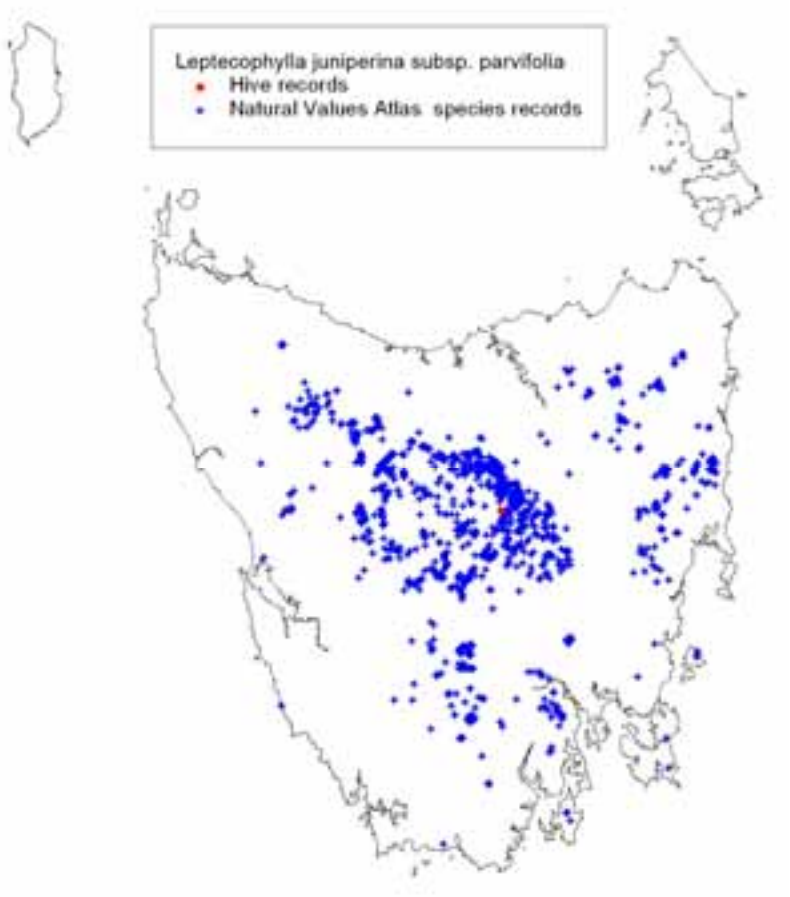
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW	■	■	■								■	■
SE												

Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
7	160	1	1-4	1-5	-

Mountain Pinkberry, *Leptecophylla juniperina subsp. parvifolia*



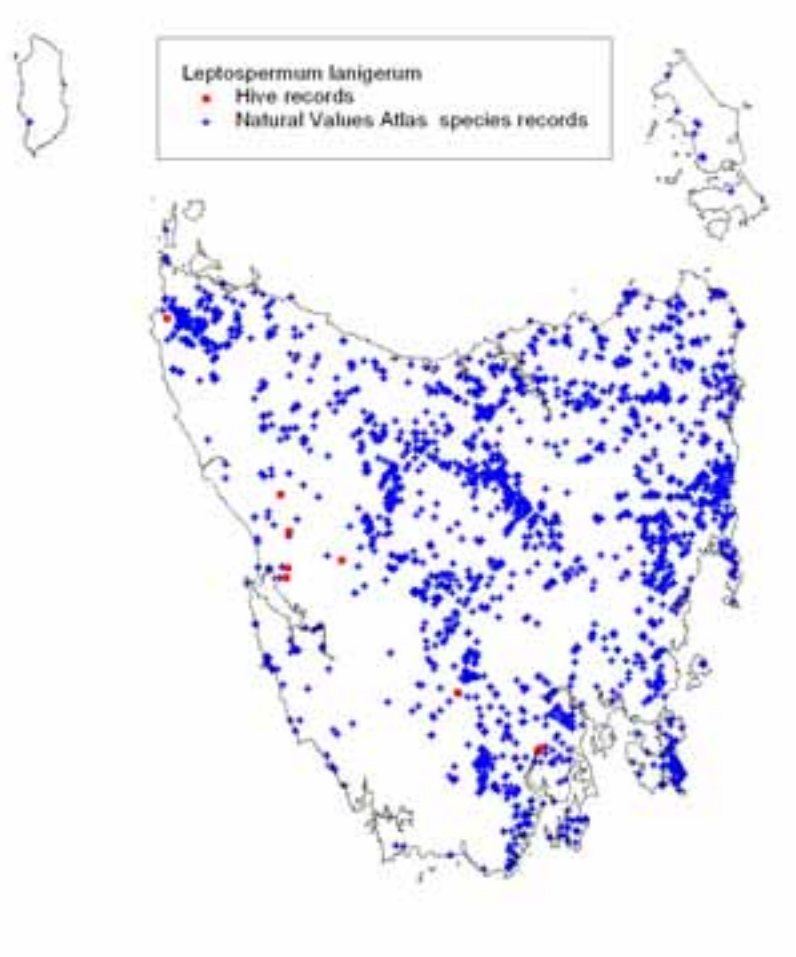
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N								■	■	■	■	
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
1	30	1	4	-	30

Woolly Tea Tree, *Leptospermum lanigerum*



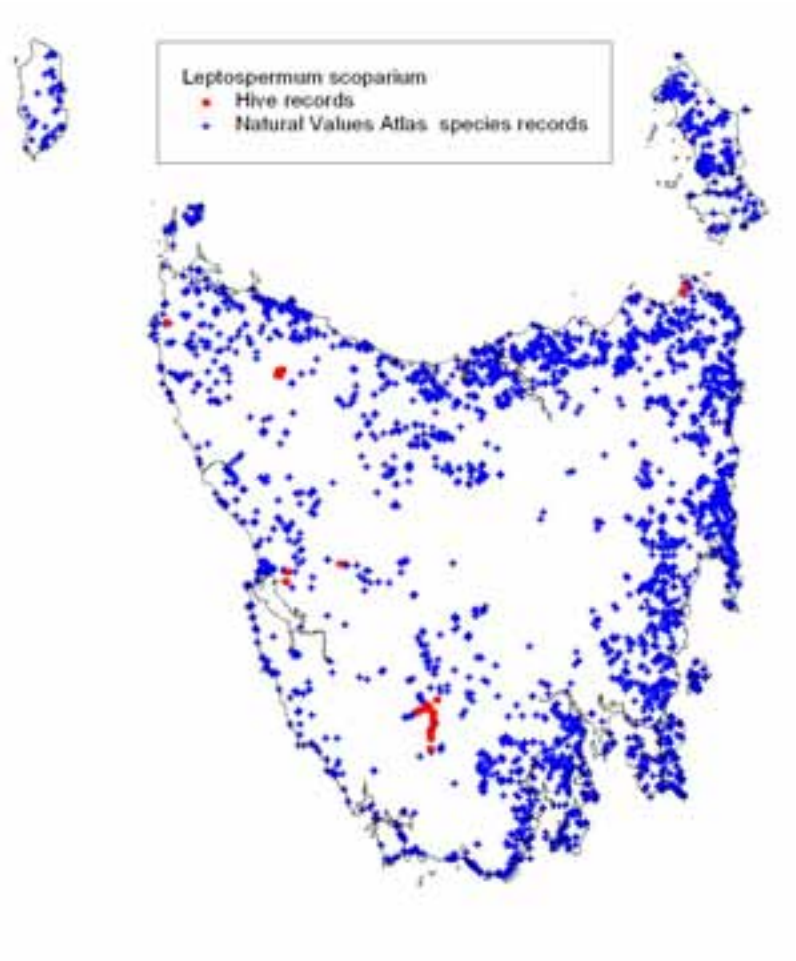
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW											▬	
N												
NE												
W	▬											▬
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
26	1791	1-2	1-2	2-4	4-5

Manuka, *Leptospermum scoparium*



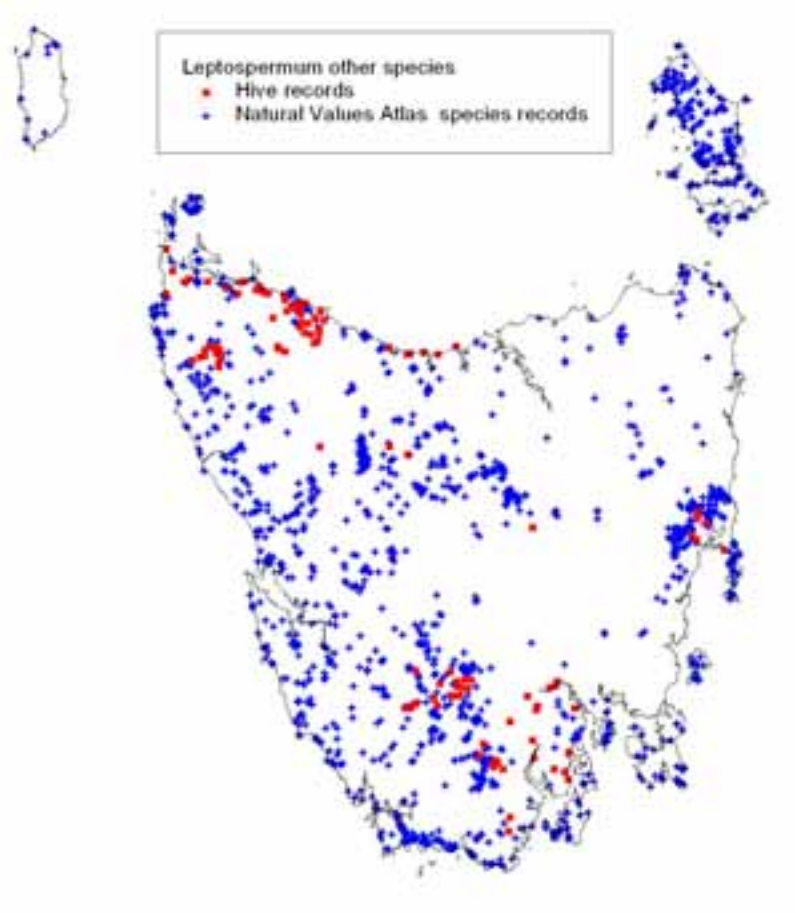
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW											▬	▬
N												
NE												
W	▬											▬
SW												▬
SE												

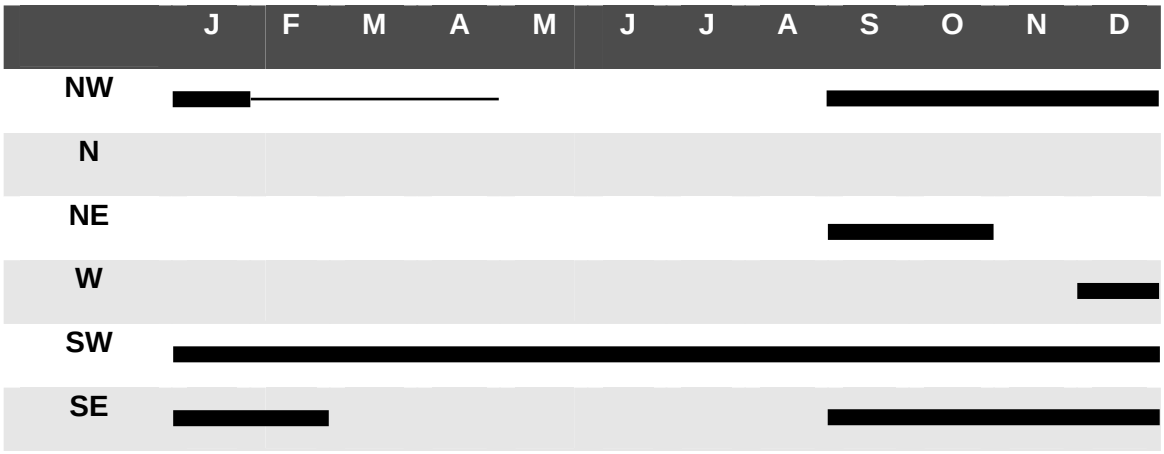
Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
44	3036	1	1-2	0-5	3-12

Tea Tree (unnamed), *Leptospermum species*



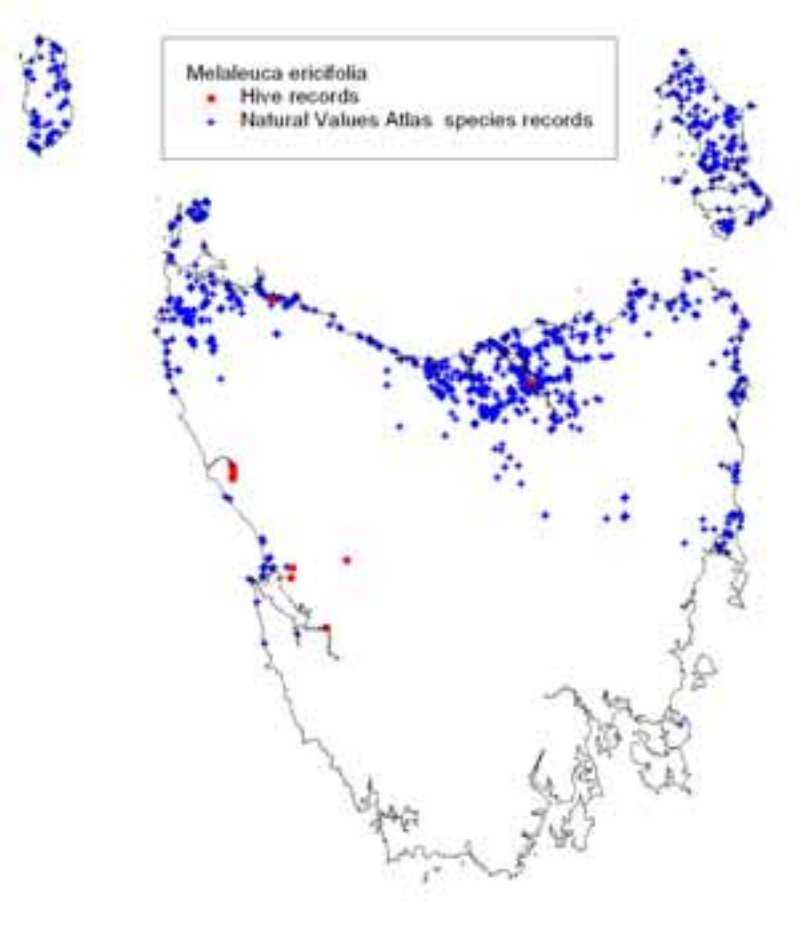
Floral Sequence



Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
113	5172	1-5	1-12	3-5	0-40

Coast Paperbark, *Melaleuca ericifolia*



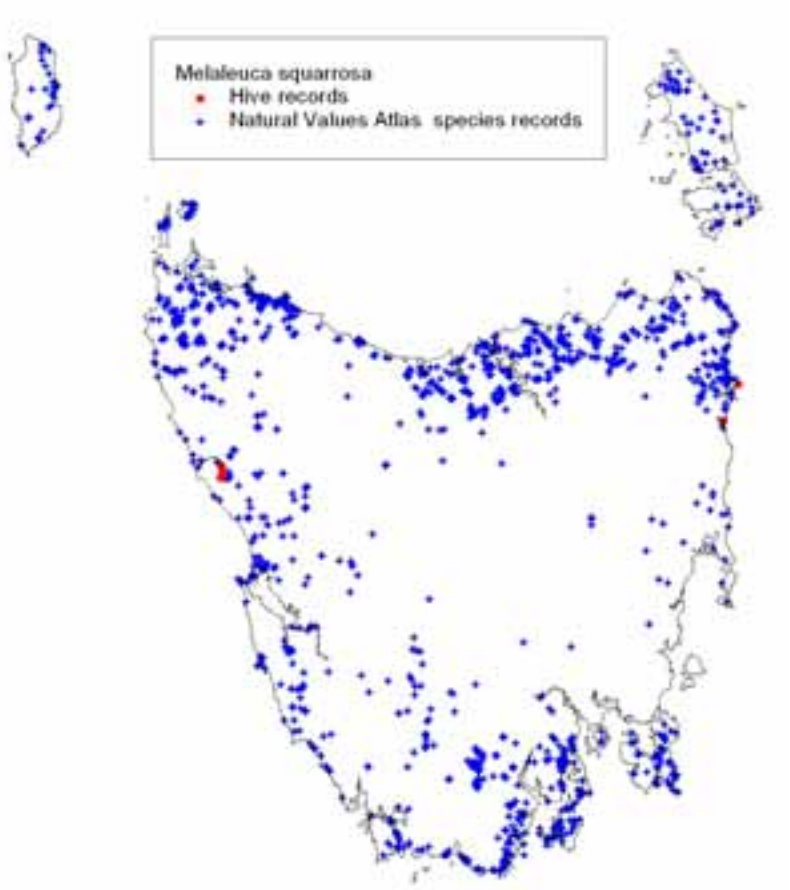
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW									■	■		
N												
NE												
W	■	■	■									■
SW												
SE												

Floral Data

Total Sites	Total Hives	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
30	2153	1	1-2	3-5	0-13

Scented Paperbark, *Melaleuca squarrosa*



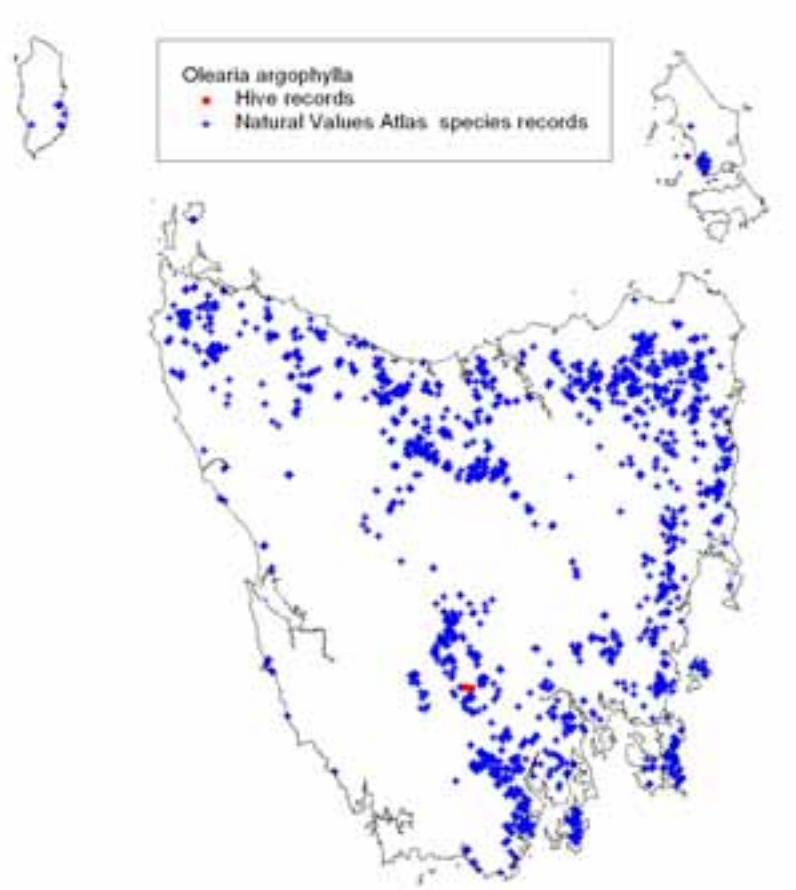
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW											■	■
N											■	
NE										■	■	
W	■											■
SW											■	■
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
21	894	1	1-2	5	5-7

Musk, *Olearia argophylla*



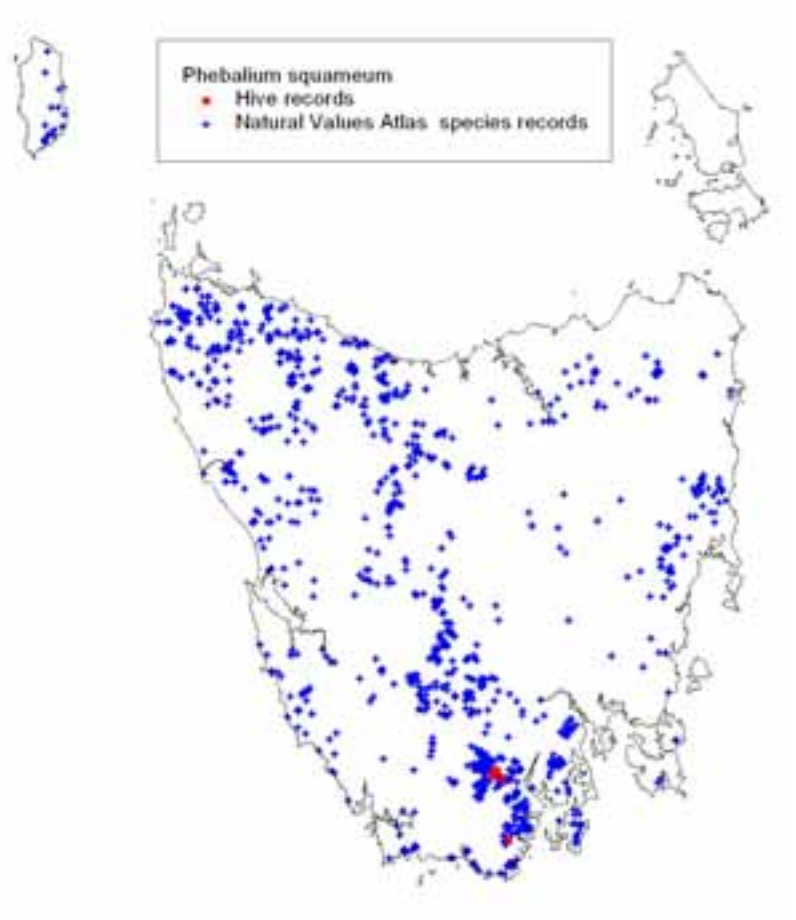
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW											■	■
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
3	75	1	2	5	0-15

Lancewood, *Phebalium squameum*



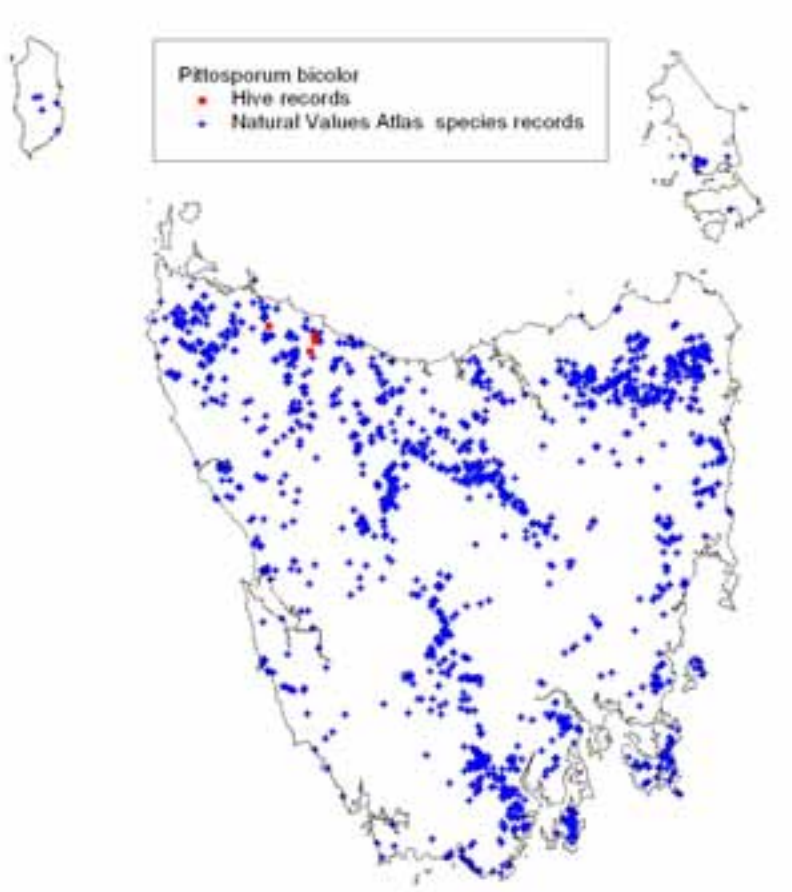
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW											■	■
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
6	80	1-4	2	4-5	5-30

Tallowwood, *Pittosporum bicolor*



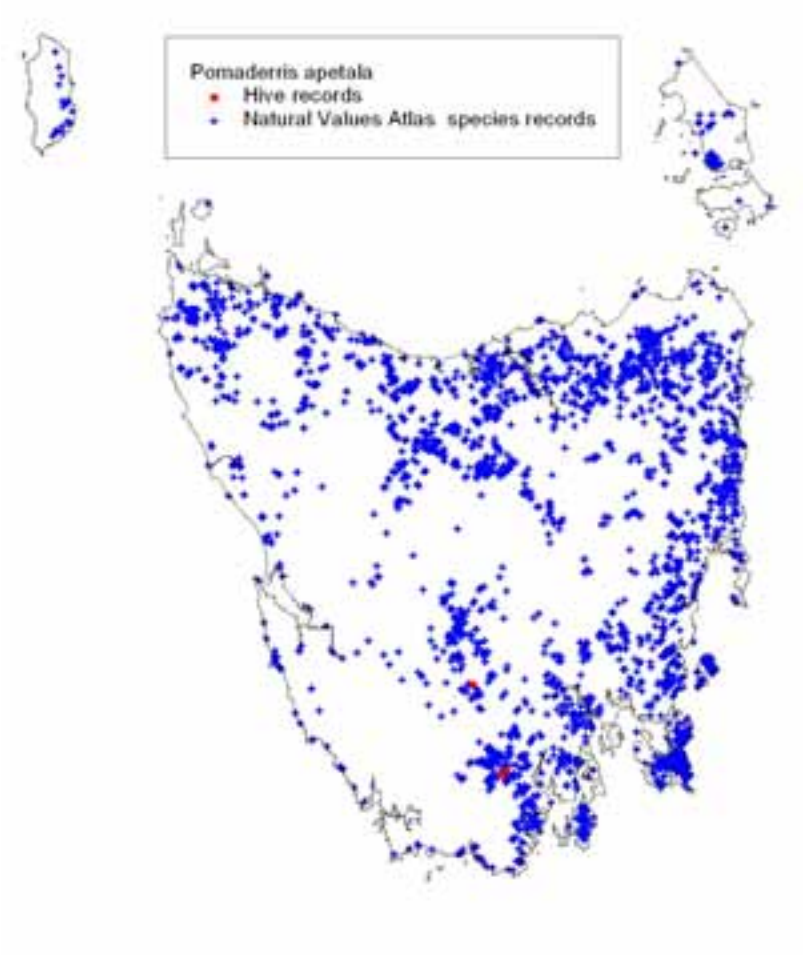
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
5	350	1	1-2	5	0

Dogwood, *Pomaderris apetala*



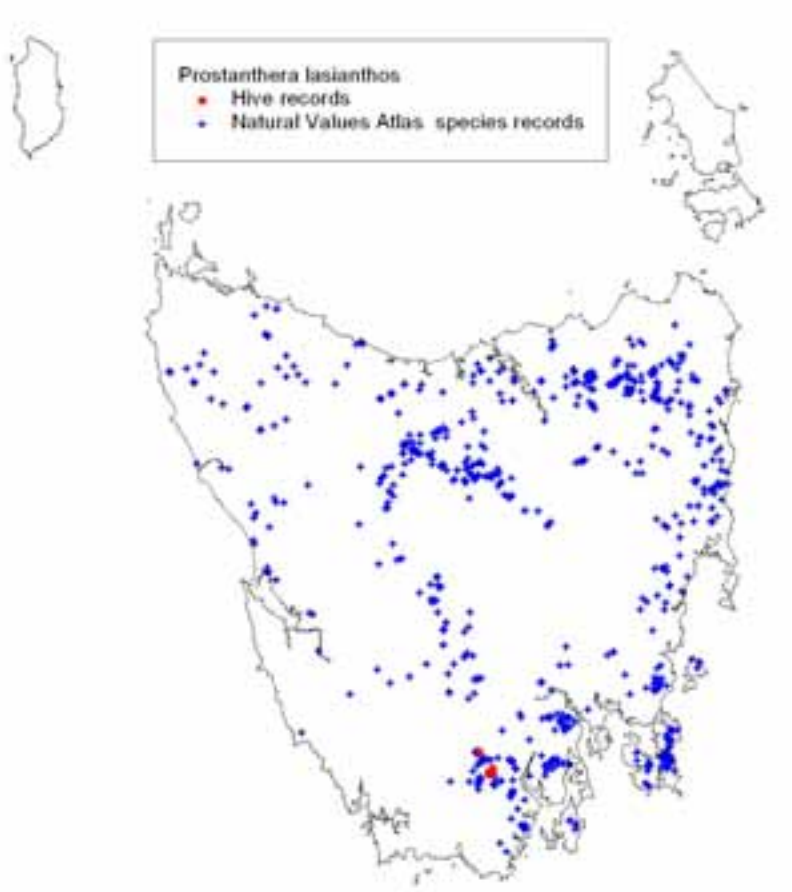
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW	▬								▬	▬	▬	▬
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
4	100	1	2-3	5	0-14

Christmas Bush, *Prostanthera lasianthos*



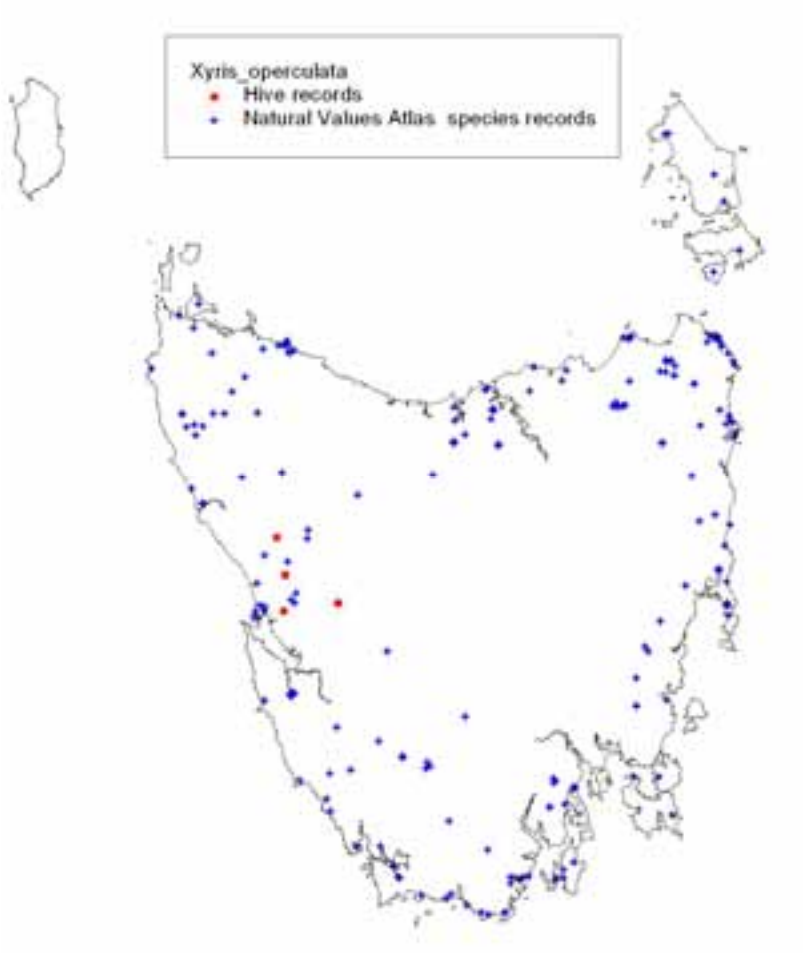
Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W												
SW											■	■
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
5	150	1	1-2	1-5	0-6

Yellow Eye, *Xyris operculata*



Floral Sequence

	J	F	M	A	M	J	J	A	S	O	N	D
NW												
N												
NE												
W	▬											▬
SW												
SE												

Floral Data

Total Sites	**Total Hives**	Year Between Flowering	Flowering Duration (months)	Pollen Value (1-5)	Honey Yield (kg/hive)
20	1590	1	1-2	1	0

Appendix 4. Tea tree Questionnaire

COMMERCIAL IN CONFIDENCE
Tea Tree Survey

Floral Resource Database for Tasmania – Improved information on Tea Tree

This project supported by RIRDC is a refining of the floral database. The FFIC/TBA Apiary Industry survey conducted in 2003/2004 was a comprehensive survey of the industry as it existed at the time. This survey is not revisiting that work but aims to provide new and improved information on Tea Tree species as an emerging component of the apiary industry in Tasmania.

It is understood that the information that individuals hold about Tea Tree species and especially Manuka that has a quantified healing factor is extremely valuable commercially. All information gained is treated in total commercial confidence. The sites that you had previously indicated a Tea Tree species as present have been included in a table along with information provided about the tea tree sp on the site. If you have any new or updated information about the tea tree on each or any site please fill in on the empty lines.

However, for any new TEA TREE site IT IS IMPORTANT TO FILL OUT A SITE FORM FOR EACH <u>NEW</u> SITE.

The information provided should include all knowledge of Tea Tree species even where it has been considered a pollution to other targeted flora, eg tea tree near Leatherwood on the west coast.

As there are a number of species commonly called tea tree, it would be of great assistance if you know the botanical/scientific name of the main species.

The table below lists those species that may be called tea tree in different parts of the state. The botanical name and other common names and distribution have been provided to assist in completing the survey as accurately as possible. **If you call anything else tea tree, please list it below.** (table condensed for publication)

Common Names	Botanical Name	Distribution
Manuka	*Leptospermum scoparium*	
Woolley Tea Tree	*Leptospermum lanigerum*	
Coastal Tea Tree	*Leptospermum laevigatum*	
Shiny Tea Tree	*Leptospermum nitidum*	
	Leptospermum galucescens	
Yellow scented paper bark, paperbark, swamp tea tree	*Melaleuca ericifolia*	
Scented Paperbark	*Melaleuca squarrosa*	
Swamp Melaleuca	*Melaleuca squamea*	

COMMERCIAL IN CONFIDENCE
New Site Survey Form

Floral Resource Database for Tasmania – Tea Tree Site Survey Form

Instructions: Fill out* one site survey form for each site *where you keep bees and know bees access tea tree sp. For each question, please circle the appropriate answer and then complete the attached species table.

Species name of the plant producing the main nectar flow at this site (common or scientific)

_____

1. Map Reference No. (see map index):_____

   or Tasmap 1:25,000 Mapsheet Name _____

2. Distance and direction from nearest township (eg. 45Km SE of Mawbanna):

   _____

OR Coordinates: _____(E) _____(N)

3. Approximate number of hives usually occupying this site; hives _____nucs _____

4. If not on private land does this site have an official number/name? **YES NO** If **YES** then:

   Site name/number is _____

   Authority that manages site: **DPIW FORESTRY AURORA/HEC**

5. If on private land do bees from this site utilize flora from any of the following areas nearby:

   RESERVED LAND STATE FOREST OTHER CROWN LAND

6. What months is the site used: **J F M A M J J A S O N D**

7. Average yearly duration of hives on this site: (in months)_____

8. Is this site used: **ANNUALLY** or every: **2ND 3RD 4TH** year,
   other:_____

9. In what year was the site first used: _____ OR how many years have you used this site:

____

(a) How long have you been aware of a tea tree yield from this site _____

(b) Do you use this site specifically for tea tree honey **Yes No.**

10. Over the time that you have used this site, what has been your:

(a) minimum honey production? _____ kg/hive

(b) maximum honey production? _____ kg /hive

(c) average honey production? _____ kg /hive

11. Have you had the "healing activity," tested **Yes No.** What factor min____ max____

Any other comments about the tea tree honey from this site

_____

_____

_____

_____

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Floral Resource Database for Tasmania – Tea Tree Site Survey Form (continued)

Instructions: Please fill out the table for each species you have detected at this site with specific reference to tea tree species.

Please use a **New Form for each Site** (a sample of the survey table)

Species (common or scientific name)	***Pollen*** Level of Importance 1 to 5 (Low 1, High 5)	***Honey*** Expected yield (kg)	Time of year flowering occurs (Months)	How many years between flows?

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Floral Resource Database for Tasmania - Tea Tree Site Survey Form (continued)

12. How important is this site to your operation? ESSENTIAL NON-ESSENTIAL
    Why? Circle one or more of the following:

    BUILD UP HONEY PRODUCTION POLLEN QUEEN REARING

    WINTER STORES OTHER:_____

    Any other comments about this site specifically or tea tree generally.

    SPECIFIC GENERAL

To complete the survey for this site, please turn over and use the table provided to list the names and details of the nectar and pollen producing species accessed by hives on this site.

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Australian Parliament. (2008) More Than Honey: the future of the Australian honeybee and pollination industries. House of Representatives Standing Committee on Primary Industries and Resources.

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Tasmanian Floral Resources for Honeybees

— *Focus on tea tree* —

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By Mark Leech

The development of a floral database for Tasmania is an important contribution to the sustainable development of the honeybee industry in Tasmania.

This report provides an overview of the Tasmanian apiary industry, with particular consideration of the potential development of a tea tree honey component. It is accompanied by a field guide to the native flora of Tasmania accessed by honeybees, *Apis mellifera*. The report and field guide will provide useful information to beekeepers and their peak bodies, governments, consultants and researchers.

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Cover photo: Leatherwood (*Eucryphia lucida*) left and Manuka tea tree (*Leptospermum scoparium*) right

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